

Issue for Bid
June 24, 2022

SPECIFICATIONS

FOR

CAMP KAUFMANN

GIRL SCOUTS of GREATER NEW YORK

81 CAMP ROAD
HOLMES, NY 12531

ARCHITECT

Peter Gisolfi Associates
Architects, Landscape Architects, LLP
566 Warburton Avenue
Hastings-on-Hudson NY 10706
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F: (914) 948-9493

TABLE OF CONTENTS

<u>SECTION NO.</u>	<u>TITLE</u>
<u>DIVISION 0</u>	
00 00 00	Table of Contents
00 01 01	Bid Proposal
00 01 02	Tax Exempt Certificate
00 01 03	Insurance and Bond Requirements
00 01 04	AIA Document A101-2017 Sample
00 01 05	AIA Document A201-2017 General Conditions
<u>DIVISION 01 – General Requirements</u>	
01 10 00	Summary
01 26 00	Special Conditions
01 31 00	Project Management and Coordination
01 33 00	Submittals
01 40 00	Quality Requirements
01 42 00	References
01 45 33	Structural Tests and Special Inspections
01 50 00	Temporary Facilities and Controls
01 60 00	Product and Substitution Requirements
01 70 00	Execution Requirements
01 73 10	Cutting and Patching
01 77 00	Closeout Procedures
01 81 19	Construction Indoor Air Quality Management
<u>DIVISION 02 – Existing Conditions</u>	
02 33 13	Underground Utility Locator Service
02 41 19	Selective Structure Demolition
<u>DIVISION 03 - Concrete</u>	
03 30 50	Site Concrete
See Structural Drawings for Building Concrete Requirements	
<u>DIVISION 04 - Masonry</u>	
04 20 00	Unit Masonry
04 72 00	Cast Stone
04 73 00	Manufactured Masonry Veneer
<u>DIVISION 05 - Metal</u>	
05 50 00	Metal Fabrications
05 51 00	Metal Stairs
See Structural Drawings for Other Metal Specification Requirements	
<u>DIVISION 06 – Wood, Plastics and Composites</u>	
06 10 00	Rough Carpentry

06 20 23	Interior Finish Carpentry
06 41 13	Interior Architectural Woodwork

DIVISION 07 – Thermal and Moisture Protection

07 11 13	Bituminous Dampproofing
07 21 00	Thermal Insulation
07 21 19	Foamed in Place Insulation
07 27 26	Fluid Applied Membrane Air Barrier
07 31 13	Asphalt Shingles
07 54 19	PVC Roofing
07 62 00	SM Flashings & Specialties
07 72 00	Roof Accessories
07 84 13	Through Penetration Firestop Systems
07 92 00	Joint Sealants

DIVISION 08 – Openings

08 12 13	Steel Doors and Frames
08 12 55	Interior Aluminum Frames
08 31 13	Access Doors and Frames
08 41 13	Aluminum Entrances and Storefront
08 51 13	Aluminum Windows
08 71 00	Door Hardware
08 80 00	Glazing
08 83 00	Mirrored Glass
08 91 19	Fixed Louvers

DIVISION 09 - Finishes

09 21 16	Gypsum Board Shaft Wall Assemblies
09 22 16	Non-Structural Metal Framing
09 24 23	Portland Cement Stucco
09 29 00	Gypsum Board
09 30 00	Ceramic Tile
09 51 13	Acoustical Panel Ceiling
09 65 19	Resilient Flooring
09 91 23	Painting

DIVISION 10 - Specialties

10 11 00	Visual Display Surfaces
10 21 13	Solid Plastic Toilet Compartments
10 28 00	Toilet Accessories
10 44 16	Fire Extinguishers & Fire Blanket

DIVISION 11 - Equipment

11 40 00	Food Service Equipment
11 40 10	Kitchen Equipment Suggested Bidders List

DIVISION 12 – Furnishings

12 36 61	Simulated Stone Countertops
----------	-----------------------------

DIVISION 21 – Fire Protection

21 00 00	Fire Protection
----------	-----------------

DIVISION 22 - Plumbing

22 00 00 Plumbing

DIVISION 23 – Heating, Ventilation and Air Conditioning

23 00 00 Heating, Ventilation and Air Conditioning

23 50 00 Supplementary Conditions

DIVISION 26 - Electrical

26 00 00 Electrical

DIVISION 31 - Earthwork

31 00 00 Site Work

31 10 00 Site Demolition Clearing & Preparation

31 20 00 Earthwork

31 23 16 Rock Removal

31 23 33 Trenching and Backfilling

31 25 00 Erosion & Sedimentation Controls

31 50 00 Excavation Support & Protection

DIVISION 32 – Exterior Improvements

32 12 16 Asphalt

32 13 73 Site Work Joint Sealants

32 14 00 Unit Pavers

32 16 40 Granite (Belgium) Block Curb

32 31 13 Chain Link Fence

32 31 19 Site Handrails and Railings

32 93 00 Planting Seeding and Topsoil

DIVISION 33 – Utilities

33 15 53 Septic System

33 30 00 Sanitary Sewerage Utilities

33 41 00 Storm Utility Drain Piping

DIVISION 34 - Transportation

34 41 13 Traffic Signs

APPENDIX 1 Geotechnical Report

Document prepared by Carlin Simpson & Associates

Geotechnical Report

APPENDIX 2 Kitchen Equipment Cut Sheets

Document prepared by Clevenger Frable LaVallee

Cut sheets for reference only – See Technical Specifications

LIST OF DRAWINGS:

T-001 Title Page

CIVIL

C-100 Existing Conditions Plan
C-200 Overall Plan
C-300 Grading & Utilities Plan
C-301 Grading & Utilities Plan
C-302 Grading & Utilities Plan
C-303 Grading, Utilities, and Erosion & Sediment Control Plan
C-400 SSTS Absorption Trench & Distribution Plan
C-500 Erosion & Sediment Control Plan
C-501 Erosion & Sediment Control Plan
C-502 Erosion & Sediment Control Plan
C-600 Sewer Profiles
C-601 Sewer Profiles
C-602 Sewer Forcemain Profiles
C-700 SSTS Trench Distribution Schematics
C-800 SSTS Absorption Trench Profiles
C-900 Details
C-901 Details
C-902 Details
C-903 Details
C-904 Details

Water & Septic

CWS-100 Existing Conditions Plan
CWS-200 Overall Plan
CWS-300 Grading and Utilities Plan
CWS-301 Grading and Utilities Plan
CWS-302 Grading and Utilities Plan
CWS-303 Grading and Utilities Plan
CWS-400 SSTS Absorption Trench & Distribution Plan
CWS-500 Sewer Profiles
CWS-501 Sewer Profiles
CWS-502 Sewer Forcemain Profiles
CWS-600 SSTS Trench Distribution Schematics
CWS-700 SSTS Absorption Trench Profiles
CWS-800 Details
CWS-801 Details

LANDSCAPE

L-100	Removals Plan
L-200	Materials Plan
L-300	Grading Plan
L-400	Planting Plan
L-500	Site Details
L-501	Site Details

ARCHITECTURAL

G-101	Code Analysis Plan
G-102	ICC/ANSI Requirements
G-103	ICC/ANSI Requirements
G-104	Signage Details
A-100	Foundation Plan
A-101	First Floor Construction Plan
A-102	Mezzanine Floor Construction Plan
A-103	Clerestory Plan
A-104	Roof Construction Plan
A-151	First Floor Reflected Ceiling Plan
A-152	Mezzanine Floor Reflected Ceiling Plan
A-200	Building Elevations
A-201	Building Elevations
A-300	Building Sections
A-301	Building Sections
A-302	Building Sections
A-350	Wall Sections
A-351	Wall Sections
A-352	Wall Sections
A-353	Wall Sections
A-354	Wall Sections
A-355	Wall Sections
A-360	Enlarged Details
A-370	Rooftop Equipment Screen Details
A-371	Fireplace Details
A-372	Faux Chimney Details
A-420	Typical Bathrooms And Interior Elevations
A-421	Typical Bathroom Details
A-701	First Floor Finish Plan
A-702	Mezzanine Floor Finish Plan
A-800	Partition Types
A-860	Roofing Details
A-861	Roofing Details

A-862	Roofing Details
A-863	Roofing Details
A-864	Roof Details
A-865	Roof Details
A-900	Aluminum Storefront System And Door Schedule
A-901	Aluminum Storefront Window And Louver Schedule
A-950	Finish Schedule

Food Service

KA-1	Kitchen Equipment Plan with Schedule
KA-2	Plumbing Plan
KA-3	Electrical Plan
KA-4	Special Conditions Plan
KA-5	Food Service Details
KA-6	Exhaust Hood Details

Structural

S-001	Title Sheet
S-002	General Notes (1)
S-003	General Notes (2)
S-100	Foundation and First Floor Framing Plan
S-101	Mezzanine and Low Roof Framing Plan
S-102	Roof Framing Plan
S-200	Concrete Details
S-201	Elevation (1)
S-202	Elevation (2)
S-203	Elevation (3)
S-204	Elevation (4)
S-300	Sections and Details (1)
S-301	Sections and Details (2)

Site Utility

SU-1	Site Utility Plan
SU-2	Site Utility Details

Plumbing:

P-1	Plumbing – First Floor Plan & Enlarged Plan
P-2	Plumbing – Kitchen Plan
P-3	Plumbing – Plumbing Equipment Schedule and Notes
P-4	Plumbing – Riser Diagrams

Fire Protection:

FP-1	Fire Protection – First Floor Plan
------	------------------------------------

FP-2	Fire Protection – Mezzanine Floor Plan
FP-3	Fire Protection – Fire Pump Schematic and Details

HVAC:

H-1	HVAC First Floor Plan
H-2	HVAC Mezzanine Floor Plan and Details
H-3	HVAC Kitchen Floor Plan and Details
H-4	HVAC Schedules and Details

Electric:

E-1	Electrical First Floor Plan Lighting, Lighting Control Chart
E-2	Electrical Mezzanine Floor Plan Lighting, Fire Alarm Riser, Notes
E-3	Electrical First Floor Plan Power
E-4	Electrical Mezzanine Floor Plan Power
E-5	Electrical Power Riser, Light Fixture Schedule
E-6	Electrical Legend, Abbreviations, Notes, Schedules
E-7	Electrical Food Service Plan
E-8	Electrical Food Service Schedule

END OF TABLE OF CONTENTS

BID PROPOSAL
CAMP KAUFMANN
THE GIRL SCOUTS OF GREATER NEW YORK
HOLMES, NY 12531

SUBMITTED BY: Name: _____
Address: _____

Phone: _____ Fax: _____
Email: _____

1. Pursuant to and in accordance with the invitation for proposals for Camp Kaufmann, 81 Camp Road, Holmes, NY, and having familiarized myself with the conditions of the building site, the drawings and specifications (including Instructions to Bidders, Form of Contract, the General Conditions with modifications thereto, and the technical specifications) and addenda, if any, as prepared by Peter Gisolfi Associates, Architects and Landscape Architects, LLP, dated June 24, 2022 - Issue for Bid, hereby propose to furnish all labor, material, equipment, and services required to construct and complete the work as follows:

1. BASE BID

Submit the price for all Labor and Materials necessary for the Base Bid work as shown on the drawings and described in the specifications. The Base Bid shall include the value of the quantity allowance for mass rock removal.

The sum of _____

Dollars (\$_____).

For evaluation of the Bid Proposals, the Bidder shall provide a detailed Schedule of Values Breakdown with this Bid Proposal.

2a. **ADD ALTERNATE No. 1- Performance and Labor & Material Payment Bonds**

Submit the amount to be ADDED to the Base Bid to provide a Performance Bond and a Labor & Material Bond covering the work of this project.

ADD

The sum of _____

Dollars (\$_____).

3. **QUANTITY ALLOWANCES**

The Base Bid shall include the value of the quantity allowance for the work described in each of the following Allowances. These amounts should include all Contractor marks ups. The total value should be noted here and also in the Base Bid Schedule of Values. In addition, provide the requested unit price for the work. This unit price will be used to calculate the contract adjustment for any additional (ADD) or less (DEDUCT) quantity. All unit prices will be subject to review before being accepted for use in contract adjustments. If necessary, provide a separate written clarification of the scope and any qualifications for the unit pricing being requested.

3a. **Unit Price No. 1 – Mass Rock Removal**

The Base Bid shall include the cost to remove an allowance of 1,000 cubic yards of mass rock using a machine mounted hammer. Submit the unit prices per cubic yard to be used to calculate the contract adjustment for additional (ADD) or less (DEDUCT) quantity of mass rock removal.

The total cost for this Allowance that is included in the Base Bid is

\$_____Dollars.

The unit price per cubic yard for mass rock removal is

\$_____Dollars/CY

1. In submitting this Proposal, I have received and included in this Proposal the following Addenda:

<u>ADDENDUM NO.</u>	<u>DATED</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

2. The undersigned hereby certifies that he has full authority to make the Proposal.
3. The undersigned acknowledges that there will be no cost to the Owner pertaining to the submission of this Proposal and the Owner(s) has the right to reject any and all bids.
4. The undersigned acknowledges that he is aware that, at the Board's discretion, the Contract will be awarded as described in the Information for Bidders, or the Proposals will be rejected.

Respectfully submitted,

Dated _____

By

Name of Firm

Signature

Printed/Typed Name

Title



New York State Department of Taxation and Finance
**New York State and Local Sales and Use Tax
Exempt Organization
Exempt Purchase Certificate**

ST-119.1
(2/04)

☐ Single purchase certificate

☐ Blanket certificate

Your exempt organization number is
**not your federal employer
identification number (see instructions).**

Exempt organization number (6-digit number
issued by the New York State Tax Department)

EX - 1 | 3 | 3 | 6 | 2 | 3

Name of seller	Name of exempt organization/purchaser
Street address	Street address
City State ZIP code	City State ZIP code
	GIRL SCOUT COUNCIL OF GREATER 40 WALL ST, SUITE 708 NY, NY NEW YORK NY 10005

The exempt organization must be the direct purchaser and payer of record.

You may **not** use this form to purchase motor fuel or diesel motor fuel exempt from tax.

Representatives of governmental agencies or diplomatic missions may not use this form.

Carefully read the instructions and other information on the back of this document.

I certify that the organization named above holds a valid Form ST-119, *Exempt Organization Certificate*, and is exempt from New York State and local sales and use taxes on its purchases.

I also certify that the above statements are true and correct. I make these statements with the knowledge that knowingly making a false or fraudulent statement on this document is a misdemeanor under section 1817 of the New York State Tax Law and section 210.45 of the Penal Law, punishable by imprisonment for up to a year and a fine of up to \$10,000 for an individual or \$20,000 for a corporation. I understand that the Tax Department is authorized to investigate the validity of the exemption claimed or the accuracy of any information entered on this form.

Print or type name of officer of organization	Title
MERIDITH MASKARA	CEO
Signature of officer of organization	Date issued
	4/8/2022

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If you have access to a telecommunications device for the deaf (TDD), contact us at 1 800 634-2110. If you do not own a TDD, check with independent living centers or community action programs to find out where machines are available for public use.



Persons with disabilities: In compliance with the Americans with Disabilities Act, we will ensure that our lobbies, offices, meeting rooms, and other facilities are accessible to persons with disabilities. If you have questions about special accommodations for persons with disabilities, please call 1 800 972-1233.



If you need to write, address your letter to:
NYS TAX DEPARTMENT
BUSINESS TAX INFORMATION CENTER
W A HARRIMAN CAMPUS
ALBANY NY 12227

INSURANCE REQUIREMENTS

A. The Contractor, at its sole cost and expense, shall provide the Owner with the following insurance coverage whether the operations to be covered thereby are through the Contractor or by a Subcontractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

1. Workers' Compensation and Disability:

Coverage	Statutory
Extensions	Voluntary compensation All states coverage employers Employer's liability - unlimited

2. Commercial General and Umbrella Liability

Coverage	Occurrence using ISO occurrence Form CG 00 01 07 98 or later form
Limits per project	General Aggregate - \$2,000,000.00 on a per project basis Products - Completed/Operations - \$1,000,000.00 Personal & Advertising Injury - \$1,000,000.00 Fire Damage (any one fire) - \$50,000.00 Medical Expenses (any one person) - \$10,000.00 Umbrella - \$10,000,000.00

3. Automobile Liability
(all vehicles hired
or non-hired)

\$1,000,000.00 per accident

4. Testing Company Errors and Omission Insurance

\$1,000,000 per occurrence/\$2,000,000 aggregate for the testing and other professional acts of the Contractor performed under the Contract with the Owner.

If written on a "claims-made" basis, the retroactive date must pre-date the inception of the Contract or agreement. Coverage shall remain in effect for two years following the completion of work. The testing company shall also provide proof of Workers' Compensation and NY State Disability Benefits Insurance, Commercial General Liability and Excess Liability with limits of \$2,000,000 each occurrence and in the aggregate.

Coverages shall be maintained without interruption from the date of commencement of the work until the date of final payment and termination of any coverage required to be maintained after final payment.

B. The insurance required to be procured by the Contractor, pursuant to paragraph A above, shall be purchased from and maintained by an insurance carrier licensed to do business in the State of New York, with an A.M. Best Rating of "secured" or better. The Contractor must submit the Certificate of Insurance to the Architect for the Owner's approval prior to the commencement of any work.

C. All insurance coverage to be provided by the Contractor, pursuant to paragraph A above, shall include a cancellation notice to the Owner pursuant to the policy terms and conditions. All insurance coverage to be provided by the Contractor shall name the Owner and the Architect as additional insureds on the policy. Additionally, the insurance coverage to be provided by the Contractor, pursuant to paragraph A above, shall state that the Contractor's coverage shall be the primary coverage for the Contractor's work.

D. In the event that any of the insurance coverage to be provided by the Contractor to the Owner contains a deductible, or a self-insured retention, or the insurance provided by the Owner contains a deductible, the Contractor shall indemnify and hold the Owner and the Architect harmless from the payment of such deductible or self-insured retention, which deductible shall in all circumstances remain the sole obligation and expense of the Contractor.

E. The Contractor acknowledges that its failure to obtain or keep current the insurance coverage required by paragraph A above shall constitute a material breach of Contract and subjects the Contractor to liability for damages, including but not limited to direct, indirect, consequential, special and such other damages the Owner sustains as a result of such breach. In addition, the Contractor shall be responsible for the indemnification to the Owner and the Architect, of any and all costs associated with such lapse in coverage, including but not limited to reasonable attorney's fees.

F. The Contractor shall require all Subcontractors to carry similar insurance coverages and limits of liability, as set forth in paragraph A above, and adjusted to the nature of Subcontractors' operations and submit same to the Owner for approval prior to start of any work. In the event the Contractor fails to obtain the required certificates of insurance from the Subcontractor and a claim is made or suffered, the Contractor shall indemnify, defend, and hold harmless the Owner, the Architect, Engineers, Consultants, and Sub-consultants, and their agents or employees from any and all claims for which the required insurance would have provided coverage. This indemnity obligation is in addition to any other indemnity obligation provided in the Contract.

G. The Contractor assumes responsibility for all injury or destruction of the Contractor's materials, tools, machinery, equipment, appliances, shoring, scaffolding, false and form work, and personal property of the Contractor's employees from whatever cause arises. Any policy of insurance secured covering the Contractor or Subcontractor property leased or hired by them and any policy of insurance covering the Contractor or Subcontractors against physical loss or damage to such property shall include an endorsement waiving the right of subrogation against the Owner for any loss or damage to such property.

H. The Owner in good faith may adjust and settle a loss with the Contractor's insurance carrier.

I. The Owner and the Contractor waive all rights against each other and any of their Subcontractors, Sub-subcontractors, agents and employees for damages caused by fire or other perils to the extent of actual recovery of any insurance proceeds under any property insurance policy procured, pursuant to paragraph A above, or other property insurance applicable to the Contractor's work.

J. Before commencement of its work, the Contractor shall obtain and pay for such insurance as may be required to comply with the indemnification and hold harmless provisions outlined under the General Conditions of the Contract for Construction.

K. Review and acknowledgment of the Certificate of Insurance by the Owner or the Architect shall not relieve or decrease the liability of the Contractor hereunder.

L. If the terms of policies expire, or the lives of the insurance companies terminate, before the Contract is completed or during the period of completed operations coverage, and the Contractor fails to maintain continuance of such insurance, the Owner is entitled to provide protection for itself, to pay premiums, and to charge the cost to the Contractor.

M. Certificate of Insurance Instructions:

1. The Contractor shall provide a certificate of insurance documenting the Contractor's active insurance meeting the limits described above.
2. The insurance company shall provide an endorsement to notify the Owner 30 days prior to the effective date of cancellation or termination of the policy or certificate; or modification of the policy or certificate which may adversely affect the interest of the Additional Insureds in such insurance.
3. The certificate shall identify the name and address of the insured, the policy number and a brief description of contract services to be performed.
4. Under "Description of Operations" include the following:

“Work involves activities associated with or in support of the construction of the new dining/educational building at Camp Kaufmann in Holmes, New York. Certificate holder is additional insured, as required by written contract, with respect to liability arising out of or connected with the Work.”

In the event the Commercial General Liability policy includes a “blanket endorsement by contract,” the following language added to the certificate of insurance will satisfy Owner’s additional insured requirement:

“Girl Scouts of Greater New York, its affiliates, subsidiaries, parent company, directors, officers, agents and employees, with respect to liability arising out of or connected with Work performed by or for _____[company name] are additional insureds under a blanket endorsement.”

5. Under “Certificate Holder” include the following:

Girl Scouts of Greater New York
40 Wall Street, Suite 708
New York, NY 10005

A second certificate shall be made out as described above but with the following under “Certificate Holder:”

Peter Gisolfi Associates
566 Warburton Ave.
Hastings-on-Hudson, NY 10706

REQUIRED BONDS FOR THE PROJECT

- A. The Contractor shall furnish a Performance Bond and Labor and Material Payment Bond meeting all statutory requirements of the State of New York.
- B. All Surety companies are subject to the approval of the Owner and may be rejected by the Owner without cause.
- C. Except as otherwise required by statute, the form and substance of such bonds shall be satisfactory to the Owner in the Owner's sole judgment.
- D. Bonds shall be executed by a responsible surety licensed to do business in New York with an AM Best Rating of "A-" or better as to Policy Holder Ratings, and "VII" or better as to "Financial Size Category." Such bonds shall remain in effect for a period not less than two (2) years following final completion of the work by the Contractor.
- E. Bonds shall further be executed by a surety that is currently listed on the U.S. Treasury Department Circular 570 entitled "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies," as amended.
- F. The Performance Bond and the Labor and Material Payment Bond shall each be in an amount equal to 100% of the Contract Sum. The value of each bond shall be adjusted during the Project construction period to reflect changes in the Contract Sum.
- G. Every Bond must display the Surety's Bond Number.
- H. Each bond must be accompanied by an original Power of Attorney, giving the names of Attorneys-in-fact, and the extent of their bonding capacity.
- I. A rider including the following provisions shall be attached to each Bond:
 - 1. Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change, or other modification of the Contract Documents. Such addition, alteration, change, extension of time, or other modification of the Contract Documents, or a forbearance on the part of either the Owner or the Contractor to the other, shall not release the Surety of its obligations hereunder and notice to the Surety of such matters is hereby waived.
 - 2. Surety further agrees that in event of any default by the Owner in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor or Surety shall cause written notice of such default (specifying said default in detail) to be given to the Owner, and the Owner shall have thirty (30) days from time after receipt of such notice within which to cure such default, or such additional reasonable period of time as may be required if the nature of such default is such that it cannot be cured within thirty (30) days. Such Notice of Default shall be sent by certified or registered U.S. Mail, return receipt requested, first class postage prepaid, to Lender and the Owner.

DRAFT AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

« »
« »
« »
« »

and the Contractor:
(Name, legal status, address and other information)

« »
« »
« »
« »

for the following Project:
(Name, location and detailed description)

«Camp Kaufmann »
«81 Camp Road, Holmes, NY 12531»
« »

The Architect:
(Name, legal status, address and other information)

« »
« »
« »
« »

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101®-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

☐ The date of this Agreement.

☐ A date set forth in a notice to proceed issued by the Owner.

☐ Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

« »

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

[« »] Not later than « » (« ») calendar days from the date of commencement of the Work.

[« »] By the following date: « »

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » (\$ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

« »

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

« »

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

« »

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

<< >>

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

<< >>

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

<< >>

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

<< >>

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

<< >> % << >>

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

<< >>

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§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2017

☐ Litigation in a court of competent jurisdiction

☐ Other *(Specify)*

<< >>

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

<< >>

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:

(Name, address, email address, and other information)

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§ 8.3 The Contractor's representative:

(Name, address, email address, and other information)

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§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

<< >>

§ 8.7 Other provisions:

<< >>

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

(Insert the date of the E203-2013 incorporated into this Agreement.)

<< >>

- .5 Drawings

Number	Title	Date

- .6 Specifications

Section	Title	Date	Pages

- .7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

- .8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[« »] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

« »

[« »] The Sustainability Plan:

Title	Date	Pages

[« »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

- 9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

« »

This Agreement entered into as of the day and year first written above.

OWNER (Signature)

« »« »

(Printed name and title)

CONTRACTOR (Signature)

« »« »

(Printed name and title)

DRAFT AIA® Document A201® – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

<< >>
<< >>

THE OWNER:

(Name, legal status and address)

<< >><< >>
<< >>

THE ARCHITECT:

(Name, legal status and address)

<< >><< >>
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TABLE OF ARTICLES

- | | |
|----|--|
| 1 | GENERAL PROVISIONS |
| 2 | OWNER |
| 3 | CONTRACTOR |
| 4 | ARCHITECT |
| 5 | SUBCONTRACTORS |
| 6 | CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS |
| 7 | CHANGES IN THE WORK |
| 8 | TIME |
| 9 | PAYMENTS AND COMPLETION |
| 10 | PROTECTION OF PERSONS AND PROPERTY |
| 11 | INSURANCE AND BONDS |
| 12 | UNCOVERING AND CORRECTION OF WORK |
| 13 | MISCELLANEOUS PROVISIONS |
| 14 | TERMINATION OR SUSPENSION OF THE CONTRACT |
| 15 | CLAIMS AND DISPUTES |
| 16 | ADDITIONAL CONDITIONS |

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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INDEX

(Topics and numbers in bold are Article headings.)

Acceptance of Nonconforming Work

9.6.6, 9.9.3, **12.3**

Acceptance of Work

9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, **12.3**

Access to Work

3.13, **3.16**, 6.2.1, 12.1

Access, Storage, Parking, and Security

3.13.2

Accident Prevention

10

Acts and Omissions

3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5,

10.2.8, 13.4.2, 13.7, 14.1, 15.2

Addenda

1.1.1, 3.11

Additional Conditions

16

Additional Costs, Claims for

3.7.4, 3.7.5, 6.1.1, 7.3.7.5, 10.3, 15.1.4

Additional Inspections and Testing

9.4.2, 9.8.3, 12.2.1, **13.5**

Additional Insured

11.1.4

Additional Time, Claims for

3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.5**

Administration of the Contract

3.1.3, **4.2**, 9.4, 9.5

Advertisement or Invitation to Bid

1.1.1

Aesthetic Effect

4.2.13

Allowances

3.8, 7.3.8

All-risk Insurance

11.3.1, 11.3.1.1

Applications for Payment

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.6.3, 9.7, 9.10,

11.1.3

Approvals

2.1.1, 2.2.2, 2.4, 3.1.3, 3.10.2, 3.12.8, 3.12.9, 3.12.10,

4.2.7, 9.3.2, 13.5.1

Arbitration

8.3.1, 11.3.10, 13.1, 15.3.2, **15.4**

ARCHITECT

4

Architect, Definition of

4.1.1

Architect, Extent of Authority

2.4, 3.12.7, 4.1, 4.2, 5.2, 6.3, 7.1.2, 7.3.7, 7.4, 9.2,

9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1,

13.5.1, 13.5.2, 14.2.2, 14.2.4, 15.1.3, 15.2.1

Architect, Limitations of Authority and Responsibility

2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2, 9.5.3, 9.6.4, 15.1.3, 15.2

Architect's Additional Services and Expenses

2.4, 11.3.1.1, 12.2.1, 13.5.2, 13.5.3, 14.2.4

Architect's Administration of the Contract

3.1.3, 4.2, 3.7.4, 15.2, 9.4.1, 9.5

Architect's Approvals

2.4, 3.1.3, 3.5, 3.10.2, 4.2.7

Architect's Authority to Reject Work

3.5, 4.2.6, 12.1.2, 12.2.1

Architect's Copyright

1.1.7, 1.5

Architect's Decisions

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3,

7.3.7, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1,

13.5.2, 15.2, 15.3

Architect's Inspections

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.5

Architect's Instructions

3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.5.2

Architect's Interpretations

4.2.11, 4.2.12

Architect's Project Representative

4.2.10

Architect's Relationship with Contractor

1.1.2, 1.5, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.2, 4.1.3, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3.7, 12, 13.4.2, 13.5, 15.2

Architect's Relationship with Subcontractors

1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3.7

Architect's Representations

9.4.2, 9.5.1, 9.10.1

Architect's Site Visits

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.5

Asbestos

10.3.1, 16.9

Attorneys' Fees

3.18.1, 9.10.2, 10.3.3

Award of Separate Contracts

6.1.1, 6.1.2

Award of Subcontracts and Other Contracts for Portions of the Work

5.2

Basic Definitions

1.1

Bidding Requirements

1.1.1, 5.2.1, 11.4.1

Binding Dispute Resolution

9.7, 11.3.9, 11.3.10, 13.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, 15.4.1

Blasting Operations

16.3

Boiler and Machinery Insurance

11.3.2

Bonds, Lien

7.3.7.4, 9.10.2, 9.10.3

Bonds, Performance, and Payment

7.3.7.4, 9.6.7, 9.10.3, 11.3.9, 11.4

Broken Glass

16.6

Building Permit

3.7.1

Capitalization

1.3

Certificate of Substantial Completion

9.8.3, 9.8.4, 9.8.5

Certificates for Payment

4.2.1, 4.2.5, 4.2.9, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.3

Certificates of Inspection, Testing or Approval
13.5.4

Certificates of Insurance

9.10.2, 11.1.3

Change Orders

1.1.1, 2.4, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3, 7.1.2, 7.1.3, 7.2, 7.3.2, 7.3.6, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2, 11.3.1.2, 11.3.4, 11.3.9, 12.1.2, 15.1.3

Change Orders, Definition of

7.2.1

CHANGES IN THE WORK

2.2.1, 3.11, 4.2.8, 7, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1, 11.3.9

Claims, Definition of

15.1.1

CLAIMS AND DISPUTES

3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, 15, 15.4

Claims and Timely Assertion of Claims

15.4.1

Claims for Additional Cost

3.2.4, 3.7.4, 6.1.1, 7.3.9, 10.3.2, 15.1.4

Claims for Additional Time

3.2.4, 3.7.4, 6.1.1, 8.3.2, 10.3.2, 15.1.5

Concealed or Unknown Conditions, Claims for 3.7.4

Claims for Consequential Damages

15.1.6

Claims for Damages

3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.1.1, 11.3.5, 11.3.7, 14.1.3, 14.2.4, 15.1.6

Claims Subject to Arbitration

15.3.1, 15.4.1

Cleaning Up

3.15, 6.3

Commencement of the Work, Conditions Relating to

2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3, 6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.3.1, 11.3.6, 11.4.1, 15.1.4

Commencement of the Work, Definition of

8.1.2

Communications Facilitating Contract Administration

3.9.1, 4.2.4

Completion, Conditions Relating to

3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1, 9.10, 12.2, 13.7, 14.1.2

COMPLETION, PAYMENTS AND

9

Completion, Substantial

4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 13.7

Compliance with Laws

1.6, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 9.6.4, 10.2.2, 11.1, 11.3, 13.1, 13.4, 13.5.1, 13.5.2, 13.6, 14.1.1, 14.2.1.3, 15.2.8, 15.4.2, 15.4.3

Concealed or Unknown Conditions

3.7.4, 4.2.8, 8.3.1, 10.3

Conditions of the Contract

1.1.1, 6.1.1, 6.1.4

Consent, Written

3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 11.3.1, 13.2, 13.4.2, 15.4.4.2

Consolidation or Joinder

15.4.4

CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

1.1.4, 6

Construction Change Directive, Definition of
7.3.1

Construction Change Directives

1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, 7.3, 9.3.1.1

Construction Schedules, Contractor's

3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.5.2

Contingent Assignment of Subcontracts

5.4, 14.2.2.2

Continuing Contract Performance

15.1.3

Contract, Definition of

1.1.2

CONTRACT, TERMINATION OR SUSPENSION OF THE

5.4.1.1, 11.3.9, 14

Contract Administration

3.1.3, 4, 9.4, 9.5

Contract Award and Execution, Conditions Relating to

3.7.1, 3.10, 5.2, 6.1, 11.1.3, 11.3.6, 11.4.1

Contract Documents, Copies Furnished and Use of
1.5.2, 2.2.5, 5.3

Contract Documents, Definition of

1.1.1

Contract Sum

3.7.4, 3.8, 5.2.3, 7.2, 7.3, 7.4, **9.1**, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.3.1, 14.2.4, 14.3.2, 15.1.4, 15.2.5

Contract Sum, Definition of

9.1

Contract Time

3.7.4, 3.7.5, 3.10.2, 5.2.3, 7.2.1.3, 7.3.1, 7.3.5, 7.4, 8.1.1, 8.2.1, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 14.3.2, 15.1.5.1, 15.2.5

Contract Time, Definition of

8.1.1

CONTRACTOR

3

Contractor, Definition of

3.1, 6.1.2

Contractor's Construction Schedules

3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.5.2

Contractor's Employees

3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.1.1, 11.3.7, 14.1, 14.2.1.1

Contractor's Liability Insurance

11.1

Contractor's Records

9.6.6

Contractor's Relationship with Separate Contractors and Owner's Forces

3.12.5, 3.14.2, 4.2.4, 6, 11.3.7, 12.1.2, 12.2.4

Contractor's Relationship with Subcontractors

1.2.2, 3.3.2, 3.18.1, 3.18.2, 5, 9.6.2, 9.6.7, 9.10.2, 11.3.1.2, 11.3.7, 11.3.8

Contractor's Relationship with the Architect

1.1.2, 1.5, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.3, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3.7, 12, 13.5, 15.1.2, 15.2.1

Contractor's Representations

3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2

Contractor's Responsibility for Those Performing the Work

3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8

Contractor's Review of Contract Documents

3.2

Contractor's Right to Stop the Work

9.7

Contractor's Right to Terminate the Contract

14.1, 15.1.6

Contractor's Submittals

3.10, 3.11, 3.12.4, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3, 11.1.3, 11.4.2

Contractor's Superintendent

3.9, 10.2.6

Contractor's Supervision and Construction

Procedures

1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.5, 7.3.7, 8.2, 10, 12, 14, 15.1.3

Contractual Liability Insurance

11.1.1.8, 11.2

Coordination and Correlation

1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1

Copies Furnished of Drawings and Specifications

1.5, 2.2.5, 3.11

Copyrights

1.5, **3.17**

Correction of Work

2.3, 2.4, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**

Correlation and Intent of the Contract Documents

1.2

Cost, Definition of

7.3.7

Costs

2.4, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.7, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.3, 12.1.2, 12.2.1, 12.2.4, 13.5, 14

Cutting and Patching

3.14, 6.2.5

Damage to Construction of Owner or Separate Contractors

3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 11.1.1, 11.3, 12.2.4

Damage to the Work

3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 11.3.1, 12.2.4

Damages, Claims for

3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.1.1, 11.3.5, 11.3.7, 14.1.3, 14.2.4, 15.1.6

Damages for Delay

6.1.1, 8.3.3, 9.5.1.6, 9.7, 10.3.2

Date of Commencement of the Work, Definition of

8.1.2

Date of Substantial Completion, Definition of

8.1.3

Day, Definition of

8.1.4

Decisions of the Architect

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 15.2, 6.3, 7.3.7, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.5.2, 14.2.2, 14.2.4, 15.1, 15.2

Decisions to Withhold Certification

9.4.1, **9.5**, 9.7, 14.1.1.3

Defective or Nonconforming Work, Acceptance, Rejection and Correction of

2.3, 2.4, 3.5, 4.2.6, 6.2.5, 9.5.1, 9.5.2, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1

Definitions

1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 15.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1

Delays and Extensions of Time

3.2, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.5, 15.2.5

Disputes

6.3, 7.3.9, 15.1, 15.2

Documents and Samples at the Site

3.11

Drawings, Definition of

1.1.5

Drawings and Specifications, Use and Ownership of
3.11

Dust Hazards

16.8

Effective Date of Insurance

8.2.2, 11.1.2

Emergencies

10.4, 14.1.1.2, 15.1.4

Emergency Change Orders

7.2.1

Employees, Contractor's

3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2,

10.3.3, 11.1.1, 11.3.7, 14.1, 14.2.1.1

Employment Information

16.7

Equipment, Labor, Materials or

1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,

4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3,

9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2

Equivalents and Substitutions

3.4.5

Execution and Progress of the Work

1.1.3, 1.2.1, 1.2.2, 2.2.3, 2.2.5, 3.1, 3.3.1, 3.4.1, 3.5,

3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.5, 8.2,

9.5.1, 9.9.1, 10.2, 10.3, 12.2, 14.2, 14.3.1, 15.1.3

Extensions of Time

3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2,

10.4, 14.3, 15.1.5, 15.2.5

Failure of Payment

9.5.1.3, **9.7**, 9.10.2, 13.6, 14.1.1.3, 14.2.1.2

Faulty Work

(See Defective or Nonconforming Work)

Final Completion and Final Payment

4.2.1, 4.2.9, 9.8.2, **9.10**, 11.1.2, 11.1.3, 11.3.1, 11.3.5,

12.3, 14.2.4, 14.4.3

Financial Arrangements, Owner's

2.2.1, 13.2.2, 14.1.1.4

Fire and Extended Coverage Insurance

11.3.1.1

Fire Protection

10.2.10

GENERAL PROVISIONS

1, 16.10

Governing Law

13.1

Guarantees (See Warranty)

Hazardous Materials

10.2.4, 10.3

Identification of Subcontractors and Suppliers

5.2.1

Indemnification

3.17, **3.18**, 9.10.2, 10.3.3, 10.3.5, 10.3.6, 11.3.1.2,

11.3.7

Indemnified Parties

1.1.10

Information and Services Required of the Owner

2.1.2, **2.2**, 3.2.2, 3.12.4, 3.12.10, 6.1.3, 6.1.4, 6.2.5,
9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 11.4, 13.5.1,
13.5.2, 14.1.1.4, 14.1.4, 15.1.3

Initial Decision

15.2

Initial Decision Maker, Definition of

1.1.8

Initial Decision Maker, Decisions

14.2.2, 14.2.4, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

Initial Decision Maker, Extent of Authority

14.2.2, 14.2.4, 15.1.3, 15.2.1, 15.2.2, 15.2.3, 15.2.4,
15.2.5

Injury or Damage to Person or Property

10.2.8, 10.4

Inspections

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3,

9.9.2, 9.10.1, 12.2.1, 13.5

Instructions to Bidders

1.1.1

Instructions to the Contractor

3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.5.2

Instruments of Service, Definition of

1.1.7

Insurance

3.18.1, 6.1.1, 7.3.7, 9.3.2, 9.8.4, 9.9.1, 9.10.2, **11**

Insurance, Boiler and Machinery

11.3.2

Insurance, Contractor's Liability

11.1

Insurance, Effective Date of

8.2.2, 11.1.2

Insurance, Loss of Use

11.3.3

Insurance, Owner's Liability

11.2

Insurance, Property

10.2.5, **11.3**

Insurance, Stored Materials

9.3.2

INSURANCE AND BONDS

11

Insurance Companies, Consent to Partial Occupancy

9.9.1

Intent of the Contract Documents

1.2.1, 4.2.7, 4.2.12, 4.2.13, 7.4

Interest

13.6

Interpretation

1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1

Interpretations, Written

4.2.11, 4.2.12, 15.1.4

Judgment on Final Award

15.4.2

Labor and Materials, Equipment

1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2

Labor Disputes

8.3.1

Labor Relations

3.4.4

Laws and Regulations

1.5, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 9.6.4, 9.9.1, 10.2.2, 11.1.1, 11.3, 13.1, 13.4, 13.5.1, 13.5.2, 13.6, 14, 15.2.8, 15.4

Liens

2.1.2, 9.3.3, 9.10.2, 9.10.4, 15.2.8

Limitations, Statutes of

12.2.5, 13.7, 15.4.1.1

Limitations of Liability

2.3, 3.2.2, 3.5, 3.12.10, 3.17, 3.18.1, 4.2.6, 4.2.7, 4.2.12, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 10.2.5, 10.3.3, 11.1.2, 11.2, 11.3.7, 12.2.5, 13.4.2

Limitations of Time

2.1.2, 2.2, 2.4, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7, 5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 11.1.3, 11.3.1.5, 11.3.6, 11.3.10, 12.2, 13.5, 13.7, 14, 15

Loss of Use Insurance

11.3.3

Material Suppliers

1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.6, 9.10.5

Materials, Hazardous

10.2.4, **10.3**

Materials, Labor, Equipment and

1.1.3, 1.1.6, 1.5.1, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2

Means, Methods, Techniques, Sequences and Procedures of Construction

3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2

Mechanic's Lien

2.1.2, 15.2.8

Mediation

8.3.1, 10.3.5, 10.3.6, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1

Minor Changes in the Work

1.1.1, 3.12.8, 4.2.8, 7.1, **7.4**

MISCELLANEOUS PROVISIONS

13

Modifications, Definition of

1.1.1

Modifications to the Contract

1.1.1, 1.1.2, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2, 11.3.1

Mutual Responsibility

6.2

No Damages for Delay

16.1

No Waiver

9.6.2

No Security Interests

9.6.5

Nonconforming Work, Acceptance of

9.6.6, 9.9.3, **12.3**

Nonconforming Work, Rejection and Correction of
2.3, 2.4, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2.1

Notice

2.2.1, 2.3, 2.4, 3.2.4, 3.3.1, 3.7.2, 3.12.9, 5.2.1, 9.7, 9.10, 10.2.2, 11.1.3, 12.2.2.1, 13.3, 13.5.1, 13.5.2, 14.1, 14.2, 15.2.8, 15.4.1

Notice, Written

2.3, 2.4, 3.3.1, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 9.7, 9.10, 10.2.2, 10.3, 11.1.3, 11.3.6, 12.2.2.1, **13.3**, 14, 15.2.8, 15.4.1

Notice of Claims

3.7.4, 10.2.8, **15.1.2**, 15.4

Notice of Testing and Inspections

13.5.1, 13.5.2

Observations, Contractor's

3.2, 3.7.4

Occupancy

2.2.2, 9.6.6, 9.8, 11.3.1.5

Orders, Written

1.1.1, 2.3, 3.9.2, 7, 8.2.2, 11.3.9, 12.1, 12.2.2.1, 13.5.2, 14.3.1

OWNER

2

Owner, Definition of

2.1.1

Owner, Information and Services Required of the

2.1.2, **2.2**, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 11.3, 13.5.1, 13.5.2, 14.1.1.4, 14.1.4, 15.1.3

Owner's Authority

1.5, 2.1.1, 2.3, 2.4, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.1.3, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.1.3, 11.3.3, 11.3.10, 12.2.2, 12.3, 13.2.2, 14.3, 14.4, 15.2.7

Owner's Financial Capability

2.2.1, 13.2.2, 14.1.1.4

Owner's Liability Insurance

11.2

Owner's Relationship with Subcontractors

1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2

Owner's Right to Carry Out the Work

2.4, 14.2.2

Owner's Right to Clean Up

6.3

Owner's Right to Perform Construction and to Award Separate Contracts

6.1

Owner's Right to Stop the Work

2.3

Owner's Right to Suspend the Work
14.3
Owner's Right to Terminate the Contract
14.2
Ownership and Use of Drawings, Specifications and Other Instruments of Service
1.1.1, 1.1.6, 1.1.7, **1.5**, 2.2.5, 3.2.2, 3.11, 3.17, 4.2.12, 5.3
Parking
3.13
Partial Occupancy or Use
9.6.6, **9.9**, 11.3.1.5
Patching, Cutting and
3.14, 6.2.5
Patents
3.17
Payment, Applications for
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3
Payment, Certificates for
4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 13.7, 14.1.1.3, 14.2.4
Payment, Failure of
9.5.1.3, **9.7**, 9.10.2, 13.6, 14.1.1.3, 14.2.1.2
Payment, Final
4.2.1, 4.2.9, 9.8.2, 9.10, 11.1.2, 11.1.3, 11.4.1, 12.3, 13.7, 14.2.4, 14.4.3
Payment Bond, Performance Bond and
7.3.7.4, 9.6.7, 9.10.3, **11.4**
Payments, Progress
9.3, **9.6**, 9.8.5, 9.10.3, 13.6, 14.2.3, 15.1.3
PAYMENTS AND COMPLETION
9
Payments to Subcontractors and Mechanic's Liens
5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2
Performance Bond and Payment Bond
7.3.7.4, 9.6.7, 9.10.3, **11.4**
Performance and Specification Standards
16.2
Permits, Fees, Notices and Compliance with Laws
2.2.2, 3.7, 3.13, 7.3.7.4, 10.2.2
PERSONS AND PROPERTY, PROTECTION OF
10
Product Data, Definition of
3.12.2
Product Data and Samples, Shop Drawings
3.11, **3.12**, 4.2.7
Progress and Completion
4.2.2, **8.2**, 9.8, 9.9.1, 14.1.4, 15.1.3
Progress Payments
9.3, **9.6**, 9.8.5, 9.10.3, 13.6, 14.2.3, 15.1.3
Project, Definition of
1.1.4
Project Representatives
4.2.10

Property Insurance
10.2.5, **11.3**
PROTECTION OF PERSONS AND PROPERTY
10
Regulations and Laws
1.5, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 9.6.4, 9.9.1, 10.2.2, 11.1, 11.4, 13.1, 13.4, 13.5.1, 13.5.2, 13.6, 14, 15.2.8, 15.4
Rejection of Work
3.5, 4.2.6, 12.2.1
Releases and Waivers of Liens
9.10.2
Representations
3.2.1, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.8.2, 9.10.1
Representatives
2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.1, 4.2.2, 4.2.10, 5.1.1, 5.1.2, 13.2.1
Responsibility for Those Performing the Work
3.3.2, 3.18, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10
Retainage
9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3
Review of Contract Documents and Field Conditions by Contractor
3.2, 3.12.7, 6.1.3
Review of Contractor's Submittals by Owner and Architect
3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2
Review of Shop Drawings, Product Data and Samples by Contractor
3.12
Rights and Remedies
1.1.2, 2.3, 2.4, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1, 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.2, 12.2.4, **13.4**, 14, 15.4
Royalties, Patents and Copyrights
3.17
Rules and Notices for Arbitration
15.4.1
Rules of Conduct
3.13
Safety of Persons and Property
10.2, 10.4
Safety Precautions and Programs
3.3.1, 4.2.2, 4.2.7, 5.3, **10.1**, 10.2, 10.4
Samples, Definition of
3.12.3
Samples, Shop Drawings, Product Data and
3.11, **3.12**, 4.2.7
Samples at the Site, Documents and
3.11
Schedule of Values
9.2, 9.3.1
Schedules, Construction
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.5.2

Separate Accounts
9.6.7
Security
3.13.2
Separate Contracts and Contractors
1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2
Shop Drawings, Definition of
3.12.1
Shop Drawings, Product Data and Samples
3.11, **3.12**, 4.2.7
Signage
3.13.3
Site, Use of
3.13, 6.1.1, 6.2.1
Site Inspections
3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.4.2, 9.10.1, 13.5
Site Visits, Architect's
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.5
Special Inspections and Testing
4.2.6, 12.2.1, 13.5
Specifications, Definition of
1.1.6
Specifications
1.1.1, **1.1.6**, 1.2.2, 1.5, 3.11, 3.12.10, 3.17, 4.2.14
Statute of Limitations
13.7, 15.4.1.1
Stopping the Work
2.3, 9.7, 10.3, 14.1
Storage
3.13
Stored Materials
3.13, 6.2.1, 9.3.2, 9.6.4, 10.2.1.2, 10.2.4
Subcontractor, Definition of
5.1.1
SUBCONTRACTORS
5
Subcontractors, Work by
1.2.2, 3.3.2, 3.12.1, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7
Subcontractual Relations
5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1
Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.7, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3, 11.1.3
Submittal Schedule
3.10.2, 3.12.5, 4.2.7
Subrogation, Waivers of
6.1.1, **11.3.7**
Substantial Completion
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, **9.8**, 9.9.1, 9.10.3, 12.2, 13.7
Substantial Completion, Definition of
9.8.1
Substitution of Subcontractors
5.2.3, 5.2.4
Substitution of Architect
4.1.3

Substitutions of Materials
3.4.5, 3.5, 7.3.8
Sub-subcontractor, Definition of
5.1.2
Subsurface Conditions
3.7.4
Successors and Assigns
13.2
Superintendent and Key Employees
3.9, 10.2.6
Supervision and Construction Procedures
1.2.2, **3.3**, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.7, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.3
Surety
5.4.1.2, 9.8.5, 9.10.2, 9.10.3, 14.2.2, 15.2.7
Surety, Consent of
9.10.2, 9.10.3
Surveys
2.2.3
Suspension by the Owner for Convenience
14.3
Suspension of the Work
5.4.2, 14.3
Suspension or Termination of the Contract
5.4.1.1, 14
Taxes
3.6, 3.8.2.1, 7.3.7.4
Termination by the Contractor
14.1, 15.1.6
Termination by the Owner for Cause
5.4.1.1, **14.2**, 15.1.6
Termination by the Owner for Convenience
14.4
Termination of the Architect
4.1.3
Termination of the Contractor
14.2.2
Termination of a Subcontract or Removal of a Subcontractor's Employee
5.4
TERMINATION OR SUSPENSION OF THE CONTRACT
14
Tests and Inspections
3.1.3, 3.3.3, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 11.4.1, 12.2.1, **13.5**
TIME
8
Time, Delays and Extensions of
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.5, 15.2.5
Time Limits
2.1.2, 2.2, 2.4, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 11.1.3, 12.2, 13.5, 13.7, 14, 15.1.2, 15.4

Time Limits on Claims

3.7.4, 10.2.8, **13.6**, 15.1.2

Title to Work

9.3.2, 9.3.3

Transmission of Data in Digital Form

1.6

UNCOVERING AND CORRECTION OF WORK

12

Uncovering of Work

12.1

Unforeseen Conditions, Concealed or Unknown

3.7.4, 8.3.1, 10.3

Unit Prices

7.3.3.2, 7.3.4

Use of Documents

1.1.1, 1.5, 2.2.5, 3.12.6, 5.3

Use of Site and Rules of Conduct

3.13, 6.1.1, 6.2.1

Values, Schedule of

9.2, 9.3.1

Ventilation

16.5

Waiver of Claims by the Architect

13.4.2

Waiver of Claims by the Contractor

9.10.5, 13.4.2, 15.1.6

Waiver of Claims by the Owner

9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.4.2, 14.2.4, 15.1.6

Waiver of Consequential Damages

14.2.4, 15.1.6

Waiver of Liens

9.10.2, 9.10.4

Waivers of Subrogation

6.1.1, **11.3.7**

Warranty

3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.4, 12.2.2, 13.7

Weather Delays

15.1.5.2

Welding

16.4

Work, Definition of

1.1.3

Written Consent

1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.8.5,

9.9.1, 9.10.2, 9.10.3, 11.4.1, 13.2, 13.4.2, 15.4.4.2

Written Interpretations

4.2.11, 4.2.12

Written Notice

2.3, 2.4, 3.3.1, 3.9, 3.12.9, 3.12.10, 5.2.1, 8.2.2, 9.7,

9.10, 10.2.2, 10.3, 11.1.3, 12.2.2, 12.2.4, **13.3**, 14,

15.4.1

Written Orders

1.1.1, 2.3, 3.9, 7, 8.2.2, 12.1, 12.2, 13.5.2, 14.3.1,

15.1.2

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is:

- (1) A written amendment to the Contract signed by both parties;
- (2) A Change Order;
- (3) A Construction Change Directive; or
- (4) A written order for a minor change in the Work issued by the Architect.

§ 1.1.1.1 Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind:

- (a) Between the Contractor and the Architect or the Architect's consultants;
- (b) Between the Owner and a Subcontractor or a sub-Subcontractor;
- (c) Between the Owner and the Architect or the Architect's consultants; or
- (d) Between any persons or entities other than the Owner and the Contractor.

§ 1.1.2.1 The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.2.2 No obligation of the Architect and/or Owner's representative(s) to the Owner, whether expressed by agreement or implied by law, shall be construed as intended for the benefit of the Contractor. Nothing in the Contract Documents nor in any aspect of the Architect's and/or Owner's representative(s) with the Owner shall create or give rise to any duty whatsoever on the part of the Architect and/or Owner's representatives to the Contractor.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project. "Work included" is general, and in no way limits or qualifies the Contract requirements.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate Contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, Articles, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Article 15.2 and certify termination of the Agreement under Article 14.2.2.

§ 1.1.9 HAZARDOUS MATERIALS

Hazardous Materials shall mean: (1) any "hazardous waste" as defined by the Resource, Conservation and Recovery Act of 1976 (42 U.S.C. Article 6901), as amended, and regulations promulgated thereunder; (2) any "hazardous, toxic or dangerous waste, substance or material" specifically defined as such in (or for the purposes of) the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (42 U.S.C. Article 9601), as amended, and regulations promulgated thereunder; (3) any "hazardous waste" or "hazardous substance" as defined by applicable laws and regulations, as amended, and regulations promulgated thereunder; and (4) any hazardous, toxic, or dangerous waste, substance, or material as defined in any so-called "superfund" or "superlien" law or any other federal, state or local statute, law, ordinance, code, rule, regulation, order or decree regulating, relating to or imposing liability or standards of conduct concerning such waste, substance or material.

§ 1.1.10 INDEMNIFIED PARTIES

Indemnified Parties shall mean the Owner, the Owner's representative(s), the Construction Lender, the Architect, Architect's Consultants and the Owner's Consultants, partners, members, shareholders, directors, officers, trustees, employees and volunteers and any other persons or entities identified by Owner as being an Indemnified Party (individually, an "**Indemnified Party**"; and collectively, the "**Indemnified Parties**").

§ 1.1.11 OWNER'S REPRESENTATIVE

Where applicable, the term "Owner's Representative" shall mean any representative who has the power and authority, on behalf of the Owner, to administer this Agreement including, without limitation, the granting or withholding of consents and/or approvals; the giving of instructions and directions regarding the Contractor's Work and the giving of notices and communications required or desired to be given by the Owner. For projects where an Owner's Representative is retained by the Owner, the term "Owner" means "the Owner and the Owner's Representative."

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results.

§ 1.2.1.1 The Contractor and all Subcontractors shall refer to all of the Drawings and to all of the Articles of the Specifications, and shall perform all of the work reasonably inferable therefrom as being necessary to produce the intended results.

§ 1.2.1.2 All indications or notations on the Drawings which apply to one of a number of similar situations, materials, or processes shall be deemed to apply to all such situations, materials, or processes wherever they appear in the Work, except where a contrary result is clearly indicated by the Contract Documents.

§ 1.2.1.3 The general character of the Work is shown on the construction drawings, but minor modifications may be made on the detailed drawings. Any details shall be worked out in relation to their location and their connection to other parts of the work. Where details or conditions are indicated in summary form, such details or conditions shall be continued throughout the course or parts in which they occur. The Contractor shall be responsible for the complete and correct application of such details throughout the portions of the Project in which they occur.

§ 1.2.1.4 In the event of any conflict or discrepancy between or among different versions of the same Contract Document, the most recently issued version takes precedence over previous versions. In the event of any conflict or discrepancy between provisions in separate Contract Documents, the more stringent provision shall govern; provided, however, figured dimensions shall prevail over scale dimensions and large scale Drawings shall prevail over small scale Drawings. If the conflict or discrepancy between or among separate Contract Documents pertains to:

- (a) Quantity, then the Contract Document requiring the greater quantity shall be deemed to be more stringent,
- (b) Quality, then the Contract Document requiring the better quality shall be deemed to be more stringent, or
- (c) Cost, then the Contract Document requiring the greater cost shall be deemed to be more stringent.

§ 1.2.1.5 Should the Architect's written interpretations, in the opinion of the Contractor, show additional work or work of more expensive character than that shown or inferred by the Contract Drawings, it shall be the duty of the Contractor to so notify the Architect and the Owner within five (5) days in order that proper adjustment may be made, if the Contractor's opinion is found to be justifiable by the Architect and the Owner. The Contractor shall assume full responsibility for all such work done without the approval of the Architect and the Owner.

§ 1.2.1.6 The Specifications and the Drawings shall be equal in authority and priority; provided, however, that in the event of conflict, (1) the Drawings shall govern as to the quantity and location, and (2) the Specifications shall govern as to quality and performance. The appropriate means and methods of performing the Work, in the event of the above-mentioned discrepancies, shall be determined by the Contractor.

§ 1.2.1.7 Drawings, in general, are made to scale, but all working dimensions shall be taken from the figured dimensions or by actual measurements taken at the job and in no case by scaling. The Contractor shall study and compare all Drawings and verify all figures before laying out or constructing the work. Whether or not an error is believed to exist, deviation from Drawings and the dimensions given thereon shall be made only after approval in writing is obtained from the Architect.

§ 1.2.1.8 In case of omissions or discrepancies between the Contract Documents, the Contractor shall secure instructions from the Architect before proceeding with the work affected by omissions or discrepancies. The Contractor shall assume full responsibility and cost for proceeding with such work without approval.

§ 1.2.1.9 During the course of work, should any errors, omissions, ambiguities, discrepancies or conflicts be found on the Drawings or in the Specifications to which the Contractor has failed to call attention before submitting its bid, the Architect shall interpret the intent of the Drawings and Specifications and the Contractor hereby agrees to abide by the Architect's interpretation and agrees to carry out the work in accordance with the decision of the Architect.

§ 1.2.1.10 Whenever any additional materials and/or workmanship not shown or specified are required to complete the work of the Contract Documents in accordance with the obvious intent thereof, the Contractor shall provide these materials and workmanship at no additional cost to the Owner.

§ 1.2.2 Organization of the Specifications into divisions, Articles and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. The Specifications are generally divided into trade Articles in accordance with the Construction Specification Institute's format for the purpose of convenience, and ready reference only, the Contractor will be permitted to allot the work of the Subcontractors at its own discretion regardless of the grouping in the Specifications. It shall be the Contractor's responsibility to settle definitely with each Subcontractor the portions of the work which each will be required to do; neither the Owner nor the Architect shall assume any responsibility whatsoever for any jurisdiction claimed by any of the trades involved in the work.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 References to trade publications, industry and published standards shall carry the latest date, including the latest revisions, unless stated to the contrary. Further, all work mentioned or indicated in the Contract Documents shall be performed by the Contractor as part of this Contract unless it is specifically indicated in the Contract Documents that such Work is to be done by others. All work shall conform to the National Electric Code, the National Board of Fire Underwriters and applicable State and local building codes and authorities having jurisdiction.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects. Inadvertent failure to capitalize terms shall have no effect on the interpretation and meaning of the Contract Documents.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect’s consultants shall be deemed the authors and Owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect’s or Architect’s consultants’ reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-c and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect’s consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

§ 1.7 CONFIDENTIALITY

§ 1.7.1 The Contractor warrants and represents that the Contractor shall not knowingly or negligently communicate or disclose at any time to any person or entity any information in connection with the Work or the Project, except:

- (a) With prior written consent of the Owner;
- (b) For information that was in the public domain prior to the date of this Agreement;
- (c) For information which becomes part of the public domain by publication
- (d) For information which was not due to any unauthorized act or omission of the Contractor;
- (e) Needed to conform with any applicable law, or
- (f) For purposes of coordination with other Contractors.

§ 1.7.2 The Contractor, any time upon request of the Owner, shall immediately return and surrender to the Owner all copies of any materials, records, notices, memoranda, recordings, drawings, specifications, and mock-ups and any other documents furnished by the Owner or the Architect to the Contractor.

§ 1.7.3 The Contractor shall specifically cause all Subcontractors or any other person or entity performing any services, or furnishing any materials or equipment of the Work to warrant and represent all items set forth in Article 1.7

§ 1.7.4 The representations and warranties contained Article 1.7 shall survive the complete performance of the Work or earlier termination of this Agreement.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Article 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if:

- (a) The Owner fails to make payments to the Contractor as the Contract Documents require;
- (b) A change in the Work materially changes the Contract Sum; or
- (c) The Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due.

§ 2.2.1.1 The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Article 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness provided, however, that any approvals, easements, assessments, and charges required in connection with the Contractor's construction means, methods, techniques, sequences, or procedures are solely the responsibility of the Contractor, regardless of the availability of any other construction means, methods, techniques sequences or procedures. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Article 1.5.2. The Contractor shall be responsible for making any and all copies of the Drawings and Specifications.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Article 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Article 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

§ 2.5 EXTENT OF OWNER'S RIGHTS

§ 2.5.1 The Rights stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner (1) granted in the Contract Documents, (2) at law or (3) in equity.

§ 2.5.2 In no event shall the Owner have control over, charge of, or responsibility for construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.1.1 Contractor hereby represents that (a) it has the necessary power and authority to enter into this Agreement and that it is under no obligation or restriction that would in any way interfere or be inconsistent with, or create a conflict of interest concerning, its performance of the Work, and (b) it is experienced in the administration and construction of projects similar in scope and nature to the Project, and in buildings similar in nature, size, age and location to the Project.

§ 3.1.1.2 Contractor accepts the relationship of trust and confidence established between it and Owner by this Agreement. Contractor shall employ:

- (a) its best efforts, skill and judgment in the performance of the Work, and
- (b) efficient business administration, coordination and management, and
- (c) its best efforts, skill and judgment, to cause the Work to be performed without defect and in the most expeditious and economical manner, consistent in each case with (1) the intent of the Contract Documents and Applicable Laws, and (2) the highest construction industry standards and practices and the best interests of Owner relating to cost, quality and schedule.

§ 3.1.1.3 Due to the fiduciary relationship, which Contractor is assuming toward Owner with respect to the Work, it is the intention of this Agreement to impose, and Contractor hereby accepts, the special and additional duties of trust and confidence created hereby.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.2.1 The Contractor shall be responsible for establishing all reference control points and completing the layout of the work.

§ 3.1.2.2 The Contractor shall be responsible for all measurements that may be required for the execution of the work to the exact position and elevation (a) required by the specifications, (b) shown on the drawings, (c) to meet existing conditions, or (d) as the result of modifications to the Work. The exactness of grades, elevations, dimensions, or locations given on a drawing issued by the Architect or the work installed by any other Contractors or Subcontractors is not guaranteed by the Architect or Owner. In all cases of interconnection between the Contractor's Work and existing or other work, the Contractor shall verify at the site all dimensions and shall be promptly rectify any discrepancies without any additional cost to the Owner.

§ 3.1.2.3 The Contractor shall have a licensed surveyor verify the lines and elevations for proper location and layout of the work.

§ 3.1.2.4 The Contractor shall be responsible for the establishment of points, wall and partition lines required by other Subcontractors in laying out their work.

§ 3.1.2.5 The Contractor shall furnish such stakes and other required equipment, tools and materials, and all labor as may be required to layout any part of the work from the base lines and bench marks established by the Owner.

§ 3.1.2.6 If, for any reason, existing monuments or other site features are removed or disturbed accidentally by the Contractor or its Subcontractors, it shall be the responsibility of the Contractor to reestablish them without cost to the Owner.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§3.1.4 The Contractor represents that the Contractor and its subsidiaries and any affiliates controlled by the Contractor have not been:

- (a) Indicted or convicted in any jurisdiction in the past ten (10) years;
- (b) The subject, and is currently not the subject, of a criminal investigation by any state or local prosecuting or investigative agency or civil investigation that involves anti-bribery, collusion, anti-trust, the Anti-Kickback Act, or the Foreign Corrupt Practices Act by any federal, state or local prosecuting or investigative agency; or
- (c) Subpoenaed in connection with any investigation described in clause b. hereof, whether it be criminal or civil.

§3.1.5 In the event that the Contractor meets any of the conditions set forth in Article 3.1.4 during the duration of the Project, the Contractor shall immediately notify the Owner in writing of such condition(s).

§3.1.6 In the event a proposed Qualified Bidder discloses or the Contractor knows of the conditions set forth in Article 3.1.4, the Contractor shall immediately disclose such information to the Owner and shall not place such proposed Qualified Bidder on any bid list without the prior written consent of the Owner.

§3.1.7 The Contractor acknowledges that, as of the date of the execution of this Agreement, it has no Claims against the Owner or any other parties including, but not limited to, any Claims related to or involving schedule delays, the Owner and the Architect's approvals or otherwise.

§3.1.8 The Contractor shall not:

- (a) Accept, for its own account, any sales commissions, trade discounts or contributions of any type from third parties in connection with the Work;
- (b) Deal with (or recommend that the Owner deal with) any firm or entity in which the Contractor has a financial or other interest;

- (c) Undertake any activity or employment which would or could create a conflict of interest, compromise the Contractor's professional judgment, or otherwise prevent the Contractor from serving the Owner's best interests;
- (d) Knowingly employ in connection with the Project, or recommend the acceptance of a bid from any Subcontractor employing any relative in first or second degree (including in-laws) of any officer or director of Contractor without fully disclosing such relationship in writing at the time that bids are solicited; and
- (e) Allow any officer, director, employee, agent or consultant, acting on behalf of the Contractor, to negotiate, accept, approve or otherwise participate in any Subcontractors' subcontract in connection with which that individual has, directly or indirectly, a controlling financial or other personal interest.

§3.1.9 If the Contractor becomes aware of any of the foregoing situations or circumstances, the Contractor shall immediately notify Owner in writing, and obtain the Owner's written approval before proceeding. Failure to so notify the Owner and obtain the Owner's written approval of an actual or potential conflict of interest shall constitute a material breach of this Agreement, entitling the Owner to terminate the Contractor for default.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Article 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a Contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§3.2.2.1 The Contractor hereby represents and warrants that it has:

- (a) Conducted a careful examination of the Site, including, without limitation, geotechnical reports, surveys and physical inspections of the area in which the Work is to be performed;
- (b) Has verified the established lines, reference points, dimensions and elevations for the proper location and layout of the Work; and
- (b) Has satisfied itself as to the nature, location and requirements of the Work, including any obstructions, the equipment and facilities needed prior and during the execution of the Work.

§3.2.2.2 The Contractor and each Subcontractor shall evaluate and satisfy themselves with the conditions at the site under which the Work is to be performed including without limitation:

- (a) The location, condition, layout and nature of the Project site and surrounding areas;
- (b) Generally prevailing climatic conditions;
- (c) Anticipated labor supply and costs;
- (d) Availability and cost of materials, tools and equipment;
- (e) Time restrictions for accessing or working at the site;
- (f) The storage, handling and trucking of materials to be used on-site; and
- (g) All other matters as may be incidental to the work under the Contract.

§3.2.2.3 The Contractor further represents and warrants that it has had adequate opportunity to study and review the Contract Documents, including the Drawings and Specifications and has determined that:

- (a) The Contract Documents are sufficiently complete and detailed for the Contractor to:
- (1) Perform the Work required to produce the results intended by the Contract Documents;
 - (2) Build the Project for the stated Contract Price within the Milestone Dates established in the Project Schedule; and
 - (3) Comply with all requirements of the Contract Documents;
- (b) The Work required by the Contract Documents, including without limitation, all construction details necessary to perform the Work, use of materials, selection of equipment and requirements of product manufacturers are consistent with:
- (1) Good and prevailing and accepted industry standards applicable to Work;
 - (2) Requirements of any warranties applicable to the Work; and
 - (3) All laws, ordinances, regulations, rules and orders which bear upon the Contractor's performance of the Work.

§3.2.2.4 If the Contractor discovers any errors, omissions, inconsistencies, ambiguities, discrepancies or conflicts within or between the Contract Documents, the Contractor shall notify the Architect and the Owner in writing within 5 days of such discovery. The Contractor herewith agrees that no extra compensation shall be awarded based upon a claim of ambiguity or unclear circumstances in the Contract Documents. The terms and conditions of this Article shall not relieve the Contractor or any obligations set forth in Article 1.2.

§3.2.2.5 The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or Contract Time in connection with any failure by the Contractor and/ or any Subcontractor to comply with the requirements of this Article 3.2.2.3.

§3.2.2.6 The Contractor shall provide all labor, materials, equipment, appliances and services necessary to execute and complete all work as required by the Contract Documents and all applicable Building codes, Rules, Regulations, Statutes and Laws. The Contractor shall conduct pre-construction surveys and provide photo/videos of any existing damage in areas where new construction is to take place prior to the start of work.

§3.2.2.7 The Contractor shall be responsible for removing and/or relocating all items which interfere with the new Construction, and shall correct all visible code violations at no additional cost to the Owner. Such violations shall include, but are not limited to, electrical panel wires, and fire stopping at fire rated partitions.

§3.2.2.8 All existing materials and equipment that are scheduled for demolition are the property of the Owner. If requested, the Contractor shall remove and store any such items in a location designated by the Owner, at no cost to the Owner.

§3.2.2.9 Where the scope of work of a Article in the Specifications or Drawings calls for service connections, supports, or installation, of any item or group of items being furnished by other Articles, the omission of any given item from the Drawings or Specifications shall not relieve the Contractor of the responsibility for installing, connecting or supporting such item at no increase in the Contract cost. The Contractor is deemed to have examined the plans and specifications in their entirety to ascertain the full scope of his work, including but not limited to connections, supports and installation of equipment furnished by all trades.

§3.2.2.10 The location of apparatus, equipment, fixtures, piping, outlets, etc., shown or specified, but not specifically dimensioned, shall be considered as only approximate. The actual location shall be as directed and as required to suit the conditions at the time of installation. Before installation, the Contractor shall consult with the Architect, and ascertain the actual location required. The Contractor shall examine the drawings and specifications for all trades to avoid conflicts.

§3.2.2.11 The Contractor shall note the parts and materials which must be built in as the work progresses, including, but not limited to, all templates, forms, sleeves, inserts, parts, blocks, anchors, etc. The Contractor shall be responsible for all cutting, patching and repairing as is necessary for the building-in of same, making all work as good as new.

§3.2.2.12 Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the respective manufacturers, unless otherwise specified.

§3.2.2.13 The Contractor shall give the Architect timely and sufficient notice of any additional design Drawings, Specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work. The Architect shall provide such information with reasonable promptness so as to cause no delay in the Work.

§3.2.2.14 The Contractor shall not proceed with any work not clearly and consistently defined in detail in the Contract Documents, but shall request additional Drawings or instructions from the Architect as provided in Article 3.2.2.13.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Articles 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Articles 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.1.1 The Contractor shall, prior to the start of any portion of the Work:

- (a) Review any specified construction or installation procedure(s) including those which may be recommended by the proposed manufacturer.
- (b) Advise the Architect if the specified procedure(s) deviate from good construction practice.
- (c) Advise the Architect if following said procedure(s) will affect any warranty, including the Contractor's general warranty.
- (d) Advise the Architect of any objections the Contractor may have to be specified procedure(s)
- (e) Propose any alternative procedure(s) which the Contractor will warrant.

§ 3.3.1.2 All loss, damage, or liability, or cost of correcting defective work arising from the employment of any construction means, methods, techniques, sequences or procedures shall be borne by the Contractor, notwithstanding that such construction means, methods, techniques, sequences or procedures are referred to, indicated or implied by the Construction Documents.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.1.1 Contractor shall provide all required labor and material to proceed with work as per Construction Schedule.

The Contractor shall work continuously and expeditiously through the Project Completion.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Articles 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.4.3.1 The Owner reserves the right to object to Contractor's use of persons who appear unfit or not skilled in the tasks assigned to them. Should any disorderly, incompetent, unfit, unskilled or objectionable person be hired or employed by the Contractor, upon or about the premises of the Owner, for any purpose or in any capacity, they shall upon request of the Architect or Owner, be removed from the Project and not again be assigned thereon without the written permission of the Architect or Owner.

§ 3.4.4 LABOR RELATIONS

§ 3.4.4.1 Contractor shall resolve all labor disputes and jurisdictional disputes to avoid delay to the Project regarding labor disputes and jurisdictional disputes. Contractor shall maintain good relations with labor unions as well as minority and other related interest groups to maintain peaceful labor relations and a trouble-free job site for the duration of the Work and advise Owner of any anticipated problems in connection therewith. Contractor shall advise Owner and Architect of any anticipated problems in connection therewith and shall resolve all labor and/or jurisdictional disputes. To the extent, if any, that Owner chooses to give Contractor directions regarding labor relations or any problems or disputes in connection therewith, Contractor shall abide by such directions so long as the same will not violate any existing collective bargaining agreement. Any loss, cost, or expense incurred with respect to the Project on account of labor disharmony shall be born solely by Contractor.

§ 3.4.4.2 In the event of strikes or labor disputes by the Contractor's forces, by Subcontractors, or by other Contractors performing work for the Owner under other contracts, the Contractor shall continue with its work and provide all necessary manpower as required to maintain the schedule and completion dates of this Project.

§ 3.4.4.3 No extension of time shall be granted for delays caused by labor or material disputes.

§ 3.4.4.4 Should it become necessary to create a separate entrance for a Contractor or a Subcontractor involved in a dispute, all costs associated with creating that entrance shall be borne by the Contractor involved in the dispute.

Such costs shall include, but not be limited to signage, fencing temporary roads and security personnel as deemed necessary by the Owner for the safety of the occupants of the site.

§ 3.4.4.5 If the Work is to be performed by trade unions, the Contractor shall make all necessary arrangements to reconcile, without delay, damage or cost to the Owner and without recourse to the Architect or the Owner, any conflict between the Contract Documents and any agreements or regulations of any kind at any time in force among members or councils which regulate or distinguish what activities shall not be included in the work of any particular trade.

§ 3.4.4.6 In case the progress of the Work is affected by an undue delay in furnishing or installing any items or materials or equipment required under the Contract Documents because of conflicts involving any labor agreement or regulation, the Owner may require that other material be provided through a Change Order or a Construction Change Directive, but in no case shall the amount of any such change increase the Contract price or time.

§ 3.4.5 EQUIVALENTS AND SUBSTITUTIONS

§ 3.4.5.1 Where, in the Specifications, certain kinds, types, brands, or manufacturers of materials are named, they shall be regarded as the required standard of quality. Where two or more are named, these are presumed to be equal, the Contractor may select one of those items. If the Contractor desires to use any kind, type brand, or manufacturer of material other than those named in the Specifications, he shall request a substitution in writing during Bidding. This request shall indicate the kind, type, brand, or manufacturer which, if accepted by the Architect, Engineer or Consultant, would be included in the Base Bid. The request shall include specific information about how the substitution differs in quality and performance from the base Specification, and shall explain how it is equal to or better than the brand(s) included in the Specifications. If the requested substitution is rejected by the Architect, Engineer or Consultant, the Contractor shall provide one of the products listed in the Specification.

§ 3.4.5.2 After the agreement has been executed or other appropriate notification has been received from the Owner, formal requests for substitutions of specified products will only be considered under the terms and conditions set forth in the Specifications. Further, by making said requests in conformance with procedures established in the Specifications, the Contractor:

- (a) Represents that he has personally investigated the proposed substitute product and has determined that it is equal to or superior in all respects to that specified.
- (b) Represents that the warranty for the substitution will be the same or greater than that applicable to the specified product.
- (c) Certifies that the cost data are complete and include all related costs under this Contract, including professional services necessary and/or required for the Architect and Engineers to implement said substitution and waives any and all claims for additional costs related to the substitution which subsequently becomes apparent.
- (d) Will coordinate the installation of the accepted substitute making all such changes as may be required for the work to be complete in all respects.
- (e) Will provide full explanation of the proposed substitution and submittal of all supporting data including technical information, catalog cuts, warranties, test results, installation instruction, operating procedures, and other like information necessary for a complete evaluation of the substitution. All such data shall be provided to the Architect and Owner at the Contractor's sole expense.
- (f) Will provide reasons the substitution is advantageous and necessary, including the benefits to the Owner and the Work in the event the substitution is acceptable.
- (g) Will provide an affidavit stating that:
 - (1) The proposed substitution conforms and meets all requirements of the pertinent Specifications and the requirements shown on the Drawings and
 - (2) The Contractor accepts the warranty and correction obligations in connection with the proposed substitution as if originally specified by the Architect.

§ 3.4.5.3 Substitution Requests shall be submitted to the Architect in sufficient time to allow the Architect no less than ten (10) working days for review. No substitution will be considered or allowed without the Contractor's submittal of complete substantiating data and information as stated herein.

§ 3.4.5.4 Substitutions and alternates may be rejected without explanation and will be considered only under one or more of the following conditions:

- (a) Required for compliance with interpretation of code requirements or insurance regulations then existing.
- (b) Unavailability of specified products, through no fault of the Contractor.
- (c) Subsequent information discloses inability of specified products to perform properly or to fit in designated space.
- (d) Manufacturer/fabricator refuses to certify or guarantee performance of specified product as required.
- (e) When in the judgment of the Owner or the Architect that a substitution would be substantially in the Owner's best interests, in terms of cost, time or other considerations.
- (f) Where the Contractor establishes that the substituted product is equal to or better than the specified product in all respects.

§ 3.4.5.5 The Contract Documents are intended to produce a Project of consistent character and quality of design. All components including visible items of mechanical and electrical equipment have been selected to have a coordinated design in relation to the overall appearance of the Project. The Architect shall judge the design and appearance of the proposed substitutes on the basis of their suitability in relation to the overall design of the Project as well as their intrinsic merits. The Architect will approve as "equal to" materials specified as proposed substitutes which, in the Architect's reasonable opinion, would be out of character or quality for the design of the Project.

§ 3.5 WARRANTY

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new, and of recent manufacture, unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 The Contractor and/or its successor and assigns will be responsible for and shall correct any defects due to faults in labor and materials which may occur within one (1) year after Final Payment has been made, except where Articles of the Specifications call for a longer period of time. The cost of correcting such defective work, including the cost of all damages of any kind sustained by the Owner, shall be borne by the Contractor as its sole cost and expense. All corrections to defective work shall be made at the convenience of the Owner.

§ 3.5.3 The warranty shall be in addition to and not in limitation of any other warranty required by the Contract Documents or otherwise prescribed by law. The warranties required under the Contract Documents shall be extended to include the performance of any and all items of work specified under the "proprietary," "patented," and other specified method as well as procedures specifically required by the Contract Documents, thereby not relieving the Contractor of its general warranty obligations.

§ 3.5.4 The Contractor shall deliver to the Owner upon completion of all work under this contract, his written guarantee made out to the Owner and in form satisfactory to the Owner, guaranteeing (and he does hereby so guarantee) all of the work under the contract to be free from faulty materials, and free from improper workmanship, and guarantee against injury from proper and usual wear, and aging. This guarantee shall be made to cover (and does cover) a period of one (1) year from the date of Substantial Completion of all work under the contract, or for a longer period where so stipulated in the Contract Documents.

§ 3.5.5 The warranties set forth herein shall survive expiration and/or termination of this Contract.

§ 3.5.6 The Contractor warrants good title to all materials, supplies and equipment installed or incorporated in the

Work.

§ 3.5.7 In addition, Contractor shall furnish maintenance and twenty-four (24) hour call back service for the equipment provided by it for a period of three (3) months after final completion and acceptance of the Work. This work shall include all necessary adjustments, greasing, oiling, cleaning, supplies, and parts to keep the equipment improper operation, except such parts made necessary by misuse, accidents, or negligence not caused by the Contractor or any of its Subcontractors.

§ 3.6 TAXES

§ 3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.6.2 When the Owner is a not-for-profit institution, it shall be tax exempt in accordance with the applicable laws of the State of New York and with Chapter 32 of the Internal Review Code, as most recently amended, for collection of all sales and excise taxes. Exemption certificates will be furnished to the Contractor by the Owner.

3.6.2 If this Project is tax exempt, Contractors shall not include sales tax in their pricing.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.1.1 The Contractor shall secure approval and comply with requirements of all authorities and deliver certificates of approval to the Architect, and shall prepare any and all documents necessary to secure such approval.

§ 3.7.1.2 The Contractor shall be responsible for all inspections for occupancy and shall secure all temporary and final certificates and any inspections for occupancy that are required. Certificates are to be delivered to the Owner and Architect before Final Payment.

§ 3.7.1.3 The Contractor shall, if required by ordinances, laws, codes, rules and/or regulations of the governing agencies having jurisdiction over this Project, retain a licensed Professional Engineer to supervise the construction of this Project including, but not limited to, foundations, structural work, soils, welding, reinforced masonry and the like. The Contractor shall pay fees and fines for inspections or re-inspections of any work related to this agreement after the date of substantial completion.

§ 3.7.1.4 In the event any violations are placed upon the premises by any public authority as a result of the Contractor's fault, in connection with the Work, the Contractor shall be solely responsible therefore and shall bear all costs attributable thereto. Final payment in an amount at least sufficient to correct such violations as determined by the Architect shall be withheld until all such violations are cured of record.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.2.1 If the Contractor fails to give such notices, it shall be liable for, and shall indemnify and hold harmless the Owner, its consultants, employees, officers and agents, the Architect and its consultants, employees, officers and agents, against any resulting fines, penalties, judgments or damages, including reasonable attorney's fees imposed on, or incurred by the parties indemnified hereunder. The Contractor shall pay any costs or fees incurred in such compliance and any fines or penalties imposed for the violation thereof and any costs or fees incurred by the Owner due to such violation.

§ 3.7.2.2 Except as set forth in Article 3.2.3, it is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the

Contractor shall promptly notify the Architect and Owner in writing, and necessary changes shall be accomplished by appropriate modification.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary (of if Contractor should have known that it would be contrary) to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 CONCEALED OR UNKNOWN CONDITIONS

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly review such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.7.6 CERTIFICATE OF OCCUPANCY

§ 3.7.6.1 It shall be the responsibility of the Contractor to satisfy the requirements that will allow the Owner to obtain all necessary approvals and releases from governing agencies having jurisdiction and to satisfy all requirements for the issuance and obtaining of the Certificate of Occupancy.

§ 3.7.6.2 At such time as the Owner makes application for the Certificate of Occupancy, the Contractor shall, at its own expense, file and have sealed by a professional engineer licensed in the jurisdiction, final affidavit(s) of certification that the Project has been constructed in conformance with filed documents, ordinances, rules, regulations and such other data that may be required by the governing agency or agencies having jurisdiction over the Project.

§ 3.7.6.3 Said certificate shall be turned over to the Architect prior to the Certification and Release of Final Payment.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- (a) Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- (b) Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

- (c) Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Article 3.8.2(a) and (2) changes in Contractor's costs under Article 3.8.2(b).

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT and KEY EMPLOYEES

§ 3.9.1 The Contractor shall employ a competent, experienced senior superintendent and any necessary key employees (i.e., project managers or project assistants) who shall be in attendance at the Project site during performance of the Work wherever and whenever work is in progress. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor shall furnish in writing to the Owner through the Architect a resume outlining the qualifications of the proposed superintendent and the proposed key employees. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed personnel or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent or key employee to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent or key employee without the Owner's consent, which shall not unreasonably be delayed.

§ 3.9.4 The Contractor shall furnish the Owner and Architect in writing the names, addresses and telephone numbers of the members of its organization who can be contacted in the event of an off-hours emergency at the building site.

§ 3.9.5 It is required of any and all supervisory personnel proposed for use by the Contractor and its Subcontractors be fluent in the English language, or said Contractor or Subcontractor shall furnish a full-time on-site interpreter to facilitate communications with the Owner and the Architect.

§ 3.9.6 In the event that a superintendent or key employee dies, becomes disabled or otherwise leaves the employ of the Contractor, the Contractor shall promptly propose a substitute of comparable expertise and experience who shall likewise be subject to Owner's approval. The Contractor shall immediately remove any key employee whom Owner, in its discretion, determines is not performing in accordance with the best interests of the Project. The Contractor shall inform the Owner of the percentage of time a key employee shall devote to the project in order to facilitate performance and completion of the Work in the most expeditious and economical manner consistent with the interests of Owner.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULE

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's Construction Schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.1.1 The Construction Schedule shall be in a detailed precedent-style critical path method (CPM) format satisfactory to the Owner and the Architect which shall also:

- (a) Provide a graphic representation of all activities and events that will occur during performance of the work;
- (b) Identify each phase of construction and occupancy; and
- (c) Set forth dates that are critical in insuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents (hereinafter referred to as the Milestone Dates).

§ 3.10.1.2 Upon review and acceptance by the Owner and the Architect for the Milestone Dates, the Construction Schedule shall be deemed part of the Contract Documents. If not accepted, the Construction Schedule shall be

promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and resubmitted for acceptance.

§ 3.10.1.3 The Contractor shall monitor the progress of the work for conformance with the requirements of the Construction Schedule and shall promptly advise the Owner of any delays or potential delays.

§ 3.10.1.4 The accepted Construction Schedule shall be dated to reflect actual conditions (sometimes referred to as progress reports) or if requested by either the Owner or the Architect. In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, any Milestone Date or the contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to Change Order.

§ 3.10.1.5 The Construction Schedule shall be updated at least once a month or more frequently if requested. The Contractor shall furnish the Owner, Owner's Representative and Architect with sufficient copies of the original schedules and all updated schedules as the Owner or Architect may require.

§ 3.10.1.6 In the event the Owner determines that the performance of the work, per the Contractor's accepted Construction Schedule, has not progressed or reached the level of completion required by the Contract Documents, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitations; (1) working additional shifts or overtime, (2) supplying additional manpower, equipment, and facilities and (3) other similar measures (hereinafter referred to collectively as Extraordinary Measures). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the Construction Schedule.

§ 3.10.1.7 The Contractor shall not be entitled to any adjustment in the Contract Time or the Contract Sum in connection with Extraordinary Measures required by the Owner under or pursuant to this Article 3.10.

§ 3.10.1.8 The Owner may exercise the rights furnished the Owner under or pursuant to this Article 3.10 as frequently as the Owner deems necessary to ensure that the Contractor's performance of the Work will comply with any Milestone Date or completion date set forth in the Contract Documents.

§ 3.10.1.9 The Owner reserves the right to withhold payment until such time as the Contractor submits a daily schedule showing that the work is again on schedule with the Construction Schedule and that the Contractor is performing the Work per the schedule to the satisfaction of the Owner, without additional cost to the Owner.

§ 3.10.1.10 The Owner shall have the right to direct a postponement or rescheduling of any date or time for the performance of any part of the work that may interfere with the operation of the Owner's premises or any tenants or invitee thereof. The Contractor shall, upon the Owner's request, reschedule any portion of the Work affecting the operation of the premises during hours when the premises are not in operation. Any postponement, rescheduling or performance of the Work may be grounds for an extension of the Contract Time, if:

- (a) The performance of the Work was properly scheduled by the Contractor in compliance with the requirements of the Contract Documents and
- (b) Such rescheduling or postponement is required for the convenience of the Owner.

§ 3.10.1.11 All Construction Schedules are the product and Ownership of the Contractor.

§ 3.10.1.12 Revisions to the Schedule shall be approved by the Owner and the Architect.

§ 3.10.1.13 Revisions to the Milestone Dates which are included in the Contract shall be made only by fully executed Change Order.

§ 3.10.1.14 The Contractor shall provide all required labor and material to proceed with work as per the Construction Schedule and shall work continuously and expeditiously through Project completion.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's Construction Schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

§ 3.11.1 The Contractor shall maintain at the site for the Owner one record copy of the Drawings ("Record Drawings"), Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.2 The Record Drawings shall be prepared and updated during the prosecution of the Work. The prints for Record Drawings use will be a set of black line prints provided by the Architect to the Contractor at the start of construction. The Contractor shall maintain said set in good condition and shall use colored pencils to mark up said set with "record information" in a legible manner to show:

- (a) Deviations from the Drawings made during construction;
- (b) Details in the work not previously shown;
- (c) Changes to existing conditions or existing conditions found to differ from those shown on any existing Drawings;
- (d) The actual installed position of equipment, piping, conduits, light switches, electric fixtures, circuiting, ducts, dampers, access panels, control valves, drains, openings and stub-outs; and
- (e) Such other information as either Owner or Architect may reasonably request.

3.11.2 At the completion of the Work, the Contractor shall prepare a complete set of "AS BUILT" drawings, stamped with the Contractor's name and "AS BUILT" in the lower right hand corner. The colored Record Drawing and the AS BUILT drawings shall be sent to the Owner. Paper and electronic copies of these documents shall be provided.

3.11.3 Final payment and any retainage shall not be due and owing or paid to the Contractor until the As Built Drawings have been approved by the Architect and the Owner and all other closeout requirements are met.

3.11.4 The Contractor shall maintain all approved permit Drawings in a manner so as to make them accessible to government inspectors and other authorized agencies. All approved Drawings shall be wrapped, marked and delivered to the Owner in paper and electronic format within sixty (60) days of final completion of Work.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work. Once complete set of all product data and approved Shop Drawings shall be submitted to the Owner as part of the close-out requirements.

§ 3.12.1.1 Under no circumstances shall a Contractor or Subcontractor submit the Architect's own construction drawings or details marked up as shop drawings. Shop drawings must be original documents.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.3.1 The Contractor shall submit for review to the Architect samples of materials listed under each Article of the Specifications. Samples shall be properly labeled for identification, consisting of the following information: job titles, sample number, submission number, and label large enough to receive Architect's stamps.

3.12.3.2 The Contractor shall not commence work under Articles of the Specifications until the Architect's approval in writing is obtained for all listed samples.

3.12.3.3 The Contractor shall not construe approval of advance samples as total guarantee of acceptance of materials. Materials will be subjected to field inspections, from time to time, as work progresses.

3.12.3.4 Samples of specific manufactured products shall be accompanied with appropriate manufacturer's literature at time of submission.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Article 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.4.1 In a timely manner, so as not to delay the Project and to ensure that Milestone Events are achieved, the Contractor shall cause to be prepared Shop Drawings, Product Data, and Samples for the Project to illustrate specific portions of the Work. Manufacturers' and suppliers' "fill-in-the-blanks" forms will not be acceptable unless modified to indicate exact requirements and conditions. Submittals shall contain only information relevant to the particular equipment or materials to be provided. Submittals that describe equipment and materials other than that to be provided shall not be submitted for review unless all inapplicable material is marked out. The Contractor shall not submit photocopies of material and equipment illustration unless photocopies are true and accurate representations of the original illustrations. Shop Drawings which require or rely upon an engineered solution must be prepared by a licensed professional employed by the applicable Subcontractor or its consultant. Contractor shall be fully responsible for any errors or omissions by such Subcontractor or its consultants, along with the costs associated with Contractor's failure to review and submit such Shop Drawings in a timely manner.

§ 3.12.4 In a timely manner, so as not to delay the Project and to ensure that Milestone Events are achieved, the Contractor shall review and check Submittals prepared by Subcontractors and mark any required corrections thereto. The Contractor shall not perform any portion of the Work requiring submission and review of any Submittal until the respective Submittal has been reviewed and processed by the Architect with appropriate comments. All such Work shall be in accordance with said Submittals, as revised if necessary to comply with the Architect's comments. By reviewing and submitting Submittals, Contractor represents that it has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that it has checked and coordinated the information contained within such Submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.4.3 The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's review or processing of Submittals unless the Contractor specifically informs the Architect and Owner in writing of such deviations with Contractor's or Subcontractor's proposal at the time of the Submittal, and the Architect and Owner shall have given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in the Submittals prepared by Contractor or its Subcontractors. Incomplete Submittals or Submittals containing excessive errors will be returned unchecked and any delay caused thereby will be the responsibility of the Contractor.

§ 3.12.4.4 On resubmitted Submittals, the Contractor shall direct specific attention, in writing or on the resubmitted Submittals, to revisions other than those requested by the Architect on previous Submittals. The Contractor shall make all revisions as noted by the Architect and shall resubmit in the original format as the prior Submittal, the required number of corrected copies of Submittals until no exceptions are taken. Each Shop Drawing submission after the first submission shall be clear of all previous stamps.

§ 3.12.4.5 The Contractor shall submit complete and accurate Submittals at the first submission. If the Submittal is returned not approved, any additional submissions must have addressed the previous basis for rejection and will be reviewed at the sole cost of the Contractor; provided, however, if any additional submission is required due to clarified, changed or added Work scope or errors not caused by the Contractor or Subcontractors, the Owner will be responsible for any costs charged by the Architect in connection with its review of said additional submission.

§ 3.12.4.6 The Contractor shall allow a minimum of ten (10) business days or the time period in the submittal schedule, whichever is greater, for Submittal review by the Architect and such period of review shall not be a basis for any Claim of delay in the progress of the Work.

§ 3.12.4.7 Shop drawings for the work of one trade shall be checked by Subcontractors of other related trades. Approval signatures of the Contractor and the Subcontractors affected by the work therein must appear on all Shop Drawings before submission to the Architect.

§ 3.12.4.8 When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Architect and the Owner shall be entitled to rely upon the accuracy and completeness of the calculations and certifications of Contractor's Subcontractors.

§ 3.12.4.9 All Shop Drawings for any Architectural, structural, mechanical or electrical work must be submitted to and approved by the Architect and/or Engineer. The Contractor represents and warrants that all Shop Drawings shall be prepared by persons and entities possessing expertise and experience in the trade for which the Shop Drawing is prepared and, if required by the Architect or applicable law, by a licensed engineer.

§ 3.12.4.10 Each shop drawing shall contain a title block with the following information:

- (a) The Title of Drawing.
- (b) Date of Drawing or Revision.
- (c) The Submission Number
- (d) Name of Project.
- (e) Name of Contractor or Subcontractor submitting Drawing.
- (f) Specification Article Title and Number.
- (g) Space for Architect's stamp and received stamps.
- (h) All Contract Reference Drawing Numbers plus Shop Drawing Numbers on related work by other Subcontractors if available.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect. If the Contractor elects to perform work without approvals, same shall be at the Contractor's risk and expense.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect

in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 PROFESSIONAL SERVICES BY THE CONTRACTOR

§ 3.12.10.1 The Contractor shall not be required to provide professional services that constitute the practice of Architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures.

§ 3.12.10.2 The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy.

§ 3.12.10.3 The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect.

§ 3.12.10.4 The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy.

§ 3.12.10.5 Pursuant to this Article 3.12.10 the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.6 The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.12.10.7 In the event any and all such calculations and/or certifications are found to be inaccurate and/or incomplete, the Contractor shall assume full responsibility and bear all costs attributable or related thereto, including without limitation, the expense of the Architect's additional services associated with the verification of such calculations and/or certifications and the expense of the Architect's additional service made necessary by the failure of such calculations and/or certifications to be accurate or complete.

§ 3.13 USE OF SITE AND RULES OF CONDUCT

§ 3.13.1 USE OF THE SITE

§ 3.13.1.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.1.2 The Owner shall establish the limits of the construction site in addition to any Contract Limit Lines shown on the Drawings. The Contractor shall continue his operations within these limits, unless upon written request and reply, a variance is agreed to by the Architect and Owner. The Contractor shall be responsible for trespassing on and/or damage to other real or personal property of the Owner or any third party by any of his employees or his Subcontractors' employees.

§ 3.13.1.3 The Contractor's right to entry and use thereof arises solely from the permission granted by the Owner under the Contract Documents.

§ 3.13.1.4 Without limitation of any other provision of the Contract Documents, the Contractor shall comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and any existing buildings as amended from time to time. The Contractor shall immediately notify the Owner in writing if during the performance of the Work the Contractor finds compliance with any portion of the rules and regulations to be impracticable, setting forth the problems of such compliance and suggesting alternatives through which the same results intended by such portions of the rules and regulations can be achieved. The Owner may, in the Owner's sole discretion, adopt such suggestions, develop new alternatives or require compliance with the existing requirements of the rules and regulations. The Contractor shall also comply with all insurance requirements and collective bargaining agreements applicable to use and occupancy of the Project site and the Building.

§ 3.13.1.5 The Contractor shall be required to perform the work of the Project with no interruption to the Owner's operations. Any work which will interfere with the Owner's operations shall be performed in accordance with the Owner's schedule and permission. All costs incurred by the Owner to make the facilities available during those times shall be borne by the Contractor. The Owner reserves to itself the right to determine what work will "interfere" with its operations and said determination shall be final.

§ 3.13.1.6 The Contractor shall provide all temporary access walkways, both interior and exterior, temporary partitioning and the like necessary to complete the operations. The Contractor shall maintain in an unobstructed condition all entrances and/or exits from existing buildings.

§ 3.13.1.7 Contractors, their workers, suppliers, etc. shall adhere strictly to the requirements hereinbefore stated, and shall not occupy or carry traffic through other parts of the site or interior of present buildings except by specific permission of the Owner.

§ 3.13.1.8 Without prior approval of the Owner, the Contractor shall not permit any workers to use any existing facilities at the Project site, including, without limitation, lavatories, toilets, entrances, and parking areas other than those designated by the Owner.

§ 3.13.1.9 The Contractor shall repair or replace any existing trees, shrubbery or other planting damaged by operations and/or workers employed in performance of its Contract.

§ 3.13.1.10 All employees or persons entering the property surrounding the facilities affected by the construction are restricted to the immediate area of work. Only persons having official business will be admitted to the construction site.

§ 3.13.2 ACCESS, STORAGE, PARKING AND SECURITY

§ 3.13.2.1 Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it is to be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor. The Contractor shall be held responsible for repairs, patching, or cleaning arising from the storage and removal of materials and equipment on or from the site.

§ 3.13.2.2 Contractor shall insure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials and equipment likely to cause hazardous or dangerous conditions. Without limitation of any other provision of the Contract Documents, Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work or (2) the Building in the event of partial occupancy, as more specifically described in Article 9.9.

§ 3.13.2.3 The Contractor shall provide full and free access for the Architect, Owner's Representative, Owner and/or their representatives, to inspect job materials, equipment fabrication, facilities, and storage locations, at and away from the job site.

§ 3.13.2.4 Employees, vehicles, equipment and material of the Contractor and of all others utilized by the Contractor for the performance of its work, shall enter onto the construction site only at those locations designated or approved by the Architect or the Owner's Representative.

§ 3.13.2.5 The Contractor shall familiarize itself with any access and storage requirements set forth in the Contract Documents and shall be subject to them. The Contractor shall properly maintain all access to work and storage areas so that there will be continuous unimpeded access to the work site in all seasons of the year, on all working days and all working hours of any and all trades employed by the Contractor and Subcontractors performing work at this site.

§ 3.13.2.6 Only such vehicles, trucks and equipment that are absolutely necessary for performing the work, for the length of time that the particular phase of the work is being performed shall be parked or stored within the work areas. All other vehicles for the Contractor, its employees and Subcontractors including passenger cars shall be parked off site, unless approved by the Owner.

§ 3.13.2.7 It shall be the responsibility of the Contractor to provide necessary and required security measures to adequately safeguard the construction site from vandalism, theft and intrusion of unauthorized persons.

§ 3.13.2.8 The Contractor shall submit the means and methods of security to the Owner for approval. The project site must be secured 24 hours a day, 7 days a week including holidays. The Contractor agrees that the Owner's approval shall not in any manner or by any means, impose any obligation or liability upon the Owner.

§ 3.13.2.9 All workers and employees of any Contractor are prohibited from (a) trespassing or leaving any vehicle on any property not designated by the Owner for the use of the Contractor and (b) leaving any vehicle on the Project site unless it is locked and the ignition keys removed.

§ 3.13.3 SIGNAGE

The Contractor shall not erect any sign on the Project site without the written consent of the Owner, which may be withheld in the sole discretion of the Owner.

§ 3.13.4 SAFE WORKING CONDITIONS

The safe working conditions at the site shall solely be the Contractor's responsibility. The Owner and the Architect shall not have any responsibility or liability in connection therewith.

§ 3.13.5 RULES OF CONDUCT

- (a) No smoking is allowed anywhere on the property. Violators will be subject to a \$1,000 fine and/or banishment from the property.
- (b) No drinking of alcoholic beverages or use of controlled substances is allowed on the grounds. Reporting to work impaired by alcohol or controlled substances will not be tolerated. The Contractor shall be responsible to insure that its employees and the employees of the Subcontractors are not impaired to any degree.
- (c) All Contractors, Subcontractors, suppliers and their employees are prohibited from conversing with the Owner's Personnel or visitors. If the project is located at or near a school, all Contractors, Subcontractors, suppliers and their employees are prohibited from conversing with any students. Any construction employees found doing so shall be removed from the site. Communication between workers and school students will not be tolerated.
- (d) All Contractors, Subcontractors, suppliers and their employees shall refrain from using indecent language. All doing so shall be removed from the site. Artwork and decoration found on vehicles belonging to Contractors or Subcontractors employees parked on or near the property which contain indecent language or pictures shall either be removed.
- (e) All construction personnel shall wear photo ID badges if required by the Owner. Photo ID badges shall be provided by the Contractor and shall be approved by the Owner.
- (f) The use of radios, tape players and the like is prohibited within the job site.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate Contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate Contractor except with written consent of the Owner and of such separate Contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate Contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.14.3 Only trade persons skilled and experienced in cutting and patching shall perform such work.

§ 3.14.4 Any cost caused by defective or ill-timed work shall be borne by the Contractor.

§ 3.14.5 The Contractor shall not cut, patch, damage or alter installed work, without the Architect's consent.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall at all times keep the Site and surrounding area free from accumulation of waste materials, debris and rubbish caused by the Contractor or its Subcontractors or their sub-Subcontractors. The Contractor shall be fully in charge of and provide and coordinate the removal of all rubbish, waste and debris at the Project Site including, but not limited to, all rubbish, waste and debris of Subcontractors and separate Contractors.

§ 3.15.2 The Contractor shall provide on-site containers, for use by all individuals and entities on the Site including Subcontractors and separate Contractors, for the collection of such waste materials, debris and rubbish, and shall periodically, and upon completion of the Work, remove said waste materials, debris and rubbish from and about the Project Site and the building, and dispose of the same at legal disposal areas away from the Project Site.

§ 3.15.3 The Contractor shall not use the Owner's dumpsters, bins, or trash compactors.

§ 3.15.4 The Contractor shall provide a sufficient amount of laborers so as to maintain a safe and clean Project Site at all times.

§ 3.15.5 The Contractor and its Subcontractors shall comply with authorities and/or agencies having jurisdiction and shall adhere to any and all safety standards for cleaning. They shall not:

- a. Burn or bury waste materials.
- b. Discharge volatile, harmful, or dangerous materials into drainage systems or water supplies.
- c. Dispose of waste materials in an unlawful or improper manner.

§ 3.15.6 The Contractor shall be solely responsible for all monetary penalties arising from any citations or fines for improper or unlawful disposal of waste materials by its employees and Subcontractors.

§ 3.15.7 If, in Owner's sole good faith judgment, the Contractor fails to clean up as provided in the Contract Documents, Owner, upon forty-eight (48) hours notice to the Contractor, may do so and the cost thereof shall be charged to the Contract Price. The performance of such clean-up by Owner or by others shall not relieve Contractor of any obligation or liability for the Work and shall not operate to waive any right or remedy of Owner.

§ 3.15.8 GENERAL AND FINAL CLEANING

§ 3.15.8.1 The Contractor shall thoroughly wash and clean all finish materials, replace broken glass, remove spots, smears, marks, grease, mastic, adhesives, dust, dirt, stains, fingerprints, paint, labels (except those required by Applicable Laws), and other foreign materials from all surfaces, clean fixtures, wash floors, vacuum carpets and wash all exposed concrete so as to present clean Work for Owner's acceptance.

§ 3.15.8.2 The Contractor shall use only those cleaning materials which will not create hazards to health or property, are recommended by the manufacturer of the surface material to be cleaned, and which will not damage surfaces or adjacent surfaces of a different material.

§ 3.15.8.3 The Contractor shall clean interior spaces prior to the start of finish painting. Contractor shall perform continual cleaning on an as-needed basis until painting is finished, and shall schedule operations so that dust and other contaminants resulting from the cleaning process will not fall on wet or newly-coated surfaces.

§ 3.15.8.4 As part of the trade costs, the Contractor shall require the appropriate Subcontractor(s) to clean permanent filters and replace disposable filters of air handling units if they were operated during construction, and clean ducts, blowers and coils if such units were operated without filters during construction and return said equipment to like new condition with full warranty. Contractor shall clean, maintain and repair such units prior to flooring, ceiling and finish material being installed.

§ 3.15.8.5 As part of the trade costs, the Contractor shall require the appropriate Subcontractor(s) to clean and perform maintenance on installed Work as frequently as necessary through the remainder of the construction period, and shall adjust and lubricate operable components to ensure operability without damaging effects. Contractor shall also recondition elevators if the same were used by Contractor or its Subcontractors or their sub-Subcontractors during construction.

§ 3.15.8.6 The Contractor shall clean each surface or unit to the condition expected in normal commercial building cleaning and shall comply with manufacturer cleaning instructions for all manufactured work. The following cleaning operations shall be completed before requesting an inspection for a Certificate of Substantial Completion:

- (a) Clean transparent materials including glass in doors and windows. Replace any damaged or broken glass.
- (b) Clean all exposed finishes to a dust free condition, free of stains, films and similar foreign substances.
- (c) Clean floors as recommended by the manufacturers (including, but not limited to wood, bamboo, ceramic tile, terrazzo, vinyl tile, rubber tile, linoleum, concrete).
- (d) Carpeted floors shall be vacuumed.
- (e) Surfaces of mechanical and electrical equipment shall be wiped. Remove excess lubrication and other substances.
- (f) Clean plumbing fixtures to a sanitary condition.
- (g) Clean light fixtures and lamps.
- (h) Remove excess or spilled grout, mortar, spackle, or caulking from all new or existing surfaces.
- (i) Remove all excess, spilled, spattered, over sprayed, or dripped paint, stain or other finishes from new or existing surfaces which are not meant to be painted, stained, or finished.

§ 3.15.8.7 The Contractor shall remove temporary protection and facilities installed for protection of work during construction unless otherwise directed by the Owner or Architect.

§ 3.15.8.8 The Contractor shall also, upon completion of the Work, remove from and about the Site tools, construction equipment, machinery, temporary facilities and surplus materials belonging to, or related to the work of, Contractor or its Subcontractors or their sub-Subcontractors, and shall leave the Project clean.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall protect, defend, indemnify and hold harmless the Indemnified Parties from and against all liability, Claims, damages, losses and expenses, including, without limitation, reasonable legal fees and court costs arising out of the negligence or willful misconduct of the Contractor, its agents and/or employees or from the negligent or willful misconduct of any Subcontractor or its agents and/or employees or a breach by a Subcontractor of any of the terms and conditions of its Subcontract, whether the same arises on account of a Claim, dispute, action or proceeding between an Indemnified Party and the Contractor or Claim, dispute, action or proceeding between an Indemnified Party and a third party provided that such liability, Claims, damages, losses and expenses are attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property. Such obligation shall not be construed to negate, abridge or otherwise reduce any other right or indemnity which would otherwise exist as to any Indemnified Party described in this Article. In any and all Claims against an Indemnified Party, the indemnification obligation under this Article 3.18 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

§ 3.18.2 Unless otherwise stated in the Agreement, the Contractor shall, before commencing work, have in full force and effect such insurance as may be required to comply with the indemnification and hold harmless provisions outlined under Article 3.18.1. However, the indemnification obligations outlined in Article 3.18.1 shall not be limited to the availability of insurance.

§ 3.18.3 Notwithstanding Article 3.18, nothing contained in the Contract Documents shall be construed to create any contractual relationship of any kind between the Architect and any of his agents or employees and the Contractor.

§ 3.18.4 A certificate of the required insurance naming the Owner, Architect, Engineers, Consultants, Sub-consultants and other such parties as additional insureds shall be submitted prior to the start of work. Said insurance shall be maintained through the entire Project life. (Refer to Article 11 for additional provisions.)

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an Architect lawfully licensed to practice Architecture or an entity lawfully practicing Architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor Architect and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract during construction as described in the Contract Documents until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or

procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. However, the Architect shall have no liability to the Owner or any other person or entity for failure to discover any deviations from the Contract Documents or for any failure to discover defects or deficiencies in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents and shall have no liability to the Owner or any other person or entity for the Contractor's failure to perform the Work. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate Contractors shall be through the Owner. Notwithstanding the foregoing, the Architect may communicate with Subcontractors or material suppliers with regard to technical and/or contractual requirements of the Contract between the Owner and the Contractor. Any communication between the Architect and a Subcontractor or material supplier shall be confirmed in writing to the Contractor.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Article 13.5, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Articles 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Article 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Article 3.7.4.

§ 4.2.8.1 Neither the Owner nor Architect has the authority to issue instructions to the Contractor to change the amount of the Contract, except by properly executed Change Orders. Instructions are issued by the Owner through the Architect, to the Contractor. The instructions shall not be implemented by the Contractor prior to a written order in the form of a Change Order, signed by the Owner, Architect and Contractor, authorizing a change in the Contract

amount or an adjustment to the Contract Sum. No amount shall be payable by the Owner to the Contractor for performance of work without an executed Change Order. See also Article 7.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Article 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Article 9.10; and issue a final Certificate for Payment pursuant to Article 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to provide material and/or labor for the Project on or off the site, or to otherwise furnish labor, material, or other services with respect to a portion of the Work. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate Contractor or Subcontractors of a separate Contractor.

§ 5.1.2 A Sub-Subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "sub-Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a sub-Subcontractor or an authorized representative of the sub-Subcontractor.

§ 5.1.3 If the terms "Specialist" or "Specialty Contractor" are used in the specifications, all requirements and provisions pertaining to Contractors and Subcontractors shall apply to these Specialists and Specialty Contractors.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 All portions of the Work and all materials that the Contractor does not supply, shall be performed or supplied under direct contracts, purchase orders or similar written agreement with Subcontractors of the Contractor (including laborers, material men or suppliers).

§ 5.2.1.1 The Contractor shall be fully responsible for the Work, acts and omissions of its Subcontractors and material men, and of persons either directly or indirectly employed by its Subcontractors and material men. The Contractor's use of Subcontractors and material men shall not diminish the Contractor's obligation to complete the Work in accordance with this Agreement and the Contract Documents.

§ 5.2.1.2 All subcontracts and sub-subcontracts shall be submitted to Owner and the Architect prior to being executed by the Contractor or the Subcontractor. The Architect and the Owner shall have the right, but not the obligation, to review and approve all subcontract and sub-subcontract scopes of work, and all subcontracts and sub-subcontracts prior to execution thereof.

§ 5.2.1.3 Neither the submission of a subcontract or sub-subcontract to the Owner, nor the review or approval of a subcontract or sub-subcontract by the Owner, shall be deemed to:

- (a) Relieve the Contractor of its duty of due diligence in selecting a Subcontractor;
- (b) Relieve the Contractor from any of its obligations under this Agreement;
- (c) Establish privity of contract between the Owner and any Subcontractor or otherwise create any rights in favor of any Subcontractor as against the Owner;
- (d) Impose on the Owner any liability arising from, or in connection with, such subcontracts or sub-subcontracts; or
- (e) (Make the Owner responsible for a Subcontractor's or sub-Subcontractor's performance or failure to perform.

§ 5.2.2 Within thirty (30) days after receipt of the official notice of the award of Contract, the Contractor shall furnish in writing to the Owner and the Architect:

- (a) The name, trade and subcontract amount of each Subcontractor; and
- (b) The names of all persons or entities proposed as manufacturers of the products identified in the Specifications (including those who are to furnish materials or equipment fabricated to a special design and, where applicable, the name of the installing Subcontractor).

§ 5.2.2.1 The Architect may reply within 14 days to the Contractor in writing stating:

- (a) Whether the Owner or the Architect has reasonable objection to any such proposed person or entity or
- (b) That the Architect requires additional time for review.

§ 5.2.2.2 Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.3 Subcontractors will not be acceptable unless evidence is furnished that the proposed Subcontractor has satisfactorily completed similar subcontracts as contemplated under this Contract, and has the necessary experience, personnel, equipment, plant, and financial ability to complete the subcontract in accordance with the intent of the Contract Documents.

§ 5.2.4 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.5 The Contractor shall not award any work to any Subcontractor without prior written approval of the Architect and Owner, which approval will not be given until the Contractor submits to the Architect a written statement concerning the proposed award to the Subcontractor, which statement shall contain such information as the Architect and the Owner require.

§ 5.2.6 The Contractor shall execute Subcontracts in the Contractor's own name and on its own behalf and not as agent for Owner.

§ 5.2.7 Each Subcontract shall be prepared based on the Contractor's form of subcontract, subject to the Owner's prior written approval as to form and content. The Contractor warrants that, in addition to other provisions required to be included under this Agreement, each Subcontract shall contain the following:

- (a) A provision stating that , by entering into this Subcontract, Subcontractor represents that Subcontractor and each parent, Affiliate, officer or principal of Subcontractor has not been: (i) indicted or convicted in any jurisdiction; (ii) the subject, and is currently not the subject, of a criminal investigation by any state or local prosecuting or investigative agency and/or civil anti-trust investigation by any federal, state or local prosecuting or investigative agency; (iii) subpoenaed in connection with any criminal or civil action; or (iv) requested by any federal, state or local prosecuting agency to cooperate in any criminal investigation of any other person or entity; provided in no

event shall the Qualified Bidder be required to violate any request from any federal, state or local prosecuting or investigative agency to not disclose the existence of such subpoena or investigation;

- (b) Provisions substantially similar to the Insurance, Indemnity, Change Order, and Termination provisions herein;
- (c) A provision permitting assignment of any Subcontract to Owner or its designee, and providing that upon an assignment made pursuant to such a provision, the assignee shall succeed to the rights and obligations of Contractor under such Subcontract, provided however that upon such assignment, the Owner shall indemnify Contractor against any all Claims of Subcontractor whose Subcontracts have been assigned to Owner for acts caused by the Owner and only for those Claims arising after any such assignment;
- (d) A provision stating that, with respect to the Work to be performed and furnished by the Subcontractor thereunder, the Subcontractor agrees to be bound to Contractor by each and all of the terms and provisions of the General Contracting Agreement and the other Contract Documents, and to assume toward Contractor all of the duties, obligations and responsibilities that Contractor, by way of the General Contracting Agreement and those other Contract Documents, assumes toward Owner, and the Subcontractor agrees further that Contractor shall have the same rights and remedies as against the Subcontractor as Owner under the terms and provisions of the General Contracting Agreement and the other Contract Documents has against Contractor with the same force and effect as though every such duty, obligation, responsibility, right or remedy were set forth therein in full; and
- (e) A provision stating that Subcontractor shall prepare and submit to Contractor As-Built Drawings on CAD Disks, which shall record: (1) approved changes to the Drawings and to the Work, whether accomplished by Change Orders or otherwise, and (2) the exact locations of all concealed Work and the size, routing and elevation thereof.

§ 5.2.9 In certain circumstances, the provisions of the Contract might require that the Contractor perform a specific percentage of work by its own forces. In these cases, the work by supervisory personnel or by office personnel shall not be considered part of the work performed by the Contractor's employees. Items such as bonds, certificates, shop drawings and the like also do not count toward the percentage of the work.

§ 5.2.9 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.2.10 The Contractor shall be responsible to the Owner for the acts and omissions of its agents, employees, Contractors and all individuals and entities retained by Contractor and all Subcontractors, and their respective agents, employees, Contractors and all individuals and entities retained by all Subcontractors.

§ 5.3 SUBCONTRACTUAL RELATIONS

§ 5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner.

§ 5.3.2 Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with sub-Subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.3 The Contractor shall not enter into any subcontract, contract, agreement, purchase order or other arrangement for any portion of the materials, services, equipment or work with any party or entity if such party or entity is an Affiliated Entity, unless such arrangement has been approved by the Owner, after full disclosure in relationship and all details relating to the proposed Arrangement. The term "Affiliated Entity" means any entity

related to or affiliated with the Contractor who has direct or indirect Ownership or control, including, without limitation:

- (a) Any entity owned in whole or in part by the Contractor
- (b) Any holder of more than 10% of the issued and outstanding shares of, or the holder of an interest in the Contractor, or
- (c) Any entity in which any officer, director, employee, partner or shareholder or member of the family of any of the foregoing persons, or any entity owned by the Contractor has a direct or indirect interest, which includes, but is not limited to, that of a partner, employee, agent or shareholder.

§ 5.3.4 Contractor shall resolve all disputes between the Subcontractors relating to the performance of their Work or the furnishing of materials, supplies or equipment in connection with the Work, without interruption or delay to the Project, and have all Subcontractors agree to continue performance of their work notwithstanding any such dispute. To the extent that disputes may arise with other Contractors, individuals or entities at the Site, the Contractor shall resolve such disputes in order to promote harmony at the Site.

§ 5.3.5 The Contractor shall promptly notify the Owner and Architect of any material defaults by any Subcontractors.

§ 5.3.6 Notwithstanding any provision contained in this Article 5 to the contrary, it is hereby acknowledged and agreed that the Owner has in no way agreed, expressly or impliedly, nor will the Owner agree, to allow any Subcontractor or other material supplier or worker employed by the Contractor the right to obtain a judgment or decree against the Owner for the amount due it from the Contractor.

§ 5.4 TERMINATION OF A SUBCONTRACT OR REMOVAL OF A SUBCONTRACTOR EMPLOYEE

§ 5.4.1 Termination of a Subcontract or Removal of a Subcontractor Employee. The Contractor shall not terminate a Subcontract or replace a Subcontractor without the prior written approval of Owner, which shall not be unreasonably withheld.

§ 5.4.2 Owner shall have the right to request termination of any Subcontract upon the occurrence of defective or incomplete Work, upon demonstrating an inability to adequately staff the Project or the existence of conditions stated in Article 5.2.6 a-e. In the event of any request for termination by Owner under this Article 5.4, Contractor shall terminate such Subcontract upon receipt of such request for termination or as soon as practicable given the circumstances at the time of such request for termination but in such instance no longer than three (3) business days after receipt of such request for termination. In the event of any termination of any Subcontract, the terminated Subcontractor shall not be entitled to anticipated or lost profits or overhead as a result of such termination.

§ 5.4.3 Owner shall have the right to request the removal of any Subcontractor's employee if Owner is not satisfied with such employee's performance and Subcontractor shall, within two (2) business days thereof, appoint a replacement having at least equal competence and experience. Owner shall have the right to disapprove any replacement for any reason or no reason at all, provided such disapproval is not in violation of any applicable laws or regulations.

§ 5.4.4 Upon termination by Owner, Contractor shall assign any one or more Subcontracts to Owner or Owner's designee; provided upon such assignment, the Owner shall indemnify Contractor against any all Claims of Subcontractor whose Subcontracts have been assigned to Owner for acts caused by the Owner and only for those Claims arising after any such assignment.

§ 5.4 DISPUTES BETWEEN SUBCONTRACTORS. Contractor shall resolve all disputes between the Subcontractors relating to the performance of their Work or the furnishing of materials, supplies or equipment in connection with the Work, without interruption or delay to the Project, and have all Subcontractors agree to continue performance of their work notwithstanding any such dispute. To the extent that disputes may arise with other Contractors, individuals or entities at the Site, the Contractor shall resolve such disputes in order to promote harmony at the Site.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that:

- (a) Assignment is effective only after termination of the Contract by the Owner for cause pursuant to Article 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- (b) Assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

§ 5.4.1.1 When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 If the Work has been suspended for more than 30 days after termination of the Contract by the Owner pursuant to Article 14.2, and the Owner accepts the assignment of such subcontract, the Subcontractor's compensation shall not be adjusted for any increases in direct costs incurred by such Subcontractor as a result of such suspension.

§ 5.4.2.1 Each subcontract shall specifically provide that the Owner shall be responsible to the Subcontractor for those obligations of the Contractor that accrue subsequent to the Owner's exercise of any rights under this contingent assignment.

§ 5.4.3 Upon such assignment to the Owner under this Article 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation.

§ 6.1.1.1 The Contractor shall cooperate and coordinate with, and perform the Work in conjunction and harmony with, Owner, and separate Contractors engaged by the Owner, if any. The Contractor acknowledges that the Owner, directly and/or through the Architect, is and shall be actively involved in the development of the Project, and in interaction with Contractor. The Contractor understands and agrees that no such involvement or interaction shall be construed to relieve the Contractor from the performance of, or to waive or modify in any respect, any of the Work. Notwithstanding the Contractor's obligations under this Article 6.1, the Contractor shall not be responsible for delays caused by any separate Contractors engaged by the Owner.

§ 6.1.1.2 Should the Contractor sustain any damage or delay through any act or omission of any other Contractor having a Contract with the Owner, or should the Contractor sustain any damage or delay through any act of omission of a Subcontractor, the Contractor shall have no claim against the Owner or the Architect for such damage or delay, but shall have a right to recover or to claim such damage only from the other Contractor or Subcontractor.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate Contractors and the Owner until subsequently revised.

§ 6.1.3.1 The Contractor shall not interfere with the erection, installation or storage upon the premises of any work, materials, supplies or equipment not included in the Work, but which is to be performed and furnished by other Contractors, and the Contractor shall properly connect and coordinate the work therewith. The Contractor shall be responsible for the coordination and intermeshing of the work of his various Subcontractors and the work of other Contractors with the Work.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.1.5 SEPARATE PRIME CONTRACTORS

In the event that the Work of the Project includes multiple Prime Contracts, the terms and conditions in this AIA A201 document pertaining to the responsibilities and requirements for a Contractor shall apply to each and every "Prime Contractor."

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate Contractors as provided in Article 10.2.5.

§ 6.2.5 The Owner and each separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Article 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate Contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- (a) The change in the Work;
- (b) The amount of the adjustment, if any, in the Contract Sum; and
- (c) The extent of the adjustment, if any, in the Contract Time.

§ 7.2.1.1 The Owner may at any time direct changes in the Work consisting of additions, deletions or other revisions. All such required changes in the Work shall be memorialized in a written Change Order signed by the Contractor and by the Owner, and executed in the manner set forth in the following sections. The Contract Price and Project Schedule for the Work shall not be revised due to any changes in the Work except to the extent expressly provided in approved written Change Orders.

§ 7.2.1.2 Contractor agrees to exercise reasonable efforts to furnish to Owner within ten (10) business days of Owner's request or such longer time as reasonably required to obtain pricing from Subcontractors and approved by Owner, not to be unreasonably withheld or delayed, a signed Change Order Proposal, in a form satisfactory to Owner, setting forth in detail, with suitable breakdowns by trades and work classifications, and using the unit price and/or other costing method specified by Owner, Contractor's estimate of:

- (a) The cost additions or savings of the Change Order, which cost shall be at the best price obtainable and shall reflect the most economical manner of affecting, such Change; and
- (b) The Changes in the Project Schedule (including required interim or Milestone Dates, the Substantial Completion date and/or the Final Completion date) which would result from implementation of Contractor's Change Order proposal.

§ 7.2.1.3 If Owner approves Contractor's Change Order proposal, Owner shall issue to Contractor a written Change Order signed by Owner, and the Milestone Dates, Substantial Completion date, Final Completion date the Contract Price and the Contract Documents, as the case may be, shall be adjusted, if required, in accordance with the terms of such Change Order. All other terms and conditions of this Agreement shall remain in full force and effect. No time extension shall be granted Contractor by reason of the issuance of any Change Order unless expressly stated therein. No course of conduct or dealing between the Owner and the Contractor shall operate as a waiver of these requirements.

§ 7.2.2 CHANGE ORDERS/CLAIMS FOR ADDITIONAL COST OR TIME

§ 7.2.2.1 Contractor shall submit to Owner, in writing, Claims for a Change Order (on its own account and on account of Subcontractors) arising from:

- (a) Bulletins issued by the Architect or other Owner Consultant; or
- (b) Delay, no later than ten (10) business days after the issuance of the bulletin or the date the delay commences, or such time as reasonably required to obtain pricing from Subcontractors and approved by Owner, not to be unreasonably withheld or delayed.

§ 7.2.2.1 Failure of the Contractor to submit such Claim within the time period prescribed in this section shall constitute a waiver (without the need or requirement of any additional writing) of such Claim by the Contractor and, as to the Owner, by any Subcontractor claiming through the Contractor.

§ 7.2.2.3 The Owner, within ten (10) business days after any Claim for Change Order is made, shall review and act on such Claim by either rejecting the Claim, requesting further information, approving the Claim or authorizing the Contractor to proceed pending resolution of the Claim. The Owner shall be permitted to give oral authorization (by for a Change Order not exceeding \$5,000 (to be confirmed in writing by the Owner upon presentment of written confirmation by the Contractor of such oral authorization). Any Change Order in excess of \$5,000 each or \$25,000 in the aggregate must be approved in writing in advance by the Owner.

§ 7.2.2.4 In no event shall the Owner be liable for any sums in excess of the amount authorized for any Change Order unless a request for a modification of any previously authorized Change Order is made by the Contractor. This request must be within 10 business days of the event giving rise to such requested modification or such time as was reasonably required to obtain pricing from Subcontractors and approval by Owner.

§ 7.2.3 OVERHEAD AND PROFIT ON CHANGE ORDERS

§ 7.2.3.1 The Contractor's maximum markup on any Change Order for overhead and profit shall be (5%) to cover or reimburse overhead and profit and actual general conditions and an insurance fee equal to two (2%) of the total cost of the Work.

§ 7.2.3.2 Subcontractors will be permitted a payment no greater than ten percent (10%) of the value of the Work for overhead and profit on Work performed by its own forces. A Subcontractor will be permitted a payment of no greater than five percent (5%) of the value of the Work for overhead and profit on Work performed by sub-Subcontractors. A sub-Subcontractor will be permitted a payment of no greater than ten percent (10%) of the value of the Work for overhead and profit on Work performed by its own forces. The aggregate payment for overhead and profit on any portion of the Work shall be limited to fifteen percent (15%), regardless of the number of Subcontractor tiers involved with the performance thereof.

§ 7.2.4 DISPUTED WORK In the event that Contractor contends that the Work it is directed to perform by the Owner is a Change Order or constitutes duties, obligations and services requested by Owner with respect to the Project that are not called for in this Agreement ("Additional Work") and Owner disputes such contention, Contractor shall nevertheless promptly perform such Work. With respect to disputes concerning Work directed by Owner, Contractor shall within twenty-four (24) hours, provide to the Owner written notice thereof, stating why it deems the Work to be Change Order or Additional Work, and shall furnish to Owner the following:

- (a) Daily time slips showing the name of each workman employed on such Work, the number of hours which he was employed thereon, the character of his duties, and the wages to be paid to him;
- (b) A written memorandum showing the amount and character of the materials furnished for such Work; and
- (c) A written memorandum of equipment used in the performance of such Work, together with the rental claimed therefor.

Failure of Contractor to provide such notice, documents, and information, shall be deemed to be a conclusive and binding determination by Contractor that the direction of Owner does not involve the performance of Change Order or Additional Work and waives any Claim for additional compensation or damages by reason thereof. Owner shall make an initial determination within ten (10) business days of Contractor's submission herein a determination of Contractor's Claim for alleged Change Order and, if denied, shall be subject to further proceedings pursuant to Article 15.

§ 7.2.1 EMERGENCY CHANGE ORDERS Notwithstanding anything to the contrary set forth herein, Contractor shall have the authority to take such actions and precautions to avoid the imminent threat of injury or damage to persons or property ("Emergency Action") without the Owner's prior written consent or approval and thereafter, to request a Change Order with respect thereto. Contractor shall:

- (a) Notify Owner that an Emergency Action has been taken within twenty-four (24) hours after the taking of the same;
- (b) Within two (2) business days of the occurrence of the Emergency Action, deliver a detailed written report to Owner setting forth the events and circumstances giving rise to such Emergency Action; and
- (c) Within seven (7) business days of such Emergency Action, submit a proposed Change Order to the Owner on account thereof, detailing the actual additional costs, expenses, General Conditions and/or change to the Project Schedule on account thereof supporting such requested Change Order.

Valid Emergency Actions taken by Contractor shall be confirmed by Owner by a duly issued Change Order in accordance with Article 7.2.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- (a) Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- (b) Unit prices stated in the Contract Documents or subsequently agreed upon;
- (c) Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- (d) As provided in Article 7.2.1.2

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Article 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such

agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Article 9.8.

§ 8.1.4 The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.1.5 The date of Final Completion of the Work is the date all of the Work required under the Contract Documents is completed, all required materials have been delivered to the Owner, and all applicable licenses, permits, certificates or approvals have been obtained by the Contractor and delivered to the Owner.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.1.1 Contractor shall not commence work on the site until certified copies of all insurance policies as indicated in Article 11, attesting that the required coverage is in force, have been received and accepted by the Owner.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall use commercially reasonable efforts to ensure that (1) the Work is completed within the time provided in the Project Schedule, and (2) the Substantial Completion date and Final Completion date of the Project set forth therein are met.

§ 8.2.3.1 The Substantial Completion date and Final Completion date of the Project shall be guaranteed in accordance with the Project Schedule as it may be adjusted as provided herein.

§ 8.2.3.2 Contractor shall make every reasonable effort to reduce the Contract Time.

§ 8.2.3.3 Milestone Dates are dates critical to the Owner’s operations that establish when a part of the work is to commence or be complete. All Milestone Dates are of the essence and shall have the same meaning as Substantial Completion.

§ 8.2.4 The Contractor may request access to the site during times beyond the work hours permitted. Approval is solely at the discretion of the Owner. If approval is given, the Contractor is responsible for paying any additional costs incurred by the Owner and the Architect for providing the site to the Contractor during the additional time periods.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the progress of the Project by Force Majeure or by the material acts of or failure to act by the Owner, Owner’s Consultants or Owner’s separate Contractors, or by the failure of

governmental entities to process or issue permits, approvals, licenses or ordinances within customary time periods through no fault of the Contractor or any Subcontractor, and such delay will actually result in a delay to the Substantial Completion date and Final Completion date, such date or schedule shall be extended for such reasonable length of time as reasonably determined in writing by the Owner.

§ 8.3.1.1 Contractor shall make such Claim in writing to Owner within ten (10) business days of the date of the event that is alleged to cause actual delay, with sufficient detail and documentation to enable the Owner to determine whether an extension of time is justified.

§ 8.3.1.2 If such timely written notice is not given, the request for an extension of time is deemed waived. In no event, however, shall the Contractor or any Subcontractor be entitled to an extension of time for any delay that does not affect the critical path of the Project Schedule or to any additional fee, cost reimbursement, compensation or damages (consequential or otherwise) solely on account of such delay.

§ 8.3.2 Notwithstanding the foregoing, in no event shall Force Majeure be construed or deemed to include any delay to the extent caused by:

- (a) The bankruptcy or insolvency of any Subcontractor;
- (b) The failure of any Subcontractor to perform any portion of the Work in accordance with the terms of its Subcontract;
- (c) The negligence or willful misconduct of the Contractor or any Subcontractor;
- (d) Any event or circumstance which constitutes a breach or default by the Contractor under this Agreement; or
- (e) Any event the results of which could have been avoided or ameliorated by or through the implementation of alternative measures or methods by the Contractor without a material increase in cost or the scope of Work or the time to complete the Work called for by the Contract Documents.

§ 8.3.3 The Contractor, as a condition to receiving an extension of time for a Force Majeure event, shall, within five (5) business days after the date of such event, present a detailed written report to Owner containing a description of the Force Majeure event, together with the Contractor's opinions and recommendations as to the options and actions available to Owner to best mitigate the effect of the delay caused by (or anticipated to be caused by) such Force Majeure event on the Project Schedule and the anticipated additional costs and expenses to Owner (for the Cost of the Work or otherwise) as a result thereof. Nothing contained herein shall be deemed to relieve the Contractor from its obligation to mitigate the effects of any Force Majeure to the fullest extent reasonably possible.

§ 8.3.4 The Contractor acknowledges and agrees that adjustments in the Contract Time may be permitted for a delay but only to the extent such delay:

- (a) Is not caused, or could not have been anticipated, by the Contractor;
- (b) Could not be limited or avoided by the Contractor's timely notice to the Owner of the delay;
- (c) Is of a duration not less than one (1) day; and
- (d) The Contractor has made all reasonable effort to recover the alleged lost time.

§ 8.3.5 The Contractor shall not be responsible for delays caused by any separate Contractors that are engaged by Owner.

§ 8.3.6 If an extension of time has been granted, such extension of time shall not be considered a justification for extra compensation to the Contractor for administrative costs.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 By no later than the fifteenth (15th) day of each month during the Construction Phase, Contractor shall submit to the Owner and the Architect, a preliminary Application for Payment for Work completed and projected to be completed in such month, in accordance with the respective Schedule of Values, in a form acceptable to Owner. Contractor shall meet with the Owner and the Architect within five (5) business days after the receipt by them of such preliminary Application for Payment to review the same. Within three (3) business days after such meeting, the Contractor shall submit to the Owner and the Architect a final, notarized form of the Application for Payment based on the aforesaid preliminary copies and incorporating any changes thereto agreed upon after such review meeting.

§ 9.3.2 Each Application for Payment shall:

- (a) Contain a separate category for cost of materials stored off-site (subject to fulfillment of all of the terms and conditions set forth in Article 9.6.4 hereof) and applicable retainage, and
- (b) Show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 9.3.3 Each Application for Payment shall accurately reflect the retainage held from and being held by Owner and the current percentage of completion on a line-item basis, shall be notarized, and supported by such data substantiating Contractor's right to payment as Owner and Owner's Representative may require, and shall be accompanied by:

- (a) Contractor's certification in a form acceptable to Owner, executed by Contractor;
- (b) Conditional waiver and release of lien documents for the entire amount covered by the subject Application for Payment in a form substantially similar to Contractor's Waiver and Release of Lien, executed by Contractor, and a Subcontractor's Waiver and Release of Lien, executed by all Subcontractors, sub-Subcontractors and suppliers, with respect to all Work for which payment is requested;
- (c) Contractor's Waiver and Release of Lien and Subcontractor's Waiver and Release of Liens, executed by, respectively, Contractor and all of the above-specified Subcontractors, sub-Subcontractors and suppliers, with respect to all Work for which payment was made at least thirty (30) business days prior to the submission of the Application for Payment;
- (d) An updated list of Subcontractors and suppliers;
- (e) The updated Project Schedule and Reports as required by this Agreement;
- (f) In the case of public works projects in New York State, certified payrolls for all Work performed by the Contractors and their Subcontractors and transcripts of payroll records as required under New York State Labor Law; and
- (g) Any other documents or materials required by other provisions of this Agreement to be delivered with an Application for Payment.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 Within ten (10) business days after such meeting the Owner will either (i) inform the Contractor of its intent to issue a Certificate of Payment for all or part of the amount requested by Contractor, or (ii) notify Contractor of its reasons for withholding a Certificate of Payment. If the Owner declines a Certificate of Payment, in whole or in part, the Owner shall provide the Contractor with a statement describing generally the reasons for the Owner's disapproval; provided, however, Owner's failure to provide such statement to Contractor shall not operate to waive Owner's right to disapprove of such Certificate of Payment, in whole or in part, or nullify any such disapproval.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in general accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material Suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.4.4 RETAINAGE

§ 9.4.4.1 Retainage shall be withheld by Owner up to and until Contractor achieves Substantial Completion of all Work, and which may only be released thereafter pursuant to the terms of Article xxx.

§ 9.4.4.2 In no event shall Contractor or any Subcontractor be entitled to a reduction in the percentage withheld as retainage, and such retainage may only be released upon Owner's prior written consent. Owner's consent to release retainage amounts (to the Contractor or its Subcontractors) is subject to the Contractor's submission of a written request for such release, accompanied by an itemized Punch List. Such release of retainage may only be approved if the amount of retainage held by Owner (if the requested reduction or release is approved) remains equal to two hundred percent (200%) of the value of Punch List work, as estimated by Owner.

§ 9.5 DECISIONS TO WITHHOLD PAYMENT

§ 9.5.1 If any one or more of the following conditions exist, the Owner may: (i) disapprove, in whole or in part, an Application for Payment (ii) otherwise decide to withhold payment, in whole or in part, from Contractor, or (iii) nullify the whole or a part of a payment previously made because of subsequently discovered evidence or subsequent observations, in each case to the extent necessary to protect Owner from loss:

- (a) Defective or non-conforming Work has not been remedied following written notice from Owner or Owner's Representative and reasonable time to cure;
- (b) The Work has not progressed to the point indicated in the Application for Payment;
- (c) Uninsured third party Claims have been filed for which the Contractor is responsible for under the Contract or reasonable evidence exists indicating likelihood of the filing of such Claims;
- (d) Failure of Contractor to make payments when due to Subcontractors or suppliers for Work performed or labor or materials furnished for Contractor, provided Owner has previously made payment to Contractor for such amounts under the Contract Documents;
- (e) Uninsured physical damage to the property of Owner or any separate Contractor for which the Contractor is responsible for under the Contract;
- (f) Failure to carry out the Work in accordance with the Contract Documents following notice from Owner to carry out such Work;
- (g) If the Schedule of Values has been amended, modified, revised or supplemented since the last progress payment, failure by Contractor to provide the Schedule of Values with the next Application for Payment following notice from Owner provide such Schedule of Values;
- (h) Failure by Contractor to provide the updated Project Schedule or Monthly Report with the Application for Payment following notice from Owner provide such Project Schedule or Monthly Report;
- (i) Failure by Contractor to maintain an up-to-date set of As-Built Drawings and Composite As-Built Drawings as provided in the Contract Documents;
- (j) To the extent payment has been made by the Owner, filing by any of Contractor's laborers, suppliers, Subcontractors or their sub-Subcontractors of a mechanic's lien against the Project Site, and Contractor has not caused the lien to be discharged or bonded; provided that the amount withheld shall not exceed the amount of the lien plus any reasonable expenses which may be incurred in discharging the lien;

- (k) An Event of Default shall have occurred;
- (l) Material failure of Contractor to perform its obligations under the Contract Documents;
- (m) Failure of Contractor to provide Owner with satisfactory releases and lien waivers following notice from Owner provide such releases and lien waivers;
- (n) Failure of Contractor to provide appropriate personnel in accordance with the requirements of the Contract Documents, if any;
- (o) Failure of Contractor to provide appropriate evidence of insurance in conformance with the requirements of the Contract Documents, if any;
- (p) Failure of Contractor to provide Owner with a complete set of Project Documents for any portion of the Work which has been completed and accepted by Owner following notice from Owner provide such Project Documents; or
- (q) If any part of such payment is attributable to Work which is not performed in accordance with the Contract Documents following written notice from Owner or Owner's representative and reasonable time to cure.

§ 9.5.2 If and when any of the conditions giving rise to the disapproval, withholding or nullification described in Article 9.5.1 have been cured, payment will be made of the applicable withheld amounts, subject to Owner's right to withhold payment, or retain a portion thereof, as may be provided elsewhere in this Agreement.

§ 9.5.3 If Owner is permitted under the provisions of this Article 9.5 or any other provisions of this Agreement to disapprove payment, in whole or in part, or withhold or nullify any payment to Contractor, and Owner does in fact do so, Contractor shall continue to perform the Work despite such action by Owner. Any stoppage of the Work by Contractor due to such action by Owner shall be a material breach of this Agreement. Owner shall not be deemed to be in breach of this Agreement by reason of any such disapproval, withholding or nullification.

§ 9.5.4 RIGHT OF OFFSET

In addition to any right of setoff provided by law, all amounts due Contractor shall be considered net of indebtedness of Contractor to Owner and its Affiliates, or any damages due to Owner hereunder by reason of Contractor's breach of this Agreement and Owner may deduct any amounts due or to become due from Contractor or its Subcontractors or to become due from Owner to Contractor or its Subcontractors.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 Within thirty (30) days after Owner's and Architect's approval of the Contractor's final Application for Payment, the Owner shall pay the Contractor the amount corresponding to the portion of the Work actually performed and approved by Owner in accordance with the Contract Documents, less a retainage equal to ten percent (10%) of the amount requested in such Application for Payment provided that:

- (a) No mechanic's, laborer's, vendor's, material man's or other liens shall remain of record in connection with the Project on account of the Work performed or any of the materials or equipment incorporated therein or purchased in connection therewith, and
- (b) The Contractor has furnished executed waivers of lien from the Contractor and from all Subcontractors and material men for the Work done and materials furnished through the date covered by the Application for Payment and
- (c) The Contractor has furnished an affidavit of payment certifying that all laborers, Subcontractors and material men have been paid for the Work performed and materials furnished through such date except for any permitted retainage.

§ 9.6.2 NO WAIVER

No progress payment made hereunder shall be deemed to constitute Owner's final acceptance or approval of the Work to which such progress payment relates or to relieve Contractor of any of its obligations, or waive any of Owner's rights or remedies, with respect to said Work.

§ 9.6.3 PAYMENTS TO SUBCONTRACTORS AND MECHANIC'S LIENS.

§ 9.6.3.1 To the extent payment has been made by Owner, Contractor shall promptly pay all costs incurred by it in connection with Work performed by the Subcontractors. If Contractor fails to promptly pay any such costs, Owner reserves the right to apply any monies due to Contractor towards the payments of said costs.

§ 9.6.3.2 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.3.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.3.4 If any Subcontractor, or anyone claiming by, through or under such Subcontractor, shall file or cause to be filed any mechanic's lien, notice of pendency, stop order or comparable lien or filing, Contractor shall, within ten (10) business days after of learning of said filing, whether from Owner or any other source, cause the same to be discharged of record, by bonding or otherwise; provided, however, the Contractor shall not be required to cause such discharge if the Owner shall have failed to pay the Contractor for the Work which is the subject of said filing when such payment was due in accordance with the terms of this Agreement. In the event Contractor shall have failed to effectuate said discharge within said ten (10) day period, Owner shall have the right to do so, by bonding or otherwise, and, in that event, any expense incurred by Owner in connection therewith, including the premiums due for any bond furnished for such discharge and reasonable attorneys' fees and disbursements, shall be paid by Contractor upon demand or, at the option of Owner, shall be deducted from any payment then due or thereafter becoming due from Owner to Contractor under this Agreement.

9.6.4 STORED MATERIALS

9.6.4.1 Unless otherwise agreed in writing, and notwithstanding anything to the contrary contained in this Agreement, Owner will make payment only on account of equipment and materials purchased by Contractor for installation and incorporation into the Project when such equipment and materials have been installed.

9.6.4.2 However, when such materials and equipment are needed to maintain the sequence of the Work and have been delivered to and safely stored and protected at the Site, or at an off-site location approved in advance and in writing by Owner, Owner will make payment on account of said materials and equipment if the following conditions shall have been fulfilled:

- (a) Owner shall have verified the storage of the same;
- (b) If the materials are stored off-site, then Owner will only make payment on account of fabricated materials (i.e., not raw materials);
- (c) Compliance by Contractor with procedures satisfactory to Owner to establish Owner's title to such stored equipment and materials or otherwise protect Owner's interest, which procedures shall include, for any such equipment and fabricated materials stored off the Site, applicable insurance, storage and transportation to the Site;
- (d) Title to any such equipment and fabricated materials stored off-site passing to Owner upon payment therefor; provided, however, that Contractor shall bear the risk of loss of such equipment and fabricated materials at all times while such equipment and fabricated materials are stored off-site and during transportation to the Site, and Contractor shall be responsible for the proper care, storage, preservation, insurance and protection of all such equipment and fabricated materials; and
- (e) The equipment and fabricated materials stored off-site shall be appropriately tagged and segregated in order to further protect Owner's interest therein prior to delivery thereof to the Site.

9.6.4.1 Contractor hereby absolutely and unconditionally guarantees to Owner delivery of all equipment and fabricated materials stored off-site as aforesaid, free and clear of all liens and encumbrances, and all such equipment and fabricated materials stored off-site, and all of Contractor's covenants and obligations in connection therewith, shall be covered by Contractor's performance and payment bonds under the Contract Documents, if any.

§ 9.6.5 NO SECURITY INTERESTS Contractor shall not enter into any contract for the supply of any component of the Work which purports to grant a security interest or right of repossession to any person or entity respecting the Work or the Project Site, or any portions thereof or chattels placed thereon.

§ 9.6.6 CONTRACTOR'S RECORDS Contractor shall maintain accurate records, on a generally accepted accounting basis acceptable to Owner, of the items constituting the cost of the Work, the hours worked by Contractor's Representatives in the performance of the Services, the name and job title of such Contractor's Representatives, and the compensation paid to it. Prior to Final Completion, upon reasonable notice from Owner, these records shall be available at Contractor's office during business hours for review and copying by Owner and its representatives and employees. Contractor shall retain these records for a period of six (6) years after Final Completion or the earlier termination of this Agreement.

§ 9.6.7 SEPARATE ACCOUNTS Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

§ 9.7.1 If the Owner does not pay the Contractor within the timeframe established in the Agreement, through no fault, breach of the Contractor or other condition outlined in Article 9, then the Contractor may, upon ten (10) additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use, and only minor items which can be corrected or completed without any material interference with the Owner's use of the Work remain to be corrected or completed. As a condition precedent to Substantial Completion, the Owner shall have received all Certificates of Occupancy and any permits, approvals, licenses, and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial occupancy of the Project.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any items, whether or not included on the Contractor's list, which are not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall complete or correct all items identified by the Contractor and the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is considered by the Architect to be substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on a Punch List prepared by the Architect.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them. Upon such acceptance (and Consent of Surety, if any), the Owner can make payment of some designated portion of the retainage applying to such Work. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.5 The Contractor shall complete all Punch List items within twenty (20) calendar days of receipt of the Punch List. Should the Contractor fail to complete the Punch List work, the Owner may, without further delay, terminate the Contract, withhold all further payments, and complete all remaining work or portions thereof, deducting all costs to administer, perform, and inspect the completion of the work from the balance due upon the Contract.

§ 9.8.5 Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage, provided such occupancy or use is consented to by the insurer as required under Article 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence, whether or not the portion is substantially complete, upon written notice to the Contractor. The Contractor shall continue with the Work as per the directions of the Owner. Such occupancy does not relieve the Contractor from completing the Work within the time period specified. When the Contractor considers a portion substantially complete, the Contractor shall submit a written and a list of outstanding items to the Architect as provided under Article 9.8.3. The stage of the progress of the Work shall be determined by the Owner and the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to (1) determine and record the condition of the Work and (2) to prepare a complete Punch List of omissions of materials, faulty workmanship, or any items that are damaged, need repair, removal or replacement.

§ 9.9.3 Partial occupancy or use of a portion or portions of the Work nor shall not constitute acceptance of Work. Further occupancy alone shall not determine when substantial completion has been reached.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Article 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 FINAL PAYMENT

§ 9.10.2.1 Contractor shall submit its Applications for Payment for the Final Payment within twenty (20) business days after Owner and Architect have determined, following final inspection, that the Work has been fully completed in accordance with the Agreement and the Project has reached Final Completion. In order for Owner to make the Final Payment, such Applications for Payment shall contain, and be accompanied by, the information and documents required for the Applications for Payment for progress payments specified in this Article and, in addition, the following:

- (a) All of the Contract Documents (including but not limited to final Composite As-Built Drawings);
- (b) All manuals, warranties, instructions for equipment, appliances, fixtures, and systems installed as part of the Work;
- (c) A certification from each Subcontractor that all of the Project Documents for which such Subcontractor was responsible have been delivered by said Subcontractor to Contractor and are complete and accurate;

- (d) Any evidence that Owner may require in order to demonstrate that all Subcontractors, suppliers and laborers have fully discharged their respective obligations and been paid or will be paid in full from the proceeds of the Final Payment;
- (e) A letter from the Architect stating that all items have been completed;
- (f) Contractor's Final Affidavit and Release of Claims, to the extent payment is made by the Owner;
- (g) A Subcontractor's Final Affidavit and Release of Claims executed by all Subcontractors and any person who has filed a lien against the Project Site, to the extent payment is made by the Owner;
- (h) If required by Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, Claims, security interests or encumbrances arising out of the Agreement, to the extent and in such form as may be designated by Owner; and
- (i) Consent to the Final Payment required of sureties, if any.

§ 9.10.2.2 In addition, neither final payment nor any remaining retained percentage shall become due until the Contractor submits:

- (a) An affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied,
- (b) A certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner,
- (c) A written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents.

§ 9.10.2.3 If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of the Final Payment to Contractor shall not constitute a waiver of any Claims by Owner arising from:

- (a) Unsettled liens,
- (b) Defective Work not discovered by Owner until after making said Final Payment,
- (c) Contractor's failure to perform any Work in compliance with the requirements of this Agreement,
- (d) The terms of any warranties or guarantees required by this Agreement or provided at law or in equity, or
- (e) Claims, demands or damages that are discovered or which arise after Final Payment, or which are covered by any indemnity set forth in this Agreement.

§ 9.10.5 The acceptance by Contractor of the Final Payment shall constitute a waiver of all Claims by Contractor except for third party bodily injury and property damage Claims and those made in writing and identified by Contractor as unsettled no later than the date the invoice for such payment is submitted to Owner.

§ 9.10.6 Contractor shall submit all required close-out documentation within sixty (60) days from the time the Architect submits a Punch List of items to be corrected. If the documentation has not been submitted, the Owner will obtain such through whatever means necessary. The Contractor shall solely be responsible for all expenses incurred

by the Owner, provided the Owner has advised the Contractor of this action thirty (30) days prior to the expiration of the sixty-day period and again, seven (7) days prior to that date by written notice.

§ 9.10.7 Title to all completed or partially completed work at the jobsite, and to all materials delivered to and stored at said job site which are intended to become a part of the complete work covered by the Contract, shall be in the name of the Owner. Notwithstanding the foregoing, and prior to acceptance of the complete work by the Owner, the Contractor shall be liable for all loss of or damage to said completed work, partially completed work, materials furnished by the Contractor, and materials or equipment furnished by others, the custody of which has been given to the Contractor, arising from any cause other than those against which the Owner herein undertakes to carry insurance. In the event of loss or damage from cause other than those against which the Owner undertakes to carry insurance, the Contractor shall replace or repair the said work or materials at his own cost and expense, to complete satisfaction of the Owner and the Architect.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

§ 10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.1.2 The Owner and the Architect have no responsibility or liability whatsoever for any safety programs or procedures, or for the management of any issues pertaining to safety at the Project.

§ 10.1.3 It shall be the sole responsibility of the Contractor to maintain a copy of the safety procedures on the Site, and to conduct weekly safety meetings with their employees. A copy of the minutes from each weekly meeting shall be a pre-requisite to each monthly Application for Payment.

§ 10.1.4 Contractor shall be responsible for initiating, maintaining and supervising the safety precautions and programs in connection with the Work, including safety of all persons and property during performance of the Work. This requirement shall apply continuously throughout the course of the Work and shall not be limited by normal working hours. Contractor shall take all reasonable precautions and safety measures, including those listed in the Contract Documents (which are presumably deemed reasonable), for the safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

- (a) Owner's property and all the Work to be incorporated therein, whether in storage on or off the Project Site, under care, custody or control of Contractor or Subcontractors or sub-Subcontractors;
- (b) Other property at the Site or adjacent thereto, including the buildings, trees, shrubs, lawns, stairways, passageways, pavements, roadways, structures, systems, equipment and utilities;
- (c) All employees of Contractor, Subcontractors, separate Contractors and all other persons who may be affected by the Work; and
- (d) All persons at the Site, including, but not limited to, Owner's members, employees, guests, visitors, licensees and invitees.

§ 10.1.5 The Contractor shall implement and maintain a safety program that ensures Site safety in accordance with all requirements of any insurer and all Applicable Laws, including, without limitation, those implemented by the Occupational Safety and Health Administration ("OSHA") and the municipality in which the project is located. Contractor shall be responsible for the safe keeping of materials, equipment and tools stored on Site by securing same in designated areas, to be locked and safeguarded by the Contractor.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 Owner places, and requires Contractor to place, the highest importance on health and safety during performance of the Work by Contractor. Contractor shall, at all locations where Work is to be performed, comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss. Contractor shall also ensure that all of its employees and Subcontractors are made aware of all safety, fire and health requirements and regulations applicable to the Work to be performed pursuant to the Contract Documents.

§ 10.2.2 Contractor's Key Personnel shall provide adequate Site supervision and act to prevent accidents and enforce safety codes and regulations. Key Personnel shall have the requisite training and abilities to ensure a safe Site in accordance with the requirements of Applicable Laws and insurers.

§ 10.2.3 The Contractor shall designate a responsible member of the Contractor's organization at the site who is responsible for site safety. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.4 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying Owners and users of adjacent sites and utilities.

§ 10.2.5 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor give the Owner reasonable advance notice and shall maintain on site a full set of safety instructions relating to all such materials, equipment or methods. The Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.6 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.7 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Articles 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a sub-Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Articles 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Article 3.18.

§ 10.2.8 INJURY OR DAMAGE TO PERSONS OR PROPERTY

§ 10.2.8.1 If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.2.8.2 When the project is located in New York State, the Contractor acknowledges that the Labor Law of the State of New York, and the regulations adopted thereunder, place upon both the Owner and the Contractor certain duties, and that liability for failure to comply therewith is imposed on both the Owner and Contractor regardless of their respective fault. The Contractor hereby agrees that, as between the Owner and the Contractor, the Contractor is solely responsible for compliance with all such laws and regulations imposed for the protection of persons performing the Contract. The Contractor shall indemnify and hold harmless the Owner, the Architect, their employees, consultants and representatives from any and all liability for violation of such laws and regulations and shall defend any claims or actions which may be brought against the Owner as the result thereof. In the event that the Contractor shall fail or refuse to defend any such action, the Contractor shall be liable to the Owner for all costs of the Owner in defending such claim or action and all costs to the Owner, including attorney's fees, in recovering such defense costs from the Contractor. This paragraph shall also apply to any notices or violations received from or penalties imposed by any board, agency, or commission exercising jurisdiction over the Project or Project site.

§ 10.2.8.3 The Contractor further agrees that it shall conform to the requirements of the Occupational Safety and Health Act of 1970 (OSHA) as amended and the Construction Safety Act of 1969 as amended, including all standards and regulations that have been or shall be promulgated by the governmental authorities which administer such acts, and shall hold harmless the Owner, the Architect, and all their employees, consultants and representatives from any and all claims, damages, losses, suits, obligations, fines, penalties, costs, charges and expenses which may be imposed upon or incurred by or asserted against any of the by reason of any act or omission of such Contractor or Subcontractor or any person or firm directly or indirectly employed by such Contractor, with respect to violations of OSHA requirements, rules and/or regulations.

§ 10.2.8.4 The Contractor shall promptly report in writing to the Owner and the Architect all accidents arising out of or in connection with the Work which cause death, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner and the Architect.

§ 10.2.9 PROPERTY PROTECTION

§ 10.2.9.1 When all or a portion of the Work is suspended for any reason, the Contractor shall securely fasten down all coverings and protect the Work, as necessary, from damage by any cause.

§ 10.2.9.2 When inclement or adverse weather conditions are expected, Contractor shall securely fasten down all coverings and material onsite, and protect the Work, as necessary, from damage by any cause.

§ 10.2.9.3 No equipment, other than equipment with rubber tires, will be allowed on any existing or new pavement within the limits of the Contract, unless the pavement has been protected with proper planking or other means as approved by the Architect.

10.2.9.4 The Contractor shall be responsible for maintaining a watertight structure. This shall include new construction, additions and existing buildings. The Contractor shall be responsible for temporary roofing, tarps, and other protection at roofs, cavity walls, etc. Should the Contractor fail to provide adequate protection, causing flooding, damage, or other disturbance to occur in existing or new buildings, Contractor shall be responsible for all costs associated with clean up and repairs.

10.2.9.5 In as much as flooding and damage have safety implications to the general public, clean up and repairs may be made by the Owner without warning to the Contractor. Administration costs incurred by the Owner and Architect will also be back charged to the Contractor. The Contractor, by entering into Contract with the Owner agrees to be liable for these costs.

10.2.9.6 Temporary partitions are to be constructed where shown on Drawings or where otherwise required for safety of the public or to prevent dust from entering occupied areas. Partitions shall be dustproof from floor to the underside of structure. Temporary partitions shall be made from framing and sheetrock, and shall have plastic on the work area side. If an access door is required, an alternating 3 layer plastic system shall be used. Any doors in temporary partitions shall be a standard hollow metal door with lockset and closer. Keys shall be provided to the Owner.

10.2.9.7 The Contractor shall guard against losses or damage arising from the nature of the work to be done under this Contract or from any unforeseen or unusual obstructions or difficulties which may be encountered in processing the work or from the actions of the elements including water, wind and frost. The Contractor shall maintain suitable adequate safeguards to protect all property and personnel, public or private.

10.2.9.8 The Contractor shall protect all completed Work in place from on-going construction activities and shall provide such protection wherever and whenever requested to do so by the Owner or Architect.

§ 10.2.10 FIRE PROTECTION

§ 10.2.10.1 The Contractor shall take all necessary precautions to insure against fire during construction and be responsible to endure that the area within Contract limits is kept orderly and clean and that combustible rubbish shall be stored on the site in such a manner and at such locations as designated by Owner to:

- (a) Provide and maintain adequate fire protection. The fire protection shall be adequate at all times, and shall be subject to applicable codes and regulations.
- (b) Comply with regulations, OSHA standards, codes of local Fire Marshal, agencies and departments having jurisdictions.

§ 10.2.10.2 The Contractor shall be required to keep fire alarm systems operational at all times or provide a fire watch approved by the local Fire Marshal.

§ 10.2.10.3 The Contractor shall provide shielding for heat and keep smoke and fire detectors from accidentally going off. Contractor will be back charged for all fines imposed for false alarms and for costs incurred by the Owner including, but not limited to, custodial overtime, alarm monitoring company, consultants, etc.

§ 10.2.10.4 shall provide approved spark arresters on all steam engines, internal combustion engines and flues.

§ 10.2.10.5 No fires shall be built on the Project site nor shall open flame devices of any kind be employed within any building or structure except for field welding with supervised fire watch.

§ 10.2.10.6 Free access to fire hydrants and standpipe connections shall be maintained at all times during construction operations, and portable fire extinguishers shall be provided by the Contractor and made conveniently available throughout the Project site. The Contractor shall notify its employees and Subcontractors of the location of the nearest fire alarm box at all locations where work is in progress.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. The term "Hazardous Materials" is defined in Article 1.1.9 of these General Conditions. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Article 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Article 10.3 for hazardous materials or substances the Contractor brings to the site.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Article 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

Contractor shall, at its own cost and expense, obtain and keep in full force and effect those insurance policies set forth in Exhibit A for the coverage amounts that are no less than the minimum coverage amounts set forth in Exhibit A. Contractor's insurance coverage shall be subject to the following terms and conditions:

- (a) Contractor's insurance shall cover the activities of Contractor, any Subcontractor and anyone directly or indirectly employed by Contractor or any Subcontractor (including anyone for whose acts any of them are liable). Such insurance shall be continuously maintained during the entire term of the Agreement.
- (b) Contractor shall not commence the Work until Contractor has furnished two copies of certificates of insurance in a form satisfactory to Owner evidencing that Contractor has obtained insurance in accordance with Exhibit A. Such certificates must provide that the insurer will give Owner at least forty-five (45) business days' prior written notice of material change in, or cancellation of, such insurance. If a certificate expires, a renewal certificate is required before any employee is allowed on the Site. Delivery of any certificate of insurance to Owner shall not constitute Owner's approval or agreement that Contractor's insurance requirements have been met or that the insurance policies shown in the certificates of insurance are in compliance with these requirements.
- (c) Contractor's insurance shall be written in form and substance reasonably satisfactory to Owner by a reputable insurance company authorized to do business in the state where the work is to be performed with a Best's rating of A-VIII or better.
- (d) Contractor's insurance will be primary and non-contributory with respect to Owner's insurance or self-insurance programs.
- (e) Owner makes no representation that the insurance required herein will necessarily be adequate to protect Contractor. Contractor's insurance obligations will not reduce or limit Contractor's obligation to indemnify Owner pursuant to the terms of this Agreement.
- (f) To the extent commercially available, with the exception of Contractor's worker's compensation insurance, Contractor's insurance policies will include the obligation to defend and include the Additional Insureds listed on Exhibit A (which include but may not be limited to Owner, Owner's Lender, the Architect, and their directors, officers, representatives, agents, and employees) as additional insureds on a primary basis for Work performed under or incidental to this Agreement. If an Additional Insured has other insurance applicable to the loss, it will be on an excess or contingent basis. Neither Contractor's obligation to provide insurance nor the scope of such insurance coverage shall be reduced by the existence of such other insurance.
- (g) All of Contractor's insurance policies required herein shall include clauses stating that each underwriter will waive all rights of recovery, under subrogation or otherwise, against the Additional Insureds, including Owner, Owner's property manager, and their directors, officers, representatives, agents, and employees and all tiers of Subcontractors or consultants engaged by them. Contractor will require similar written waivers from all Subcontractors on behalf of all parties enumerated in this Article.
- (h) The Contractor will cause each Subcontractor employed by Contractor to purchase and maintain insurance of the types and in the amounts specified below. When requested by Owner, Contractor will furnish copies of certificates of insurance evidencing coverage for each Subcontractor pursuant to the requirements described herein.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner, at its cost and expense, will obtain and maintain "all risk" builder's risk insurance covering direct damage for the full insurable value of all labor and materials relating to the construction of the Project, prior to and during construction, until Final Completion. The policy will insure Owner, the Contractor and Subcontractors and suppliers as their interest may appear, and shall provide for reimbursement, in the event of a Claim for loss, of the cost of repairing, restoring or replacing, reconditioning or re-erecting the property lost or damaged with materials of similar kind and quality, including, but not limited to, the cost of materials, labor, supervision, engineering, expediting, expenses, transportation, insurance premiums and taxes.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Article 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Article 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and sub-Subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, false work, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss. Property insurance provided by the Owner shall not cover any tools, apparatus, machinery, scaffolding, hoists, forms, staging, shoring and other similar items commonly referred to as construction equipment, which may be on the site and the capital value of which is not included in the Work. The Contractor shall make its own arrangements for any insurance it may require on such construction equipment.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and sub-Subcontractors in the Work.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 The Contractor shall provide insurance coverage for portions of the Work stored off the Project site after written approval from the Owner of the value established in the approval. The Contractor shall provide insurance coverage for portions of the Work in transit, and stored on the site, but not incorporated into the Work as full replacement cost basis without voluntary deductible.

§ 11.3.1.5 Partial occupancy or use in accordance with Article 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and sub-Subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Article 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of certificates of insurance evidencing such insurance coverages required by this Article 11.3. Each certificate shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

If permitted by their respective insurance companies, without penalty, the Owner and Contractor waive all rights against (1) each other and any of their Subcontractors, sub-Subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate Contractors described in Article 6, if any, and any of their Subcontractors, sub-Subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent of actual recovery of any insurance proceeds under property insurance obtained pursuant to this Article 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner if acceptable to the respective insurance companies. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate Contractors described in Article 6, if any, and the Subcontractors, sub-Subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Article 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their sub-Subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the

method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.3.11 The Contractor shall pay all deductibles of the Owner's insurance for claims as a result of the negligence of the Contractor.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND (IF REQUIRED)

§ 11.4.1 If requested by Owner, Contractor shall obtain and execute payment and performance bonds, issued by surety companies satisfactory to Owner, guaranteeing the full performance by Contractor of its obligations under this Agreement and the full payment of all obligations incurred by it hereunder (which payment bond shall provide a direct right of action against the surety by a claimant). Each such bond shall be in the sum equal to one hundred ten percent (110%) of the estimated Budget at the time this Agreement is entered and shall:

- (a) Name Owner as the obligee, be in form and substance satisfactory to Owner, and
- (b) Be underwritten by a surety company authorized to do and doing business in the State of New York and
- (c) Be in the forms acceptable to the Owner and prescribed by Law or Regulation or by the Contract Documents and be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department.

All bonds signed by an agent must be accompanied by a certified copy of the authority to act. Note: Surety must have an A.M. Best rating of "A" or better.

§ 11.4.1.1 Contractor shall require each Subcontractor to furnish a performance bond upon execution of its Subcontract unless such requirement is specifically waived in writing by Owner for particular Subcontractors. Each such bond shall be in the sum equal to one hundred ten percent (100%) of the Subcontract price, shall name Contractor and Owner as co-obligees, shall be in form and substance satisfactory to Owner and shall be underwritten by a surety company authorized to do and doing business in the State and otherwise reasonably satisfactory to Owner.

§ 11.4.1.2 The premiums payable with respect to any such payment and performance bonds shall be paid directly by the Contractor and shall not be deemed to constitute a part of the Cost of the Work or the basis upon which the Base Fee is determined. The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.1.3 The Bonds shall remain in effect for a period not less than two (2) years following the date of Substantial Completion or the time required to resolve any items of incomplete work and the payment of any disputed amounts, whichever period is longer.

§ 11.4.1.4 No performance of payment bond shall require, as a condition precedent to termination of a Contract or Contractor, that any meeting be arranged or held with a Contractor (Principal) and/or surety, prior to such termination. Any such requirement(s) shall be void and unenforceable and the Owner shall have the right to reject such bond(s) and/or ignore such condition. The exclusive method of termination of a Contract or Contractor is contained in the Contract Documents and a Contractor and surety expressly agree to be bound thereby.

§ 11.4.1.5 If the surety on any Bond furnished by Contractor is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of the above paragraphs, Contractor shall within five days thereafter substitute another Bond and Surety, both which must be acceptable to the Owner.

11.4.1.6 The Contractor shall require the attorney in fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his power of attorney indicating the monetary limit of such power.

11.4.1.7 Every Bond under this Article 11.5.1 must display the Surety Bond Number. A rider including the following provisions shall be attached to each Bond:

(a) Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change or other modification of the Contract Documents. Such addition, alteration, change, extension of time, or other modification of the Contract Documents, or a forbearance on the part of either the Owner or the Contractor to the other, shall not release the Surety of its obligations hereunder and notice to the Surety of such matters is hereby waived.

(b) Surety further agrees that in event of any default by the Owner alleged by the Contractor in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor or Surety shall cause written notice of such default (specifying said default in detail) to be given to the Owner, and the Owner shall have thirty (30) days from the time after receipt of such notice within which to cure such default, or such additional reasonable period of time as may be required if the nature of such default is such that it cannot be cured within thirty (30) days.

(c) Alternatively, the Owner may acknowledge receipt of such written notice, respond stating it is not in default, specifying the reasons for such statement. Such Notice of Default shall be sent by certified or registered U.S. mail, return receipt requested, first class postage prepaid, to Lender and the Owner.

(d) Surety agrees that it is obligated under the bonds to any successor, grantee or assignee of the Owner.

(e) Surety shall be liable for the costs of litigation expenses, including but not limited to reasonable attorney's fees incurred by the Owner in defending a claim or lien filed by a Subcontractor or material man.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.4.3 The Contractor shall deliver the required bonds to the Owner no later than fourteen (14) days after receiving a fully-executed Contract.

§ 11.4.4 The Contractor shall keep the Surety informed of the progress of the Work, and where necessary, obtain the Surety's consent to, or waiver of:

- (a) Notice of changes in the Work;
- (b) Request for reduction or release of retainage;
- (c) Request for final payment and
- (d) Any other material required by the Surety.

§ 11.4.4.1 The Owner shall be notified by the Contractor, in writing, of all communication with Surety. The Owner may, in the Owner's sole discretion, inform Surety of the progress of the Work and obtain consents as necessary to protect the Owner's rights, interest, privileges and benefits under and pursuant to any bond issued in connection with the work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time or Contract Sum.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate Contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, and any cost, loss or damages to the Owner resulting from such actions shall be at the Contractor's expense. If prior to the date of Substantial Completion, the Contractor, a Subcontractor or anyone for whom either is responsible uses or damages any portion of the Work or premises, including, without limitation, mechanical, electrical, plumbing and other building systems, machinery, equipment or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Article 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Article 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. Contractor shall, within a reasonable time after receipt of notice thereof, but in no event later than seventy-two (72) hours after receipt of such notice, commence to correct, repair, and make good any defects in the Work. If Contractor fails to begin correction of nonconforming Work within the timeframe noted above, the Owner or Architect, the Owner may correct it at the expense of the Contractor.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Article 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate Contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Article 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Article 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.2.6 The Contractor shall deliver to the Owner, before final payment is made on the Contract, all required written guarantees/warranties in form acceptable to Architect and Owner's Representative properly sworn to and signed by a responsible officer of the Contractor's firm, warranting all work and materials included in its Contract against all defects not due to ordinary wear and use for a period of one (1) year, or as amended in the Contract Documents, from the Date of Substantial Completion.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

§ 13.1.1 The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Article 15.4.

§ 13.1.2 Historical lack of enforcement of any law, local or otherwise, shall not constitute a waiver of Contractor's responsibility for compliance with such law in a manner consistent with the Contract Documents unless and until the Contractor has received written consent for the waiver of such compliance from the Owner and the Agency responsible for the law enforcement.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Article 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract. The Contractor shall not assign any monies due to or to become due to it under the Contract without the previous consent of the Owner.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

§ 13.3.1 All notices to be given hereunder shall be in writing and may be given, served, or made by (1) depositing the same in the United States mail addressed to the authorized representative (as specified below) of the party to be notified, postpaid and registered or certified, return receipt requested; or (2) depositing the same for overnight delivery (prepaid by and billed to the party giving notice) with a nationally-recognized overnight delivery service addressed to the authorized representative of the party to be notified; or (3) delivering the same in person to the authorized representative of the party being notified; or (4) facsimile, to the attention of the authorized representative of the party being notified, with the requirement of a facsimile confirmation. Notices deposited in the United States mail shall be effective, unless otherwise stated in the Specifications, from and after the fourth day next following the date deposited in a United States mail receptacle or when actually received, whichever is earlier. Notices transmitted by overnight delivery shall be effective the business day next following posting. Notices delivered in person shall be effective immediately. Facsimile notices shall be effective as of the time received, as shown on a printed facsimile confirmation.

§ 13.3.1.2 All notices to be given to the parties hereto shall be sent to or made at the following address: (INSERT NAME OF CONTACT AND ADDRESS)

- (a) Owner
- (b) Owner's Representative (if applicable)
- (c) Architect
- (d) Contractor

§ 13.3.2 The parties identified in Article 13.3.1 hereby designate and appoint those persons as their representatives, respectively, to receive all notices and communications hereunder and, to the extent of their obligations hereunder, to act for them in all respects. Either party may designate another person from time to time, by appropriate written notice to the other parties.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Except as expressly provided in the Contract Documents, duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law or in equity or by other agreement, and such rights and remedies shall survive acceptance of the Work and/or termination of the Contract.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Article 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Article 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Articles 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.3.1 The Contractor agrees that the cost of testing services required for the convenience of the Contractor in his scheduling and performance of the Work, and the cost of testing services relating to remedial operations performed to correct deficiencies in the Work shall be borne by the Contractor.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5.7 Upon request, the Contractor shall deliver tests samples of any of the materials specified in these specifications to an independent testing agency. The Owner shall pay for the test of samples which are found to conform to the specifications. The Contractor shall pay for the tests of samples which do not conform to the specifications. This shall not relieve the Contractor of his obligations to perform specific tests described elsewhere in these specifications.

§ 13.5.8 Where the specifications require part of the work to be specifically tested and approved, it shall not be tested or covered up without timely notice thereof or consent thereto. Should any part of the work be covered up without notice, approval or consent, such part of the work shall be uncovered for examination at the Contractor's expense if the Owner shall so require.

§ 13.5.9 Where operating tests are specified, the Contractor shall test the work as it progresses, on his own account, and shall make satisfactory preliminary tests in all cases before applying for official test.

§ 13.5.10 Test shall be made in the manner specified, for the different branches of the Work. Each test shall be made on the entire system for which such test is required, wherever practical. In case it is necessary to test portions of the work independently, the Contractor shall do so.

§ 13.5.11 Should defects appear, they shall be corrected by the Contractor and the test repeated until the installation is acceptable.

§ 13.5.12 When notice of tests is to be given to the Architect, it shall also be given to the Owner's Representative.

§ 13.5.13 All paragraphs wherein the Architect is entitled to additional compensation from the Contractor shall be revised to reflect that the Owner's Representative is also so entitled.

§ 13.6 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Article 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of ninety (90) consecutive days through no act or fault of the Contractor or a Subcontractor, sub-Subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- a. Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- b. An act of government, such as a declaration of national emergency that requires all Work to be stopped.

§ 14.1.3 If one of the reasons described in Article 14.1.1 exists, the Contractor may, upon fourteen (14) days' written notice to the Owner and Architect, terminate the Contract unless such reason is cured prior to the expiration of the notice period and recover from the Owner payment for Work properly executed in accordance with the Contract Documents prior to the effective date of termination.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor:

- (a) Refuses or fails to supply sufficient skilled workers, suitable materials, or equipment to complete the Work in a diligent, efficient, timely, workmanlike, skillful, and careful manner;
- (b) Fails to make prompt payment to Subcontractors for materials or labor or equipment in accordance with the respective agreements between the Contractor and the Subcontractors;
- (c) Disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- (d) Disregards the instructions of the Architect or the Owner, when such instructions are based on the requirements of the Contract Documents.
- (e) Is adjudged a bankrupt or insolvent, or makes a general assignment for the benefit of the Contractor's creditors, or a trustee or receiver is appointed for Contractor, or for any of its property, or files a petition to take advantage of any debtor's act or to reorganize under bankruptcy or similar laws; or
- (f) Breaches any warranty made by the Contractor under or pursuant to the Contract Documents.
- (g) Fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all the requirements of the Contract Documents.

- (h) Fails after commencement of the Work to proceed continuously with the construction and completion of the Work to reasonably assure completion within the Contract Time.
- (i) Fails to keep the Project free from strikes, work stoppages, slowdowns, lockouts or other disruptive activity as required by Article 3.4 hereof.
- (j) Or otherwise does not fully comply with the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner may, without prejudice to any other rights or remedies of the Owner, terminate employment of the Contractor upon three (3) days written notice and may:

- (a) Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and take possession of materials stored off-site by the Contractor;
- (b) Accept assignment of subcontracts pursuant to Article 5.4; and
- (c) Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work and the Contractor shall be back charged for costs incurred by the Owner.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Article 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and services of other professionals (including without limitation, attorneys' fees) and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner shall survive termination of the Contract.

§ 14.2.5 It is recognized that such events could impair or frustrate the Contractor's performance of the Contract:

- (a) if any order for relief is entered on behalf of the Contractor pursuant to Title 11 of the United States Code,
- (b) if any other similar order is entered under any other debtor relief laws,
- (c) if Contractor makes general assignment for the benefit of its creditors,
- (d) if a receiver is appointed for the benefit of its creditors, or
- (e) if a receiver is appointed on account of its insolvency.

§ 14.2.5.1 Accordingly, it is agreed that upon the occurrence of any such event, Owner shall be entitled to request of Contractor or its successor in interest adequate assurance of future performance in accordance with the terms and conditions of the Contract. Failure to comply with such request within ten (10) days of delivery of the request shall entitle Owner to terminate the Contract and to the accompanying rights set forth in Articles 14.2.1 through 14.2.3 hereof. In all events, pending receipt of adequate assurance or performance and actual performance in accordance therewith, Owner shall be entitled to proceed with the Work with its own forces or with other Contractors on a time and material or other appropriate basis, the cost of which will be back charged against the Contract Sum.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 In addition to Owner's right to suspend, delay or interrupt Contractor from any part of the Work pursuant to the Contract Documents, Owner may at any time, at will and with cause suspend, delay, interrupt any part of the Work or any subcontract or all Work for any reason whatsoever for such period of time as the Owner may determine by giving three (3) day's prior written notice to Contractor, specifying the part of the Work or subcontract to be suspended, delayed, or interrupted, and the effective date of such suspension, delay, or interruption, as the case may be. Contractor shall continue to prosecute the part of the Work not suspended, delayed, or interrupted, and shall properly protect and secure the part of the Work so suspended, delayed or interrupted, so far as is necessary in Owner's reasonable opinion.

§ 14.3.1.2 Notwithstanding Article 8.3 hereof, if the Work or any subcontract is so suspended, delayed, interrupted. Owner shall incur no liability to Contractor by reason of such suspension, delay or interruption except that Contractor shall be entitled to payment of reasonable standby fees (or at Owner's option, payment for demobilization and subsequent remobilization) and of cost directly associated with protecting and securing the affected Work, provided said cost are authorized in advance by Architect and Owner. No payments shall be made by Owner, however, to the extent that such Work of subcontract is, was or could have been suspended, delayed, or interrupted under the Contract Documents or an equitable adjustment is made or denied under another provision of the Contract. In case of such suspension, delay or interruption, Owner will issue a Construction Change Directive or authorize a Change Order, making any required adjustment to the Date of Substantial Completion and/or the Contract Sum. For the remainder of the Work, the Contract Documents shall remain in full force and effect.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. In addition to Owner's right to terminate Contractor from any part of the Work pursuant to the Contract Documents, Owner may at any time at will and without cause, terminate any part of the Work or any subcontract or all remaining Work for any reason whatsoever by giving three (3) days notice to Contractor, specifying the part of the Work or subcontract to be terminated and the effective date of termination. Contractor shall continue to prosecute the part of the Work not terminated.

§ 14.4.1.1 If the Work or any subcontract is so terminated, Owner shall incur no liability to Contractor by reason of such termination except that Contractor shall be entitled to payment for Work properly executed in accordance with the Contract Documents prior to the effective date of termination (the basis for such payment shall be as provided in the Contract) and for costs directly related to Work thereafter performed by Contractor in terminating such Work or subcontract, provided said Work is authorized in advance by Architect and Owner.

§ 14.4.1.2 No payment shall be made by Owner, however to the extent that such Work or subcontract is was, or could have been terminated under the Contract Documents or an equitable adjustment is made or denied under another provision of the Contract. In case of such termination, Owner will issue a Construction Change Directive or authorize Change Order, making any required adjustment to the Date of Substantial Completion and/or Contract Sum. For the remainder of the Work, the Contract Documents shall remain in full force and effect.

§ 14.4.2 Upon receipt of written notice of such termination for the Owner's convenience, the Contractor shall immediately, in accordance with instructions from the Owner, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Article:

- (a) Cease operations as directed by the Owner in the notice;
- (b) Take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- (c) Terminate all subcontracts and orders and enter into no further subcontracts for materials, labor, services, or facilities except as necessary to complete portions of the Work.
- (d) Place no further orders and enter into no further orders and enter into no further subcontracts for materials, labor, services, or facilities except as necessary to complete continued portions of the Work.
- (e) Proceed to complete the performance of the Work not terminated.

§ 14.4.3 Upon such termination, the Contractor shall recover as its sole remedy payment for Work properly performed in connection with the terminated portion of the Work prior to the effective date of termination and for items properly and timely fabricated off the Project site, delivered and stored in accordance with the Owner's instructions. The Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, anticipated profits.

§ 14.4.4 The Owner shall be credited for (1) payments previously made to the Contractor for the terminated portion of the work, (2) claims which the Owner has against the Contractor under the Contract and (3) the value of the materials, supplies, equipment or other items that are to be disposed of by the Contractor that are part of the Contract Sum.

§ 14.4.5 In the event the Owner commences legal proceedings against the Contractor, or same is commenced against

the Owner by the Contractor, the Contractor shall be liable to the Owner for the expenses incurred by the Owner in connection with said proceedings. Said expenses shall include reasonable attorney's fees, costs, interest, penalties, and/or witness fees.

§ 14.4.6 Upon determination by legal means (e.g. court action, etc.) that termination of Contractor pursuant to Articles 14.2.1 and 14.2.2 was wrongful, such termination will be deemed converted to a termination for convenience pursuant to Article 14.4.1 and Contractor's remedy for such termination shall be limited to the recovery of the payments permitted for termination for convenience as set forth in Article 14.4.1.

§ 14.5 Limitation of Owner's Liability

§ 14.5.1 The Owner shall not be responsible for damages or loss of anticipated profits on Work not performed on account of any termination of the Contract by it.

§ 14.5.2 The Owner shall not be liable to the Contractor for punitive damages on account of its termination of the Contract and the Contractor hereby expressly waives its right to claim such damages against the Owner.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Article 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents, provided that, if the claim involves a payment which the Owner believes is not warranted, said payment may be withheld pending resolution of the claim. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Article 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 Unit prices are different from lump sum allowances, unit price allowances, or alternates in that they are not included in either the Bid price or in the Contract amount. As such, any unit prices shall be reviewed and may be negotiated and amended by agreement between the Owner and the Contractor prior to the award of the Contract for construction. A list of accepted unit prices shall be made a part of the Contract and shall be attached to it for reference. However, the Owner shall not be obligated to accept these unit prices as the sole basis for Change Order work. Change Order pricing may be based on unit prices, time and material pricing or lump sum pricing

§ 15.1.5.3 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- (a) Damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- (b) Damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

§ 15.1.6.1 This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Article 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Articles 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Article 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions:

- (a) Request additional supporting data from the claimant or a response with supporting data from the other party;
- (b) Reject the Claim in whole or in part;
- (c) Approve the Claim;
- (d) Suggest a compromise; or
- (e) Advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either:

- (a) Provide a response on the requested supporting data;
- (b) Advise the Initial Decision Maker when the response or supporting data will be furnished; or
- (c) Advise the Initial Decision Maker that no supporting data will be furnished.

§ 15.2.4.1 Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall:

- (a) Be in writing;
- (b) State the reasons therefor; and
- (c) Notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both.

§ 15.2.5.1 The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Article 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Articles 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Article 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that:

- (a) The arbitration agreement governing the other arbitration permits consolidation;
- (b) The arbitrations to be consolidated substantially involve common questions of law or fact; and
- (c) The arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Article 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

ARTICLE 16 – ADDITIONAL CONDITIONS

§ 16.1 NO DAMAGES FOR DELAY

§ 16.1.1 Notwithstanding any other terms or conditions set forth in the Contract Documents, the Contractor agrees to make no claim for damages for delay in the performance of the work occasioned by any act or omission of the Owner or any of its representatives, and agrees that any such claim shall be fully compensated for by an extension of time to complete the Work.

§ 16.1.2 For projects where payments for the Work have been obtained through obligations or bonds which have been sold after public referendum: In the event the work is suspended or canceled as a result of the order of any court, agency, department, entity or individual having jurisdiction, or in the event the work is suspended or canceled due to the fact that court, agency, department, entity or individual having jurisdiction has issued an order, the result of which is that the afore said obligations or bonds are no longer available for payment for the work. Contractor expressly agrees that it shall be solely entitled to payment for work accomplished until a notice of suspension or cancellation is served upon Contractor. Contractor expressly waives any and all rights to institute an action, claim, cause of action or similar for any damages it may suffer as a result of the suspension or cancellation of the work and/or its Contract pursuant to this Section.

§ 16.2 PERFORMANCE AND SPECIFICATION STANDARDS

§ 16.2.1 Applicable codes and standards for material furnished and work installed shall include all state laws, local ordinances, requirements of governmental agencies having jurisdiction, and applicable requirements of the following codes and standards, including but not limited to:

- (a) Building Code of New York State (2010) and amendments thereto.
- (b) New York State Energy Conservation Code.
- (c) If the project is a public school in the State of New York: The New York State Education Department Manual of Planning Standards.
- (d) New York State Department of Transportation, Office of Engineering, Standard Specification, Construction and Materials, dated January 2, 1990, and latest addendum thereto.
- (e) Life Safety Code – NFPA 101-97.

§ 16.2.2 Where specific performance requirements are listed herein, it is the intent of this specification that all manufacturers, fabricators, suppliers, installers, Contractors, Subcontractors, specialty and sub-Subcontractors will provide services satisfying these requirements whether mentioned by trade or manufacturer's name or submitted for approval as a substitute.

§ 16.2.3 Wherever in the specifications reference is made to ANSI or ASTM Standards, Federal Specifications, Consumer Product Standards, or similar recognized standards, the latest edition of the respective publishing agency in effect at the date of "Bid Issuance" shall be accepted as establishing the technical requirements which shall be complied with, unless date of publication is recorded in the Specification.

§ 16.2.4 Where no explicit quality or standards for materials or workmanship are established for work, such work shall be a quality consistent with industry standards and of the construction quality established for the Project generally.

§ 16.3 BLASTING OPERATIONS

§ 16.3.1 Transportation, storage, and use of explosives shall be in strict accordance with all local, state, and federal regulations, statutes, and requirements. All safety precautions, as set forth in Section 9 – "Explosives" of the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc. shall be observed.

§ 16.4 WELDING

§ 16.4.1 The Contractor and each Subcontractor shall control the safe handling and storage of all welding materials, acetylene and oxygen tanks, and other equipment required for welding and cutting work at the job site.

§ 16.4.2 All welding materials and equipment shall be removed promptly from the premises upon completion of the welding and cutting work.

§ 16.4.3 Appropriate fire extinguishing equipment shall be provided where welding or cutting is to be performed. Sprinklers subject to fusing from heat due to welding or cutting shall be temporarily shielded, with valves to remain open. The Contractor will be back charged for all fines imposed for false fire alarms.

§ 16.4.4 Welding or cutting shall not be performed in or near rooms or locations where flammable gases, liquids or vapors, lint, dust or loose combustible stocks are present unless suitably protected.

§ 16.4.5 Combustible construction or material shall be wetted down or protected by non-combustible shields or covers from possible sparks, hot metal or oxide.

§ 16.5 VENTILATION DURING CONSTRUCTION

§ 16.5.1 The Contractor shall provide ventilation of enclosed area during construction as may be required to permit proper curing and drying out and to prevent excessive humidity moisture and condensation.

§ 16.5.2 Ventilation shall be by natural or artificial means as required by conditions involved.

§ 16.6 BROKEN GLASS

§ 16.6.1 The Contractor shall be responsible for all broken, scratched or damaged glass, which shall be replaced upon completion of the Work or immediately, if in an inhabited portion of a building. If broke glass is replaced by the Owner, the Contractor shall reimburse the Owner for replacement cost of all such damaged glass.

§ 16.6.2 The responsibility to replace broken glass shall terminate upon final acceptance of the Work by the Owner, except as provided in the specifications with respect to defective materials, workmanship and guarantee/warranty provisions.

§ 16.7 EMPLOYMENT INFORMATION

§ 16.7.1 Discrimination in employment – In accordance with Section 220-E Labor Law of the State of New York, it is agreed that:

(a) In the hiring of employees for the performance of the Contract or any subcontract hereunder, no Contractor,

- (b) Subcontractor, nor any person acting on behalf of such Contractor or Subcontractor shall by reason of race, creed, color or national origin discriminate against any person who is qualified and available to perform the work to which the employment relates.
- (c) No Contractor, Subcontractor, nor person on his behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this Contract on account of race, color, creed or national origin.
- (d) There may be deducted from the amount payable to the Contractor a penalty of five dollars for each person each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the Contract.
- (e) This Contract may be cancelled or terminated by the Owner and all monies due or to become due hereunder may be forfeited for a second or any subsequent violation of the terms or conditions of this section of the Contract.
- (f) The aforesaid provisions of this section shall be limited to operations performed within the territorial limits of the State of New York.

§ 16.7.2 For public works projects in the State of New York, the Contractors shall comply with Prevailing Wage Rates as issued by the State of New York Department of Labor for the location and duration of this Project.

§ 16.7.3 The Contractor shall comply with all of the provisions of the Immigration Reform and Control Act of 1986 and regulations promulgated pursuant thereto and shall require its Subcontractors to comply with same. The Contractor shall and does hereby agree to fully indemnify, protect, defend and hold harmless the Owner, the Architect, their agents and employees from and against any penalties, fees, costs, liabilities, suits, claims or expenses of any kind or nature, including reasonable attorney's fees, arising out of or resulting from any violation or alleged violation of the provisions of said laws in connection with the work performed hereunder.

§ 16.8 DUST HAZARDS

The Contractor is responsible for installing, maintaining, and effectively eliminating harmful dust when a harmful dust has been identified in accordance with the Labor Law of the State of New York. Any fines or penalties levied as a result of dust will be borne solely by the Contractor.

§ 16.9 ASBESTOS

§ 16.9.1 The Contractor is obligated to insure that absolutely no asbestos containing material is used in conjunction with the work. It is the Contractor's sole responsibility to provide assurance that no asbestos containing material is built into the construction, nor does any equipment used in the construction contain any asbestos containing material.

§ 16.9.2 If asbestos containing material is found, at any time during or after the construction is completed, it shall be the responsibility of the Contractor remove it and replace it with new non-asbestos containing material, as per federal, state and local mandates. To the extent fully permitted by law, any and all claims by the Contractor, the Contractor's employees, agents or any third parties including but not limited to the Owner or the Architect, or any of their servants or employees for personal injury, death or property damage arising out of or resulting from the Work shall be the responsibility of the Contractor. Nothing in this paragraph should be construed as limiting the Contractor's indemnity obligations under Article 3.18.

§ 16.10 GENERAL PROVISIONS

§ 16.10.1 All personal pronouns used in this Contract, whether used in the masculine, feminine or neuter gender, shall include all other genders; and the singular shall include the plural and vice versa. Title of articles, paragraphs, and subparagraphs are for convenience only, and neither limit nor amplify the provisions of this Contract. The use herein of the word "including", when following any general statement, term, or matter, shall not be construed to limit such statement, term, or matter to the specific items or matters set forth immediately following such word or similar items or matters, whether or not non-limiting language (such words as "without limitation" or "but not limited to"), or words of similar import is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement, term or matter.

§ 16.10.2 Whenever possible, each provision of this Agreement shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of this Agreement, or portion thereof, is prohibited by

law or found invalid under any law, only such provision or portion thereof shall be ineffective, without in any manner invalidating or affecting the remaining provisions of this Agreement or valid portions such provisions, which are hereby deemed severable.

§ 16.10.3 Each party hereto agrees to do all acts and things and to make, execute and deliver such written instruments, as shall from time to time be reasonably required to carry out the terms and provision of the Contract Documents.



SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Agreement for Construction Services (hereinafter referred to as the Contract) and other Division 1 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Project consists of the construction of the new Camp Kaufmann for the Girl Scouts of Greater New York, including site work as detailed on the drawings, specifications, and any addenda, bulletins, and requests for information referenced thereto.
 - 1. Project Location: 81 Camp Road, Holmes NY 12531
 - 2. Owner: Girl Scouts of Greater New York
- B. Architect Identification: The Contract Documents, which will be issued for bid were prepared for the Project by Peter Gisolfi Associates Architects – Landscape Architects, LLP, 566 Warburton Avenue, Hastings-on-Hudson, New York 10706. These documents shall be revised to include addenda issued during the preparation period and shall be distributed as “Issued for Construction” documents.
- C. The Work consists of the construction of one new multi-use building. The Work includes:
 - 1. New Construction, including but not limited to:
 - a. Site work; including but not limited to:
 - (1) Curbs
 - (2) Pavement
 - (3) Railings and Fences
 - (4) Site Lighting
 - (5) Grading
 - (6) Layout
 - (7) Landscape Planting
 - (8) Landscape Accessories
 - (9) Retaining Walls
 - (10) Drainage
 - (11) Utility Piping
 - b. Foundations and structural work;
 - c. Mechanical, electrical and plumbing work;

- d. Fire protection work;
- e. Exterior wall construction;
- f. Roofing;
- g. Construction of interior partition walls;
- h. Installation of finishes including, but not limited to: floors, walls and ceilings, rough and finish carpentry, cabinetry and millwork, doors, vision panels, hardware, teaching and display boards, signage, etc.
- i. Installation of elevator and stairs
- j. Installation of storefronts, windows and doors;
- k. Special construction associated with:
 - (1) Theater
 - (2) Arts Room
 - (3) Scene Shop
 - (4) Control Booth
 - (5) Classrooms
 - (6) Offices
 - (7) TV/Radio Studio (Verni)
 - (8) Production Booth (Verni)
 - (9) Digital Media (Verni)
 - (10) Performance Space (Verni)
 - (11) Toilet rooms
 - (12) Lobbies
 - (13) Corridors
 - (14) Exterior canopy
 - (15) Mechanical, electrical, elevator, and tel-data rooms, janitors' closets, storage rooms and closets
- D. All materials, assemblies, forms and methods of construction and service equipment shall comply with the requirements of the latest edition of the Building Code of New York State (2010), the National Fire Protection Association, the National Electrical Code, and all other federal, state and local codes and standards referenced in the technical Specifications and drawings.
- E. All architectural drawings and dimensional information for this project are based on the British system of measurement and must be in feet and inches. Landscape and site dimensions are also based on the British system and are shown in feet and decimals equivalents of inches.
- F. Many areas of the building require special attention (special acoustical provisions and restrictions) to meet the allowed background and intrusive noise levels. These areas are designated as "Noise Critical Spaces." Noise Critical Spaces include spaces that must be quiet, and spaces that contain noise producing equipment.

The following areas have been designated as Noise Critical Spaces:

- (1) Theater
- (2) Arts Room
- (3) Scene Shop
- (4) Control Booth
- (5) Classrooms
- (6) Offices
- (7) TV/Radio Studio (Verni)

- (8) Production Booth (Verni)
- (9) Digital Media (Verni)
- (10) Performance Space (Verni)
- (11) Lobbies
- (12) Corridors
- (13) Mechanical and electrical rooms

- G. All penetrations by ducts, pipes and conduit of partitions and slabs enclosing noise critical spaces and mechanical and electrical rooms shall be sleeved, packed and sealed airtight with non-hardening sealant.

1.3 CONTRACTS

- A. The Project will be constructed under an Agreement for Construction Services where the Basis of Payment is Lump Sum.

1.4 WORK SEQUENCE

- A. A Construction Implementation and Phasing Plan shall be prepared and submitted to the Owner, the Owner's Representative, and the Architect for approval prior to the start of construction.

1.5 USE OF PREMISES

- A. The Construction Manager and its subcontractors shall have use of the Project Site for construction during construction period, as directed by the Owner or the Owner's Representative.

1.6 OWNER-FURNISHED PRODUCTS

- A. Whenever there are items noted "Owner Supplied" or "Supplied by Owner," Construction Manager and its subcontractors shall be responsible for installation of said items, unless otherwise noted.

1.7 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the CSI/CSC's "MasterFormat" numbering system.
 - 1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the Table of Contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Construction Manager and its subcontractors. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Construction Manager and its subcontractors or by others when so noted.
3. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.11 MISCELLANEOUS PROVISIONS

A. RESPONSIBILITY & INTENT

1. The Construction Contractor and its subcontractors shall provide all labor, materials, equipment, appliances and services necessary to execute and complete all work as required by the Contract Documents and the applicable Building Codes. Construction Contractor and its subcontractors shall conduct pre-construction survey and provide photo/videos of any existing damages in areas where construction is to take place prior to the start of work.
2. It is the intent that the work included under each Section of the Specifications shall cover the manufacture, fabrication, delivery, installation and/or erection, with all incidentals thereto, unless otherwise noted or specified. "Provide", means to "furnish and install".
3. The Construction Contractor and its subcontractors is cautioned that the "Work Included" is general and in no way limits or qualifies the Contract requirements
4. It is the intent of the Contract Documents to provide for complete installation of all portions of the work. Except where work, or a portion thereof, is specifically noted as by Owner, it is understood that all items, materials and equipment are to be furnished and installed, complete, ready for operation or use.
5. Where additional or supplemental details or instructions are required to complete an item or items of work, the Architect shall furnish the necessary information to the Construction Contractor and its subcontractors. No work shall be performed, installed or fabricated which depends upon the furnishing

of such information, without the written approval of the Architect of the specific condition. The furnishing of such data shall not be the grounds for a claim for extra work by the Construction Contractor and its subcontractors.

6. The Construction Contractor and its subcontractors will be deemed to have based their pricing on a complete installation. Where additional details or instructions are required to complete the work, the Construction Contractor and its subcontractors are deemed to have made an allowance in their pricing for the completion of such work, consistent with adjoining or similar details and/or the best accepted practices of the trade, whichever is more expensive.
7. Where the scope of the work of a Section in the Specifications or Drawings calls for service connections, supports, or installation, of any item or group of items being furnished by other sections, the omission of any given item from the Drawings shall not relieve the Construction Contractor and its subcontractors of the responsibility for installing, connecting or supporting such item at no increase in Contract cost. The Construction Contractor and its subcontractors is deemed to have examined the plans and specifications of all other Sections to ascertain the full scope of his work including but not limited to connections, supports and installation of equipment furnished by other trades or Sections.
8. Whenever any additional materials and/or workmanship not shown or specified are required to complete the work of the Contract Document in accordance with the obvious intent thereof, the Construction Contractor and its subcontractors shall provide these materials and workmanship at no additional cost to the Owner.
9. Salvageable Materials: Any existing materials, equipment, misc. etc. scheduled for demolition are the property of the Owner. If requested, Construction Contractor and its subcontractors will remove and store any such items to a location designated by the Owner.

B. SALES TAX EXEMPTION

1. The Owner is exempt from payment of Federal, State, Local Taxes and sales and compensating use taxes of the State of New York and of cities and counties on all materials and supplies incorporated into the completed Project. These taxes are not to be included in any of the bids or charges. This exemption does not apply to tools, machinery, equipment or other property leased by or to the Construction Contractor and its subcontractors, or to supplies and materials which, even though they are consumed, are not incorporated into the completed Project, and the Construction Contractor and its subcontractors shall be responsible for and pay any and all applicable taxes, including sales and compensating use taxes, on such leased tools, machinery, equipment or other property and upon all such unincorporated supplies and materials.
2. The Construction Contractor and its subcontractors shall obtain any and all necessary certificates or other documentation from the appropriate governmental agency or

agencies, and use such certificates or other documentation as required by law, rule or regulation.

PART 2 - EXECUTION (Not Used)

END OF SECTION 01 10 00

Where additional, or supplemental, details or instructions are required to complete an item or items of work, the Architect shall furnish the necessary information to the Contractor. No work shall be performed, installed or fabricated which depends upon the furnishing of such information, without the written approval of the Architect of the specific condition. The furnishing of such data shall not be the grounds for a claim for extra work by the Contractor. The Contractor will be deemed to have based his bid on a complete installation where additional details or instructions are required to complete the work, the Contractor is deemed to have made an allowance in his bid for the completing of such work, consistent with adjoining or similar details and/or the best accepted practices of the trade, whichever is more expensive.

- e. Where the scope of the work of a Section in the Specifications or Drawings calls for service connections, supports, or installation, of any item or group of items being furnished by other sections the omission of any given item from the Drawings of a particular Contract shall not relieve the Contractor of the responsibility for installing, connecting or supporting such item at no increase in Contract cost. The Contractor is deemed to have examined the plans and specifications of all other Sections to ascertain the full scope of his work, including but not limited to, connections, supports and installation of equipment furnished by other trades or Sections.
- f. Whenever any additional materials and/or workmanship not shown or specified are required to complete the work of the Contract Document in accordance with the obvious intent thereof, the Contractor shall provide these materials and workmanship at no additional cost to the Owner.
- g. Salvageable Materials: All existing materials, equipment, misc. etc. scheduled for demolition are the property of the Owner. If requested, contractors will remove and store any such items to a location designated by the Owner.
- h. Each contractor shall be responsible for dust protection in their respective areas of work. If there is an area of work containing multiple contract contractors then the contractor for general construction will erect the dust protection partition. However, all contractors will be required to maintain the partition. Therefore, if one contractor(s) removes or damages the partition that contractor(s) will be responsible to replace the partition in kind.

3. PRODUCT ACCEPTANCE STANDARDS

- a. Where the words "or acceptable equal" or other synonymous terms are used, it is expressly understood that they shall mean that the acceptance of any such submission is vested in the Architect, whose decision shall be final and binding upon all concerned. All submissions are subject to such review.
- b. The intent of this article is to encourage and permit competition on qualified products by reputable and qualified suppliers and manufacturers, whose products, reputation and performance warrant approval for the conditions, intent of design and performance considerations.
- c. Whenever a product is specified in accordance with Federal ASTM Designation, American National Standards Institute or other association standard, the Contractor

shall present an affidavit from the manufacturer certifying that the product complies with the particular standard specification. Where necessary and requested substantiate compliance.

- d. Whenever any product is specified or shown by describing proprietary items, model numbers, catalog numbers, manufacturer, trade names or similar references, such reference is intended to establish the measure of quality which the Architect has determined as requisite and necessary for the project. The right is reserved to approve or disapprove proposed deviations of design, function, construction or similar differences which will affect the design intent. The Architect shall have the right to reject any substitutions of submission of materials not manufactured in the U.S.A. or which have not been used successfully in the Architect's opinion for five years in this area. This also applies to acceptance of non-specified products.
- e. Acceptance of Non-Specified Products
 - (1) For acceptance of products other than those specified, the Contractor shall submit a request, in writing, to the Architect and Owner. The request shall clearly define and describe the product for which approval is requested. Requests shall be accompanied by manufacturer's literature, specifications, drawings, cuts, performance data, list of reference or other information necessary to completely describe the item.
 - (2) The Contractor shall submit to the Owner for review two (2) copies of a complete list of suppliers, materials and equipment they propose to use in connection with this project.
 - (3) Substitution of products will be considered only under the following conditions:
 - (a). The Contractor shall place orders for specified materials and equipment promptly. No excuse or proposed substitution will be considered for materials and equipment due to unavailability unless proof is submitted that firm orders were placed ten (10) days after approval by the Architect of the item listed in the specifications.
 - (b). The reason for the unavailability is beyond the control of the Contractor. Unavailability will be construed as being due to strikes, lockouts, bankruptcy, discontinuance of the manufacture of a product, or Acts of God.
 - (c). Requests for such substitution shall be made in writing to the Architect within ten (10) days of date that the Contractor ascertains he cannot obtain the material or equipment specified.
 - (d). Request shall be accompanied by a complete description of material or equipment which the Contractor wishes to use as a substitute as described above.
 - (f). After any material or piece of equipment has been accepted, no change in brand or make will be permitted unless satisfactory written evidence is presented and approved by the Architect that the manufacturer cannot make scheduled delivery of approved material, or that material delivered has been rejected and the

substitution of a suitable material is an urgent necessity, or that other conditions have become apparent which indicate that the approval of such other material is in the best interest of the Owner.

- (g). For any item or items which the Owner may have pre-purchased before the start of the work because of excessive lead time required for such items, it will be the Contractor's responsibility to receive, store and install such items purchased by the Owner.

4. CONDITIONS AT THE SITE

- a. The contractor has visited the site and agrees that he is cognizant and fully aware of the systems involved with his own work and the work of other trades and realizes what logistics are required to bring manpower and materials to the work areas and to remove from the work areas any demolition, debris, garbage and equipment that is his responsibility.
- b. The contractor must be aware that this work will be performed in an occupied school campus and must abide by all of the school rules and regulations. Noise and dust will be kept to a minimum level as defined by the Construction Manager. To that end, there will be some phasing and the contractor agrees to cooperate with the normal day-to-day requirements. A three (3) day notice of noise disturbance is to be submitted to the Construction Manager with the specific time of the noise. The Owner will inform the school owner to obtain approval.
- c. The use of radios, tape players and the like will be prohibited within the job site.
- d. The Contractor's facilities, offices, storage rooms, tool sheds, equipment, temporary construction, scaffolding, surplus materials, waste, other materials and other items stored on or at the Site will be situated at such parts thereof as shall be designated by the Construction Manager and shall be relocated upon instruction of the Construction Manager. All such facilities, offices, storage rooms and tool sheds shall be adequate for the purpose intended and built and maintained in accordance with all Legal Requirements and insurance company recommendations. Each of the aforesaid items shall be removed from the Site when no longer required for the Work or as required by the Construction Manager.
- e. During the execution of the Work and at all times while it is present on the Site working in any capacity whatsoever, the Contractor shall protect all unfinished Work and materials on the Site and all tools, plans, equipment and other apparatus used or to be used by the Contractor in connection with the Work, from rain, water, frost and other elements and from all other kinds of damage including, without limitation, vandalism, theft and waste. All materials stored on the Site shall be stored in a suitable manner. The Contractor shall be fully responsible for the materials so stored, and neither the Owner nor the Owner's Representatives shall be under any responsibility therefore. The Contractor shall secure and protect the Work and all tools, equipment and material from and against damage, loss or injury resulting from the Contractor's activities. Until such time as the obligations of the Contractor under the Contract for the performance of the Work shall have been fully satisfied, the Contractor shall be fully responsible for any damage, loss or injury done to the Work, or any materials, tools, equipment or appliances incorporated into the Work or delivered to the premises for incorporation into the Work; and this shall be true irrespective of whether any particular portion of the Work to which such damage occurred has been completed so long as all of the

Work shall not have been completed and accepted in accordance with the terms hereof and whether or not payment was made for such portion of the Work. Such risk of loss shall extend to damage or injury occasioned by Act of god, fire or other event or catastrophe whether natural or man-made. To the fullest extent permitted by law, except for the Construction Manager or Owner's intentional acts, neither the Owner's Representatives nor the Owner shall have any responsibility for any such injury, damage or loss.

- f. The Contractor shall use only such workmen and other laborers on the Project as shall be compatible with all other laborers and workmen employed in connection with the Project; and no such laborer or workmen or retained by or on behalf of the Contractor shall be the cause of any labor disturbance, strike, picketing, jurisdictional union dispute or work slowdown. If any such dispute, strike, picketing, or slowdown shall occur due to the persons employed by or on behalf of the Contractor, then the Contractor shall immediately cease the continuation of such offending practice. The Contractor shall indemnify and hold harmless the Construction Managers and Owner from any and all damages, injuries, expenses (including legal fees) and all other liabilities (including consequential damages resulting from any such labor problem). If any such dispute, strike, picketing or slowdown shall occur due to the persons employed by or on behalf of any Subcontractor, then the Contractor shall compel his Subcontractor to cease the continuation of such offending practice. Any delay or loss of time due the above does not constitute reason for a delay claim.
- g. The Contractor shall be responsible for instituting a safety program to be maintained and enforced through the period during which the Work is being prosecuted. A copy of the safety program and weekly safety meeting minutes shall be provided to the Construction Manager.
- h. The Contractor shall man the Project with at least one full-time on-site supervisor responsible for loss, accident prevention, and administering and supervising the safety of its respective workers. Each such supervisor shall have a working knowledge of OSHA requirements with respect to the operations for which he is responsible. Contractor to provide a resume of the site supervisor to the Construction Manager for review and approval.
- i. The Owner's Representatives may direct the Contractor to leave out portions of the Work. If the Owner, Architect, Engineer or Construction Manager shall fail to respond to any inquiry or provide any information to the Contractor as required hereunder, and if as a result thereof, the Contractor is delayed in the performance of any other work, the sole remedy of the contractor shall be to have a reasonable extension of the time in which to perform such Work after the date that such information is provided or obligation performed.
- j. The consumption of alcoholic beverages or use of any controlled substances shall **not** be permitted on the property.
- k. Each Contractor shall issue to all their field labor force, Laminated Photo ID Badges which shall be worn while working on the library property. The photo ID Badge will include a current photograph of the worker, their personal name and company name.
- l. **No** smoking is permitted on the school site.
- m. Parking permitted only in areas designated by the Construction Manager.

- n. All contractors are to refrain from conversing with school personnel and students. Any construction employees found to do such will be dismissed from the site.
- o. All contractors are to refrain from using indecent language. Employees doing so, will be dismissed from the site.

5. RULES TO BE COMPLIED WITH

- a. The Contractor and each Subcontractor hereby accepts and assumes full and exclusive liability for the payments of contributions, taxes, or premiums which may be payable or required under an Unemployment Insurance Act or Federal Social Security Act as to employees engaged in the performance of work included in this Contract. He further agrees to relieve the Owner from the liability for contributions measured by wages to the employees of the Contractor or his Subcontractors engaged in performance of the work included in this Contract.
- b. The Contractor shall further comply with the rules and regulations which may be issued by the U.S. Commissioner of Internal Revenue with the approval of the Secretary of the Treasury for the enforcement of the Federal Social Security Act as to employees engaged in the performance of the work included in this Contract.
- c. The Contractor shall procure and pay for all other permits, licenses, certificates and approvals necessary for the execution of this Contract.
- d. The work shall be performed in accordance with the rules and regulations of OSHA, and all city, state, county and federal authorities, codes and restrictions having jurisdiction.
- e. All mechanical and electrical equipment supplied shall have a U.L. label.
- f. The Contractor shall be responsible for any disturbance or deficiency created in the air conditioning or other mechanical, electrical or structural facilities within the building as a result of the alteration. If such disturbance or deficiency results, it shall be the Contractor's responsibility to correct the resulting conditions and to restore the services to the complete satisfaction of the Owner, Construction Manager, Architect and Engineers.
- g. The Contractor shall comply with the rules of the building as to the hours of availability of the building elevators and the manner of handling materials, equipment and debris to avoid conflict and interference with building operations.
- h. No asbestos or lead containing products to be used on this project.
- i. Demolition to occur only per the schedule approved by the Owner / Owner's Representative. Opening protection to be installed prior to commencing. Contractor must obtain approval from Construction Manager prior to commencement of demolition work. Failure to do so will result in a \$500.00 back-charge per occurrence.
- j. Storage of chemicals and painting supplies shall be outside the existing or new structures and shall follow manufacturer's storage guidelines.
- k. Deliveries sent to the site need to be accepted and signed for by the Contractor. Deliveries will not be signed for by the Owner or Owner's Representatives.

- l. Use of existing building facilities, for the area occupied by the library, during construction is prohibited including toilet rooms, telephones and water fountains. Contractor(s) will be backcharged \$250.00 per occurrence if any individual related to the project is observed disregarding these rules.
 - m. No storage of materials will be permitted in the existing building at any time. Contractors must provide exterior storage containers as needed. Location shall be approved by Construction Manager.
- 6. TEMPORARY PROVISIONS (by GENERAL CONSTRUCTION CONTRACTOR, unless otherwise noted)
 - a. The General Construction Contractor shall install and maintain the temporary fencing including gates, posts, mesh, chains, locks and keys, and (2) Knox Boxes for Fire Department use. See the Construction Implementation Plan for locations and requirements. The Owner will be provided with six (6) keys.
 - b. General Construction Contractor shall be responsible for installing and maintaining all site safety signage as needed. Additionally, install signage on the entrance gate indicating the following: "Construction Entrance Only", "No Smoking Permitted - \$1,000 Fine", "Hard Hat Area". Prepare additional temporary signs within the site to provide direction assistance and information to help construction personnel and visitors locate the following:
 - 1. Access roads, parking and delivery area.
 - 2. Office and first-aid stations.
 - 3. Sanitary Facilities.
 - 4. Telephones.
 - 5. Emergency exits.
 - 6. Fire protection facilities.
 - 7. Barricades and obstructions.
 - 8. Hazardous elements of construction work.
 - c. Temporary partitions and doors shall be provided by the General construction Contractor.
 - d. Temporary port-o-sans shall be provided and maintained by the General Construction Contractor to accommodate all of the project contractors. Quantity of port-o-sans shall be in accordance with OSHA Standards.
 - e. The General Construction Contractor shall be responsible for minimizing dust and dirt. On the exterior, site shall be watered down frequently to prevent dust from rising. Street curb cuts and sidewalks shall be maintained clean at all times throughout the construction phase.

- f. General Construction Contractor shall be responsible for restoring site. All areas to be seeded shall be cleaned of all construction debris and shall be roto-tilled, 4 inches of top soil added and hydro-seeded, as specified by the Architect.
 - g. All Contractors shall be responsible for minimizing dust and dirt.
 - h. All site elements must be restored to "As-Found" condition or better at the conclusion of the project.
- 7. TEMPORARY HEAT (By General Construction Prime Contractor)
 - a. Heat for temporary use must be provided by the Construction Prime Contractor as required to complete his work. If possible, and only with the Owner's Permission, it may be obtained through the building existing or new system. If, for any reason this system must be shut down due to field conditions, or is not completely in operation, the Contractor shall then be obliged to provide and maintain temporary heat required.
 - b. Damages to the existing heating system caused by any Contractor shall be repaired by that Contractor at no cost to the Owner.
 - c. The following conditions shall be maintained:
 - (1) During the placing, setting, and/or curing of interior carpentry, furring, spackle, and drywall, an ambient temperature of 60 degrees F shall be maintained, and such temperature shall be maintained 48 hours before, during and 48 hours after installation in each space where such covering is required.
 - (2) During the placing, setting and curing of all concrete, an ambient temperature of 50 degrees F shall be maintained in the area involved.
 - (3) Except as noted above, all areas in which work is in progress, shall be maintained at 45 degrees F during working hours.
- 8. TEMPORARY ELECTRIC LIGHT AND POWER (By Electrical Prime Contractor)
 - a. The Electrical Contractor shall provide temporary Electric Light and Power for the use of all the contractors. It shall be set up so that light and power is available 24 hours per day throughout the project. The Electrical Contractor shall also provide sufficient power and hook-ups for welding machines.
 - b. The Electrical Contractor shall provide temporary power to any contractor trailer used on site during the construction phase.
- 9. TEMPORARY WATER (By Plumbing Prime Contractor)
 - a. Water is available within and at the exterior of the building for use by each Contractor.
 - b. At all times take precautions against freezing, leakage and damaged caused by the water supply system.

- c. The Contractor shall be responsible to ensure temporary water is available throughout the construction phase of the project.
- d. The Contractors shall avoid the waste of water, and shall be responsible for any damages caused by his use of water during construction.

10. SIGNS

- a. The Contractor shall maintain the premises free from advertising placards and inscriptions and other announcements, lettering or insignia of all kinds and shall remove forthwith, any signs or posters which may be placed, by others, on any structure or parts of the property, released by the Owner to the Contractor for construction purposes, or on any fence surrounding such property.
- b. The installation of any item, element or assembly which bears on any exposed surface any name, trademark, or other insignia which is intended to identify the manufacturer, the vendor, or other sources from which such object has been obtained is prohibited. Also forbidden is the installation of any articles which bear visible evidence that an insignia, name or other device, has been removed. Name plates, giving performance requirements and capacity may be attached to operating equipment when located in mechanical and electrical spaces.

11. COLOR SELECTION

- a. Color schedules will be issued by the Architect during the progress of the work and the Contractor, his Subcontractors and material suppliers shall cooperate in furnishing required color samples to aid on the final selection. Where special colors are selected, the Contractor shall furnish accurate reproductions of these colors, in duplicate, and on actual material to be furnished to the project, for final approval.

12. PARKING

- a. Parking is limited to the construction area **only**. Work persons found parked in spaces allocated for school students or staff will be fined. Their respective prime contractor will be back-charged \$50.00 per occurrence.

13. STORAGE AND ACCESS (Each Contractor)

- a. Each Contractor shall make provisions to use storage trailers or other means for storing and securing materials to be incorporated in the Work. The Owner or Owner's Representatives will assume no responsibility for the Contractor's tools, equipment or materials left in, or out of the building.
- b. All existing materials, equipment, miscellaneous items, etc. scheduled for demolition are the property of the Owner. If requested, contractors will remove and store any such items to a location designated by the Owner or Owner's Representatives. All items not requested to be salvaged by the Owner shall be discarded by the Contractor.

14. SALES TAX EXEMPTION

- a. The Owner is exempt from payment of Federal, State, Local Taxes and sales and compensating use taxes of the State of New York and of cities and counties on all materials and supplies incorporated into the completed Project. These taxes are

not to be included in any of the bids or charges. This exemption does not apply to tools, machinery, equipment or other property leased by or to the Contractor or a Subcontractor, or to supplies and materials which, even though they are consumed, are not incorporated into the completed Project, and the Contractor and Subcontractors shall be responsible for and pay any and all applicable taxes, including sales and compensating use taxes, on such leased tools, machinery, equipment or other property and upon all such unincorporated supplies and materials.

- b. The Contractor and Subcontractors shall obtain any and all necessary certificates or other documentation from the appropriate governmental agency or agencies, and use such certificates or other documentation as required by law, rule or regulation.

15. MATERIAL AND EQUIPMENT LIST

- a. Within ten (10) days after the date of award of each Sub-Contract, each Sub-Contractor shall submit for approval a complete list of suppliers, materials and equipment proposed for use in connection with the project to the Architect. Include information concerning anticipated lead times for materials and equipment, based upon suppliers' experience with specified or approved materials and equipment (See Article 16 below).
- b. After any material or piece of equipment has been approved, no change in brand or make will be permitted unless satisfactory written evidence is presented and approved by the Architect that the manufacturer cannot make a scheduled delivery of approved material, or that material delivered has been rejected and the substitution of a suitable material is an urgent necessity, or that other conditions have become apparent which indicate that the approval of such other material is in the best interest of the Owner.

16. SCHEDULING OF THE WORK

- a. Execute the work in conjunction with the contract documents. In case of discrepancy between the plans and the actual conditions at the site report the conditions to the Architect.
- b. Take every precaution to protect the existing work indicated to remain. If work that is to remain becomes damaged during the course of operations, it will be repaired and/or replaced to the Owner's satisfaction, at no additional cost by the contractor(s) that caused the damage.
- c. If there are any deviations from the agreed-upon schedule, such a deviation shall be reported to all parties a minimum of 72 hours before a deviation takes effect, with mutual agreement.
- d. Make necessary arrangements to have utilities and services temporarily disconnected while performing the work or as required, maintained for temporary use, and formulate a schedule of disruption with all parties, indicating when and how long such disruptions will continue, and the provisions to be provided for temporary utilities and/or services.
- e. Schedule for completion shall be per information to Bidders. Time is of the essence.

- f. Contractor shall provide a minimum of 48 hours advance written notice to the Construction Manager for deliveries of materials, site visits by inspectors, testing labs, manufacturers representatives or any other occasion that impacts the use of the site.
 - g. Contractors are required to place orders for long-lead-time items, such as steel, windows, doors, hardware, custom masonry, pre-manufactured equipment, etc. as soon after the written notice to proceed with the work as possible. No deviation in the time for substantial completion will be granted for reasons related to late delivery of material and equipment.
17. SHOP DRAWINGS, PRODUCT DATA, EQUIPMENT/DELIVERY SCHEDULES, SAMPLES AND COORDINATION DRAWINGS (collectively "Submissions")
- a. Within 10 calendar days from the date of the Contract, the Contractor shall provide to the Architect and Construction Manager and Construction Manager a schedule of all Submissions. Submissions shall include (as relevant) all shop drawings, coordination drawings, fabrication drawings and erection drawings, schedules, reports, diagrams, layouts, setting plans, samples and other data required by Plans and Specifications and/or requested by the Architect and Construction Manager and Construction Manager pertaining to systems, methods of construction, equipment, materials, performance and test reports and data, wiring diagrams and controls, cuts, mock-ups, brochures, catalogs, and other data as may be necessary to describe the Work in sufficient detail, design and dimensions or as may otherwise be deemed necessary by the Architect and Construction Manager. Each of the Submissions shall be delivered in such number as the Architect and Construction Manager or Contract Documents may require for submission to the Architect for approval.
 - b. Architect's review of Submissions is for scope of Work. Acceptance review and approval of Submissions by Architect does not constitute approval and shall not relieve the Contractor from their:
 - (i) obligation to perform the Work in accordance with the Contract Documents or
 - (ii) responsibility for the proper matching and fitting of its work with all contiguous or adjacent work and existing conditions, unless the Contractor has informed the Architect in writing of any deviations between Plans and Specifications and the Submissions to be submitted under this Article 3 and Contractor has been relieved of responsibility in writing by the Architect.
 - c. The Contractor shall make such corrections in Submissions as required by Architect or the Construction Manager and Contractor shall deliver corrected Submissions to the Architect as required until the Submissions are approved. If the Architect rejects any Submission due to non-conformance with the Contract Documents such rejection shall not form the basis for any claim by the Contractor for a delay or other damages.
 - d. All submissions shall be submitted, and resubmitted as required, in a timely fashion so as to cause no delay in the Work or the work of any Other Contractor.
 - e. The Contractor shall verify at the Project site all conditions, dimensions and elevations indicated on the Plans, and the Contractor shall advise Architect of any deviations that affect its Work. Approval of Submissions by the Architect is not

verification by the Architect of field dimensions. The Contractor's obligations hereunder shall include taking field measurements for all Work, and approval of Submissions by the Architect or the Construction Manager shall not relieve the Contractor from correcting Work reflected in error on the Contractor's Submissions, not conforming to the field requirements or existing conditions or not complying with the terms of this Contract.

- f. Submissions shall be identified with the name of the Project, dated and numbered sequentially with a consistent numbering system to be used for all revisions. Submissions shall be covered with a transmittal letter identifying the Project and the Specification number of each item, stating qualification, deviations or departures from the Contract Documents. All such Submissions shall be to proper scale and shall be prepared in accordance with industry standards. Reproducible electronic media as well as full size paper prints and drawings shall be submitted in such number as requested by the Architect.
- g. Within 10 calendar days of the signing of this Trade Contract, Contractor will submit to Architect an initial schedule, in a form satisfactory to the Construction Manager and Construction Manager, showing equipment and material including quantities and delivery dates for all manufactured and fabricated goods, materials, products, equipment, fixtures and other items required for the Work. Such schedule shall be updated as required by Architect.
- h. If it is anticipated that finished products will have a range of color, graining, texture or other characteristics, the Contractor shall construct a mock-up and provide a sufficient number of samples of the specified products exhibiting the full range of all such characteristics. Products delivered or erected without such a submission and not approved by the Architect shall be subject to rejection. Except for range samples, or otherwise provided, all samples shall be submitted in such numbers as required by the Architect. All samples shall be marked, tagged, or otherwise properly identified with the name of the Contractor, the Project, the purpose for which they are being submitted and the date of submission.
- i. No portion of the Work shall be commenced until the applicable Submission has been approved by the Architect.
- j. During the progress of Work the Contractor shall update and revise shop drawings to reflect any revisions and changes to the Work. Upon final completion of the Work, the Contractor shall provide the Architect with such number of final as-built sets of documents as required by the Architect relating its Work to the final as-built condition of the portion of the Project worked by the Contractor. Such as-builts shall be submitted in electronic and full size paper form or as required by Construction Manager.

18. WELDING AND CUTTING

- a. Appropriate fire extinguishing equipment shall be provided where welding or cutting is to be performed. Sprinklers subject to fusing from heat due to welding or cutting shall be temporarily shielded, with valves to remain open. Contractors will be back charged for all fines imposed for false fire alarms.
- b. Welding or cutting shall not be performed in or near rooms or locations where flammable gases, liquids or vapors, lint, dust or loose combustible stocks are

present unless suitably protected when sparks or hot metal from the welding or cutting operations may cause ignition or explosion of such materials.

- c. Combustible construction or material shall be wetted down or protected by noncombustible shields or covers from possible sparks, hot metal or oxide.

19. TEMPORARY USE OF EQUIPMENT

- a. No equipment intended for permanent installation shall be operated for temporary purposes unless directed herein.

20. DEFECTIVE, DAMAGED AND UNSATISFACTORY WORK

- a. Work which has become defective, damaged, unsatisfactorily installed, permanently stained, marred, cracked and materials which do not conform to grade of quality required, will be rejected, removed immediately, reset as required with material and methods of like kind and quality to produce satisfactory, complete work to full satisfaction of the Architect at no additional costs or extension of contract time.

21. CLEANING AND RESTORATION

- a. Care shall be taken by all workmen not to mark, soil or otherwise deface finished surfaces. In the event that any finished surface becomes defaced in any way by mechanics or workmen, the Contractor responsible shall clean and restore such surfaces to their original condition or replace to the Owner's and Architect's satisfaction.
- b. Areas of the building in which painting and finishing work is to be performed shall be cleaned throughout by the Contractor just prior to the start of this work, and these areas shall be maintained in satisfactory condition for painting and finishing as directed by the Architect. This cleaning shall include the removal of trash and rubbish from the area; broom cleaning of floors; the removal of plaster, mortar, dust and other extraneous materials from finish surfaces.
- c. In addition to the cleaning specified above and the move specific cleaning which may be required in various sections of the Specifications, the space shall be prepared for occupancy by a thorough cleaning throughout by the Contractor including washing, or cleaning by other approved methods, surfaces on which dirt or dust has collected and by washing glass doors on both sides. Provide and maintain adequate runner strips of non-staining reinforced Kraft building paper on finished floors as required for protection. Equipment shall be left in an undamaged, bright, clean, polished condition.
- d. Upon completion of his work, and also when directed, the Contractor shall remove from the building and premises all temporary work, all rubbish and debris, and shall leave the building and the premises in a neat, orderly, and "broom clean" condition.
- e. Contractor and all Subcontractors shall cooperate in every possible way to expedite the use and occupancy of the building, and the completion of unfinished items.
- f. Each Contractor shall clean each surface or unit associated with his/her trade to the condition expected in normal commercial building cleaning and shall comply with manufacturer cleaning instructions for all manufactured work. The following

cleaning operations shall be completed by the associated trade performing the work before requesting an inspection for a Certificate of Substantial Completion:

1. Clean transparent materials including glass in doors and windows. Replace any damaged or broken glass.
 2. Clean all exposed finishes to a dust free condition, free of stains, films and similar foreign substances.
 3. Clean new floors as recommended by the manufacturers. Carpeted floors shall be vacuumed, while wood, ceramic tile, terrazzo, linoleum sheet floors and vinyl tile floors shall be damp mopped in accordance with manufacturer's suggested maintenance instructions.
 4. Surfaces of mechanical and electrical equipment shall be wiped. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps of all construction dust.
 5. Remove excess or spilled grout, mortar, spackle, or caulking from all new or existing surfaces.
 6. Remove all excess, spilled, spattered, oversprayed, or dripped paint, stain, or other finishes from new or existing surfaces which are not meant to be painted, stained or finished.
- g. Contractor shall remove temporary protection and facilities installed for protection of work during construction unless otherwise directed by the Owner, Architect or Construction Manager.
- h. All Contractors shall comply with authorities and/or agencies having jurisdiction and shall adhere to any and all safety standards for cleaning. Contractors shall not:
1. Burn or bury waste materials.
 2. Discharge volatile, harmful or dangerous materials into drainage systems or water supplies.
3. Dispose of waste materials in an unlawful or improper manner.
- i. Any Contractor who is cited or fined for improper or unlawful disposal of waste materials shall be solely responsible for all monetary penalties arising from such action.

22. COORDINATION

- a. The Contractor shall coordinate the work of all Sub-Contractors, arrange space conditions to accommodate the work of all trades and prepare composite drawings as required to scale clearly the work of each trade Contractor in relation to each other.
- b. The Contractor will be held responsible to correct unsatisfactory conditions resulting from improper coordination.
- c. Such drawings shall be reviewed by the Architect.
- d. Contractors to communicate and supply shop drawings to each other to insure proper coordination.
- e. Daily field reports are to be provided by all Contractors to the Construction Manager.
- f. Coordination Meetings:
 - 1. General: Prepare a written memorandum on required coordination activities. Include such items as required notices, reports, minutes of meetings, and attendance at meetings. Distribute this memorandum to each entity performing work at the project site. Prepare similar memorandum for separate contractors where interfacing of their work is required.
 - 2. Weekly coordination meetings: The Contractor for Construction shall schedule and hold weekly general project coordination meetings at regularly scheduled times that are convenient for the attendance of other prime contractors and other parties involved. These meetings are in addition to the specific meetings held for other purposes, such as regular project meetings and special pre-installation meetings. Required attendance includes each prime contractor and every other entity identified by any prime contractor as being currently involved in the coordination or planning for the work of the entire project. Conduct meetings in a manner that resolve coordination problems. The Contractor for construction shall preside at each meeting, and shall record meeting results. The Contractor for Construction shall distribute copies of the meeting results to everyone in attendance, the Architect and Construction Managers, and to others affected by the decisions and actions resulting from each meeting.
- g. Scaled and figured dimensions with respect to the items are approximate only; sizes of equipment have been taken from typical equipment items of the classes indicated. Before proceeding with the work, the contractor shall carefully check all dimensions and sizes and shall assume full responsibility for the fitting in of equipment and materials to the building and to meet architectural and structural conditions.
- h. Separate plans shall also be prepared for sleeve locations and concrete pads for mechanical equipment required by all contractors for the performance of their work. These drawings shall be coordinated with the coordination drawings. When final information is received, such data shall be promptly inserted on the coordination drawings.

- i. The HVAC Contractor shall provide electronic format CADD dwg files or pdf files, at a scale of 3/8" – 1'-0" showing all HVAC equipment, ductwork, and major piping, including elevations and dimensions to all fixed building elements, such as beams; columns, slabs; ceilings; including ceiling suspensions; framing; floor; walls; doors, including door swings; and windows affected by the equipment, ductwork, and piping. Show all registers, grilles, diffusers, radiators and convectors, and other terminal elements. Show location of all valves, dampers (fire, smoke, volume, and automatic), coils, humidifiers, smoke detectors, etc. requiring access for service and maintenance. Locate all access doors. Include large-scale details and sections as required to fully delineate the conditions in congested areas, leaving space for the work of the other contractors. Show plan layout of all equipment bases, pads, and inertia blocks. Clearly label all work by HVAC Contractor.
- j. The Plumbing Contractor shall overlay on the electronic format CADD dwg files or pdf files coordination drawings prepared by the Construction Contractor and the HVAC Contractor all water supply, drain, waste, vent, sprinkler main and branch piping, risers and sprinkler heads and other major lines. Indicate piping elevations and locations of the fire hose cabinets, drinking fountains, etc. Indicate any conflicts with or locations where piping and equipment encroach on ductwork lines. Locate valves and other items requiring access for service and maintenance. Locate all access doors. Avoid interference with HVAC work and with building construction. Use same scale as drawing being overlaid. Clearly label all work by Plumbing Contractor.
- k. The Electrical Contractor shall overlay on electronic format CADD dwg files or pdf files coordination drawings prepared by Construction, HVAC, Plumbing and Fire Protection Contractors all main conduit and bus runs, cable trays, light fixtures, major equipment, and switch gear and panel boards. Show elevations and clearances. Show all items requiring access for service and maintenance. Locate all access doors. Avoid interference with HVAC, Plumbing, and Fire Protection work and with building construction. Use same scale as drawings being overlaid. Clearly label all work by Electrical Contractor.
- l. Each Contractor shall use the signed completed coordination drawings as a working reference. Compare all shop drawings, prior to their submittal to the Architect, with the coordination drawings and revise the shop drawings to fit the coordination drawing condition. If revisions to the coordination drawings are required because of shop drawings, make revisions as directed by Construction Manager and notify all affected contractors with copy of notification to Construction Manager. Maintain up-to-date record of all revisions on own coordination drawing copies; keeping one copy at the project site.
- m. No extra compensation will be paid to any contractor for relocating any duct, pipe, conduit, or other material installed without coordination among trades involved or among other affected contractors. Each Contractor who causes any additional work to other contractors by improperly coordinated work or work not installed in accordance with the signed coordination drawings shall reimburse the affected other contractors for the cost of the additional work.

23. TRADE BREAKDOWNS

- a. After the execution of the Agreement, the Contractor shall promptly prepare a trade breakdown for review. The above trade breakdown will be submitted before

the work is commenced. Breakdown shall be for each work area as requested by the Architect or Construction Manager.

- b. The Contractor shall submit this breakdown updated monthly to show the amount of work completed. This shall be delivered together with the monthly requisition for payment.

24. MANUFACTURER'S DIRECTIONS

- a. Where manufactured articles, materials and equipment are specified, but specific installation instructions are not included they shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the manufacturer's latest printed instructions.
- b. The Contractor is required to maintain at the job site the current edition of such printed instructions. Where such directions are at variance with the specifications the Contractor shall require clarification from the Architect.

25. JOB PROGRESS MEETINGS

- a. Job progress meetings shall be scheduled by the Owner during the course of construction. The Contractor or the Contractor's duly authorized representative and such Sub-Contractors as required by the Contractor or the Owner or the Architect shall be present at job progress meetings. The Contractor and trade Contractors shall answer questions on progress, workmanship, approvals required, delivery of materials and other subjects concerning the work. The purpose of such meeting is to coordinate the efforts of all concerned so that the work proceeds without delay to completion as required by the contract. Each contractor must send a qualified representative, knowledgeable in the project and authorized to make decisions on behalf of the company, to every meeting. Failure to attend a project meeting or arriving late will result in a \$500.00 back-charge, per occurrence.
- b. The Owner, or the Construction Manager or the Architect may require any schedule to be modified so that changes in the work, delays or acceleration of any segment of the work shall be reflected in such schedule. The Contractor shall cooperate with the Owner in providing data for such changes in or modification of schedules.

26. MEASUREMENTS

- a. Verify dimensions and measurements of the site and be responsible for the correctness of them. No extra charges or compensation will be allowed on account of difference between actual dimensions and measurements indicated on drawings; any difference found shall be submitted to the Architect in sufficient time for his consideration and direction before proceeding with the work involved.
- b. It is the duty of the Contractor to take his own measurements of the work and be responsible for same.
- c. The Contractor shall thoroughly examine the drawings and specifications, carefully checking the figured dimensions, before commencing work, and report to the Architect if any discrepancy, error or defect appears, but shall not be held responsible for their existence.

27. LOCATION OF APPARATUS

- a. The location of apparatus, equipment, fixtures, piping outlets, etc., shown or specified but not specifically dimensioned shall be considered as only approximate. The actual location shall be as directed and as required to suit the conditions at the time of installation. Before installation, the Contractor shall consult the Architect, and ascertain the actual location required. He shall also consult with other trade Contractors and examine their drawings so as to avoid conflicts with other work and apparatus.

28. PUNCH LIST PROCEDURE

- a. After submission of the list of items to be corrected by the Contractor as referred to in Article 9.2.8 of the General Conditions, the Architect reserves the right to issue a revised list of corrections to be made (Punch List). If such a revised list is necessary, the Architect will furnish to Contractor a "Punch List" of items requiring completion or correction.
- b. It shall be the Contractor's responsibility to reproduce and distribute all necessary copies as needed to the various trades immediately, and see that the items requiring correction or completion are given prompt attention. No certificates of Substantial Completion will be issued by the Architect until corrections are made, or the Architect is satisfied that they will be made.

29. OPERATING AND MAINTENANCE INSTRUCTIONS

- a. Three (3) sets of operating and maintenance instructions covering completely the operating and maintenance of all equipment furnished under the Contract shall be delivered to the Owner. These shall include operating equipment and flow diagrams of all systems. Three (3) sets of lubricating charts and manuals for each item or equipment shall be furnished.
- b. Upon completion of the work and at a time designated a competent engineer or factory representative shall be provided for a sufficient period of time to instruct representatives of the Owner in the operation and maintenance of each piece of equipment and of each system as a whole. Such period shall not exceed five (5) days for the work of each Section of the Specification.
- c. The Contractor shall certify by endorsement thereon, that each for the manuals is complete and accurate. The Contractor shall assemble these manuals for all Sections of the work, review them for completeness prior to submission. The Contractor shall provide suitable transfer cases and deliver the manuals suitably bound, indexed and marked.
- d. Operational instructions must be video recorded.

31. KEYS AND MAINTENANCE KITS

- a. All keys, maintenance kits or stock, replacement parts of materials, spare construction materials, and equipment required under the Contract shall be supplied by Contractor.

32. PROJECT CLOSE-OUT DOCUMENTATION

- a. Prior to final payment, the Contractor shall submit to the Architect the following documents in an original and one copy unless otherwise noted:
- b. A complete listing of all trade Contractors, business addresses and items supplied by each such trade Contractor.
- c. A listing of manufacturers of major materials, equipment and systems installed in the work.
- d. Payments of Debts and Claims and Consent of Surety: Adequate evidence that he has paid all obligations arising out of the Construction Contract. He shall submit AIA Document No. G-706, Contractor's Affidavit of Payment of Debts and Claims, together with AIA Document G-707, Consent of Surety, indicating written consent of the surety to final payment.
- e. Release of Liens: The Contractor shall also submit AIA Document G-706-A, Contractor's Affidavit of Release of Liens, indicating that the releases for waivers submitted are complete to the best of his knowledge, information and belief and, if there are any exceptions that they be so stated specifically in this form.
- f. Certificate of Substantial Completion AIA Document G-704.
- g. Contractor's one year guarantee as outlined in the Supplementary General Conditions Article 3.5.3. Submit all other guarantees and warranties as outlined in the contract documents.
- h. Submit individual Final Waiver's of Lien from subcontractors and suppliers as may be required by the Owner.
- i. Final Approvals and Certificates: All final approvals and certificates as required by the specifications, drawings and all applicable codes and regulations.
- j. The Contractor shall submit to the architect, before completion of work, and before final payment, a detailed "as built" plan showing locations, elevations, sizes and connections of drainage structure and pipes.
- k. Submit a current certificate of insurance.
- l. Submit a Punch List Item Letter stating all items have been completed.
- m. Contractor to submit site documents (A201:3.11.1), Certificate of Current Insurance (A201:9.10.2), Contractors Guarantee of Insurability (A201:9.10.2), Certification of Wages and Final Application for Payment (AIA G702/703).
- n. Turn over to Owner all Procedures manuals and spare parts.
- o. A Close-out meeting will be held to review the final documents.
- p. As a predecessor to release of "retainage", the contractor shall submit all close-out documentation, including as-built drawings. No retainage reduction will be permitted until close-out requirements are approved.

33. PROTECTION

- a. A minimum of five (5) days prior to the start of construction, the Contractor must submit to the Construction Manager a written and diagrammatic description of the means and methods the Contractor will initiate to protect the site during the construction period. The Construction Manager will forward this information to the Owner and Architect for review and comment. The Contractor may not commence construction until he has received an acceptance of the protection procedures from the Owner.
- b. During construction, the General Contractor shall be responsible for maintaining a watertight structure. This shall include additions and existing buildings. The Contractor shall be responsible for temporary roofing, tarps and other protection at roofs, cavity walls, etc.. Should the Contractor fail to provide adequate protection causing flooding, damage or other disturbance to the existing building, Contractor shall be responsible for all costs associated with clean up and repairs. Inasmuch as flooding and damage have safety implications to the general public, clean up and repairs may be made by the Owner without warning to the Contractor. Administration costs incurred by the Owner, Construction Manager, and Architect will also be back charged to the Contractor. The Contractor, by entering into Contract with the Owner, agrees to be liable for these costs.
- c. Temporary partitions are to be constructed where shown on drawings or where otherwise required for safety of the public or to prevent dust from entering occupied areas. Partitions shall be dustproof from floor to ceiling (if existing condition is a drop-in tile ceiling, Contractor shall remove tile and install partition to structure above.) In addition to framing and sheetrock or plywood, partition to have plastic on the work area side. If an access door is required, an alternating 3 layer plastic system shall be used. The door shall be a standard hollow metal door with lockset and closer. Keys shall be distributed to the Prime Contractors, Owner, Architect and Construction Manager.

34. SURVEYING

- a. Certificates: Submit a certificate signed by the land surveyor or professional engineer certifying the location and elevation of improvements including the following:
 1. Foundation Survey: After completion of foundations, as-built survey shall be submitted prior to continuing with the work.
 2. Anchor Bolt Survey: After installation of all column anchor bolts, surveyor shall survey as-built conditions. No steel erection shall proceed until all corrections, if any, are completed.
 3. Steel Survey: After completion of steel erection, surveyor shall survey steel indicating actual elevations to top of steel, plumbness and alignment of all columns and beams. No masonry work shall proceed until survey is submitted and corrections, if required, are made.
 4. Final Property Survey: Before Substantial Completion, the Surveyor shall prepare a final property survey showing significant features (real property) that have resulted from construction of the project. Include on the survey a certification, signed by the Surveyor, to the effect that principal lines and levels of the project are accurately positioned was shown on the drawings.

- b. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of "Submittals" and "Project Closeout" Sections.

35. PRE-CONSTRUCTION PHOTOGRAPHS

- a. Prior to beginning work, the contractor shall photographically record existing conditions for all project areas using digital video in MPEG-2 format. Video shall be made at high resolution (1440 x 1152) and shall adequately zoom in on selected elements for clear representation of existing conditions. All video recording shall be done in the presence of the Consultant. Submit the completed video on DVD disk(s) to the Consultant for the record.
- b. Photograph any and all damaged or misaligned materials or surfaces which may in any way be misconstrued as having occurred during the implementation of this Contract. Inspect all existing conditions on all paths of travel on the site, adjacent right of ways, and within the building with the Consultant. With clear labeling and convenient indexing, provide written documentation for each video disk referencing both the disk and site locations of recorded images of any and all damage that could be misconstrued as being caused by the Contractor's work and/or access. Repair all damage to existing conditions and along the paths of travel caused by Contractor's Operations.

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Agreement for Construction Services (hereinafter referred to as the Contract) and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - a. General project coordination procedures.
 - b. Conservation.
 - c. Coordination Drawings.
 - d. Administrative and supervisory personnel.
 - e. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - a. Division 1 Section "Submittal Requirements" for preparing and submitting the Contractor's Construction Schedule.
 - b. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - c. Division 1 Section "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
- B. Coordination: Contractor shall coordinate its construction operations with those of sub-contractors and entities to ensure efficient and orderly installation of each part of the

Work. Contractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.

- a. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - b. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - c. Make adequate provisions to accommodate items scheduled for later installation.
- C. Contractor shall prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
- a. Prepare similar memoranda for Owner, Owner's Representative, and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
- a. Preparation of Contractor's Construction Schedule.
 - b. Preparation of the Schedule of Values.
 - c. Installation and removal of temporary facilities and controls.
 - d. Delivery and processing of submittals.
 - e. Progress meetings.
 - f. Preinstallation conferences.
 - g. Project closeout activities.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
- a. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

1.4 SUBMITTALS

A. Coordination Drawings:

1. The Contractor shall prepare Coordination Drawings, composite shop drawings, and/or field installation layout drawings:
 - a. if limited space availability necessitates maximum utilization of space for efficient installation of different components;
 - b. if coordination is required for installation of products and materials fabricated by separate entities
 - c. for such work directed by the Architect and/or required by the job requirements.

2. These coordination drawings, composite shop drawings, and/or field installation layout drawings shall be coordinated in the field among the subcontractors to verify the proper relationship to the work of other trades based on field conditions and shall be checked for accuracy and approved by the Contractor before submission to the Architect for their review and concurrence. Drawings shall be at a scale of not less than 3/8 inch equals one foot, unless otherwise noted and shall:
 - a. show all structure and other information needed for coordination
 - b. show horizontal and vertical dimensions to avoid structural framing, ceilings, partitions, and other services
 - c. show penetrations through interior and exterior walls, floors, ceilings, and roofing
 - d. indicate required installation sequences
3. Review of coordination drawings shall not diminish responsibility under this Contract for final coordination of installation and maintenance clearances of all systems and equipment with architectural, structural, mechanical, electrical, and other work.
4. Any subcontractor who fails to promptly review and incorporate his work on the drawings shall assume full responsibility for any installation conflicts affecting his work and shall remedy those conflicts without additional cost to the Owner and without change to the schedule.
5. Coordination meetings to resolve interferences in the work will be held at the project site under the direction of the Architect. Representatives of all trades involved must be present at each meeting.
6. Any changes to reviewed coordination drawings shall be approved in writing by the Architect/Engineer prior to the start of work in the affected area.
7. Coordination drawings include but are not necessarily limited to:
 - a. Structure
 - b. Partition/room layout
 - c. Ceiling tile and grid
 - d. Light fixtures
 - e. Access panels
 - f. Sheet metal, coils, boxes, grilles, diffusers, etc.
 - g. HVAC piping and valves
 - h. Smoke and fire dampers
 - i. Soil, waste, and vent piping
 - j. Water piping
 - k. Roof drain piping
 - l. Major electrical conduit runs, panelboards, feeder conduit, and racks of branch conduit
 - m. Above ceiling miscellaneous metal
 - n. Fire protection systems and components
 - o. Heat trace for piping
 - p. Equipment supports, anchors, guides, and seismic restraints.

8. Refer to Mechanical Section "Basic Mechanical Materials and Methods" and Electrical Section "Basic Electrical Materials and Methods" for specific Coordination Drawing requirements for mechanical and electrical installations.
- B. Staff Names: Within 10 days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
 - a. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
 - a. Include special personnel required for coordination of operations with other contractors.

1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 - a. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 - b. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - c. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Owner's Representative and Architect, within 3 days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 10 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
 - a. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - b. Agenda: Discuss items of significance that could affect progress, including the following:

- a. Construction schedule.
 - b. Phasing.
 - c. Critical work sequencing.
 - d. Designation of responsible personnel.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for processing Applications for Payment.
 - g. Distribution of the Contract Documents.
 - h. Submittal procedures.
 - i. Preparation of Record Documents.
 - j. Use of the premises.
 - k. Responsibility for temporary facilities and controls.
 - l. Parking availability.
 - m. Office, work, and storage areas.
 - n. Equipment deliveries and priorities.
 - o. First aid.
 - p. Security.
 - q. Progress cleaning.
 - r. Working hours.
- C. Progress Meetings: Conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.
- a. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - b. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.

- 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
 - 14) Documentation of information for payment requests.
- c. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
- a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- D. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
- a. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work
- b. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
- a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
- b. Schedule Updating: Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
- c. Review present and future needs of each contractor present, including the following:
- 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.

- 8) Temporary facilities and controls.
- 9) Work hours.
- 10) Hazards and risks.
- 11) Progress cleaning.
- 12) Quality and work standards.
- 13) Change Orders.

- c. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 33 00
SUBMITTALS

1. GENERAL

A. The submittal requirements include, but are not necessarily limited to:

- (1) Insurance and General Conditions
- (2) Schedules
- (3) Shop Drawings, Product Literature and Samples
- (4) Applications for Payment
- (5) Requests for Changes

2. INSURANCE AND GENERAL CONDITIONS

A. The following information is to be sent directly to the Architect & Owner in care of the Project Executive or designee:

- (1) *All insurance certificates:* The insurance coverage required is detailed in the General Conditions and in Division 1 of the Specifications. In addition to the Certificate of Insurance, the Contractor shall provide the Owner with copies of any endorsements subsequently issued amending coverage or limits.
- (2) *All other information* required under the general conditions including, but not limited to, schedules of value, materials and equipment lists, directories of personnel, etc.

3. CONSTRUCTION SCHEDULE

A. Under the General Conditions, Paragraph 3.10 and its subparagraphs, **the General Construction Contractor (aka Contractor) must submit a Construction Schedule to the Architect & Owner within ten days of the notice to proceed.** The specific requirements for the type and format of the construction schedule, revisions thereto, and penalties for non-compliance are detailed in the General Conditions.

B. Upon approval of the construction schedule, the Contractor shall distribute copies of the reviewed construction schedule to:

1. the Owner.
2. the Architect.
3. the Engineers.
4. the job site file.
5. the Subcontractors

C. The Contractor shall instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedule.

4. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. Within 14 calendar days from the date of the Contract, the Contractor shall provide to the Architect & Owner a schedule of all Submissions. Submissions shall include (as relevant) all shop drawings, coordination drawings, fabrication drawings and erection drawings, reports, diagrams, layouts, setting plans, samples and other data required by Plans and Specifications and/or requested by the Architect & Owner pertaining to systems, methods of construction, equipment, materials, performance and test reports and data, wiring diagrams and controls, cuts, mock-ups, brochures, catalogs, and other data as may be necessary to describe the Work in sufficient detail, design and dimensions or as may otherwise be deemed necessary by the Architect and Owner.

B. All Submittals for items that are considered long lead items by the Architect & Owner must be submitted within twenty-five (25) days of notice to proceed. All other submittals must be submitted in sufficient time to allow at least ten (10) working days for the Architect's review. Approval signatures of Contractors and all Sub-contractors affected by the Work shown therein must appear on all shop drawings before submission to Architect. A copy of Shop Drawings shall be provided for Owner's review as requested.

(1) The following are considered long lead items for this project:

- (a) Storefront and Window Assemblies
- (b) Masonry
- (c) Steel
- (d) Mechanical Equipment

C. Shop Drawings:

(1) All shop drawings must be accompanied by the submittal cover sheet (transmittal form) prepared and distributed by the Owner's Representative&/or Owner. **One (1) electronic copy of all shop drawings shall be sent directly to the Architect for all non-engineered items or directly to the Engineer for all engineered items.** All shop drawings must be presented in a clear and thorough manner. Copies of all transmittals must be sent to the Owner's Representative&/or Owner.

(2) Each shop drawing shall contain a title block with provisions for the following:

- (a) Number and Title of Drawing.
- (b) Date of Drawing or Revision, and Revision Number (1st, 2nd, 3rd, etc.)
- (c) Name of Project.
- (d) Name of Contractor or Sub-contractor submitting Drawing, and name of supplier and manufacturer
- (e) Specification Section Title and Number.
- (f) Space for Architect's stamp and received stamps. (8" x 3")

(3) Details shall be identified by reference to sheet and detail, schedule or room numbers shown on Contract Drawings.

(4) Minimum sheet size: 8-1/2 inches by 11 inches.

- (5) Each shop drawing shall have listed on it all Contract Reference Drawing Numbers plus Shop Drawing Numbers on related work by other Sub-contractors if available.
- (6) Each shop drawing submission shall have indicated on the drawing under submission number (whether first, second, third, etc.) Shop drawings for work of one trade shall be checked by Sub-contractors of related trades, and shall have received their stamp of approval before being submitted to Architect.
- (7) Shop drawings which involve a change from or variance with Contract Drawings shall be so noted by Contractor and Architect duly advised in writing of recommended change and reasons thereof.
- (8) Architect's review of Submissions is for scope of Work. Acceptance review and approval of Submissions by Architect does not constitute approval and shall not relieve the Contractor from its:
 - (a) Obligation to perform the Work in accordance with the Contract Documents or
 - (b) Responsibility for the proper matching and fitting of its work with all contiguous or adjacent work and existing conditions, unless the Contractor has informed the Architect in writing of any deviations between Plans and Specifications and the Submissions to be submitted under this Article 3 and Contractor has been relieved of responsibility in writing by the Architect.
- (9) All contractors are advised to refer to the coordination Section 01040 for the requirements to prepare coordination drawings which addressed trade space allocation.

D. Product Data:

- (1) **Two (2) copies of all product data shall be sent directly to the Architect for all non-engineered items or directly to the Engineer for all engineered items. Copies of all transmittals must be sent to the Owner's Representative&/or Owner.**
- (2) Contractor shall:
 - (a) Clearly mark each copy to identify pertinent products or models.
 - (b) Show performance characteristics and capacities.
 - (c) Show dimensions and clearances required.
 - (d) Show wiring or piping diagrams and controls.
 - (e) Modify Drawings and diagrams to delete information which is not applicable to the work.
 - (f) Supplement standard information to provide information specifically applicable to the work.

E. Samples

- (1) The Contractor shall submit for review to the Architect samples of materials listed under each section of the specifications. Samples shall be properly labeled for identification, consisting of the following information: job titles, sample number, submission number, label large enough to receive Architect's stamps.

- (2) The Contractor shall not commence work under sections of the specifications until the Architect's approval in writing is obtained for all listed samples.
- (3) The Contractor shall not construe approval of advance samples as total guarantee of acceptance of materials. Materials will be subjected to field inspections, from time to time, as work progresses.
- (4) Samples of specific manufactured products shall be accompanied with appropriate manufacturer's literature at time of submission.
- (5) Samples shall be of sufficient size and quantity to clearly illustrate:
 - (i) Functional characteristics of the product, with integrally related parts and attachment devices.
 - (ii) Full range of color, texture and pattern.

F. Contractor's responsibilities:

- (1) Review shop drawings, product data and samples prior to submission.
- (2) Determine and verify:
 - (i) Field measurements.
 - (ii) Field construction criteria.
 - (iii) Catalog numbers and similar data.
 - (iv) Conformance with Contract Documents.
- (3) Coordinate each submittal with requirements of the work and of the Contract Documents.
- (4) Notify the Architect in writing, at time of submission, of any deviations in the submittals from requirements of the Contract Documents.
- (5) Begin no fabrication or work which requires submittals until return of submittals with Architect approval.
- (6) The Contractor shall make such corrections in Submissions as required by Architect or the or Owner and Contractor shall deliver corrected Submissions to the Architect & Owner as required until the Submissions are approved. If the Architect rejects any Submission due to non-conformance with the Contract Documents such rejection shall not form the basis for any claim by the Contractor for a delay or other damages.
- (7) The Contractor shall verify at the Project site all conditions, dimensions and elevations indicated on the Plans and the Contractor shall advise Architect of any deviations that affect its Work. Approval of Submissions by Architect is not verification by Architect of field dimensions. The Contractor's obligations hereunder shall include taking field measurements for all Work, and approval of Submissions by the Architect shall not relieve the Contractor from correcting Work reflected in error on the Contractor's Submissions, not conforming to the field requirements or existing conditions or not complying with the terms of this Contract.

- (8) Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the work or in the work of any other Contractor.
- G. Submittals received from sources other than the Contractor will be returned to the sender "without action".
- H. Submittals received which are not required nor requested by the Contract Documents will be returned to sender "without action, submittal not required".
- I. Submittals received which are required for "Architect's information" such as inspection and test reports, survey data and fabricator's design calculations, will not be returned.
- J. Submittals shall contain:
 - (1) Field dimensions, clearly identified as such.
 - (2) Relation to adjacent or critical features of work or materials.
 - (3) Applicable standards, such as ASTM or Federal Specification numbers.
 - (4) Identification or deviations from Contract Documents.
 - (5) Contractor's stamp, dated and initialed or signed, certifying to review and approval of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with the requirements of the Work and of the Contract Documents. Submittals which do not have the Contractor's stamp, dated and initialed or signed, will be returned to the Contractor, without being reviewed, for resubmittal.
 - (a) The Contractor's stamp shall contain the words "Reviewed and Approved as being in conformance with requirements of Contract Documents".
- K. Resubmission Requirements:
 - (1) The Contractor shall make any corrections or changes in the submittals required by the Architect and resubmit until approved.
 - (2) Each shop drawing submission after the first submission shall be clear of all previous stamps.
 - (3) The same number of copies required for original submission is required for resubmission.

L. ARCHITECT'S ACTION STAMP

- (1) Except for submittals which are for "Architect's Information", the Architect will stamp each submittal to be returned with a self explanatory action stamp, appropriately marked, dated and initialed or signed, as follows:

PETER GISOLFI ASSOCIATES Architects • Landscape Architects, LLP 566 Warburton Avenue • Hastings-on-Hudson, NY 10706 • 914-478-3677		
Submittal has been reviewed for general conformance with the design concept of the project and general compliance with the Contract Documents. The Contractor is responsible for confirming and correlating all quantities and dimensions; for all fabrication processes, means, methods, and techniques of construction; for coordinating work with all other trades; and for performing all work in a safe and satisfactory manner. Corrections or comments made on submittals shall not relieve the Contractor and Subcontractor(s) from compliance with the requirements and design intent of the Contract Documents. The design professionals have reviewed only those areas of the submittal(s) marked with clouds or other designations indicating that those were the only areas changed since the design professional's previous review(s). Therefore, any changes made to areas outside of the clouded (or other clearly designated) areas have not been reviewed. Any changes made in these other areas shall be deemed to have been made by the Contractor or Subcontractor(s) without the knowledge or consent of the design professionals.	Reviewed	
	Not reviewed	
	No exception(s) taken	
	Make correction(s) noted	
	Revise and resubmit	
	Rejected	
Reviewed by:	Date:	

Shop drawings that are returned: "Revise and Re-submit" or "Rejected" shall be corrected and resubmitted to the Architect promptly

M. DISTRIBUTION AFTER REVIEW

- (1) The Architect shall distribute the reviewed shop drawings to the Owner's Representative&/or Owner for distribution as follows:
- (a) To the Contractor: two non-reproducible copies or one reproducible and one non-reproducible print;
 - (b) To the Owner's Representative&/or Owner: two non-reproducible copies. One is for use by the Owner's Representative&/or Owner and the other is to be forwarded to the Owner by the Owner's Representative&/or Owner at the completion of the project.
 - (c) To the Architect: two non-reproducible copies (one for the Architect's file and one for the Engineer's file).
- (2) The Contractor shall obtain black line prints of the approved shop drawings and distribute reproductions of shop drawings and copies of product data which carry the Architect's stamp of approval to:
- a. Job site file.
 - b. Record Documents file.
 - c. Other affected contractors.
 - d. Subcontractors.
 - e. Supplier or fabricator.

- (3) The Contractor shall distribute samples which carry the Architect's stamp of approval as directed by the Architect.

N. APPLICATIONS FOR PAYMENT

1. The Contractor shall submit a "pencil copy" of the requisition for payment to the Owner's Representative&/or Owner no later than the 2nd of the month for work completed up to that day. After the "pencil copy" is approved, four (4) notarized copies of the final requisition shall be submitted to the Owner's Representative&/or Owner no later than the 10th of the month for forwarding to the Architect for final approval.
2. The Application for Payment must be prepared using AIA form G-702.
3. The Application for Payment must be accompanied by the following:
 - a. A current sworn statement from the Contractor setting forth all subcontractors and materialmen with whom the Contractor has subcontracted, the amount of such subcontract, the amount requested for any subcontractor or materialman in the Application for Payment and the amount to be paid to the Contractor from such progress payment, together with a current, duly executed waiver of mechanics' and materialmen's liens from the Contractor establishing receipt of payment or satisfaction of the payment requested by the Contractor in the current Application for Payment.
 - b. Commencing with the second (2nd) Application for Payment submitted by the Contractor, duly executed so-called "after the fact" waivers of mechanics' and materialmen's liens from all subcontractors, materialmen and, when appropriate, from lower tier subcontractors, establishing receipt of payment or satisfaction of payment of all amounts requested on behalf of such entities and disbursed prior to submittal by the Contractor of the current Application for Payment, plus sworn statements from all subcontractors, materialmen and, where appropriate, from lower tier subcontractors covering all amounts described in Paragraph 5.4.2 of the Contract for Construction.
 - c. Certified payroll sheets from the Contractor and all subcontractors furnishing labor during the period of the requisition.
 - d. Progress photos
 - e. Copies of daily reports and toolbox meeting minutes.
 - f. Such other information, documentation and materials as the Owner or the Architect may request or require.

O. REQUESTS FOR CHANGES

1. In order to facilitate checking of quotations for extras or credits, all proposals, shall be accompanied by a complete itemization of costs including labor, materials and

sub-contracts. Labor and materials shall be itemized in the manner prescribed above and in the format described below. Where major cost items are sub-contracts, they shall be itemized also. All proposals without such itemization will be returned to the Contractor for resubmission, and owner may issue a construction change directive in lieu thereof.

- | | | |
|----|--|-------|
| a. | Materials (Itemized Breakdown) | _____ |
| b. | Rental of Equipment (Itemized Breakdown) | _____ |
| c. | Subtotal (Add lines 1-2) | _____ |
| d. | Prime Contractor Overhead and Profit (5% x line 3) | _____ |
| e. | Subtotal (Add lines 3-4) | _____ |
| f. | Labor (Itemized Breakdown) | _____ |
| g. | Insurance & fringes on Labor (Workmen's Comp., etc.) | _____ |
| h. | Subtotal (Add lines 6-7) | _____ |
| i. | Prime Contractor Overhead and Profit (10% x line 8) | _____ |
| j. | Subtotal (Add lines 8 and 9) | _____ |
| k. | Sub-Contract Work (same as 1-10 above) | _____ |
| l. | Prime Contractor Overhead and Profit – (sub-contracted work)
(5% x line 11) | _____ |
| m. | Subtotal (Add lines 11 and 12) | _____ |
| n. | Subtotal (Add lines 5, 10 and 13) | _____ |
| o. | TOTAL CHANGE ORDER (Add lines 14 and 15) | _____ |

- a. When performing any Work on the basis of the cost of labor and materials and Contractor or its Subcontractors are permitted or required to perform any overtime work, the cost of labor shall include additional wages over and above straight time rates as well as wages at straight time rates, however the allowance (mark up percentages) set forth above if applicable, shall not be computed nor paid with respect to such additional wages.
- b. Superintendent or non-working foreman direct costs are not allowed.
- c. **Contractors are strongly urged to refer to the General Conditions for any and all provisions governing additional work and/or changes to the work.**

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Agreement for Construction Services (hereinafter referred to as the Contract) and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Division 1 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
 - 2. Divisions 2 through End of specifications for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

- B. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.
- D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Ambient conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.
 - 1. Each independent inspection and testing agency engaged on the Project shall be prequalified as complying with the American Council of Independent Laboratories' "Recommended Requirements for Independent laboratory Qualification" and that specialize in the types of inspections and test to be performed and shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

- B. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect or Owner's Representative.
 2. Notify Architect and Owner's Representative seven days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's and Owner's Representative's approval of mockups before starting work, fabrication, or construction.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.6 QUALITY CONTROL

- A. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 5. Do not perform any duties of Contractor.
- E. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Agreement for Construction Services (hereinafter referred to as the Contract), Article I of the Contract, and other Division 1 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": The term "approved," when used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.
- D. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.

- J. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- K. "Project site" is the space available for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names: Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity

in the context of referencing a standard or publication. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of these entities. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

- F. Abbreviations and Names: Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity in the context of referencing a standard or publication. If a question arises concerning the name and address of an association indicated, please direct the inquiry to the Architect for clarification.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 45 33

STRUCTURAL TESTS AND SPECIAL INSPECTIONS

GENERAL

1.1 INTENT AND CONDITIONS

- A. Intent
 - 1. Define and coordinate structural testing and special inspection services.
 - 2. Define and coordinate conventional testing and inspection services.
 - 3. To assist in determining the probable compliance with the contract documents and Chapter 17 of the New York State Building Code.
 - 4. These services do not relieve the Contractor of responsibility for compliance with the requirements of the contract documents.
- B. Conditions
 - 1. If inspection of fabricator's work is required, the Owner's representative may require testing and inspection of the work at the plant, before shipment. Owner, architect and Structural Engineer of Record (SER) reserve the right to reject material not complying with the contract documents.
 - 2. Testing and inspection shall be performed in accordance with the industry standards used as reference for the specified material or procedure unless other criteria are specified. In the absence of a referenced standard, testing shall be accomplished in accordance with generally accepted industry standards.
 - 3. Failure to detect defective work or materials shall in no way prevent later rejection if defective work or materials are discovered.

1.2 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
 - A325-10 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
 - A370-12 Standard Test Methods and Definitions for Mechanical Testing of Steel Products
 - A490-12 Standard Specification for Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
 - C31/C31M-10 Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - C33/C33M-11a Standard Specification for Concrete Aggregates

- C39/C39M-12 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- C109/C109M-11b Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
- C136-06 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- C138/C138M-10b Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
- C140-12 Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
- C143/C143M-10a Standard Test Method for Slump of Hydraulic Cement Concrete
- C172/C172M-10 Standard Practice for Sampling Freshly Mixed Concrete
- C173/C173M-10b Standard Test Method for Air Content of freshly Mixed Concrete by the Volumetric Method
- C330/C330M-09 Standard Specification for Lightweight Aggregates for Structural Concrete
- C567/C567M-11 Standard Test Method for Density Structural Lightweight Concrete
- C780-11 Standard Test Method for Pre-construction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
- C1019-11 Standard Test Method for Sampling and Testing Grout
- C1064/C1064M-11 Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete
- C1077-11c Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
- C1314-11a Standard Test Method for Compressive Strength of Masonry Prisms
- D422-63(2007) Standard Test Method for Particle-Size Analysis of Soils
- D698-07e1 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
- D1140-00(2006) Standard Test Methods for Amount of Material in Soils Finer than No. 200 Sieve
- D1556-07 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
- D1557-09 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft lbf/ft³)
- D2166-06 Standard Test Method for Unconfined Compressive Strength of Cohesive Soil
- D2167-08) Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
- D2216-10 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

- D3740-11 Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction
 - E94-04(2010) Standard Guide for Radiographic Examination
 - E164-08 Standard Practice for Contact Ultrasonic Testing of Weldments
 - E329-11c Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
 - E543-09 Standard Specification for Agencies Performing Non-Destructive Testing
 - E605-93(R2011) Standard Test Methods for Thickness and Density of Sprayed Fire Resistive Material (SFRM) Applied to Structural Members
 - E709-08 Standard Guide for Magnetic Particle Examination
 - E1155-96(R2008) Determining FF Floor Flatness and FL Floor Levelness Numbers
- C. American Welding Society (AWS):
D1.D1.1M-10 Structural Welding Code-Steel
- D. New York State Building Code, 2015

1.3 RELATED REQUIREMENTS

- A. Refer to PART 3 for technical scope sections regarding specific qualifications, inspections, tests, frequency and standards required.

1.4 DEFINITIONS

- A. Testing: Evaluation of systems, primarily requiring physical manipulation and analysis of materials, in accordance with approved standards.
- B. Inspection: Evaluation of systems, primarily requiring observation and judgment.
- C. Structural Tests and Special Inspections: Structural Tests and Special Inspection Services herein include items required by Chapter 17 of the New York State Building Code, and other items which in the professional judgment of the SER, are critical to the integrity of the building structure.
- D. Conventional Testing and Inspections: Conventional Testing and Inspection Services herein describe those items not specially required by Code but may be considered essential to the proper performance of the building systems.
- E. Project Architect (Architect) The prime consultant in charge of overall design and coordination of the Project.

- F. Structural Engineer of Record (SER): The Licensed Engineer in responsible charge of the structural design for the Project relative to the Construction Documents.
- G. Licensed Structural Engineer: A professional engineer with education and experience in the design of structures similar to this Project and licensed in State in which Project is located.
- H. Testing Agency (TA):
 - 1. Testing Agency: Approved independent testing agency acceptable to the COR AND SER and as noted below:
 - 2. Authorized to operate in the State in which the project is located and experienced with the requirements and testing methods specified in the Contract Documents.
 - 3. Meeting applicable requirements of references stated in paragraph 1.4.
 - 4. Calibrate testing equipment at reasonable intervals by devices of accuracy traceable to either the National Bureau of Standards, or to accepted values of natural physical constants.
- I. Special Inspector (SI): A properly qualified individual or firm performing special inspections.
- J. The categories of special inspector are:
 - 1. Special Inspector - Technical I, II and III: Usually an employee of a testing agency:
 - a. Technical I (Sections 033000)
 - 1) ACI Certified Concrete Field Testing Technician – Grade I.
 - 2) ACI Certified Concrete Strength Testing Technician.
 - 3) ACI Certified Concrete Laboratory Testing Technician – Grade 1.
 - 4) ACI Certified Concrete Construction Inspector-In-Training.
 - 5) Inspector shall be employed by a testing laboratory, experienced in the type of work being performed, and under the direct supervision of a licensed civil/structural engineer.
 - b. Technical I (Section 05 12 00) - Non-destructive Testing Technician SNT-TC-1A Level I, and/or AWS Certified Associate Weld Inspector (CAWI).
 - c. Technical II (Section 03 3000)
 - 1) ACI Certified Concrete Laboratory Testing Technician - Grade II.
 - 2) ACI Certified Laboratory Aggregate Testing Technician.
 - 3) ACI Certified Concrete Construction Inspector.
 - 4) Inspector shall be employed by a testing laboratory, experienced in the type of work being performed, and under the direct supervision of a licensed civil/structural engineer.

- d. Technical II (Section 051200) - Non-destructive Testing Technician ASNT TC-1A Level II, (NDE Technician II), AWS/CAWI, with minimum 3 years' experience, or an AWS/CWI.
 - e. Technical III (Section 033000) - A civil/structural engineer regularly engaged in this type of work, with a minimum of 4 years' experience and licensed in the state in which the project is located and is an employee of a qualified and approved testing laboratory. The licensed engineer shall review and approve all reports.
 - f. Technical III (Section 051200) - ASNT Level III with a minimum of 10 years' experience or an AWS/CWI with a minimum of 10 years' experience.
2. Special Inspector - Structural I and II:
- a. Structural I (Sections 033000, 051200, - Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a licensed civil/structural engineer.
 - b. Structural II (Sections 03 10 00, 03 20 00, 03 30 00, 05 12 00, 31 63 29) - Civil/structural engineer regularly engaged in the design of structural systems of this type, licensed in the state in which the project is located. The licensed engineer shall review and approve all inspection reports.

1.5 RESPONSIBILITIES/AUTHORITY

A. Structural Testing and Special Inspection

- 1. Special Inspectors:
 - a. Sign the Structural Testing and Special Inspection Summary Schedule in conjunction with other responsible parties prior to commencement of construction.
 - b. If requested, attend a pre-construction meeting to review the scope of structural testing and special inspection.
 - c. Use the approved design drawings and specifications, supplemented by the approved shop drawings for review of the work.
 - d. Test and/or inspect the work assigned for conformance with the building department approved design drawings, specifications and applicable material and workmanship provisions of the Code. Perform testing and inspection in a timely manner to avoid delay of work.
 - e. Bring discrepancies to the immediate attention of the contractor for correction, confirm that they are corrected and, if uncorrected after a reasonable period of time, bring to the attention of the Structural Engineer of Record, the Building Official, and to the Architect.
 - f. Submit test and/or inspection reports to the Building Official, Contractor, the Structural Engineer of Record, and other designated persons in accordance with the Structural Testing and Special Inspection Summary Schedule.

- g. Submit a final signed report stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications and the applicable workmanship provisions of the Code.
- 2. Testing Agency:
 - a. Sign the Structural Testing and Special Inspection Summary Schedule in conjunction with other responsible parties prior to commencement of construction.
 - b. If requested, attend a pre-construction meeting to review the scope of structural testing and special inspection.
 - c. When engaged as a special inspector, provide structural testing and special inspection services as previously described.
- 3. Project Architect
 - a. Complete and sign the Structural Testing and Special Inspection Summary Schedule in conjunction with other responsible parties prior to commencement of construction. Provide a completed copy of the schedule to all signed parties including Building Official.
 - b. If appropriate, arrange and attend a pre-construction meeting to review the scope of structural testing and special inspection. Include Contractor, Building Official, SER, Testing Agency and other parties concerned.
 - c. Coordinate the flow of reports and related information to expedite resolution of construction issues.
- 4. Structural Engineer of Record (SER):
 - a. Identify items requiring structural testing and special inspection including special cases.
 - b. Define "type" of special inspector required for "description" of work indicated on the structural testing and special inspection schedule.
 - c. Complete and sign the Structural Testing and Special Inspection Summary Schedule prior to commencement of construction.
 - d. If requested, attend a pre-construction meeting to review the scope of structural testing and special inspection.
 - e. Review reports submitted by special inspectors.
 - f. If engaged as a special inspector, provide structural testing and special inspection services as previously described.
- 5. Contractor:
 - a. Sign the Structural Testing and Special Inspection Summary Schedule in conjunction with other responsible parties prior to commencement of construction.
 - b. If requested, attend a pre-construction meeting to review the scope of structural testing and special inspection.
 - c. Post or make available the Structural Testing and Special Inspection Summary Schedule within its office at the job site. Also, provide adequate notification to those parties designated on the schedule so they may properly prepare for and schedule their work.

- d. Provide the special inspectors access to the approved design drawings, approved shop drawings and specifications at the job site.
 - e. Review reports submitted by special inspectors.
 - f. Retain at the job site all reports submitted by the special inspectors for review by the building official upon request.
 - g. Provide the special inspector safe access to the work requiring inspection and/or testing.
 - h. Provide labor and facilities to provide access to the work and to obtain, handle and deliver samples, to facilitate testing and inspection and for storage and curing of test samples.
 - i. Verification of conformance of the work within specified construction tolerances is solely the Contractor's responsibility.
6. Fabricator:
- a. Sign the Structural Testing and Special Inspection Summary Schedule in conjunction with other responsible parties prior to commencing construction.
 - b. Submit a Certificate of Compliance to the Building Official, Special Inspector, and Structural Engineer of Record that the work was performed in accordance with the approved plans and specifications.
7. Building Official (Typical responsibilities noted for information only):
- a. Determine work, which in the Building Officials opinion, involves unusual hazards or conditions in accordance with the IBC.
 - b. Review special inspector qualifications.
 - c. Accept and sign the completed Structural Testing and Special Inspection Summary Schedule.
 - d. Review all fabricators who perform work in their shop, which requires special inspection.
 - e. Review reports and recommendations submitted by the special inspectors.
 - f. Review the "final signed reports" submitted by the special inspector(s). These documents should be accepted and approved by the building department prior to issuance of a Certificate of Occupancy.
8. Owner
- a. Establish direct funding to provide for cost of structural testing and special inspection services.
 - b. Provide special inspector with approved design drawings, specifications and approved shop drawings.
 - c. Provide special inspectors and testing agencies with full access to site at all times.
 - d. Sign the Structural Testing and Special Inspection Summary Schedule in conjunction with other responsible parties prior to commencement of construction.

B. Conventional Testing and Inspection

1. Testing Agency:

- a. Test or inspect the work assigned, for conformance with building department approved plans, specifications and applicable workmanship provisions of the IBC.
 - b. Bring non-conforming items to the immediate attention of the Contractor, and if uncorrected to the Architect of Record.
 - c. Submit test and/or inspection reports to the Architect of Record, the Contractor and other designated persons.
2. Contractor:
 - a. Provide adequate notification to testing agency so they may properly prepare for and schedule their work.
 - b. Provide testing agency with access to the approved design drawings, approved shop drawings and specifications at the job site.
 - c. Correct in a timely manner, deficiencies identified in test and/or inspection reports.
 - d. Provide testing agency with safe access to the work requiring testing and inspection.
 - e. Provide labor and facilities to provide access to the work and to obtain and handle samples, to facilitate testing and inspection and for storage and curing of test samples.
 - f. Verification of conformance of the work within specified construction tolerances is solely the Contractor's responsibility.
3. Architect of Record (or other prime consultant):
 - a. Coordinate the flow of reporting and related information to expedite resolution of construction issues.
4. Inspections by Building Official
 - a. Contractor shall provide adequate notice for inspections performed by the Building Official, as required by the 2000 IBC, the New York State Building Code, and local ordinance.
5. Periodic Site Observations by Design Consultant
 - a. Special structural testing and inspection, conventional testing and inspection, and periodic inspections by the Building Official do not preclude the normal field involvement and site observations by Architect or Structural Engineer of Record, nor shall it relieve the Contractor of any responsibility to complete the work in accordance with the approved drawings and specifications.
6. Limits of Authority
 - a. Testing agents and/or special inspectors may not waive or alter contract requirements, or approve or accept any portion of the work unless specifically authorized by the Architect or Structural Engineer of Record. They may not assume any duties of the Contractor, and they have no authority to stop or reject "Work".

1.6 Payment

- A. Owner or Architect/Structural Engineer of Record acting as the Owner's Agent shall directly employ and pay for services of the special inspectors to perform required Structural Testing and Special Inspection.
- B. Owner shall employ and pay for services of the testing agency to perform required Conventional Testing and Inspection.
- C. Unless noted otherwise, the Contractor shall provide and pay for all materials, samples, mock-ups, and assemblies required for testing and inspection and shall pay for all shipping costs related to delivery of this work. Testing agency will pay for shipping costs of samples transported from site to lab.
- D. If exploratory work is required to determine the cause of defects, the cost of such work shall be paid by the Contractor, if the work is found to be defective, in the judgment of the Architect/Engineer. Contractor shall reimburse the Owner for all costs incurred in this event.
- E. Any tests required to qualify the Contractor, or the workmen for any phase of the work, shall be performed at no additional cost to the Owner. Structural Tests and Special Inspections:

1.7 INSPECTION NOTICES

- A. Contractor: Provide minimum of 24 hours notice for all items requiring testing or inspection. Do not place items requiring testing and inspection services prior to or during placement until testing and inspection services are available. Do not enclose or obscure items requiring testing and inspection services after placement until testing and inspection services are performed.

1.8 REPORTS

- A. Testing agency and/or special inspectors shall submit a report in accordance with the Structural Testing and Special Inspection Schedule and shall conduct and interpret tests and inspections and state in each report whether; (1) test specimens and observations comply with Contract Documents, and specifically state any deviations, (2) record types and locations of defects found in work, (3) record work required and performed, to correct deficiencies.
- B. Submit reports for structural testing and special inspection, in timely manner to the Contractor, and COR.
 - 1. Submit reports for ongoing work, to provide the information noted below:
 - a. Date issued.
 - b. Project title and number.
 - c. Firm name and address.

- d. Name and signature of tester or inspector.
 - e. Date and time of sampling.
 - f. Date of test or inspection.
 - g. Identification of product and specification section.
 - h. Location in project, including elevations, grid location and detail.
 - i. Type of test or inspections.
 - j. Results of tests or inspections and interpretation of same.
 - k. Observations regarding compliance with Contract Documents or deviations therefrom.
2. Submit final signed report stating that, to the best of the special inspector's knowledge, the work requiring testing and/or inspection conformed to the Contract Documents.

1.9 FREQUENCY OF TESTING AND INSPECTION

- A. For detailed requirements see individual technical specification sections, and Part 3 of this section.

1.10 PROTECTION AND REPAIR

- A. Upon completion of testing, sample-taking, or inspection, repair damaged work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed surfaces, as judged solely by the COR. Protect work exposed by or for testing and/or inspection and protect repaired work. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for testing and/or inspection.

1.11 TESTS TO DEMONSTRATE QUALIFICATION

- A. If the Contractor proposes a product material, method, or other system that has not been pre-qualified, the SER may require applicable tests, to establish a basis for acceptance or rejection. These tests will be paid for by the Contractor.
- B. The SER reserves the right to require certification or other proof that the system proposed, is in compliance with any tests, criteria or standards called for. The certificate shall be signed by a representative of an independent testing agency.

PRODUCTS (NOT USED)

EXECUTION

1.12 SCOPE OF STRUCTURAL TESTS AND SPECIAL INSPECTIONS

- A. Refer to individual specification section articles for Quality Control testing and inspection items.

1.13 STRUCTURAL TESTS AND SPECIAL INSPECTIONS PROGRAM SUMMARY

- A. The parties involved shall complete and sign the Structural Testing and Special Inspection Schedule. The completed schedule is an element of the Contract Documents and after permit issuance, becomes part of the approved plans and specifications. The completed schedule shall include the following:
 - 1. Specific listing of items requiring inspection and testing.
 - 2. Associated specification section which defines applicable standards by which to judge conformance with approved plans and specifications in accordance with the New York State Building Code. The specification section should also include the degree or basis of inspection and testing; i.e., intermittent/will-call or full-time/continuous.
 - 3. Frequency of reporting, i.e., intermittent, weekly, monthly, per floor, etc.
 - 4. Parties responsible for performing inspection and testing work.
 - 5. Required acknowledgments by each designated party.
- B. See attached "Structural Testing and Special Inspection Schedule".

1.14 TECHNICAL SECTIONS

- A. Section 02200 - Earthwork - Grading, Excavation Filling
 - 1. (Not Used)
 - 2. Definitions
 - a. Refer to PART 1 for standard definitions.
 - b. Special Inspector - Technical
 - 1) Technical I Technician shall be under the direct supervision of a Technical III. Work shall be performed in a qualified geotechnical/testing laboratory.
 - 2) Technical II Technical with a minimum of 2 years experience, or a graduate engineer, and is an employee of a qualified and approved geotechnical/testing laboratory, under the direct supervision of a Technical III.
 - 3) Technical III A civil/geotechnical engineer regularly engaged in this type of work with a minimum of 4 years experience, licensed in the State in which the project is located, and is an employee of a

qualified and approved geotechnical/testing laboratory. This licensed engineer shall review and approve all final field reports.

3. Structural Testing and Special Inspection Requirements
 - a. Classification of materials used and encountered during construction per ASTM:D2488 and ASTM:D2487.
Technical I - Performance of laboratory testing of materials, as needed (Proctor, Sieve Analysis, Atterberg Limits, Consolidation Test, etc.).
 - b. Field Density Tests: Provide periodic results of field compaction and laboratory work for general compliance with Contract Documents and Geotechnical Reports.
4. Observe all subgrades/excavation bases below footings and slabs and verify design bearing capacity is achieved.
5. Document presence of groundwater within excavations.
6. Provide reports of subgrade observations for general compliance with Contract Documents and Geotechnical Report.
7. Verify cut and fill slopes as specified in the contract documents.
8. Conventional Testing and Inspections Requirements
 - a. Contractor shall verify that footings comply with frost depth requirements and shall report any variances to the SER in a timely manner.

B. Section 033000.1 - Concrete Form Work

1. General
 - a. (Not Used)
2. Definitions
 - a. Refer to PART 1 for standard definitions.
 - b. Special Inspector - Structural
 - 1) Structural I: Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a Structural II.
 - 2) Structural II: Civil/structural engineer regularly engaged in the design of structural systems of this type, licensed in the State in which the project is located. The licensed engineer shall review and approve all inspection reports.
 - 3) Special Inspector - Structural may be an employee of the SER.
3. Structural Testing and Special Inspection Requirements
 - a. Verify formwork dimensions for all concrete, excluding:
 - 1) Isolated spread footings of buildings three stories or less in height that are fully supported on earth or rock
 - 2) Strip footings of buildings three stories or less in height that are fully supported on earth or rock, where the footings support walls of light frame construction, the footings are designed in accordance with Table 1805.4.2, or the footing structural design is based on a f'_c no greater than 2500 psi.

- 3) Non-structural slabs on grade, including prestressed slabs on grade when effective prestress in concrete is less than 150 pounds per square inch.
 - 4) Concrete foundation walls constructed in accordance with Table 1805.5(2), Table 1805.5(3) or Table 1805.5(4).
 - 5) Concrete patios, driveways and sidewalks on grade.
 - 4. Conventional Testing and Inspection Requirements
 - a. (Not Used)
- C. Section 033000.2 - Concrete Reinforcement
 - 1. General
 - a. Refer to Section 05100 - Structural Steel for inspections involving welding reinforcing steel.
 - 2. Definitions
 - a. Refer to PART 1 for standard definitions.
 - b. Special Inspector - Technical
 - 1) (Not Used)
 - c. Special Inspector – Structural
 - 1) Structural I Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a Structural II.
 - 2) Structural II Civil/structural engineer regularly engaged in the design of structural systems of this type, licensed in the State in which the project is located. The licensed engineer shall review and approve all inspection reports.
 - 3) Special Inspector - Structural may be an employee of the SER.
 - 3. Structural Testing and Special Inspection Requirements
 - a. Inspect reinforcement in all cast in place concrete, excluding:
 - 1) Isolated spread footings of buildings three stories or less in height that are fully supported on earth or rock
 - 2) Strip footings of buildings three stories or less in height that are fully supported on earth or rock, where the footings support walls of light frame construction, the footings are designed in accordance with Table 1805.4.2, or the footing structural design is based on a f'_c no greater than 2500 psi.
 - 3) Non-structural slabs on grade, including prestressed slabs on grade when effective prestress in concrete is less than 150 pounds per square inch.
 - 4) Concrete foundation walls constructed in accordance with Table 1805.5(2), Table 1805.5(3) or Table 1805.5(4).
 - b. Verify the following:
 - 1) Verify reinforcing bar grade.
 - 2) Verify reinforcing bars are free of dirt, excessive rust, and damage.

- 3) Verify reinforcing bars are adequately tied, chaired, and supported to prevent displacement during concrete placement.
 - 4) Verify proper clear distances between bars and to surfaces of concrete.
 - 5) Verify reinforcing bar size and placement.
 - 6) Verify bar laps for proper length and stagger.
 - 7) Verify mechanical splices are placed in accordance with the plans, specifications and reviewed shop drawings.
 - 8) Verify weldability of reinforcing steel, other than ASTM A706. Verify welding of reinforcing bars meets requirements set forth in Section 05100.
 - 9) Verify epoxy coating is present at locations noted on the plans and specifications, include tie wires, chairs, bolsters, etc. Verify coating damage is repaired in accordance with the contract documents.
4. Conventional Testing and Inspection Requirements
- a. (Not Used)
- D. Section 033000.3 - Cast-in-Place Concrete
1. General
 - a. (Not Used)
 2. Definitions
 - a. Refer to PART 1 for standard definitions.
 - b. Special Inspector - Technical
 - 1) Technical I ACI Certified Grade I inspector. Inspector shall be employed by a testing laboratory, under the direct supervision of a Technical III.
 - 2) Technical II ACI Certified Grade II inspector. Inspector shall be employed by a testing laboratory, under the direct supervision of a Technical III.
 - 3) Technical III A civil/structural engineer regularly engaged in this type of work, with a minimum of 4 years experience and licensed in the State in which the project is located and is an employee of a qualified and approved testing laboratory. The licensed engineer shall review and approved all reports.
 - 4) Testing laboratory shall have C.C.R.L. certification at the National Bureau of Standards.
 - c. Special Inspector - Structural
 - 1) Structural I Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a Structural II.
 - 2) Structural II Civil/structural engineer regularly engaged in the design of structural systems of this type, licensed in the State in which the project is located. The licensed engineer shall review and approve all inspection reports.

- 3) Special Inspector - Structural may be an employee of the SER.
3. Structural Testing and Special Inspection Requirements
 - a. Sample and test all cast in place concrete.
 - 1) Prepare compression test specimens (ASTM C31), one set of four standard cylinders of concrete for each compressive strength test, mold and store cylinders for laboratory-cured specimens.
 - 2) Perform compressive strength tests (ASTM C39). One set of four cylinders for each day's pour between one and 25 cubic yards. If a day's pour exceeds 25 cubic yards, one set of four cylinders for each additional 50 cubic yards, or fraction thereof. One specimen at seven days, two at 28 days, and one specimen retained in reserve for later testing if required. For post tensioned concrete, make and test an additional cylinder at three days to verify strength prior to stressing. (When frequency of testing will provide less than five strength tests for a given class of concrete, conduct at least five strength tests from randomly selected batches. If fewer than five batches are used, conduct one test from each batch.)
 - 3) Slump (ASTM C143): One test at point of discharge for each set of compression test specimens; additional tests
 - 4) Air entrainment (ASTM C231): Test the first batch of air entrained concrete and one additional test for each set of compression test specimens.
 - 5) Concrete Temperature: Test concrete temperature hourly when air temperature is 40F and below and when 80F and above, and each time a set of compression test specimens is made.
 - b. Perform concrete mix verification.
 - 1) Verify mixer truck trip ticket conforms to approved mix design
 - 2) Verify that total water added to mix on site does not exceed that allowed by concrete mix design.
 - 3) Verify that concrete quality is indicative of adequate mixing time, consistency, and relevant time limits.
 - c. Inspect preparation and placement of all concrete, excluding:
 - 1) Isolated spread footings of buildings three stories or less in height that are fully supported on earth or rock
 - 2) Strip footings of buildings three stories or less in height that are fully supported on earth or rock, where the footings support walls of light frame construction, the footings are designed in accordance with Table 1805.4.2, or the footing structural design is based on a f'_c no greater than 2500 psi.
 - 3) Non-structural slabs on grade, including prestressed slabs on grade when effective prestress in concrete is less than 150 pounds per square inch.
 - 4) Concrete foundation walls constructed in accordance with Table 1805.5(2), Table 1805.5(3) or Table 1805.5(4).
 - 5) Verify the following:

- a) Verify acceptable general condition of concrete base prior to placement.
 - b) Verify that concrete conveyance and depositing avoids segregation and contamination
 - c) Verify that concrete is properly consolidated
 - d) Verify reinforcement remains at proper location
 - e) Unless noted, inspections shall be continuous.
- d. Observe protection and curing methods for all concrete, excluding:
- 1) Isolated spread footings of buildings three stories or less in height that are fully supported on earth or rock
 - 2) Strip footings of buildings three stories or less in height that are fully supported on earth or rock, where the footings support walls of light frame construction, the footings are designed in accordance with Table 1805.4.2, or the footing structural design is based on a f'_c no greater than 2500 psi.
 - 3) Non-structural slabs on grade, including prestressed slabs on grade when effective prestress in concrete is less than 150 pounds per square inch.
 - 4) Concrete foundation walls constructed in accordance with Table 1805.5(2), Table 1805.5(3) or Table 1805.5(4).
 - 5) Verify the following:
 - a) Verify specified curing procedures are followed.
 - b) Verify that specified hot and cold weather procedures are followed.
 - c) Inspect all bolts installed in concrete.
 - d) Verify specified size, type, spacing, configuration, embedment, and quantity.
 - e) Verify proper concrete placement and means have been taken to achieve consolidation around all bolts.
 - f) Conventional Testing and Inspection Requirements

E. Section 042000 - Masonry

1. General

- a. Special inspection of masonry is required during preparation of masonry wall prisms or test specimens, sampling and placing of masonry units, placement of structural reinforcement, cleanout of grout space immediately prior to closing of elements, and during all grouting operations.
- b. Inspections noted below as being periodic shall be performed at least once per 500 square feet, except 100% of shear walls, masonry beams, and masonry columns shall be inspected.

2. Definitions

- a. Refer to PART 1 for standard definitions.
- b. Special Inspector - Technical
 - 1) Technical I Technician shall be under the direct supervision of a Technical III regularly engaged in testing and inspection of this

- type of work. The licensed engineer shall review and approve all inspection reports.
- 2) Technical II Graduate civil/structural engineer, with experience in this type of work. Supervised by a Technical III. The licensed engineer shall review and approve all inspection reports.
 - 3) Technical III A civil/structural engineer regularly engaged in this type of work with a minimum of 4 years experience, licensed in the State in which the project is located, and is an employee of a qualified and approved testing laboratory. The licensed engineer shall review and approve all reports.
- c. Special Inspector - Structural
- 1) Structural I Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a Structural II.
 - 2) Structural II Civil/structural engineer regularly engaged in the design of structural systems of this type, licensed in the state in which the project is located. The licensed engineer shall review and approve all inspection reports.
 - 3) Special Inspector - Structural may be an employee of the SER.
3. Structural Testing and Special Inspection Requirements – Level 1
- a. Samples and Tests for Special Inspections
- 1) Masonry Unit Test – shall be performed in accordance with IBC Section 2105, as follows:
 - a) Units conform to ASTM C 55 or ASTM C 90.
 - b) Test units according to ASTM C 140 prior to the start of construction.
 - c) During construction one set of tests for each 5,000 SF of wall area, but not less than one set for the project.
 - 2) Prism Tests - number and frequency in accordance with SER should indicate which wall types IBC Section 2105, as follows: require testing.
 - a) A set of 3 masonry prisms for each masonry type requiring testing, shall be built and tested in accordance with ASTM C1314 prior to the start of construction.
 - b) During construction a set of 3 masonry prisms shall be built and tested in accordance with ASTM C1314 for each 5,000 SF of wall area in question, but not less than one set of 3 masonry prisms for the project.
 - c) The compressive strength of masonry determined in accordance with ASTM C1314 for each set of prisms shall equal or exceed specified f_m.
 - 3) Preparation, storage, handling of prism tests. (Contractor shall provide labor and materials to construct all prism tests.)
- b. Masonry Preparation and Placement

- 1) Base Conditions: On a periodic basis, verify that masonry bearing surfaces are clean.
 - 2) Condition of Units: On a periodic basis, verify that masonry units are clean and sound and dry.
 - 3) Proportions of site-prepared mortar: On a periodic basis, verify proportions of prepared mortar are consistent with previously submitted materials.
 - 4) Placement: On a periodic basis, inspect laying of masonry units for the following: nominal unit widths, stack or running bond, proper thickness and tooling of mortar joints, acceptable depth of furrowing of bed joints. Note temperature at time of inspection.
 - 5) Joints: On a periodic basis, inspect construction, expansion and contraction joints for location and continuity of steel.
 - 6) On a periodic basis, verify hot and cold weather procedures are followed.
 - 7) On a periodic basis, verify wall cavities are protected against entry of precipitation.
- c. Masonry Reinforcement:
- 1) Vertical Reinforcement: On a periodic basis, inspect placement and alignment of vertical bars and dowels for size, grade and spacing. Inspect length of lap splices, clearances between bars, clearances to masonry units and outside face of walls, and positioning of steel.
 - 2) Horizontal Reinforcement: On a periodic basis, inspect horizontal joint reinforcement steel and masonry reinforcement bars for size, length of lap splices, dowels, clearances between bars, clearance to masonry units and outside face of walls, and alignment.
 - 3) Ties: On a periodic basis, inspect ties in masonry for type, straightness, embedment, spacing and size.
 - 4) Dowels and Anchors: On a periodic basis, inspect the installation of masonry anchor bolts, joist anchors, inserts, straps, and dowels.
 - 5) Prior to Masonry Grouting and Capping
 - 6) Grout Spaces: On a periodic basis, verify that grout spaces are correctly sized and clean, cleanouts are closed after inspection and grout barriers are in place before grouting.
 - 7) Reinforcement: On a periodic basis, verify placement of reinforcement and connectors remains consistent with construction documents.
 - 8) Site Prepared Grout: On a periodic basis, verify proportions of site prepared grout are consistent with previously submitted materials.
- d. During Grouting Operations
- 1) Grouting: On a periodic basis, verify proper grouting technique including consolidation to approved height of grout space, reconsolidation and vibration.

- 2) Dry Packing: On a periodic basis, verify proper application of dry packing.
- e. General Compliance
 - 1) On a periodic basis, verify that work is being performed in accordance with the contract documents and the approved submittals and that materials used are consistent with prior submittals.
- 4. Structural Testing and Special Inspection Requirements – Level 2
 - a. Samples and Tests for Special Inspections
 - 1) Masonry Unit Test – shall be performed in accordance with IBC Section 2105, as follows:
 - a) Units conform to ASTM C 55 or ASTM C 90.
 - b) Test units according to ASTM C 140 prior to the start of construction.
 - c) During construction one set of tests for each 5,000 SF of wall area, but not less than one set for the project.
 - 2) Prism Tests - number and frequency in accordance with SER should indicate which wall types IBC Section 2105, as follows: require testing.
 - a) A set of 3 masonry prisms for each masonry type requiring testing, shall be built and tested in accordance with ASTM C1314 prior to the start of construction.
 - b) During construction a set of 3 masonry prisms shall be built and tested in accordance with ASTM C1314 for each 5,000 SF of wall area in question, but not less than one set of 3 masonry prisms for the project.
 - c) The compressive strength of masonry determined in accordance with ASTM C1314 for each set of prisms shall equal or exceed specified f_m .
 - 3) Preparation, storage, handling of prism tests.
 - b. Masonry Preparation and Placement
 - 1) Base Conditions: On a periodic basis, verify that masonry bearing surfaces are clean.
 - 2) Condition of Units: On a periodic basis, verify that masonry units are clean and sound and dry.
 - 3) Proportions of prepared mortar
 - 4) Placement: On a periodic basis, inspect laying of masonry units for the following: nominal unit widths, stack or running bond, proper thickness and tooling of mortar joints, acceptable depth of furrowing of bed joints. Note temperature at time of inspection.
 - 5) Joints: On a periodic basis, inspect construction, expansion and contraction joints for location and continuity of steel.
 - 6) On a periodic basis, verify hot and cold weather procedures are followed.
 - 7) On a periodic basis, verify wall cavities are protected against entry of precipitation.

- c. Masonry Reinforcement:
 - 1) Vertical Reinforcement: On a periodic basis, inspect placement and alignment of vertical bars and dowels for size, grade and spacing. Inspect length of lap splices, clearances between bars, clearances to masonry units and outside face of walls, and positioning of steel.
 - 2) Horizontal Reinforcement: On a periodic basis, inspect horizontal joint reinforcement steel and masonry reinforcement bars for size, length of lap splices, dowels, clearances between bars, clearance to masonry units and outside face of walls, and alignment.
 - 3) Ties: On a periodic basis, inspect ties in masonry for type, straightness, embedment, spacing and size.
 - 4) Dowels and Anchors: Inspect the installation of all masonry anchor bolts, joist anchors, inserts, straps, and dowels. Continuous
- d. Prior to Masonry Grouting and Capping
 - 1) Grout Spaces: Verify that grout spaces are correctly sized and clean, cleanouts are closed after inspection and grout barriers are in place before grouting.
 - 2) Reinforcement: Verify placement of reinforcement and connectors remains consistent with construction documents.
 - 3) Site Prepared Grout: Verify proportions of site prepared grout are consistent with previously submitted materials.
- e. During Grouting Operations
 - 1) Grouting: On a periodic basis, verify proper grouting technique including consolidation to approved height of grout space, reconsolidation and vibration.
 - 2) Dry Packing: On a periodic basis, verify proper application of dry packing.
- f. General Compliance
 - 1) On a periodic basis, verify that work is being performed in accordance with the contract documents and the approved submittals and that materials used are consistent with prior submittals.
- 5. Conventional Testing and Inspection Requirements
 - a. Not Used.

F. Section 051000 - Structural Steel

- 1. General
 - a. If special inspection of fabricators work is required, testing agent may test and inspect structural steel at plant before shipment. Owner and SER reserve right to reject material not complying with Contract Documents at any time before final acceptance.
- 2. Definitions
 - a. Refer to PART 1 for standard definitions.
 - b. A.S.N.T: The American Society for Non-destructive Testing.
 - c. N.D.E.: Non-destructive Evaluation.

- d. A.W.S./C.A.W.I. : American Welding Society/Certified Associate Weld Inspector.
 - e. A.W.S./C.W.I. American Welding Society/Certified Weld Inspector.
 - f. R.C.S.C Research Council On Structural Connections
 - g. Special Inspector – Technical Shall be employed by a testing agency and shall be supervised by an A.W.S./C.W.I. with a minimum of 10 years experience or an A.S.N.T. Level III with a minimum of 10 years experience. These individuals shall satisfy the following requirements:
 - 1) Technical I Non-destructive Testing Technician S.N.T.-TC-1A Level I, and/or A.W.S. Certified Associate Weld Inspector (C.A.W.I.)
 - 2) Technical II Non-destructive Testing Technician A.S.N.T. TC-1A Level II, (NDE Technician II), A.W.S./C.A.W.I., with minimum 3 years experience, or an A.W.S./C.W.I.
 - 3) Technical III A.S.N.T. Level III with a minimum of 10 years experience or an A.W.S./C.W.I. with a minimum of 10 years experience.
 - h. Special Inspector -Structural
 - 1) Structural I Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in design of structural systems of this type. Inspections shall be performed under the direct supervision of a Structural II.
 - 2) Structural II Civil/structural engineer regularly engaged in the design of structural systems of this type, licensed in the state in which the project is located. The licensed engineer shall review and approve all inspection reports.
 - 3) Special Inspectors - Structural may be an employee of the SER.
3. Structural Testing and Special Inspection Requirements
- a. High Strength Bolting (Field Installed):
 - 1) General
 - a) On a periodic basis, visually inspect mating surfaces and bolt type for all slip-critical bolted connections for general conformance with the contract documents prior to bolting.
 - b) Determine the requirements for bolts, nuts, washers, paint and installation/tightening standards are met.
 - c) Observe calibration procedures when such procedures are required in the contract documents and verify that selected procedure is used to tighten bolts.
 - 2) Slip Critical Bolts and Tension Bolts
 - a) Test bolt tightening in 10% of all bolts. Test a minimum of two bolts in each connection. Verify that all plies of connected elements have been brought into contact, at 100% of connections. Verify all tips are removed from "twist"-off bolts.
 - 3) Bearing Bolts

- a) On a periodic basis, visually inspect to confirm all plies of connected elements have been brought into contact, at 100% of connections. (Applies only to bolts designed for values not requiring exclusion of threads from failure plane, all other bolts require testing as for tension bolts.)
- 4) Standard
 - a) Test High Strength bolted connections per R.C.S.C. "Specifications for Structural Joints Using ASTM A325 or A490 Bolts."
- b. High Strength Bolting (Shop Installed):
 - 1) For shop fabricated work, perform tests required for field installation, except that bolt testing may be reduced or deleted, if fabrication shop satisfies AISC Quality Certification Program - Category I, or more stringent criteria, or is approved by building official and SER.
- c. Welding (General): The Special Inspector shall perform the following on a periodic basis:
 - 1) Prior to start of fabrication determine if fabrication shop meets the criteria for exempting shop welds from inspection and confirm in writing to building official and SER.
 - 2) Verify qualifications of all welders as AWS certified.
 - 3) Verify Manufacturer's certificate of compliance for weld filler materials.
 - 4) Verify proposed welding procedures and materials.
 - 5) Verify adequate preparation of faying surfaces.
 - 6) Verify preheat and interpass temperatures of steel, proper technique and sequence of welding, and cleaning and number of passes are provided as required.
- d. Welding (Field):
 - 1) Fillet Welds: On a periodic basis, visually inspect 100% of all fillet welds, for size, length, and quality, per AWS D1.1.
 - 2) Partial Penetration Welds: Test 100% of all partial penetration welds exceeding 5/16 inch, using Ultrasonic Testing per A.W.S. D1.1. Test 25% of all partial penetration welds less than 5/16 inch, using Magnetic Particle Testing per ASTM E-109, performed on root pass and on finished weld.
 - 3) Full Penetration Welds: Test 100% of all full penetration welds exceeding 5/16 inch, using Ultrasonic Testing per A.W.S. D1.1 Test 25% of all full penetration welds less than 5/16 inch, using Magnetic Particle Testing per ASTM E-109, performed on root pass and on finished weld.
 - 4) Stud Shear Connector Welds: Visually inspect 100% of installed studs for full 360° flash. Test all questionable studs, not showing full 360° flash by bending studs to 15° from vertical, away from weld discontinuity, per AWS D1.1. All ceramic welding ferrules

shall be removed by contractor. Randomly test all other studs by bending to 15° from vertical as noted:

- a) Studs welded thru deck 15%
 - b) Studs welded to bare steel 5% Alternatively, sound 100% of installed studs, for full penetration weld, using an 8 lb. maul. Test questionable studs as noted above. Welding ferrules need not be removed.
- 5) Steel Joist/Joist Girder Welds: Provide testing and inspection for field welds previously described.
 - 6) Deck Welds: On a periodic basis, visually inspect size, location, length and burn thru for 100% of puddle welds on metal deck designed as a structural element, per AWS D1.3.
 - 7) Cold Formed Metal Framing Welds: On a periodic basis, visually inspect 100% of welds for specified length, size, and continuity in accordance with AWS D1.3 for metal less than 1/8" in thickness, for work designed as a structural element.
 - 8) Welding of Reinforcing Bars: Visually inspect 100% of all reinforcing bar welds as the welding is performed, per AWS D1.4.
 - a) Verify weldability of reinforcing steel other than ASTM A706.
 - b) Verify proper joint preparation is provided and proper electrodes are used and properly stored and dried. Technical II
 - 9) Miscellaneous Metals, Inserts and Prefabricated Components: Where integrity of the connections impact life safety or performance of the building structure, provide testing and inspection as for typical welds previously specified.
- e. Welding (Shop):
 - 1) Perform inspections as for field welding except weld testing may be reduced or deleted, if fabrication shop satisfies AISC Quality Certification Program - Category I, or more stringent criteria, and is approved by building official and SER.
 - f. Mechanical Fasteners (Misc.):
 - 1) Fasteners: Visually inspect specified size, spacing, embedment, and location.
 - g. Structural Configuration:
 - 1) Submittals: Verify mill test reports and other submitted documentation, for compliance with contract document. Structural I
 - 2) Materials: Verify materials delivered to site comply with contract documents and approved shop drawings. Materials include:
 - a) Structural Steel
 - b) Bolts
 - c) Electrodes
 - d) Mechanical fasteners
 - e) Deck gauge Technical I
 - 3) Detail Compatibility. On a periodic basis:

- a) Review project documents affecting integrity of the structure, including contract documents and pertinent submittals (approved shop drawings).
 - b) Visit site, at intervals appropriate to the stage of construction, to perform review of the structure and visually confirm general compliance with the project documents.
 - c) Inspect the following to verify member orientation, configuration, type, and size complies with details indicated on the contract documents and approved shop drawings: -Bracing and stiffening members. -Proper applications of joint details at connections for structural members. -Other work critical to the integrity of the building structure.
 - 4. Conventional Testing and Inspection Requirements
 - a. High Strength Bolting
 - 1) Bolt Material Test: Test a minimum of two bolts of each ASTM class specified, for bolt hardness and tensile properties. SNT-TC-1A
 - 2) Fabrication and Erection Tolerances Verify in-place structure satisfies specified tolerances.
- G. Section 072500 - Spray Applied Fire-resistive material
- 1. General
 - a. Testing agency shall be familiar with the requirements and testing methods required in IBC Standards and with approved UL assembly requirements.
 - 2. Definitions
 - a. Refer to PART 1 for standard definitions.
 - b. Special Inspector – Technical Shall be supervised by an engineer licensed to practice in the state where the work is performed. Inspector shall be acceptable to the building official, the Owner and the SER and shall satisfy the following minimum requirements:
 - 1) Technical I Shall be familiar with the interpretation and use of IBC Standard 7-6, and have prior field experience in testing and inspection of spray-applied Fire-resistive material.
 - 3. Structural Testing and Special Inspection Requirements
 - a. Spray Applied Fire-resistive material
 - 1) Procedures and Preparation Verify substrates to receive Fire-resistive material are prepared in accordance with manufacturer's instructions and are free of materials which may prevent adequate adhesion. Inspect batching to comply with manufacturer's requirements for first 3,000 s.f. applied.
 - 2) Thickness Test thickness of applied Fire-resistive material as per ASTM E605.
 - 3) Density Test density per ASTM E605.

- 4) Bond Strength Test bond strength of cured fire-resistant material per ASTM E 736.
- 4. Conventional Testing and Inspection Requirements
 - a. Not used.

END OF SECTION 01 45 33

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Agreement for Construction Services (hereinafter referred to as the Contract) and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Sewers and drainage.
 - 2. Water service and distribution.
 - 3. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
 - 4. Heating and cooling facilities.
 - 5. Ventilation.
 - 6. Electric power service.
 - 7. Lighting.
 - 8. Telephone service.
- C. Support facilities include, but are not limited to, the following:
 - 1. Temporary roads and paving.
 - 2. Dewatering facilities and drains.
 - 3. Project identification and temporary signs.
 - 4. Waste disposal facilities.
 - 5. Field offices.
 - 6. Storage and fabrication sheds.
 - 7. Lifts and hoists.
 - 8. Temporary elevator usage.
 - 9. Temporary stairs.
 - 10. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Environmental protection.
 - 2. Stormwater control.
 - 3. Tree and plant protection.

4. Pest control.
5. Site enclosure fence.
6. Security enclosure and lockup.
7. Barricades, warning signs, and lights.
8. Fire protection.

1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Architect and shall be included in the Contract Sum.
- B. Water Service: Use water from Owner's existing water system without metering and without payment of use charges.
- C. Electric Power Service: Use electric power from Owner's existing system without metering and without payment of use charges.

1.5 SUBMITTALS

- A. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Within 7 days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.

1.6 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
 1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
 2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

- A. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.
 - 1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
 - 1. Keep temporary services and facilities clean and neat.
 - 2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.
- B. Pavement: Comply with Division 2 Section "Hot-Mix Asphalt Paving."
- C. Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized steel, chain-link fabric fencing; minimum 8 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top rails.
- D. Portable Chain-Link Fencing: Minimum 2-inch 9-gage, galvanized steel, chain-link fabric fencing; minimum 8 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide concrete bases for supporting posts.
- E. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."
- F. Gypsum Board: Minimum 1/2 inch thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36.
- G. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively.
- H. Paint: Comply with requirements in Division 9 Section "Painting."
- I. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- J. Water: Potable.

2.2 EQUIPMENT

- A. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- B. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- C. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.
- D. Heating Equipment: Unless Owner authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
- E. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
- F. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work in conjunction with Construction Implementation Plan submitted to the Owner and Owner's Representative by the Contractor for approval. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, pro-

vide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.

1. Arrange with utility company and Owner for time when service can be interrupted, if necessary, to make connections for temporary services.
 2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
- B. Sewers and Drainage: Provide temporary connections to remove effluent that can be discharged lawfully.
1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 2. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
- C. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
1. Contractor shall provide temporary water to the new building for use by all Contractors and will take precautions against freezing; leakage and damage caused by the water supply system.
 2. Contractor requiring water service shall provide rubber hoses as necessary.
 3. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
 4. Contractors shall avoid the waste of water, and shall be responsible for any damages caused by their use of water during construction.
 5. Contractor shall provide temporary connections where needed to permit Owner to maintain service at all times.
- D. Sanitary Facilities: Contractor to provide and maintain temporary port-o-sans toilets.
- E. Heating, Cooling, and Ventilation: Heating, cooling, and ventilation for temporary use must be provided by the Contractor as required for the duration of the Project. After receiving approval from the owner and/or Owner's Representative, it may be obtained through the existing building system. Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.

Damages to the existing heating system caused by the Contractor shall be repaired by him at no cost to the Owner.

1. The following conditions shall be maintained:
 - a. During the placing, setting, and/or curing of interior carpentry, furring, spackle, and drywall, an ambient temperature of 60 degrees F shall be maintained, and such temperature shall be maintained 48 hours before,

during and 48 hours after installation in each space where such covering is required.

- b. During the placing, setting and curing of all concrete, an ambient temperature of 50 degrees F shall be maintained in the area involved.
 - c. Except as noted above, all areas in which work is in progress, shall be maintained at 45 degrees F during working hours.
 - d. Where finished Work has been installed maintain at 65 deg F for finishing activities and areas.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- G. Electric Power Service: Temporary electric light and power is to be provided by the Contractor. It shall be set up so that light and power is available 24 hours per day throughout the project.

Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.

- 1. Install power distribution wiring overhead and rise vertically where least exposed to damage.
 - 2. Connect temporary service to Owner's existing power source, as directed by electric company officials.
 - 3. The Contractor shall provide temporary connections where needed to permit the Owner to maintain service at all times.
 - 4. Temporary relocations of interior exit signs in existing building shall be performed by the Contractor at no additional cost to the Owner.
 - 5. All trade trailers shall be powered by the contractor requiring same.
- H. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.
- I. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
- 1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
 - 2. Provide metal conduit, tubing, or metallic cable for wiring exposed to possible damage. Provide rigid steel conduits for wiring exposed on grades, floors, decks, or other traffic areas.
 - 3. Provide metal conduit enclosures or boxes for wiring devices.

4. Provide WP and GFI receptacles in all exterior or wet locations.
- J. Lighting: Temporary lighting shall be based on 1 watt per square foot covering each and every square foot of floor area in the building. Sufficient wiring, lamps, and outlets shall be installed to insure proper lighting. The minimum lamp size shall be 75 watts. All temporary lighting shall be removed upon completion of work or at direction of Architect or Owner's Representative.
- K. Telephone Service: Provide temporary coin operated telephone service throughout construction period for common-use facilities used by all personnel engaged in construction activities.
 1. At the telephone, post a list of important telephone numbers.
 2. Install a coin-operated telephone station at a convenient grade-level location for convenience of personnel.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
 2. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and paved areas as indicated on Drawings.
 1. Provide a reasonably level, graded, well-drained subgrade of satisfactory soil material, compacted to not less than 95 percent of maximum dry density in the top 6 inches.
 2. Provide gravel paving course of subbase material not less than 3 inches thick; roller compacted to a level, smooth, dense surface.
 3. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 2 Section "Earthwork."
 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.

4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 2 Section "Hot-Mix Asphalt Paving."
- D. Traffic Controls: Provide temporary traffic controls at junction of temporary roads with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads. Comply with requirements of authorities having jurisdiction.
- E. Dewatering Facilities and Drains: Comply with requirements in applicable Division 2 Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.
 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining property nor endanger permanent Work or temporary facilities.
 2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
 3. Remove snow and ice as required to minimize accumulations.
- F. Project Identification and Temporary Signs: Prepare Project identification and other signs as required by the Owner or the Owner's Representative. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.

Upon complete of the project, or as may be directed by the Architect, signs, framing, supports and foundation shall be removed from the project site.
- G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.
 1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
- H. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building or elsewhere on-site.
- I. Temporary Elevator Usage: Refer to Division 14 Sections for temporary use of new elevators.
- J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished, permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. **Site Safety Signage:** The Contractor shall be responsible for installing and maintaining all site safety signage as needed. Additionally, install signage on the entrance gate indicating the following: "Construction Entrance Only", "No Smoking Permitted - \$1,000 Fine", "Hard Hat Area", "No Deliveries Between 8:00 and (:30 a.m. and between 2:30 and 3:30 p.m." and signage as required by the Construction Implementation Plan.
- B. **Environmental Protection:** Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
- C. **Stormwater Control:** Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.
- D. **Tree and Plant Protection:** Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage. Protect tree root systems from damage, flooding, and erosion.
- E. **Tree and Plant Protection:** Comply with requirements in Division 2 Section "Tree Protection and Trimming."
- F. **Pest Control:** Before deep foundation work has been completed, retain a local exterminator or pest-control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Engage this pest-control service to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.
- G. **Site Enclosure Fence:**
 - 1. The Contractor shall maintain all temporary construction fencing required on the Construction Implementation Plan including gates, chains and padlocks, and shall maintain security by limiting number of keys for all trades, and restricting distribution to authorized personnel including Architect and Owner's Representative. Contractor shall provide Owner with one set of keys.
- H. **Security Enclosure and Lockup:** Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- I. **Barricades, Warning Signs, and Lights:** Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.
 - 1. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch- thick exterior plywood.

- J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 2. Vertical Openings: Close openings of 25 sq. ft. or less with plywood or similar materials.
 3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
 5. Where temporary wood or plywood enclosure exceeds 100 sq. ft. in area, use fire-retardant-treated material for framing and main sheathing.
- K. Temporary Partitions: The Contractor shall erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
1. Construct dustproof partitions of not less than nominal 4-inch studs, 5/8-inch gypsum wallboard with joints taped and painted on occupied side, and 1/2-inch fire-retardant plywood on construction side.
 2. Construct dustproof, floor-to-ceiling partitions of not less than nominal 4-inch studs, 2 layers of 3-mil polyethylene sheets, inside and outside temporary enclosure. Cover floor with 2 layers of 3-mil polyethylene sheets, extending sheets 18 inches up the side walls. Overlap and tape full length of joints. Cover floor with 3/4-inch fire-retardant plywood.
 - a. Construct a vestibule and airlock at each entrance to temporary enclosure with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
 3. Insulate partitions to provide noise protection to occupied areas.
 4. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
 5. Protect air-handling equipment.
 6. Weatherstrip openings.
 7. On the exterior, site shall be watered down frequently to prevent dust from rising. Streets shall be maintained clean at the Owner's Representative's request.
- L. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.

- a. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
 4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
- M. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Temporary Facility Changeover: Except for using permanent fire protection as soon as it is available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00

PRODUCT and SUBSTITUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Agreement for Construction Services (hereinafter referred to as the Contract) and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following administrative and procedural requirements: selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products and substitutions made after award of the Contract.
- B. Related Sections include the following:
 - 1. Division 1 Section "References" for applicable industry standards for products specified.
 - 2. Division 1 Section "Submittals" for requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.
 - 3. Division 1 Section "Closeout Procedures" for submitting warranties for contract closeout.

1.3 DEFINITIONS

- A. Measurement: All drawings, details, and all product information shall use the "British" measurement system (feet and inches). Submittals based on the Metric System shall be rejected.
- B. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.

3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- C. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:
1. Substitutions requested during the bidding period, and accepted by Addendum prior to award of the contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
 2. Revisions to the Contract Documents requested by the Owner or Architect.
 3. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.
- D. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.
- E. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- F. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.4 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.

- Issue for Bid
June 24, 2022

- i. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - j. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Architect will notify Contractor through Owner's Representative of acceptance or rejection of proposed substitution within two weeks of receipt of request, or one week of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.
- B. Where manufactured articles, materials and equipment are specified, but specific installation instructions are not included they shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the manufacturer's latest printed instructions.
- C. The Contractor is required to maintain at the job site the current edition of such printed instructions. Where such directions are at variance with the specifications the Contractor shall require clarification from the Architect

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Store products to allow for inspection and measurement of quantity or counting of units.
6. Store materials in a manner that will not endanger Project structure.
7. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
9. Protect stored products from damage.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Refer to Divisions 2 through End of Specifications for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures: Procedures for product selection include the following:

1. Available Products: Where Specification paragraphs or subparagraphs titled "Available Products" introduce a list of names of both products and manufacturers, provide one of the products listed or another product that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
2. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed or another manufacturer that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 2. Requested substitution does not require extensive revisions to the Contract Documents.
 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 4. Substitution request is timely, fully documented and properly submitted.
 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 7. Requested substitution is compatible with other portions of the Work.

8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
11. The specified product or method of construction cannot be provided within the Contract Time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
12. The request is directly related to an “or-equal” clause or similar language in the Contract Documents.
13. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
14. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that he substitution will overcome the incompatibility.
15. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.
16. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.

The Contractor’s submittal and the Architect’s acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval of that substitution.

2.3 COMPARABLE PRODUCTS

- A. Where products or manufacturers are specified by name, submit the following, in addition to other required submittals, to obtain approval of an unnamed product:
 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents; that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

2.4. PRODUCT ACCEPTANCE STANDARDS

- A. Where the words "or acceptable equal" or other synonymous terms are used, it is expressly understood that they shall mean that the acceptance of any such submission is vested in the Architect, whose decision shall be final and binding upon all concerned. All submissions are subject to such review.
- B. The intent of this article is to encourage and permit competition on qualified products by reputable and qualified suppliers and manufacturers, whose products, reputation and performance warrant approval for the conditions, intent of design and performance considerations.
- C. Whenever a product is specified in accordance with Federal ASTM Designation, American National Standards Institute or other association standard, the Contractor shall present an affidavit from the manufacturer certifying that the product complies with the particular standard specification. Where necessary and requested substantiate compliance.
- D. Whenever any product is specified or shown by describing proprietary items, model numbers, catalog numbers, manufacturer, trade names or similar references, such reference is intended to establish the measure of quality which the Architect has determined as requisite and necessary for the project. The right is reserved to approve or disapprove proposed deviations of design, function, construction or similar differences which will affect the design intent. The Architect shall have the right to reject any substitutions of submission of materials not manufactured in the U.S.A. or which have not been used successfully in the Architect's opinion for five years in this area. This also applies to acceptance of non-specified products.
- E. Acceptance of Non-Specified Products
 - (1) For acceptance of products other than those specified, the Contractor shall submit a request, in writing, to the Architect and Owner. The request shall clearly define and describe the product for which approval is requested. Requests shall be accompanied by manufacturer's literature, specifications, drawings, cuts, performance data, list of reference or other information necessary to completely describe the item.
 - (2) The Contractor shall submit to the Owner for review two (2) copies of a complete list of suppliers, materials and equipment he proposes for use in connection with this project.
 - (3) Substitution of products will be considered only under the following conditions:
 - (a). The Contractor shall place orders for specified materials and equipment promptly. No excuse or proposed substitution will be considered for materials and equipment due to unavailability unless proof is submitted that firm orders were placed ten (10) days after approval by the Architect of the item listed in the specifications.
 - (b). The reason for the unavailability is beyond the control of the Contractor. Unavailability will be construed as being due to strikes, lockouts, bankruptcy, discontinuance of the manufacture of a product, or Acts of God.
 - (c). Requests for such substitution shall be made in writing to the Architect within ten (10) days of date that the Contractor ascertains he cannot obtain the material or equipment specified.

- (d). Request shall be accompanied by a complete description of material or equipment which the Contractor wishes to use as a substitute as described above.
- (f). After any material or piece of equipment has been accepted, no change in brand or make will be permitted unless satisfactory written evidence is presented and approved by the Architect that the manufacturer cannot make scheduled delivery of approved material, or that material delivered has been rejected and the substitution of a suitable material is an urgent necessity, or that other conditions have become apparent which indicate that the approval of such other material is in the best interest of the Owner.
- (g). For any item or items which the Owner may have pre-purchased before the start of the work because of excessive lead time required for such items, it will be the Contractor's responsibility to receive, store and install such items purchased by the Owner.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 70 00

EXECUTION REQUIREMENTS CHECK AGAINST CONTRACT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Agreement for Construction Services (hereinafter referred to as the Contract) and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.
- B. Related documents include the following:
 - 1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. Division 1 Section "Submittal Procedures" for submitting surveys.
 - 3. Division 1 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
 - 4. Division 1 Section "Closeout Procedures" final cleaning.

1.3 SUBMITTALS

- A. Qualification Data: For land surveyor to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

- D. Certified Surveys: Submit two copies signed by land surveyor.
- E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without Owner's written permission.
- C. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Location of Apparatus: the location of apparatus, equipment, fixtures, piping outlets, etc., shown or specified but not specifically dimensioned shall be considered as only approximate. The actual location shall be as directed and as required to suit the conditions at the time of installation. Before installation, the Contractor shall consult the Architect, and ascertain the actual location required. He shall also consult with other trade Contractors and examine their drawings so as to avoid conflicts with other work and apparatus.
- B. Measurements: Verify dimensions and measurements of the site and be responsible for the correctness of them. No extra charges or compensation will be allowed on account of difference between actual dimensions and measurements indicated on drawings; any difference found shall be submitted to the Architect in sufficient time for his consideration and direction before proceeding with the work involved

1. It is the duty of the Contractor to take his own measurements of the work and be responsible for same.
 2. The Contractor shall thoroughly examine the drawings and specifications, carefully checking the figured dimensions, before commencing work, and report to the Architect if any discrepancy, error or defect appears, but shall not be held responsible for their existence
- C. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- D. General: The Contractor shall engage a land surveyor to lay out the Work using accepted surveying practices.
1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 3. Inform installers of lines and levels to which they must comply.
 4. Check the location, level and plumb, of every major element as the Work progresses.
 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- E. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- F. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- G. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.
- H. Certificates: submit a certificate signed by the land surveyor or professional engineer certifying the location and elevation of improvements including the following:
1. Foundation Survey: After completion of foundations, as-built survey shall be submitted prior to continuing with the work.
 2. Anchor Bolt Survey: After installation of all column anchor bolts, surveyor shall survey as-built conditions. No steel erection shall proceed until all corrections, if any, are completed.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 2. Allow for building movement, including thermal expansion and contraction.
- G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.
- H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
- L. Care shall be taken by all workmen not to mark, soil, or otherwise deface finished surfaces. In the event that any finished surface becomes defaced in any way by mechanics or workmen, the Contractor responsible shall clean and restore such surfaces to their original condition or replace to the Owner's and Architect's satisfaction.
- M. Areas of the building in which painting and finishing work is to be performed shall be cleaned throughout by the Contractor just prior to the start of this work, and these areas shall be maintained in satisfactory condition for painting and finishing as directed by the Architect. This cleaning shall include the removal of trash and rubbish from the area; broom cleaning of floors; the removal of plaster, mortar, dust and other extraneous materials from finish surfaces.
- N. In addition to the cleaning specified above and the move specific cleaning which may be required in various sections of the Specifications, the space shall be prepared for occupancy by a thorough cleaning throughout by the Contractor including washing, or

cleaning by other approved methods, surfaces on which dirt or dust has collected and by washing glass doors on both sides. Provide and maintain adequate runner strips of non-staining reinforced Kraft building paper on finished floors as required for protection. Equipment shall be left in an undamaged, bright, clean, polished condition.

- O. Upon completion of his work, and also when directed, the Contractor shall remove from the building and premises all temporary work, and all rubbish and debris and shall have left the building and the premises in a neat orderly "broom clean" condition.
- P. Contractor and all Subcontractors shall cooperate in every possible way to expedite the use and occupancy of the building, and the completion of unfinished items.

3.6 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
 - 2. Work which has become defective, damaged, unsatisfactorily installed, permanently stained, marred, cracked and materials which do not conform to grade of quality required, will be rejected, removed immediately, reset as required with material and methods of like kind and quality to produce satisfactory, complete work to full satisfaction of the Architect at no additional costs or extension of contract time.
- B. Restore permanent facilities used during construction to their specified condition.

Execution Requirements

Page 01 70 00-8

- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 70 00

SECTION 01 73 10

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Standard Form of Agreement between Owner and Contractor (hereinafter referred to as the Contract), the General Conditions of the Contract for Construction (hereinafter referred to as the General Conditions, any Supplementary General Conditions, and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. The Contractor shall perform cutting and patching to work in place if necessary.
- C. Related Sections include, but may not be limited to, the following:
 - 1. Division 7 Section "Through-Penetration Firestop Systems" for patching fire-rated construction.
 - 2. Divisions 2 through End of Specification Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - a. Requirements in this Section apply to mechanical and electrical installations. Refer to Mechanical and Electrical Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

In addition to the above, refer to related sections of the General Conditions.

1.3 DEFINITIONS

- A. Cutting: Removal of construction in place which may be necessary to permit installation or performance of other Work or to uncover work requested by the Architect and/or Owner's Representative.
- B. Patching: Fitting and repair work required to restore surfaces to the conditions of the original work in place or to the satisfaction of the Architect and/or the

Owner's Representative after installation of other Work or after inspections have occurred.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
- C. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- D. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- E. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 - 5. Proceed with patching after construction operations requiring cutting are complete and Owner's Representative has given approval to proceed with patching.
- F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces

in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

- a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION 01 73 10

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Agreement for Construction Services (hereinafter referred to as the Contract) and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project Record Documents.
 - 3. Operation and maintenance manuals.
 - 4. Warranties.
 - 5. Instruction of Owner's personnel.
 - 6. Final cleaning.
- B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through end of specification sections.

1.3 QUALITY ASSURANCE

- A. Codes: All work shall comply with all state, county and local Building Code and Standards.
- B. Personnel: Delegate the responsibility for maintenance of the record documents to one person on the Contractor's staff.
- C. Accuracy of Records: Coordinate all changes in the record documents within 24 hours after having received the reviewed information. Make proper entries on each page of drawings and specifications to accurately record the change.

PREREQUISITES TO SUBSTANTIAL COMPLETION

The commissioning must be complete, except for functional testing and controls training, prior to Substantial Completion, unless approved in writing by the Owner's Project Manager.

1.4 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - a. The Architect reserves the right to issue a revised punch list. If such a revised punch list is necessary, the Architect will provide a copy to the Owner.
 - b. Punch List Distribution: It shall be the contractor's responsibility to reproduce and distribute all necessary copies of any punch list to the various Subcontractors immediately and see that the items requiring correction or completion are given prompt attention.
 - c. Completion of Punch List Items: No Certificate of Substantial Completion will be issued by the Architect until corrections required by said punch list are made or the Architect is satisfied that they will be made. See General Conditions for computation of value of uncompleted punch list items which shall be retained
 2. Advise Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and photographic negatives, damage or settlement surveys, property surveys, and similar final record information.
 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Complete final cleaning requirements, including touchup painting.
 13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Shop Drawings Manufacturers' Literature and Test Data: Submit to the Owner, before final acceptance, a copy of all reviewed shop drawings (with all corrections noted), plus sets of all reviewed catalog cuts, equipment manuals, etc. Material shall be indexed to specification section

- C. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect and Owner's Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - 2. Results of completed inspection will form the basis of requirements for Final Completion.

PREREQUISITES TO FUNCTIONAL COMPLETION

- A. All TAB work and the commissioning of Division 17 must be complete prior to Functional Completion, unless approved in writing by the Owner's Project Manager. Exceptions to this are the planned control system training performed after occupancy and any required seasonal or approved deferred testing. This includes for all systems, but is not limited to:
 - 1. Completed and signed start-up and prefunctional checklist documentation
 - 2. Requested trend log data
 - 3. Submission of final approved TAB report
 - 4. Completion of all functional testing
 - 5. Required training of Owner personnel completed and approved
 - 6. Submission of the approved O&M manuals
 - 7. All identified deficiencies have been corrected or are approved by the Owner to be excepted from this milestone
- B. The Owner's Project Manager will determine the date of Functional Completion after reviewing the Commissioning Agent's recommendation for Functional Completion.

1.5 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 - 1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
 - 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 - 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - 4. Submit consent of surety to final payment.
 - 5. Submit pest-control final inspection report and warranty.
 - 6. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect and Owner's Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.6 PROJECT CLOSE-OUT DOCUMENTATION

- A. Prior to final payment, the Contractor shall submit to the Architect the following documents in an original and one copy unless otherwise noted:
 - 1. A complete listing of all trade Contractors, business addresses and items supplied by each such trade Contractor.
 - 2. A listing of manufacturers of major materials, equipment and systems installed in the work.
 - 3. Payment of Debts and Claims: Adequate evidence that the Contractor has paid all obligations to date arising out of the contract. Contractor shall submit AIA Document No. G-706 (or other approved form), Contractor's Affidavit of Payment of Debts and claims.
 - 4. Release of Liens: Contractor and Subcontractors shall also submit AIA Document G-706A (or other approved form) Subcontractor's Affidavit of Release of Liens, indicating that the releases for waivers submitted are complete to the best of his knowledge.
 - 5. Certificate of Substantial completion AIA Document G-704.
 - 6. Contractor's one year guarantee. Submit all other guarantees and warranties as outlined in the contract documents.
 - 7. Submit individual Final Waiver's of Lien from subcontractors and suppliers as may be required by the Owner.
 - 8. Final Approvals and Certificates: All final approvals and certificates as required by the specifications, drawings and all applicable codes and regulations.
 - 9. The Contractor shall submit to the architect, before completion of work, and before final payment, a detailed "as built" plan showing locations, elevations, sizes and connections of drainage structure and pipes.
 - 10. Submit a current certificate of insurance.
 - 11. Submit a Punch List Item Letter stating all items have been completed.
 - 12. Turn in site documents (A201:3.11.1), Certificate of Current Insurance (A201:9.10.2), Contractors Guarantee of Insurability (A201:9.10.2), Certification of Wages and Final Application for Payment (AIA G702/703).
 - 13. Turn over to Owner all Procedures manuals and spare parts.
 - 14. A Close-out meeting will be held to review the final documents.
 - 15. As a predecessor to release of "retainage", contractor shall submit all close-out documentation including as-built drawings. No retainage reduction will be permitted until close-out requirements are approved.

1.7 PROJECT RECORD DOCUMENTS

- A. General: Prior to the start of construction, the Architect will furnish to each prime contractor a complete set of drawings for the project. These will be marked up with "as built" conditions as noted below. As-builts will be reviewed once a month at a meeting with the Owner's Representative, Architect and contractors. The right to payment will be forfeited for that month if as-builts are not up to date. The purpose of the project drawings (as-built drawings), is to record the actual locations of the work in place including but not limited to underground lines, concealed piping, and ductwork within buildings, concealed valves and control equipment, and to record changes in the work. Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's and Owner's Representative's reference during normal working hours.
- B. Record drawings: The Contractor shall keep one reproducible print of all of the Architect's Construction Documents commencing with the original and including all revisions thereto, as the record copies of the drawings from which the Project is constructed shall show on these drawings by marked revisions, any deviations between the work as shown on these drawings and the work as actually installed due to changes it was required to make because of field conditions or conflicts between the work of two or more trades.

The Contractor shall mark up a copy of the "Project Record" with an erasable colored pencil (not ink or indelible pencil) and a "cloud" on back around the areas affected to show:

1. General:
 - a. Accepted changes in the work.
 - b. Details not shown in the original contract documents.
 - c. Accepted change orders.
 - d. Relocation of work.
 - e. Changes in dimensions.
 - f. Changes in floor elevations.
 - g. Substitutions: include the updating of all equipment schedule sheets.
2. Mechanical, Plumbing and Electrical:
 - a. Location of concealed work.
 - b. Designation of all utilities as to the size and use of such utilities.
 - c. The location of all utilities including unchanged original design and modifications to the original design:
 - plumbing
 - heating, ventilating, air conditioning
 - electrical assemblies and services
 - appurtenances concealed in building structures
 - access doors
 - d. The numbering information necessary to correlate all electrical energy consuming items (or outlets for same) to the panel or switchboard circuits from which they are supplied
3. A set of the final shop drawings will suffice in lieu of marked-up design drawings for the following items:
 - a. Duct Work.

- b. Sprinkler Piping.
 - c. Plumbing Piping.
 - d. Heating Piping.
 - e. Electrical Service Work
- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Note related Change Orders, Record Drawings and Product Data, where applicable.
- D. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, Record Drawings, and Record Specifications, where applicable.
- E. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- F. Submittal Procedure: The project record drawings are to be submitted when all the work is completed, and forwarded to the Architect and his consultants for review.
 - 1. Reproducible Drawings: All project record drawings must be submitted in the form of easily reproduced sepia transparencies or other quality reproducible method.
 - 2. Shop Drawings: Project record drawings submitted in the form of Shop Drawings to the Architect shall be keyed into reproducible copies of the Construction Drawings with indications of the applicable shop drawings and other data for complete cross numbers or other data on both shop drawings and construction drawings by indicating the specific areas each shop drawing covers with a key plan and indicating shop drawing number, etc. Size, dimensions, and information indicated on shop drawings need to be duplicated on construction drawings.
 - 3. Material Data: Reviewed catalog cuts, certified performance data for all materials and equipment, etc. shall be indexed by Project Manual Section and submitted to the Architect for review along with the above drawings before final payment.

- Heating and air conditioning equipment
- Plumbing
- Electrical work

1.8 OPERATION AND MAINTENANCE MANUALS

- A. Assemble a three (3) complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. These shall include operating equipment and flow diagrams of all systems. Three (3) sets of lubricating charts and manuals for each item or equipment furnished. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.
 2. Maintenance Data:
 - a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.
- C. The Contractor shall certify by endorsement thereon, that each for the manuals is complete and accurate. The Contractor shall assemble these manuals for all Sections of the work, review them for completeness prior to submission. The Contractor shall provide suitable transfer cases and deliver the manuals suitably bound, indexed and marked.

1.9 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual. Deliver to the Architect upon completion of all the work under this Contract his written warranty made out to the Owner and in a form satisfactory to the Architect and the Owner, warranting all the work under the contract to be free from faulty materials, and free from improper workmanship. Under the warranty, the contractor shall replace work in accordance with AIA Document A-111 such work as may be found by the Owner to be improper or imperfect and to make good all damage caused to other work or materials by the imperfection or removal and replacement of the imperfect work.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.
- D. Extended Warranties and Special Warranties

Certain extended warranties by Contractors or maintenance contracts longer than one year's duration are required under various sections of the specifications. At the completion of the work all such warranties or maintenance contracts covering material, workmanship, maintenance, or other items as specified, shall be forwarded in duplicate to the Architect, together with a letter addressed to the Owner giving a summary of each said warranty as follows:

- Character of work covered by warranty
- Name of Contractor furnishing warranty
- Period of warranty
- Condition of warranty

Contractor shall issue four (4) copies of a special written agreement of warranty if called for under Item 1.03 of each specification section. Examples of items requiring a special agreement of warranty include certain equipment.

- E. Format:

The warranties shall cover all the work done under this Contract. All subcontractor warranties shall bear the endorsement of the Contractor in writing, as per the following format:

To:

Attention of: Peter Gisolfi Associates

Re: (Work Covered in Warranty) _____

Name of Contractor _____

Address of Contractor _____

Re: _____ (name of project)

Dear

The undersigned warrants to the Owner that he will be responsible for all faulty or defective materials, equipment and workmanship, in the _____ work* and that he will remedy any defects and pay for all damage to other work resulting from his work which shall appear within a period of year(s) from the date of Substantial Completion as defined in the Contract Documents.

(Add additional conditions of warranty as noted in various technical sections of the Specifications.)

During the warranty period, upon written notice from Owner, the undersigned shall proceed with due diligence at the undersigned's sole expense to remove and replace properly any defective materials and equipment or perform any labor necessary to correct any such defect in the above. In case that the undersigned fails to remedy such defects, then the Owner may furnish such materials and equipment or labor as are necessary to correct the work, and the undersigned agrees to reimburse the Owner for any expense therefore promptly and fully.

Witness: Signed:** _____

Date: Signed:** _____

* (the contractor shall insert "all of the work as that term is defined in the Contract Documents")

** Signatures must be notarized.

Contractor - endorsement of above warranty.

Date: Signed:** _____

F. Cost:

Contractor warranties shall provide for the correction of work performed without additional charge. Any additional expense or damage resulting from imperfect work or the removal or replacement of imperfect work shall also be covered by the Contractor warranty.

1.10 Final Payment Requirements:

Before final payment may be authorized, the following submittals must be complete, updated and on file:

1. Progress Payment Certificate
2. Change Orders
3. As-Built (Record) Drawings
4. Substantial Completion Items List
5. Statement of Satisfactory Completion
6. Warranties

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

- A. Upon completion of the work and at a time designated a competent engineer or factory representative shall be provided for a sufficient period to instruct representative of the Owner in the operation and maintenance of each piece of equipment and of each system as a whole. Such period shall not exceed five (5) days for the work of each Section of the Specification.
- B. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, sub-systems, and equipment not part of a system.
 1. Provide instructors experienced in operation and maintenance procedures.
 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 3. Schedule training with Owner, through Owner's Representative, with at least seven days' advance notice.
 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.

- C. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include a detailed review of the following items:
1. Maintenance manuals.
 2. Record documents.
 3. Spare parts and materials.
 4. Tools.
 5. Lubricants.
 6. Fuels.
 7. Identification systems.
 8. Control sequences.
 9. Hazards.
 10. Cleaning.
 11. Warranties and bonds.
 12. Maintenance agreements and similar continuing commitments.
- D. As part of instruction for operating equipment, demonstrate the following procedures:
1. Startup.
 2. Shutdown.
 3. Emergency operations.
 4. Noise and vibration adjustments.
 5. Safety procedures.
 6. Economy and efficiency adjustments.
 7. Effective energy utilization.
- E. Operational instructions must be videotaped.

3.2 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and anti-pollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

- d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Replace parts subject to unusual operating conditions.
 - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - q. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - s. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 77 00

SECTION 01 81 19
CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes:

- 1. Requirements for the development of a Construction Indoor Air Quality Management Plan (alternately referred to as the IAQ Plan or the Plan).
- 2. Requirements for the preparation, storage and installation sequence of absorptive and emitting materials.
- 3. Requirements for use of filtration media during construction.
- 4. Requirements for completing IAQ Testing.
- 5. Requirements for completing a building flushout.

- B. Related Sections

- 1. Section 01 81 23 - Volatile Organic Compound Limits.

- C. Owner's Project Requirements:

- 1. Minimize the detrimental impacts on Indoor Air Quality (IAQ) resulting from construction activities.
- 2. Minimize factors that contaminate indoor air, such as: dust entering HVAC systems and ductwork, improper storage of materials on-site, poor housekeeping, shall be minimized.

1.3 REFERENCES

- A. Abbreviations and Acronyms

- 1. SMACNA - The Sheet Metal and Air Conditioner National Contractors Association.
- 2. ASHRAE - The American Society of Heating, Refrigerating and Air-Conditioning Engineers.
- 3. ANSI – American National Standards Institute.
- 4. EPA – U.S. Environmental Protection Agency.
- 5. GBCI – Green Building Certification Institute.
- 6. IAQ – Indoor Air Quality.
- 7. LEED – Leadership in Energy and Environmental Design.
- 8. MERV – Minimum Efficiency Reporting Value.
- 9. USGBC – United States Green Building Council.
- 10. VOC – Volatile Organic Compound.

- B. Definitions

1. Type 1 Materials: Materials and finishes that act as sources of VOC, formaldehyde, particulate contamination or other air-borne compounds. Type 1 materials can include "wet" products, such as paints, sealants, adhesives, caulks, sealers and fireproofing materials as well as "dry" products such flooring coverings with plasticizers, and engineered wood with formaldehyde. These materials are 'emitting' materials.
2. Type 2 Materials: Materials and finishes which are woven, fibrous, or porous in nature, and tend to absorb chemicals or particulates released by Type 1 materials. Examples include textiles, carpeting, acoustical ceiling tiles and gypsum board. Type 2 materials can become "sinks" for deleterious substances which may be released much later, or collectors of contaminants that may promote subsequent bacterial growth. These materials are 'absorptive' materials.
3. MERV: Filtration efficiency rating as determined by ASHRAE 52.2-1999.

C. Reference Standards:

1. SMACNA IAQ guidelines for Occupied Buildings under Construction, Second Edition 2007, ANSI/SMACNA 008-2008.
2. ANSI / ASHRAE 52.2-1999, "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size".
3. EPA "Compendium of Methods for the Determination of Air Pollutants in Indoor Air"
4. United States Green Building Council (USGBC): Leadership in Energy and Environmental Design (LEEDTM) Green Building Rating System, LEED 3.0 for New Construction.

1.4 INFORMATIONAL SUBMITTALS

A. Construction IAQ Management Plan:

1. Submit a draft IAQ Management Plan at a date to be determined by the Owner.
2. Summary of criteria to be included in the IAQ Management Plan:
 - a. Meet or exceed the standards included in the "IAQ Guidelines for Occupied Buildings under Construction", 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3).
 - b. Plan the sequence of installation of materials so that absorptive materials are protected from moisture damage when stored on-site and after installation according to the Sequence of Finish Installation Plan.
 - c. Include a Sequence of Finish Installation Plan highlighting measures to reduce the absorption of VOCs by materials that act as 'sinks'.
 - d. Plan that filtration used on air handling equipment during construction and immediately prior to occupancy meet the requirements by Code/EPA/ASHRAE.
 - e. Plan the activities to occur immediately prior to occupancy those are required for a building outside air flush out and/or the performance pre-occupancy IAQ testing.
3. Refer to Detailed Requirements for IAQ management (3.04 of this Section).

B. Construction schedule outlining the start-up date and expected duration of all Construction IAQ Management control measures.

C. Schedule of operation of air handling units to be used during construction with manufacturer's cuts of the minimum MERV 8 filtration to be used.

D. Schedule of proposed activities:

1. For Building Flushout (for each air-handling unit or ventilation system):

- a. Area of space served.
- b. Volume of outside air to be delivered.
- c. Volume of outside air required.
- d. Start and end date of flushout.
- e. Indoor temperature ranges that will be maintained.

2. For IAQ Testing (for each air-handling unit or ventilation system):

- a. Proposed test equipment to be used.
- b. Diagrams of proposed test locations.
- c. Coordinated construction and testing schedule demonstrating that sufficient time has been allocated for the test activities.

E. A construction log identifying the start-up date and duration of all major IAQ Management Plan control measures, including:

1. Operation of HVAC equipment.
2. Filtration installation and replacement.
3. Building flush-out activities.
4. IAQ testing activities.

1.5 CLOSEOUT SUBMITTALS

- A. Closeout Submittals are to be made at a date following substantial completion to be determined by the Owner.
- B. A copy of the final Construction IAQ Report.

PART 2 - PRODUCTS

2.1 FILTRATION MEDIA

- A. Minimum MERV 8 filtration (as approved by the mechanical engineer) when air-handling units are used during construction.

PART 3 - EXECUTION

3.1 IMPLEMENTATION AND COORDINATION:

- A. Designate one individual as Construction IAQ Representative to:
 1. Regularly visit the site and monitor the IAQ.
 2. Communicate the progress of the IAQ to the Owner and Architect on regular basis.
- B. Coordinate the IAQ requirements with all affected sub-contractors and trades.

- C. Ensure that trades and sub-contractors are responsible for the implementation of specific control measures as indicated in the IAQ Plan.
- D. It is the responsibility of the Contractor to establish a construction schedule which allows sufficient time for IAQ measures (including building flush-out and IAQ testing).

3.2 INSTALLATION OF FILTRATION:

- A. During Construction (if air handlers are used during construction):
 - 1. Install minimum MERV 8 filtration media at:
 - a. The ends of return air ductwork.
 - b. At air return grills (in an open plenum or chase).
 - c. At return air openings at mechanical rooms housing air-handling units.
 - 2. Replace all filtration media immediately prior to occupancy.
- B. For areas in which a Building Flushout is implemented:
 - 1. Install new filtration immediately prior to the beginning of the flushout.
 - 2. At the completion of the Building Flushout inspect the condition of the filtration and replace any the have collected significant dust and particulates through the flushout process.
- C. Replace filtration media with new filtration media (per MERV rating approval by Mechanical Engineer) immediately prior to occupancy for each air-handing unit that was used during construction replace.

3.3 CONSTRUCTION IAQ MANAGEMENT – DETAILED REQUIREMENTS

- A. General:
 - 1. Follow the SMACNA Guidelines, as stated in Chapter 3 of the referenced “IAQ Guidelines for Occupied Buildings Under Construction”.
 - 2. Outline IAQ measures in six categories as listed in below in 3.04.B. of this Section.
 - 3. Organize in accordance with the SMACNA format.
 - 4. Address measures to be implemented by the in each of the six categories (including subsections).
 - 5. List all six categories and their subsections in the Plan; list as ‘Not Applicable’ items that do not apply to this project.
- B. SMACNA Categories of IAQ Measures:
 - 1. HVAC Protection:
 - a. Return Side.
 - b. Plenum Protection.
 - c. Supply Side.
 - d. Central Filtration.
 - e. HVAC Scheduling.
 - f. Equipment Cleaning.

- g. Establishing Pressurization.
 - 2. Source Control:
 - a. Product Substitution.
 - b. Modifying Equipment Operation.
 - c. Changing Work Practices.
 - d. Local Exhaust.
 - e. Air Cleaning.
 - f. Cover or Seal.
 - 3. Pathway Interruption:
 - a. Depressurize Work Area.
 - b. Pressurize Occupied Space.
 - c. Erect Barriers to Contain Construction Areas.
 - d. Relocate Pollutant Sources.
 - e. Temporarily Seal the Building.
 - 4. Housekeeping:
 - a. Routine Jobsite Cleaning.
 - b. Protection of Stored Materials.
 - c. Protection of Materials During and After Installation.
 - 5. Schedule - Airing Out of New Materials:
 - a. Airing Out of New Materials.
 - b. Sequencing of Finish Applications.
 - c. Proper Curing of Concrete before Covering.
 - d. Installation During Unoccupied Hours.
 - 6. Occupant Relocation:
 - a. Avoidance of Building Occupancy While Pollutants Are Present.
 - b. Economical and Effective Control Measures.
- C. Requirements for Protection of Materials from Moisture Damage:
 - 1. Establish measures to prevent installed materials or materials stored on site from moisture damage and dampness.
 - 2. Establish measures to be taken if moisture damage does occur to Type 2 (absorptive) materials.
- D. Requirements for Housekeeping:
 - 1. Institute a regular housekeeping schedule. Select cleaning measures and frequency according to the pollutants generated in a space.
 - 2. Where applicable, suppress dust by the use of low-odor wetting agents and sweeping compounds.
 - 3. Use low-odor cleaning agents.
 - 4. Clean up spills of water or solvent immediately.

5. Regularly clean hidden or hard-to-reach surfaces, such as wall cavities, tops of door, ledges, and behind water closets.
- E. Requirements for Airing Out of Materials:
1. Remove carpet and carpet tiles from their packaging 24 to 72 hours prior to their installation and store in unoccupied ventilated areas (100% outside air supply, minimum of 1.5 air changes per hour, and no recirculation), away from acoustical ceiling tiles (and away from spaces where ceiling tiles have been installed).
 2. Store carpeting according to manufacturer's recommendations for allowable temperature and humidity range.
 3. Do not store carpeting with materials having high emissions of VOCs or other contaminants. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paint, wood preservatives, and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders.
 4. Install finishes over concrete slabs and toppings (stone flooring at the lobby, VCT at back-of-house areas, miscellaneous carpet, paints or sealers) according to the manufacturer's instructions regarding the appropriate condition of the concrete slab.
 5. Air out millwork unwrapped off site for a period of at least 3 days prior to delivery.
- F. Requirements for Installation and Replacement of Filtration Media:
1. Provide a description of the filtration media in all ventilation equipment under the HVAC Protection section of the Plan.
 2. Include a description of the replacement criteria for filtration media during construction
 3. Provide confirmation of filtration media replacement for all equipment immediately prior to occupancy.
 4. Require that filtration media meet the requirements of Item 2.01 (Filtration Media) of this Section.
- G. Requirements for Sequence of Finish Installation for Materials:
1. Include a list of the Type 1 and Type 2 materials specified for the project.
 2. Establish a Sequencing Plan to install Type 2 (absorptive) materials after the installation of Type 1 (emitting) materials where feasible.
- H. Post Construction and Pre-Occupancy Indoor Air Quality Measures: Include in the Indoor Air Quality Management Plan strategies for completing one of the following options for each area served by a separate ventilation system or air-handling unit. A combination of the two options is allowable, but use only one of the options for each separate ventilation system or air-handling unit.
1. Air Flushout. Refer to 3.5.B in this Section for details.
 2. Air Quality Testing. Refer to 3.5.C in this Section for details.
- I. Non-Adherence: Include provisions in the Construction IAQ Management Plan for addressing conditions in the field that do not adhere to the Plan, including provisions to rectify non-compliant conditions.

3.4 FLUSHOUT OR TESTING REQUIREMENT:

A. Comply with one of the following strategies:

1. Meet the Building Flush-out requirements for the entire Project.
2. Meet the IAQ Testing requirements for the entire project.

B. Building Flush-out:

1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total volume of 14,000 cubic feet. of outdoor air per square foot of floor area while maintaining an internal temperature of at least 60 deg F (16 deg C) and a relative humidity no higher than 60 percent.
2. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3,500 cubic feet of outdoor air per square foot of floor area to the space. Following occupancy ventilate occupied spaces at a minimum rate of 0.30 cfm per square foot of outside air or the design minimum outside air rate required, whichever is greater. During each day of the post-occupancy flush-out period begin ventilation a minimum of three hours prior to occupancy and continue during occupancy. Maintain these conditions until a total of 14000 cubic feet per square foot of outside air has been delivered to the space.
3. At the completion of the building flushout, replace the filtration media with new filters, except the filters solely processing outside air.

OR

C. IAQ Testing:

1. Conduct baseline indoor-air-quality testing, after construction ends and prior to occupancy, using widely accepted testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air".
2. All interior finishes must be installed, including but not limited to millwork, doors, paint carpet and acoustic tiles. Movable furnishings such as workstations and partitions must be unwrapped and in place.
3. Demonstrate that the contaminant maximum concentrations listed below are not exceeded:
 - a. Formaldehyde: 27 ppb.
 - b. Particulates (PM10): 50 micrograms/cu. m.
 - c. Total Volatile Organic Compounds (TVOC): 500 micrograms/cu. m.
 - d. 4-Phenylcyclohexene (4-PH): 6.5 micrograms/cu. m. This test is only required if carpets or fabrics with styrene butadiene rubber (SBR) latex backing material are installed.
 - e. Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels.
4. For each sampling point where the maximum concentration limits are exceeded, conduct additional flush-out with outside air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat the procedure until all requirements have been met. Retest non-complying building areas from same locations as in the first test.
5. All IAQ tests and retests must be successfully completed prior to the occupation of the space.

6. The number of sampling locations will vary depending on the size of building and number of ventilation systems.
7. For each portion of building served by a separate ventilation system, use a number of sampling points not less than one per 25,000 sq. ft. (2300 sq. m) or for each contiguous floor area, whichever is larger. Include areas with the least ventilation and greatest presumed source strength.
8. Conduct all air-sample tests as follows:
 - a. Prior to occupancy of the area to be tested.
 - b. During normal work hours.
 - c. With building ventilation system started at the normal daily start time and operated at the minimum outside airflow rate for the occupied mode throughout the duration of the air testing.
 - d. With all interior finishes installed including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Non-fixed furnishings such as workstations and partitions are encouraged, but not required, to be in place for the testing.
9. Collect air samples between 3 and 6 feet above the finish floor to represent the breathing zone of occupants, and over a minimum four-hour period.

END OF SECTION

SECTION 02 33 13

UNDERGROUND UTILITY LOCATOR SERVICE

PART 1 GENERAL

1.01 DESCRIPTION

- A. Retain an independent utility locator service company with a minimum of five (5) years experience to field locate, mark, and stakeout existing underground utilities and service connections.
 - 1. Include 24 hours of “locator service” to locate underground utilities.
 - 2. If required determine the exact location of utilities by hand excavated test pits or through vacuum methods. Support and protect all utilities to remain in place.
 - 3. Contractor shall field locate, mark, and stakeout underground utilities prior to excavation.
 - 4. Contractor will be responsible for the location of all utilities within areas of excavation, and all costs associated with the repair of utilities hit/damaged during construction.

1.02 SUBMITTALS

- A. Submit detailed experience and qualifications description of underground utility locator service. Experience and qualifications package should include a description of the types of utility locator equipment and experience that can be provided.

1.03 DELIVERABLES

- A. At the conclusion of this project, provide three (3) sets of paper and one (1) copy of electronic plans documenting all utilities located and identified. All documentation shall be referenced to existing data (horizontal and vertical) previously established.

1.04 COORDINATION AND SCHEDULING

- A. General Location: Within areas of excavations all utilities shall be field located and their locations marked at least one (1) day prior to the performance of the required excavation.
- B. Exact Location: The performance of hand excavated test pits or vacuum excavations to determine the utilities exact location shall be performed just prior to performing the work to minimize the time that excavated areas will be exposed to erosive conditions.

- C. Coordinate work with the Director's representative to minimize utility disruptions and facility operations. The Director's Representative shall be notified at least three (3) working days prior to performing the work, and should be provided a schedule for the works progression.

PART 2 (Not Used)

PART 3 EXECUTION

3.01 WORK AREAS AND PERFORMANCE

- A. The Director's Representative may limit or restrict scheduling of the utility locator service based upon project progress.

END OF SECTION

SECTION 02 41 19

DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of building or structure.
 - 2. Salvaging selected building components.

1.3 DEFINITIONS

- A. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- B. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Items of interest or value to Owner that may be uncovered during demolition remain the property of Owner. Carefully salvage said items in a manner to prevent damage and promptly return to Owner.

1.5 PRE-DEMOLITION MEETING

- A. The Contractor shall conduct a pre-demolition meeting at the Project Site to review the demolition work with all associated trades. The Contractor shall:
 - 1. Discuss the condition of construction to be demolished.
 - 2. Review structural load limitations of existing structure.

3. Review and finalize demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Review and finalize protection requirements, including the protection of adjacent buildings.
 5. Review requirements of work performed by other trades.
 6. Review procedures for noise control and dust control.
- B. The Contractor shall furnish written minutes of the pre-demolition meeting to the Owner and Architect.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Proposed Protection Measures: Submit informational report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
1. Adjacent Buildings: Detail special measures proposed to protect adjacent buildings to remain.
 2. Layout drawings and calculations for shoring and bracing shall be prepared, signed and sealed by a New York State licensed Professional Engineer hired by the Contractor. These shall be submitted to the Owner for review and approval, but such approval shall not constitute a waiver of the Contractor's obligations or responsibilities
 3. Existing Building:
 - a. The Contractor and his Engineer shall design the appropriate sequence of demolition to impose the minimum stresses on the adjacent structures to remain. No portions of the structure shall be permitted to fail nor shall any debris be dropped except by methods that insure life safety. Locate demolition equipment throughout the structure and remove materials so as not to impose excessive loads on existing supporting columns and floor framing.
- C. Schedule of Demolition Activities: Indicate the following:
1. Detailed sequence of demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations, where applicable, are uninterrupted.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.

3. Coordination for shutoff, capping, and continuation of utility services.

- D. Inventory: Submit a list of items to be removed, salvaged and delivered to Owner prior to start of demolition.
- E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
- B. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit Photographic Documentation and/or Video before the Work begins.
- C. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.8 QUALITY ASSURANCE

- A. Refrigerant Recovery Qualifications: Certified by an EPA-approved certification program.

1.9 FIELD CONDITIONS

- A. Maintain access to existing walkways, exits, and other facilities used during construction.
- B. Owner assumes no responsibility for buildings and structures to be demolished.
- C. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as far as practical.
- D. Notify Design Professional of discrepancies between existing conditions and Drawings before proceeding with demolition.
- E. Hazardous Materials: Owner is arranging for the removal of hazardous materials in advance of the demolition.
 - 1. If additional suspected hazardous materials are encountered, do not disturb; immediately notify the Owner.
- F. Storage or sale of removed items or materials is not permitted.

- G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations. Remove existing utilities as noted on the Demolition Plan.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. The Contractor shall engage a Professional Engineer, licensed in the State of New York to survey condition of structure(s) to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition operations. The Contractor shall work with said Engineer to develop a demolition plan.
- B. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, the Contractor shall investigate and measure the nature and extent of conflict and promptly submit a written report to the Owner and Design Professional.
- C. The Contractor shall establish work and staging areas. The Contractor shall place demolition debris in appropriate containers once they have been size-reduced.
- D. The Contractor shall verify that utilities have been disconnected and capped before starting demolition operations.
- E. The Contractor shall review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- F. The Contractor shall confirm that existing conditions correlate with requirements indicated to determine extent of selective demolition required.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be demolished.
 - 1. Disconnect, demolish, and remove electrical and plumbing systems and components indicated to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Equipment to Be Removed: Disconnect and cap services and remove equipment.
- C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- B. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- C. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from adjacent occupied buildings.
 - 2. Protect site features that are to remain or that are exposed during selective demolition operations.
 - 3. Provide tree protection.
 - 4. Comply with requirements for temporary enclosures, dust control, and other provisions shown on the drawings and described in the specifications.
- D. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.
 - 2. The design, installation, use, maintenance and removal of shoring, reinforcement and/or temporary supports are the sole responsibility of the Contractor.

3.4 DEMOLITION \ REQUIREMENTS

- A. The Contractor is solely responsible for construction safety and shall hold the Owner, Design Professional, and their assigned representatives harmless from litigation and all other legal related situations arising from:
 - 1. Contractor's failure to perform this portion of the work;
 - 2. Contractor's operations;
 - 3. Contractor's errors, omissions, or negligence.
- B. The Contractor is solely responsible for demolition operations including, but not limited to, sequence of operations, means, methods, supervision and control. Documentation of any means and methods provided to the Owner, the Design Professional and the Construction Manager shall be for reference only.
- C. The Contractor is solely responsible for verifying the integrity of the existing structure before demolishing any walls, floors, ceilings and/or roofing.
- D. The Contractor is solely responsible for identifying any load-bearing walls prior to demolition, and for providing reinforcement or support before demolition, saw-cutting or other operations begin.
- E. Any injuries resulting from the Contractor's demolition operations are the sole responsibility of the Contractor.
- F. Demolition Plan: Before the Work of this Section is started, the Contractor shall prepare a detailed demolition plan. The demolition plan shall include, but not be limited to, detailed outline of intended demolition and disposal procedures. The demolition plan will not relieve the Contractor of complete responsibility for the successful performance of the Work in accordance with all applicable Federal, State, and local codes and restrictions.

3.4.1 DEMOLITION (GENERAL)

- A. General: Demolish indicated buildings completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 - 2. Maintain fire watch during and for at least 4 hours after flame cutting operations.
 - 3. Maintain adequate ventilation when using cutting torches.
 - 4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

- B. Engineering Surveys: During demolition, perform surveys to detect hazards that may result from building demolition activities.
- C. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
 - 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- D. Explosives: Use of explosives is not permitted.
- E. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
- F. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
- G. Dispose of demolished items and materials promptly.

3.4.2 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.
- C. Below-Grade Construction: Demolish foundation walls and other below-grade construction.
 - 1. Remove below-grade construction, including basements, foundation walls, and footings, completely. Do not undermine the foundation of the adjacent buildings.
- D. Existing Utilities: Demolish and remove existing utilities and below-grade utility structures.

3.5 SITE RESTORATION

- A. Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.
- B. Where a building, or any portion, has been demolished to grade, the floor slab or foundation of such building, or portion, shall be removed, and the site backfilled to the grades indicated on the project drawings, unless otherwise directed by Owner.
- C. Removed and Salvaged Items (where applicable):
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Protect items from damage during transport and storage.
 - 5. See the Landscape Removals Plan for instructions on salvaging the existing wood beams in the main building.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 03 30 50
SITE CONCRETE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following but is not limited to:
 - 1. Foundation systems including footings, piers, pilasters, and the like.
 - 2. Sub-base for paving and utility cradling.
 - 3. Lamppost footings.
 - 4. Pavements and ramps.
 - 5. Curbs and walls.
 - 6. Bases and footings for steps and outdoor seating.
 - 7. Drainage structures.
 - 8. Curing and protection of all concrete and cement work.
 - 9. Cutting, patching, grouting, repairing and pointing up as required.
 - 10. All other work and materials as may be reasonably inferred and needed to complete the work of this section.
- B. Related sections include the following:
 - 1. Division 31, Section "Earthwork."

1.03 SUBMITTALS

- A. Submit concrete mix designs. Obtain approval before placing concrete.
- B. Product data:
 - 1. Submit complete materials list of items proposed for the work. Identify materials source.
 - 2. Submit admixture, curing compound, retarder and accessory item product data.
 - 3. Submit material certificates for aggregates, reinforcing and joint fillers.
 - 4. Submit material designs for oil resistant coatings prior to any materials being delivered to the site.
- C. Submit concrete delivery tickets. Show the following:
 - 1. Batch number.
 - 2. Mix by class or sack content with maximum size aggregate.
 - 3. Admixtures.
 - 4. Air content.
 - 5. Slump.
 - 6. Time of loading.
- D. Submit shop drawings for concrete walls and stairs.

1.04 QUALITY ASSURANCE

- A. Comply with Division 1 requirements.
- B. Materials and methods of construction shall comply with the following standards:
 - 1. American Society for Testing and Materials (ASTM).
 - 2. American Concrete Institute, (ACI).
- C. Maintain field records of time, date of placing, curing and removal of forms of concrete in each portion of work.
- D. Do not change source or brands of cement and aggregate materials during the course of the work.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver curing materials, admixtures and retarders in manufacturer's standard unopened containers with labels legible and intact. Store and protect from freezing and damage.

1.06 PROJECT CONDITIONS

- A. Work notification: Notify Landscape Architect as least 24 hours prior to installation of concrete.
- B. Establish and maintain required lines and grade elevations.
- C. Do not install concrete work over wet, saturated, muddy or frozen subgrade.
- D. Do not install concrete when air temperature is below 40 Degrees F. Use of calcium chloride, salt, or any other admixture to prevent concrete from freezing is prohibited.
- E. Protect adjacent work.
- F. Provide temporary barricades and warning lights as required for protection of project work and public safety.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Portland cement: ASTM C150, Type 1.
 - 1. Provide white Portland cement for integrally colored concrete.
- B. Water: clean, fresh and potable.
- C. Air-entraining admixture: ASTM C260.
- D. Water-reducing admixture: ASTM C494.

2.02 MIXES

- A. Provide ASTM C94 ready-mixed concrete. Batch mixing at site not acceptable.
 - 1. Strength: 4,000 psi minimum at 28 days.
- B. Provide an approved water-reducing admixture in all concrete.
- C. Provide an air-entraining admixture in all concrete. Air content 5% to 7%.
- D. Indicate water added to mix at job site on each delivery ticket. Show quantity of water added. Site water tempered mixes exceeding specified slump range will be rejected as not complying with specification requirements.

2.03 MATERIALS DEFINITIONS

- A. Fine Aggregate (sand) shall conform to AASHTO Designation M-6 having clear, hard, durable, uncoated grains, free from deleterious substances and shall range in size from fine to coarse within the following percentages by weight:

Passing 3/8" Sieve	100%
Passing No. 4 Sieve	95% – 100%
Passing No. 16 Sieve	45% - 85%
Passing No. 50 Sieve	10% - 30%
Passing No. 100 Sieve	2% - 10%

- B. Coarse Aggregate shall conform to AASHTO Designation M-80 and shall be free of deleterious matter or coatings and gradation shall be within the following percentage by weight:

Passing 1 1/2" Sieve	100%
Passing 1" Sieve	95% – 100%
Passing 2" Sieve	25% - 60%
Passing No. 4 Sieve	0% - 10%

- C. Water shall be clean and shall not contain any oil, acid, alkali, salts, vegetable matter, organic matter or other deleterious substances.
- D. Reinforcement bars shall conform to the requirements of ASTM A615, grade 60 or ASTM A616, Grade 60 including Supplementary Requirement S1. Tie wire shall be 16 gauge annealed steel type. Chairs, bolsters, bar supports and spacers shall be sized and shaped for strength and support of reinforcing during installation and placement of concrete.
- E. Wire fabric reinforcement shall conform to the requirements of either ASTM A185 or ASTM A497.
- F. Forms: Wood or metal of sufficient to resist concrete placement pressure and to maintain horizontal and vertical alignment during concrete placement. Provide forms straight, free of defects and distortion, and height equal to full depth of concrete work.
 - 1. Provide 2" nominal thickness, surfaced plank wood forms for straight sections. Use flexible metal, 1" lumber or plywood forms to form radius bends.

- G. Joint filler: ASTM D175, pre-molded non-extruding asphalt-impregnated fiberboard, thickness indicated.
- H. Curing compound: ASTM C309, non-yellowing, non-staining liquid membrane-forming type containing a fugitive dye. Chlorinated rubber compounds not acceptable for exterior use.
- I. Form release agent: Non-staining chemical form release agent free of oils, waxes and other materials harmful to concrete.
- J. Oil Resistant Coating shall be Amercoat 66, Polyamide-cured epoxy, as manufactured by Ameron or approved equal.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions where Concrete Work is to be installed and notify the Owner's Field Representative of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until satisfactory conditions have been corrected by the Contractor in a manner acceptable to the Owner's Field Representative.

3.02 PREPARATION

- A. Provide minimum 6" depth of compacted granular base material at curbs. Compact granular base to 95% of the maximum dry density in accordance with ASTM D698 Standard Proctor Method.
- B. Remove loose material and debris from base surface before placing concrete.
- C. Install, align and level forms. Stake and brace forms in place. Maintain following grade and alignment tolerance:
 - 1. Top of form: Maximum 1/8" in 10'-0".
 - 2. Vertical face: Maximum 1/4" in 10'-0".
- D. Coat form surfaces in contact with concrete with form release agent. Clean forms after each use and coat with form release agent as necessary to assure separation from concrete without damage.
- E. Locate, place and support reinforcement as indicated.
 - 1. Provide reinforcing bars at curbs, and other locations indicated, adequately supported and secured to prevent displacement.
- F. Install, set and build-in work furnished under other specification sections. Provide adequate notification for installation of necessary items.

3.03 INSTALLATION

- A. Method of Construction
 - 1. Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete", and as specified.

2. There shall be no less than six (6) sacks of cement per cubic yard. The Concrete shall contain no more than six (6) gallons of water per sack of cement, and shall produce a slump of not more than four (4) inches. Air Content shall be 7% (\pm 1%).

3. Weather Limitations

- (a) Cold Weather Concreting - When the ambient temperature is above 40 degrees F, the plastic concrete shall have a temperature of at least 50 degrees F, at the time of placing. When the ambient temperature is 40 degrees F or below, the plastic concrete shall have a temperature of at least 60 degrees F. Concrete shall not be placed when the ambient temperature is less than 10 degrees F.

Maintenance of at least the minimum temperature shall be accomplished by heating the water or the aggregates, or both, as necessary. Heating methods which alter or prevent the entrainment of the required amount of air in the concrete shall not be used. Heating shall be in accordance with the ACI 306, Part 2.2 through 2.6.

- (b) Hot Weather Concreting - When the ambient temperature reaches 75 degrees F, the plastic concrete shall have a temperature of no more than 90 degrees F, at the time of placing, and one or more of the following precautions shall be followed:
 - (1) During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required. When air temperature is between 85° F (30° C) and 90° F (32° C), reduce mixing and delivery time from 1½ hours to 75 minutes, and when temperature is above 90° F (32° C), reduce mixing and delivery time to 60 minutes.
 - (2) Use a water reducing retarder as per manufacturer's recommendation. When more than one admixture is used, they shall be from the same manufacturer.
 - (3) Sprinkle coarse aggregate stockpile to cool by evaporation.
 - (4) Place concrete in compliance with ACI 305 and as herein specified. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90° F (32° C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water.
 - (5) In the case of truck mixing, do not rotate the drum during and after the addition of cement to the mix until mixing water is added at the construction site. This may require reduced loads or the utilization of horizontal type mixers.
 - (6) Prevent absorption by sprinkling subgrade and wood forms just before placing so that they will not absorb water from the mix.
 - (7) Erect windbreaks to prevent winds from drying exposed concrete surfaces while they are being finished.

(8) Screed and float concrete as it is placed and start curing immediately.

4. Concrete shall be deposited within thirty (30) minutes after mixing, as nearly as practicable, in its final position to avoid segregation due to rehandling or flowing.
5. Provide proper chutes, troughs and other devices to convey concrete to the various levels. In no case shall concrete be deposited from a height that will separate the aggregates.
6. In placing concrete around reinforcement, care shall be taken to work the concrete well around and into thorough contact with the steel and not disturb the reinforcement. Mechanical vibrators shall be used to insure consolidation, but over-vibrating which may cause segregation shall be avoided.
7. Moisten base to provide a uniform dampened condition at the time concrete is placed. Verify manholes or other structures are at required finish elevation and alignment before placing concrete.
8. Place and spread concrete to the full depth of the forms. Use only square-end shovels or concrete rakes for hand-spreading and consolidating concrete. Exercise care during spreading and consolidating operations to prevent segregation of aggregate and dislocation of reinforcement.
9. Place concrete in a continuous operation between expansion joints. Provide construction joints when sections cannot be placed continuously.
10. Place concrete in one course, monolithic construction, for the full width and depth of concrete work.
11. Provide curb profiles indicated.
12. Provide concrete base for patching and repairing existing street paving damaged or removed to accommodate new curbs, walks and entrance apron paving.

B. Joints:

1. Construct control, expansion and construction joints properly aligned with face perpendicular to concrete surface.
2. Provide standard keyed-section construction joints where indicated.
3. Provide expansion joints using pre-molded joint filler at concrete work abutting curbs, walls, structures, walks, and other fixed objects.
 - a. Locate expansion joints as indicated. When not indicated provide joints at maximum 20'-0" on center for curbs.
 - b. Install joint fillers full-width and depth of joint. Provide sealant flush with adjacent finished surface.
 - c. Protect the top edge of the joint filler during concrete placement.

B. Concrete finishing:

1. Perform concrete finishing using mechanical or hand methods as required.
2. As soon as the face forms are removed, all fins and other projections shall be carefully removed and offsets leveled, and rubbed with carborundum where necessary. Pointing and filling voids shall be performed only when approved by the Owner's Field Representative.
3. Complete surface finish as follows:
 - a. Curbs: Provide a light broom finish.
 - b. Walks: Provide a light broom finish.
4. Walks to be hand tooled edged with 1" radius curve.
5. Walk contraction joints to be scored as shown on plan maximum 6' apart.

D. Curing

1. General
 - a. Comply with all the requirements of ACI 301.
 - b. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 - c. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
 - d. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
2. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.
 - a. Provide moisture curing by following methods:
 - (1) Keep concrete surface continuously wet by covering with water.
 - (2) Continuous water-fog spray.
 - (3) Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
3. Provide moisture-cover curing as follows:
 - a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

4. Liquid membrane curing meeting the requirements of AASHTO Designation M-148 may be used upon approval of the Owner's Field Representative.

E. Oil Resistant Coating

1. All concrete surfaces to be coated must contain no additives or hardeners, and should not be treated with sealers or conventional curing compounds containing waxes, silicones, or silicates.
2. Do not use form release agents based on oils, which will deposit a residue on the concrete.
3. All surface preparation and installation shall be in accordance with the manufacturer's recommendations.

3.04 FIELD QUALITY CONTROL

- A. Provide field quality control testing and inspection during concrete operations.
- B. Testing:
 1. Provide slump test on first load of concrete delivered each day and whenever requested due to changes in consistency or appearance of concrete.

3.05 PROTECTION

- A. Protect concrete work from damage due to construction and vehicular traffic until final acceptance. Exclude construction and vehicular traffic from concrete pavements for at least 14 days.

3.06 CLEANING

- A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris and equipment. Repair damage resulting from concrete operations.
- B. Sweep concrete sidewalks and pavement, wash free of stains, discoloration, dirt and other foreign material immediately prior to final acceptance.

END OF SECTION

SECTION 04 20 00
UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:
 - 1. Concrete masonry units.
 - 2. Face brick.
 - 3. Mortar and grout.
 - 4. Reinforcing steel.
 - 5. Masonry joint reinforcement.
 - 6. Ties and anchors.
 - 7. Embedded flashing.
 - 8. Cavity-wall insulation.
 - 9. Miscellaneous Masonry Accessories.
- B. Related Sections include the following:
 - 1. Division 7 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing.
 - 2. Division 7 Section "Fluid Applied Membrane Air Barrier"
 - 3. Division 9 Section "Non-Structural Metal Framing" for 'Z' clips within plane of rigid insulation connecting thinset ground face CMU back to structure.
- C. Products installed, but not furnished, under this Section include the following:
 - 1. Steel lintels and shelf angles for unit masonry, furnished under Division 5 Section "Metal Fabrications."

1.3 DEFINITIONS

- A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

- A. Product Data: For each different masonry unit, accessory, and other manufactured product specified.
- B. Shop Drawings: Show fabrication and installation details for the following:

1. Special Brick Units: Show sizes, profiles, and locations of each special brick unit required.
 2. Special Ground Face CMU units at decorative base: Show sizes, profiles, details of inside and outside corners.
 3. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
 4. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Verification: For the following:
1. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
 2. Colored mortar Samples for each color required, showing the full range of colors expected in the finished construction. Make samples using the same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
 3. Special face brick shapes samples not less than 12 inches in length, showing the full range of colors and textures expected in the finished construction.
 4. Weep holes/vents in color to match mortar color.
 5. Accessories embedded in the masonry.
- D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
1. Each type of masonry unit required.
 - a. Include size-variation data for brick, verifying that actual range of sizes falls within specified tolerances.
 2. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
 3. Each material and grade indicated for reinforcing bars.
 4. Each type and size of joint reinforcement.
 5. Each type and size of anchor, tie, and metal accessory.
- E. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.5 QUALITY ASSURANCE

- A. Mockups: Before installing unit masonry, build mockups to verify brick blend as specified. Final determination of the specified blend shall be following construction of the mockup. The mockup shall be revised until the blend is approved by the Architect. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Locate mockups in the locations indicated or, if not indicated, as directed by Architect.
 2. Build mockup approximately 10 feet long by 10 feet high by full thickness, including face and backup wythes and accessories. Include a sealant-filled joint at least 16 inches long in each mockup. Include backup wall framing and air barrier assembly.
 3. Provide aluminum window head / jamb sample section installed within mockup along with all relevant flashing. Provide cut away view to inspect flashing materials and connection to air barrier assembly.
 4. Provide aluminum window sill sample section installed within mockup with all relevant flashing. Provide cut away view to inspect installed flashing materials and connection to air barrier assembly.
 5. Clean exposed faces of mockups with masonry cleaner as indicated.
 6. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 7. Protect accepted mockups from the elements with weather-resistant membrane.
 8. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 9. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.
 10. Demolish and remove mockups when directed.
- B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
1. Protect Type I concrete masonry units from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
 - 3. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
 - 4. Protect sills, ledges, and projections from mortar droppings.
 - 5. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 6. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- C. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
 - 1. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PRODUCTS

1.8 CONCRETE MASONRY UNITS

A. General: Provide shapes indicated and as follows:

1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
2. Provide square-edged units for outside corners, unless indicated as bullnose.

B. Concrete Masonry Units: ASTM C 90 and as follows:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi or as noted on the drawings.
2. Weight Classification: Normal weight.
3. Provide Type I, moisture-controlled units.
4. Size (Width): Manufactured to the following dimensions:
 - a. 4 inches nominal; 3-5/8 inches actual.
 - b. 6 inches nominal; 5-5/8 inches actual.
 - c. 8 inches nominal; 7-5/8 inches actual.
 - d. 10 inches nominal; 9-5/8 inches actual.
 - e. 12 inches nominal; 11-5/8 inches actual.
5. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.

C. Decorative Concrete Masonry Units (Ground Face CMU): ASTM C 90, type I and as follows:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
2. Weight Classification: Normal weight, unless otherwise indicated.
3. Provide Type I, moisture-controlled units.
4. Size: Manufactured to dimensions indicated for nondecorative units.
5. Finish: Exposed faces of the following general description matching color, pattern, and texture of Architect's samples.
 - a. Normal-weight aggregate, ground-face finish.
6. Manufacturer: Trenwyth Trendstone Plus with field applied sealer (Size and color selection as noted in Construction Drawings)
7. Sealer For Decorative CMU
 - a. Clear sealer for decorative CMU shall be Trendcoat WB from Trenwyth Industries, Inc., or approved equal from Kingston Block.

1.9 BRICK

A. General: Provide shapes indicated and as follows for each form of brick required:

1. Provide units without cores or frogs and with exposed surfaces finished for ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces.

- B. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 - 1. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 - 2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
 - 3. Bricks to be installed in the Jack Arches shall be factory cut.
- C. Face Brick: ASTM C 216 Grade SW, Type FBX, and as follows:
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.
 - 2. Initial Rate of Absorption: Less than 20 g/30 sq. in. per minute when tested per ASTM C 67.
 - 3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 - 4. Sizes: Modular to match existing.
 - 5. Selection: Field Brick; The Belden Brick Company Modular Graystone Smooth & Modular Dutch Gray Smooth A; Percentages to be determined.
 - 6. Selection: Soldier Course Brick; The Belden Brick Company Modular 470-479 Medium A.

1.10 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.
- D. Mortar Cement: ASTM C 1329.
- E. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 - 1. White-Mortar Aggregates: Natural white sand or ground white stone.
 - 2. Colored-Mortar Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.
- F. Aggregate for Grout: ASTM C 404.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.

- H. Water: Potable.
- I. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Mortar Cement:
 - a. Magnolia Superbond Mortar Cement; Blue Circle Cement.
 - b. Lafarge Mortar Cement; Lafarge Corporation.
 - 2. Cold-Weather Admixture:
 - a. Accelguard 80; Euclid Chemical Co.
 - b. Morseled; W. R. Grace & Co., Construction Products Division.
 - c. Trimix-NCA; Sonneborn, Div. of ChemRex, Inc.

1.11 REINFORCING STEEL

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, Grade 60 and Grade 40.

1.12 MASONRY JOINT REINFORCEMENT

- A. General: ASTM A 951 and as follows:
 - 1. Hot-dip galvanized, carbon-steel wire for interior walls.
 - a. Wire Size for Side Rods: W2.8 or 0.188-inch diameter.
 - b. Wire Size for Cross Rods: W2.8 or 0.188-inch diameter.
 - 2. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units where indicated.
- B. For single-wythe masonry, provide either ladder or truss type with single pair of side rods and cross rods spaced not more than 16 inches o.c.
- C. Stainless Steel Type 304 for exterior walls.

1.13 TIES AND ANCHORS, GENERAL

- A. General: Provide ties and anchors, specified in subsequent articles, made from materials that comply with this Article, unless otherwise indicated.
 - 1. Hot-Dip Galvanized Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
 - 2. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
 - 3. Stainless Steel Type 304 for exterior walls.

1.14 BENT WIRE TIES

- A. General: Rectangular units with closed ends and not less than 4 inches wide. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.
 - 1. Where coursing between wythes does not align, use adjustable ties composed of 2 parts; 1 with pintles, the other with eyes; with maximum misalignment of 1-1/4 inches.
 - 2. Where wythes are of different materials, use adjustable ties composed of 2 parts; 1 with pintles, the other with eyes; with maximum misalignment of 1-1/4 inches.
- B. Wire: Fabricate from 3/16-inch- diameter, hot-dip galvanized steel wire except that reinforcing in exterior masonry shall be stainless steel wire.

1.15 RIGID ANCHORS

- A. General: Fabricate from steel bars as follows:
 - 1. 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins.
 - 2. Finish: Interior masonry Hot-dip galvanized to comply with ASTM A 153. Exterior masonry construction shall be stainless steel.

1.16 MISCELLANEOUS MASONRY ACCESSORIES

- A. Provide the following masonry accessories as manufactured by Hohmann & Barnard. Masonry accessories located in exterior construction shall be stainless steel and masonry accessories located in interior construction shall be hot dipped galvanized.
 - 1. Stainless Steel Drip Plate with Foam Tite Seal (DP-FTSA) with preformed inside and outside corners
 - 2. RB-Twin Rebar Positioner
 - 3. PTA-422 Partition Top Anchors; 12 Ga, 8" long, Hot Dipped Galv, @4'-0" O.C.
 - 4. Thermal 2-Seal Tie with 9 gauge Type 304 stainless steel continuous wire
 - 5. #342S Rectangular Plastic Weep Hole w/ S.S. Screen insert
 - 6. Mortar Net Wall Defender.
 - 7. NS-Closed Cell Neoprene Sponge for Control Joints and Expansion Joints
 - 8. T2 Termination Bar
 - 9. Mighty-Flash stainless steel fabric flashing
 - 10. DP stainless steel drip plates 3" wide with FTSA foam Tite Seal with flash adhere strip. Provide inside and outside preformed corners.
 - 11. MFL Preformed S.S. Inside & Outside Custom corner flashings
 - 12. ST/Steel Stainless Steel Corners & End Dams per dimensions shown on drawings
 - 13. Diedrich 202V Vana Stop Organic Masonry Cleaner
 - 14. DOW CavityMate Ultra Extruded Polystyrene Foam Insulation (Thickness as Indicated on drawings) Using Dow Great Stuff Insulating Foam Sealant to seal gaps
 - 15. Enviro Barrier fluid applied Air/Vapor Barrier

16. X-Barrier Peel and Stick Barrier membrane
17. Enviro-Barrier Mastic
18. Stretch-X-Seal Stretchable Detail Tape

1.17 CAVITY-WALL INSULATION

- A. Extruded-Polystyrene Foam Board Insulation. ASTM C 578, Type IV, but with an aged thermal resistance (R-value) for thickness listed below for 1-inc deg F x h x sq. ft./Btu at 75 deg F at 5 years; closed-cell product, moisture resistant with an integral skin.
 1. 1 1/2" thickness R-value 7.5.
- B. Adhesive: Type recommended by insulation board manufacturer for application indicated.

1.18 MASONRY CLEANERS

- A. Proprietary Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1.19 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 1. Do not use calcium chloride in mortar or grout.
 2. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification.
 1. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
 2. Limit cementitious materials in mortar for exterior masonry to portland cement, mortar cement, and lime.
 3. For masonry below grade, in contact with earth, and where indicated, use Type S.
 4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.

PART 2 - EXECUTION

2.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

2.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this Section and in other Sections of the Specifications.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.
- D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 - 1. Mix units from several pallets or cubes as they are placed.
- F. Wetting of Brick: Wet brick before laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at the time of laying.
- G. Masonry accessories shall be installed in accordance with manufacturer's recommendations.

2.3 CONSTRUCTION TOLERANCES

- A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:

- B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.
- C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, nor 1/2 inch maximum.
- D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.
- E. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
- F. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

2.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
 - 1. Exposed concrete masonry unit bond shall be one-half running bond with vertical joint in each course centered on units in courses above and below.
 - 2. Face brick bond shall be as indicated on the drawings.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
- F. Fill space between hollow-metal frames and masonry solidly with mortar, unless otherwise indicated.

- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
 - 3. At fire-rated partitions, install firestopping in joint between top of partition and underside of structure above to comply with Division 7 Section "Firestopping."

2.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow masonry units as follows:
 - 1. With full mortar coverage on horizontal and vertical face shells.
 - 2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
 - 3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
- B. Lay solid brick-size masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
 - 1. At cavity walls, bevel beds away from cavity, to minimize mortar protrusions into cavity. As work progresses, trowel mortar fins protruding into cavity flat against the cavity face of the brick.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated. Tooling of face brick joints shall match joint tooling of existing face brick.

2.6 BONDING OF MULTI-WYTHE MASONRY

- A. Use bonding system indicated on Drawings.
- B. Corners: Provide interlocking masonry unit bond in each wythe and course at corners, unless otherwise indicated.
 - 1. Provide continuity with masonry joint reinforcement at corners by using prefabricated "L" units as well as masonry bonding.

- C. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
 - 1. Provide continuity with masonry joint reinforcement by using prefabricated "T" units.

2.7 CAVITIES

- A. Keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavities flush.
 - 1. Use wood strips temporarily placed in cavity to collect mortar droppings. As work progresses, remove strips, clean off mortar droppings, and replace in cavity.
- B. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
 - 1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

2.8 MASONRY JOINT REINFORCEMENT

- A. General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 - 2. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
 - a. Reinforcement above is in addition to continuous reinforcement.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.
- D. Rake out joints for pointing with mortar to depth of not less than 3/4 inch before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

2.9 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
 - 1. Provide prefabricated or built-in-place masonry lintels. Use specially formed bond beam units with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.
 - 2. Provide either of above at Contractor's option or provide precast or formed-in-place concrete lintels complying with requirements in Division 3 Section "Cast-in-Place Concrete."
- C. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

2.10 FLASHING, WEEP HOLES, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Unless otherwise indicated, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
- C. Install flashing as follows:
 - 1. At multi-wythe masonry walls, including cavity walls, extend flashing from exterior face of outer wythe of masonry, through outer wythe, turned up a minimum of 8 inches, and through inner wythe to within 1/2 inch of the interior face of the wall in exposed masonry. Where interior surface of inner wythe is concealed by furring, carry flashing completely through inner wythe and turn flashing up approximately 2 inches, unless otherwise indicated.
 - 2. At lintels and shelf angles, extend flashing a minimum of 4 inches into masonry at each end. At heads and sills, extend flashing 4 inches at ends and turn flashing up not less than 2 inches to form a pan.
 - 3. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 7 Section "Joint Sealants" for application indicated.
 - 4. Extend sheet metal flashing 1/2 inch beyond face of masonry at exterior and turn flashing down to form a drip.
- D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
 - 1. Use round plastic tubing to form weep holes.

2. Use wicking material to form weep holes above flashing in brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
 3. Space weep holes 24 inches o.c.
 4. Space weep holes formed from plastic tubing or wicking material 16 inches o.c.
 5. Place cavity drainage material immediately above flashing in cavities.
- E. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.

2.11 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
 5. Clean brick by the bucket-and-brush hand-cleaning method described in BIA Technical Notes No. 20, using job-mixed detergent solution.
 6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
 7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.

END OF SECTION 04 20 00

SECTION 04 72 00
CAST STONE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Cast stone trim.
 - a. Window sills.
 - b. Lintels.
 - c. Surrounds.
 - d. Coping.

B. Related Sections:

- 1. Section 042000 "Unit Masonry Assemblies" for installation of cast stone units in unit masonry.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

- 1. For cast stone units, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.

- 1. Include building elevations showing layout of units and locations of joints and anchors.

C. Samples for Initial Selection: For colored mortar.

D. Samples for Verification:

- 1. For each color and texture of cast stone required, 10 inches square in size.
- 2. Label Samples to indicated types and amounts of pigments used.]

E. Full-Size Samples: For each color texture and shape of cast stone unit required.

1. Make available for Architect's review at Project site.
2. Make Samples from materials to be used for units used on Project immediately before beginning production of units for Project.
3. Approved Samples may be installed in the Work.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and testing agency.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute.
- B. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- C. Source Limitations for Cast Stone: Obtain cast stone units through single source from single manufacturer.
- D. Mockups: Furnish cast stone for installation in mockups specified in Section 04810 "Unit Masonry Assemblies."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of cast stone with unit masonry work to avoid delaying the Work and to minimize the need for on-site storage.
- B. Pack, handle, and ship cast stone units in suitable packs or pallets.
 1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
 2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

PART 2 - PRODUCTS

2.1 CAST STONE MATERIALS

- A. General: Comply with ASTM C 1364 and the following:
- B. Portland Cement: ASTM C 150, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C 114. Provide natural color or white cement as required to produce cast stone color indicated.

- C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33; gradation and colors as needed to produce required cast stone textures and colors.
- D. Fine Aggregates: Natural sand or crushed stone complying with ASTM C 33, gradation and colors as needed to produce required cast stone textures and colors.
- E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- F. Admixtures: Use only admixtures specified or approved in writing by Architect.
 - 1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
 - 2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
 - 3. Air-Entraining Admixture: ASTM C 260.
 - 4. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.
 - 5. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 6. Water-Reducing, Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 7. Water-Reducing, Accelerating Admixture: ASTM C 494/C 494M, Type E.
- G. Reinforcement: Deformed steel bars complying with ASTM A 615/A 615M, Grade 60. Use epoxy-coated reinforcement when covered with less than 1-1/2 inches of cast stone material.
 - 1. Epoxy Coating: ASTM A 775/A 775M.
- H. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666, Type 304.

2.2 CAST STONE UNITS

- A. Manufacturers:
 - 1. Metropole, Inc.
 - 2. Continental Cast Stone.
 - 3. Towne House Restoration, Inc.
 - 4. David Kucera, Inc.
 - 5. Architectural Molding Composite.
 - 6. Essex Works.
- B. Provide cast stone units complying with ASTM C 1364 using either the vibrant dry tamp or wet-cast method.
 - 1. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666/C 666M, Procedure A, as modified by ASTM C 1364.

C. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.

1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
3. Provide drips on projecting elements unless otherwise indicated.

D. Fabrication Tolerances:

1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.

E. Cure units as follows:

1. Cure units in enclosed moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
2. Keep units damp and continue curing to comply with one of the following:
 - a. No fewer than five days at mean daily temperature of 70 deg F or above.
 - b. No fewer than six days at mean daily temperature of 60 deg F or above.
 - c. No fewer than seven days at mean daily temperature of 50 deg F or above.
 - d. No fewer than eight days at mean daily temperature of 45 deg F or above.

F. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

G. Colors and Textures: Match existing units.

2.3 ACCESSORIES

A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666.

B. Dowels: 1/2-inch- diameter, round bars, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666.

PART 3 - EXECUTION

- 3.1 Refer to the Division 4 Section "Unit Masonry Assemblies" for installing cast stone units in unit masonry.

END OF SECTION 047200

SECTION 04 73 00
MANUFACTURED MASONRY VENEER

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Portland cement based manufactured [stone] [and] [brick] veneer and trim.
- B. Related Sections:
 - 1. 07 92 00—Joint Sealants.
 - 2. 09 24 23—Portland Cement Stucco

1.02 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI A118.4 Specifications for Latex-Portland Cement Mortar.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM C 39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 2. ASTM C 67 – Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
 - 3. ASTM C 144 – Standard Specification for Aggregate for Masonry Mortar.
 - 4. ASTM C 177 – Standard Test Method for Steady-State Head Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
 - 5. ASTM C 207 – Standard Specification for Hydrated Lime for Masonry Purposes.
 - 6. ASTM C 270 – Standard Specification for Mortar for Unit Masonry.
 - 7. ASTM C 482 – Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement.
 - 8. ASTM C 567 – Standard Test Method for Determining Density of Structural Lightweight Concrete.
 - 9. ASTM C 847 – Standard Specification for Metal Lath.
 - 10. ASTM C 932 – Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering.
 - 11. ASTM C 979 – Standard Specification for Pigments for Integrally Colored Concrete.
 - 12. ASTM C 1032 – Standard Specification for Woven Wire Plaster Base.
 - 13. ASTM C 1059 – Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete.
 - 14. ASTM D 226 – Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

15. ASTM C1063 –Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster
 16. ASTM C1329 Standard specification for Portland cement
 17. ASTM C578 – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
 18. ASTM C1289 – Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
 19. ASTM E2556/E2556M – Standard Specification for Vapor Permeable Flexible Sheet Water-Resistive Barriers Intended for Mechanical Attachment
- C. Other Standards:
1. UBC Standard No. 14-1, Kraft Waterproof Building Paper
 2. ICC AC38 Acceptance Criteria for Water Resistive Barriers
 3. UU-B-790 Building Paper, Vegetable Based, Kraft , waterproofed, water repellent and fireproof
- D. International Code Council (ICC):
1. ESR Report.
- E. Underwriter's Laboratory (UL): Building Materials Directory.

1.03 SUBMITTALS

- A. Reference Section 01 33 00–Submittal Procedures; submit following items:
1. Product Data.
 2. Samples:
 - a. Standard sample board consisting of small-scale pieces of veneer units showing full range of textures and colors.
 - b. Full range of mortar colors.
 3. Verification Samples: Following initial sample selection submit “laid-up” sample board using the selected stone and mortar materials and showing the full range of colors expected in the finished Work; minimum sample size: 3 by 3 feet.
 4. Quality Assurance/Control Submittals:
 - a. Qualifications:
 - 1) Proof of manufacturer qualifications.
 - 2) Proof of installer qualifications.
 - b. Regulatory Requirements: Evaluation reports.
 - c. Veneer manufacturer’s installation instructions.
 - d. Installation instructions for other materials.
- B. Closeout Submittals: Reference Section 01 78 00–Closeout Submittals; submit following items:
1. Maintenance Instructions.
 2. Special Warranties.

1.04 QUALITY ASSURANCE

- A. Qualifications:
1. Manufacturer Qualifications: Eldorado Stone, LLC.

2. Installer Qualifications: Experienced mason familiar with installation procedures and related local, state and federal codes masonry.

B. Field Sample:

1. Prepare 4 by 4 foot sample at a location on the structure as selected by the Architect. Use approved selection sample materials and colors. Include back up material.
2. Obtain Architect's approval.
3. Protect and retain sample as a basis for approval of completed manufactured stone work. Approved sample may be incorporated into completed work.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Follow manufacturer's instructions.

1.06 PROJECT/SITE CONDITIONS

- A. Environmental Requirements: When air temperature is 40 degrees F (4.5 degrees C) or below, consult local building code for Cold-Weather Construction requirements.

1.07 WARRANTY

- A. Special Warranty: Manufacturer's standard warranty coverage against defects in materials when installed in accordance with manufacturer's installation instructions.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- | | | |
|----|---|---|
| A. | Eldorado Stone, LLC
1370 Grand Ave., Bldg. B
San Marcos, CA 92069 | Tel: (800) 925-1491
Fax: (760) 736-3840
E-Mail: customerservice@westlake.net
Website: www.eldoradostone.com |
| B. | Product: Architectural stone veneer. | |
| C. | Substitutions: None Allowed. | |

2.02 MATERIALS

- A. Stone Veneer:
1. Profile: Stacked Stone, color TBD. Include matching corner pieces.
- B. Veneer Unit properties: Precast veneer units consisting of portland cement, lightweight aggregates, and mineral oxide pigments.
1. Compressive Strength: ASTM C 192 and ASTM C 39, 5 sample average: greater than 1,800 psi (12.4MPa).
 2. Shear Bond: ASTM C 482: 50 psi (345kPa), minimum.
 3. Freeze-Thaw Test: ASTM C 67: Less than 3 percent weight loss and no disintegration.

4. Thermal Resistance: ASTM C 177: 0.473 at 1.387 inches thick
5. Weight per square foot: 2012 IBC and 2012 IRC, ASTM C1670, 15 pounds, saturated.
- C. Reinforcing: ASTM C 847, 2.5lb/yd² (1.4kg/m²) galvanized expanded metal lath complying with code agency requirements for the type of substrate over which stone veneer is installed.
- D. Mortar:
 1. Cement: Portland cement complying with ASTM C 1329.
 2. Lime: ASTM C 207.
 3. Sand: ASTM C 144, natural or manufactured sand.
 4. Color Pigment: ASTM C 979, mineral oxide pigments.
 5. Water: Potable.
 6. Pre-Packaged Latex-Portland Cement Mortar: ANSI A118.4.
- E. Bonding Agent: Exterior integral bonding agent meeting [ASTM C 932] [ASTM C 1059 Type II]
- F. Water Repellent: Water based silane or siloxane masonry water repellent

2.03 MORTAR MIXES

- A. Standard Installation (Grouted Joints):
 1. Mix mortar in accordance with ASTM C 270,
 2. Polymer modified mortar complying with ANSI A118.4
 - a. Add color pigment in grout joint mortar in accordance with pigment manufacturer's instructions not to exceed 10% by weight of cement.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates upon which work will be installed.
- B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.
- C. Commencement of work by installer is acceptance of substrate.

3.02 PREPARATION

- A. Protection: Protect adjacent work from contact with mortar.
- B. Surface Preparation: Prepare substrate in accordance with manufacturer's installation instructions for the type of substrate being covered.

3.03 INSTALLATION

- A. Install and clean stone in accordance with manufacturer's installation instructions for Standard Installation (Grouted Joint) or Jointless/Dry-Stacked installation as specified above.
- B. Apply repellent in accordance with repellent manufacturer's application instructions.

3.04 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Manufacturer's Field Service Representative shall make two periodic site visits review of on-going installation process but is not responsible for any errors or omissions that are not observed or are previously completed.

3.05 CLEANING

- A. Reference Section 01 74 00—Cleaning and Waste Management.
- B. Remove protective coverings from adjacent work.
- C. Cleaning Veneer Units:
 - 1. Wash with soft bristle brush and water/granulated detergent solution
 - 2. Rinse immediately with clean water
- D. Removing Efflorescence:
 - 1. Allow veneer to dry thoroughly
 - 2. Scrub with soft bristle brush and clean water
 - 3. Rinse immediately with clean water; allow to dry
 - 4. If efflorescence is still visible, contact ES Customer Service for assistance

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Loose bearing and leveling plates.
 - 2. Loose steel lintels.
 - 3. Shelf angles.
 - 4. Steel framing and supports for mechanical and electrical equipment.
 - 5. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 6. Metal edgings.
 - 7. Miscellaneous metal trim.
- B. Related Sections include the following:
 - 1. Division 6 Section "Rough Carpentry" for metal framing anchors and other rough hardware.

1.3 SUBMITTALS

- A. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
- B. Provide samples representative of materials and finished products as may be requested by Architect.
- C. Welding Certificates: Copies of certificates for welding procedures and personnel.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code-Steel," AWS D1.2 "Structural Welding Code-Aluminum," and AWS D1.3 "Structural Welding Code-Sheet Steel."

1.5 PROJECT CONDITIONS

- A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

1.6 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.

- C. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- D. Gray-Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.
- E. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.
- F. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 PAINT

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36.
- D. Machine Screws: ASME B18.6.3.
- E. Lag Bolts: ASME B18.2.1.

- F. Wood Screws: Flat head, carbon steel, ASME B18.6.1.
- G. Plain Washers: Round, carbon steel, ASME B18.22.1.
- H. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1.
- I. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Alloy Group 1 or 2 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.
- J. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.5 GROUT

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, non-gaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Shear and punch metals cleanly and accurately. Remove burrs.
- C. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

- E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- J. Remove sharp or rough areas on exposed traffic surfaces.
- K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.7 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

2.8 LOOSE STEEL LINTELS

- A. Fabricate loose structural-steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Size loose lintels to provide bearing length at each side of openings equal to one-twelfth of clear span, but not less than 8 inches, unless otherwise indicated.
- D. Galvanize loose steel lintels located in exterior walls.

2.9 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports that are not a part of structural-steel framework as necessary to complete the Work.
- B. General: Provide steel framing and supports indicated and as necessary to complete the Work.
- C. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors 1-1/4 inches wide by 1/4 inch thick by 8 inches long at 24 inches o.c., unless otherwise indicated.
 - 2. Furnish inserts if units must be installed after concrete is placed.
- D. Galvanize miscellaneous framing and supports where indicated.

2.10 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from structural-steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches from each end, 6 inches from corners, and 24 inches o.c., unless otherwise indicated.
- C. Galvanize miscellaneous steel trim in the following locations:
 - 1. Exterior.
 - 2. Interior, where indicated.

2.11 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.

2.12 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
 - 1. ASTM A 123, for galvanizing steel and iron products.
 - 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instruction and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.
- B. Center nosings on tread widths with noses flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.2 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment,

and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- E. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.3 SETTING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 Section "Painting."
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 50 00

SECTION 05 51 00
METAL STAIRS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Preassembled steel stairs with precast-terrazzo treads and landings.
 - 2. Preassembled steel stairs with concrete treads & metal pan risers
- B. Related Sections include the following:
 - 1. Division 5 Section "Ornamental Railings" for ornamental metal handrails and railings fabricated from stock components.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal stairs capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each component of metal stairs.
 - 1. Treads and Platforms of Metal Stairs: Capable of withstanding a uniform load of 100 lbf/sq. ft. or a concentrated load of 300 lbf on an area of 4 sq. in., whichever produces the greater stress.
 - 2. Stair Framing: Capable of withstanding stresses resulting from loads specified above in addition to stresses resulting from railing system loads.
 - 3. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch, whichever is less.

1.4 SUBMITTALS

- A. Product Data: For metal stairs.

- B. Shop Drawings: Show fabrication and installation details for metal stairs. Include plans, elevations, sections, and details of metal stairs and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
 - 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer licensed in the State of New York responsible for their preparation.
- C. Welding Certificates: Copies of certificates for welding procedures and personnel.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Arrange for metal stairs specified in this Section to be fabricated and installed by the same firm.
- B. Fabricator Qualifications: A firm experienced in producing metal stairs similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

1.6 COORDINATION

- A. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 FERROUS METALS

- A. Metal Surfaces, General: Provide metal free from pitting, seam marks, roller marks, and other imperfections where exposed to view on finished units. Do not use steel sheet with variations in flatness exceeding those permitted by referenced standards for stretcher-leveled sheet.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

- C. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.
- D. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- E. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- F. Steel Bars for Gratings: ASTM A 36/A 36M.
- G. Uncoated, Cold-Rolled Steel Sheet: Commercial quality, complying with ASTM A 366/A 366M; or structural quality, complying with ASTM A 611, Grade A, unless another grade is required by design loads.
- H. Uncoated, Hot-Rolled Steel Sheet: Commercial quality, complying with ASTM A 569/A 569M; or structural quality, complying with ASTM A 570/A 570M, Grade 30, unless another grade is required by design loads.
- I. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.2 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 25 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Machine Screws: ASME B18.6.3.
- D. Lag Bolts: ASME B18.2.1.
- E. Plain Washers: Round, carbon steel, ASME B18.22.1.
- F. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

2.3 PAINT

- A. Shop Primers: Provide primers that comply with Division 9 Section "Painting."

2.4 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by welding, unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces.
- B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.
 - 1. Architectural class.
- C. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Shear and punch metals cleanly and accurately. Remove sharp or rough areas on exposed surfaces.
- D. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Weld connections to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Weld exposed corners and seams continuously, unless otherwise indicated.
 - 5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.5 STEEL-FRAMED STAIRS

- A. Stair Framing: Fabricate stringers of structural-steel tubes, channels, or plates, or a combination, as indicated. Provide closures for exposed ends of stringers. Construct platforms of structural-steel channel headers and miscellaneous framing members as indicated. Bolt or weld headers to stringers; bolt or weld framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finished surfaces.
 - 1. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.
- B. Metal Risers, Subtread Pans, and Subplatforms: Form to configurations shown from steel sheet of thickness necessary to support indicated loads, but not less than 0.0677 inch.
 - 1. Steel Sheet: Uncoated cold-rolled steel sheet, unless otherwise indicated.
 - 2. Steel Sheet: Uncoated hot-rolled steel sheet, unless otherwise indicated.
 - 3. Directly weld metal pans to stringers; locate welds on side of subtreads to be concealed by concrete fill. Do not weld risers to stringers.
 - 4. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
 - 5. Shape metal pans to include nosing integral with riser.
 - 6. Attach extruded abrasive nosings to risers. Make nosings full width of tread, with noses flush with riser faces and level with tread surfaces.
 - 7. Provide subplatforms of configuration indicated or, if not indicated, the same as subtreads. Weld subplatforms to platform framing.

2.6 STAIR HANDRAILS AND RAILINGS

- A. General: Comply with applicable requirements in Division 5 Section "Ornamental Handrails and Railings" for handrails and railings, and as follows:
 - 1. Fabricate newels of steel tubing and provide newel caps of gray-iron castings, as shown.
 - 2. Fabricate newels of steel tubing and provide newel caps of pressed steel, as shown.
 - 3. Railings may be bent at corners, rail returns, and wall returns, instead of using prefabricated fittings.
 - 4. Connect railing posts to stair framing by direct welding, unless otherwise indicated.

2.7 FINISHES

- A. Comply with NAAMM'S "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Finish metal stairs after assembly.
- C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed products:
 - 1. Interiors (SSPC Zone 1A): SSPC SP 3, "Power Tool Cleaning."
- D. Apply shop primer to prepared surfaces of metal stair components, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place or existing construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete, unless otherwise indicated.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- F. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

- G. Install precast treads with adhesive supplied by manufacturer.

3.2 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 Section "Painting."

END OF SECTION 05 51 00

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Wood blocking, cants, and nailers.
 - 2. Wood furring and grounds.
- B. Related Sections include the following:
 - 1. Division 6 Section "Finish Carpentry" for nonstructural carpentry items exposed to view and not specified in another Section.

1.3 DEFINITIONS

- A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NELMA - Northeastern Lumber Manufacturers Association.
 - 2. NLGA - National Lumber Grades Authority.
 - 3. SPIB - Southern Pine Inspection Bureau.
 - 4. WCLIB - West Coast Lumber Inspection Bureau.
 - 5. WWPA - Western Wood Products Association.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount

- of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D 5516 and ASTM D 5664.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant-treated wood product through one source from a single producer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 3. Provide dressed lumber, S4S, unless otherwise indicated.
 4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPAC2.
 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
1. For exposed lumber indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat all rough carpentry, unless otherwise indicated.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, provide materials that comply with performance requirements in AWPAC20 (lumber) and AWPAC27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664, for lumber and ASTM D 5516, for plywood.
 2. Use treatment that does not promote corrosion of metal fasteners.
 3. Use Interior Type A High Temperature (HT), unless otherwise indicated.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction, including the following:
1. Blocking.
 2. Cants.
 3. Nailers.
 4. Furring.
 5. Grounds.
- B. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
1. Mixed southern pine, No. 2 grade; SPIB.
 2. Hem-fir or Hem-fir (north), Construction or 2 Common grade; NLGA, WCLIB, or WWPAC.

3. Spruce-pine-fir (south) or Spruce-pine-fir, Construction or 2 Common grade; NELMA, NLGA, WCLIB, or WWPA.
 4. Eastern softwoods, No. 2 Common grade; NELMA.
 5. Northern species, No. 2 Common grade; NLGA.
 6. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.
- C. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inch thick.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: CABO NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. Lag Bolts: ASME B18.2.1..
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- C. Apply field treatment complying with AWPAC M4 to cut surfaces of preservative-treated lumber and plywood.
- D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. CABO NER-272 for power-driven fasteners.
 - 2. Table 2305.2, "Fastening Schedule," in the BOCA National Building Code.
- E. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.
- F. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

3.2 WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

END OF SECTION 06 10 00

SECTION 06 20 23
INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior trim.
- B. Related Requirements:
 - 1. Division 6 Section "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
 - 2. Division 9 Section "Painting" for priming and back priming of interior finish carpentry.

1.3 DEFINITIONS

- A. MDF: Medium-density fiberboard.
- B. MDO: Plywood with a medium-density overlay on the face.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.
 - 2. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.
 4. Include copies of warranties from chemical-treatment manufacturers for each type of treatment.
- B. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.
- C. Samples for Verification:
1. For each species and cut of lumber and panel products with non-factory-applied finish, with 1/2 of exposed surface finished, 50 sq. in. for lumber and 8 by 10 inches for panels.
 2. For each finish system and color of lumber and panel products with factory-applied finish, 50 sq. in. for lumber and 8 by 10 inches for panels.

1.5 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For fire-retardant-treated wood, from ICC-ES.
- B. Sample Warranty: For manufacturer's warranty.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and the following grading rules:

1. NeLMA: Northeastern Lumber Manufacturers' Association, "Standard Grading Rules for Northeastern Lumber."
2. NHLA: National Hardwood Lumber Association, "Rules for the Measurement and Inspection of Hardwood & Cypress."
3. NLGA: National Lumber Grades Authority, "Standard Grading Rules for Canadian Lumber."
4. SPIB: The Southern Pine Inspection Bureau, "Standard Grading Rules for Southern Pine Lumber."
5. WCLIB: West Coast Lumber Inspection Bureau, Standard No. 17, "Grading Rules for West Coast Lumber."
6. WWPA: Western Wood Products Association, "Western Lumber Grading Rules."

B. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.

1. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.

C. Softwood Plywood: DOC PS 1.

D. Hardboard: AHA A135.4.

E. MDF: ANSI A208.2, Grade 130, made with binder containing no urea-formaldehyde resin.

F. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea-formaldehyde resin.

2.2 FIRE-RETARDANT-TREATED MATERIALS

- #### A. General: For applications indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction, and comply with testing requirements; testing by a qualified testing agency.

- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent respectively.
- C. For exposed items indicated to receive a stained or natural finish, use organic resin chemical formulations that do not contain colorants, and provide materials that do not have marks from spacer sticks on exposed face.
- D. Do not use material that does not comply with requirements for untreated material or is warped or discolored.
- E. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
 - 2. For exposed plywood indicated to receive a stained or natural finish, mark back of each piece.
- F. Application: All interior lumber and plywood.

2.3 INTERIOR TRIM

- A. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
 - 1. Species and Grade: Maple; Clear A Finish; NHLA.
 - 2. Maximum Moisture Content: 9 percent.
 - 3. Finger Jointing: Not allowed.
 - 4. Gluing for Width: Use for lumber trim wider than 6 inches.
 - 5. Veneered Material: Not allowed.
 - 6. Face Surface: Surfaced (smooth).
 - 7. Matching: Selected for compatible grain and color.
- B. Hardwood Moldings for Transparent Finish (Stain or Clear Finish): WMMPA HWM 2, N-grade wood moldings made to patterns included in WMMPA HWM 1.
 - 1. Species: Maple.
 - 2. Maximum Moisture Content: 9 percent.
 - 3. Finger Jointing: Not allowed.
 - 4. Matching: Selected for compatible grain and color.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.

2.5 FABRICATION

- A. Back out or kerf backs of the following members except those with ends exposed in finished work:
 - 1. Interior standing and running trim except shoe and crown molds.
- B. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.
- C. When required wood trim exceeds 8" it shall be made of glued up and shall be minimum 5/4". Grain matching to be shown in shop drawings for Architect's approval.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, too small to fabricate with proper jointing arrangements, or with defective surfaces, sizes, or patterns.

- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 - 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 2. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
 - 3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
 - 4. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
 - 1. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
 - 2. Install trim after gypsum-board joint finishing operations are completed.
 - 3. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.6 CLEANING

- A. Clean interior finish carpentry on exposed and semi-exposed surfaces. Restore damaged or soiled areas and touch up factory-applied finishes, if any.

3.7 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 06 20 23

SECTION 06 41 13
INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Wood cabinets.
- B. Related Sections include the following
 - 1. Division 6 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.

1.3 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated, including cabinet hardware and accessories handrail brackets and finishing materials and processes.
 - 1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show details full size.
 - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.

3. Show locations and sizes of cutouts and holes for items installed in architectural woodwork.
- C. Samples for Initial Selection:
 1. Shop-applied transparent finishes.
- D. Samples for Verification:
 1. Lumber with or for transparent finish, not less than 5 inches wide by 24 inches long, for each species and cut, finished on 1 side and 1 edge.
 2. Veneer leaves representative of and selected from flitches to be used for transparent-finished woodwork.
 3. Veneer-faced panel products with or for transparent finish, 12 by 24 inches, for each species and cut. Include at least one face-veneer seam and finish as specified.
 4. Corner pieces as follows:
 - a. Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
 - b. Miter joints for standing trim.
 5. Exposed cabinet hardware and accessories, one unit for each type and finish.
- E. Product Certificates: For each type of product, signed by product manufacturer.
- F. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.
- G. Qualification Data: For fabricator.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Certified participant in AWI's Quality Certification Program.
- C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood veneers and transparent-finished wood doors that are required to be of same species as woodwork.
- D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

1. Provide AWI Quality Certification Program labels and certificates indicating that woodwork, including installation, complies with requirements of grades specified.
- E. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.
- F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at

site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.
- B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Division 8 Section "Finish Hardware" to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Wood Species and Cut for Transparent Finish: White Maple, quarter sawn or cut.
- C. Wood Species for Opaque Finish: Eastern white pine, sugar pine, or western white pine.
- D. Wood species and Cut for Theater wood base: Eastern White Pine, quarter sawn or cut.
- E. Wood species and Cut for Theater wood base at wood floor: White Oak, quarter sawn or cut
- F. Wood Products: Comply with the following:
 - 1. Hardboard: AHA A135.4.
 - 2. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
 - 3. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
 - 4. Softwood Plywood: DOC PS 1.
 - 5. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.

2.2 WOOD CABINETS FOR TRANSPARENT FINISH

- A. Grade: Premium.

- B. AWI Type of Cabinet Construction: As indicated.
- C. Wood Species and Cut for Exposed Surfaces: Clear White Maple.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this Article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified.
 - 1. Do not use treated materials that do not comply with requirements of referenced woodworking standard or that are warped, discolored, or otherwise defective.
 - 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 - 3. Identify fire-retardant-treated materials with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Comply with performance requirements of AWPAC20 (lumber) and AWPAC27 (plywood). Use the following treatment type:
 - 1. Interior Type A: Low-hygroscopic formulation.
 - 2. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.
 - 3. Kiln-dry materials before and after treatment to levels required for untreated materials.

2.4 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Finish Hardware".
- B. Provide cabinet hardware as indicated on the drawings.
- C. Shelf Rests: BHMA A156.9, B04013; metal.
- D. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.5 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
- B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.
- C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.
- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.
- F. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- G. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 2. Maintain veneer sequence matching of cabinets with transparent finish.
 3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips.
- H. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.
- I. Refer to Division 9 Sections for final finishing of installed architectural woodwork not indicated to be shop finished.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 41 13

SECTION 07 11 13
BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Cold-applied, cut-back asphalt dampproofing.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified, including data substantiating that materials comply with requirements for each dampproofing material specified. Include recommended method of application, recommended primer, number of coats, coverage or thickness, and recommended protection course.
 - 1. Certification by dampproofing manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed bituminous dampproofing similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Single-Source Responsibility: Obtain primary dampproofing materials and primers from one source and by a single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

1.5 PROJECT CONDITIONS

- A. Substrate: Proceed with dampproofing only after substrate construction and penetrating work have been completed.
- B. Weather Limitations: Proceed with dampproofing only when existing and forecasted weather conditions will permit work to be performed according to manufacturer's recommendations and warranty requirements.
- C. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has thoroughly cured.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Cold-Applied, Asphalt Emulsion Dampproofing:
 - a. Euclid Chemical Co.
 - b. Karnak Chemical Corporation.
 - c. Koppers Industries, Inc.

2.2 BITUMINOUS DAMPPROOFING

- A. General: Provide products recommended by manufacturer for designated application.
 - 1. Odor Elimination: For interior and concealed-in-wall uses, provide type of bituminous dampproofing material warranted by manufacturer to be substantially odor free after drying for 24 hours under normal conditions.
- B. Cold-Applied, Asphalt Emulsion Dampproofing: Asphalt-based emulsions recommended by the manufacturer for dampproofing use when applied according to the manufacturer's instructions.
 - 1. Trowel Grade: Emulsified asphalt mastic, prepared with mineral- colloid emulsifying agents suitable for application in a relatively thick film, complying with ASTM D 1187, Type I.
 - 2. Trowel Grade: Emulsified asphalt mastic, prepared with mineral- colloid emulsifying agents and containing fibers other than asbestos, complying with ASTM D 1227, Type III or IV.

2.3 MISCELLANEOUS MATERIALS

- A. Primer: Asphalt primer complying with ASTM D 41, for asphalt-based dampproofing.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrate of projections and substances detrimental to work; comply with recommendations of prime materials manufacturer.
- B. Install cant strips and similar accessories as shown and as recommended by prime materials manufacturer even though not shown.
- C. Fill voids, seal joints, and apply bond breakers, if any, as recommended by prime materials manufacturer, with particular attention at construction joints.
- D. Install separate flashings and corner protection stripping, as recommended by prime materials manufacturer, where indicated to precede application of dampproofing. Comply with details shown and with manufacturer's recommendations. Pay particular attention to requirements at building expansion joints, if any.
- E. Prime substrate as recommended by prime materials manufacturer.

3.2 INSTALLATION, GENERAL

- A. Comply with manufacturer's recommendations except where more stringent requirements are indicated and where Project conditions require extra precautions to ensure satisfactory performance of work.
- B. Application: Apply dampproofing to the following surfaces.
 - 1. Where indicated on the Drawings.

3.3 COLD-APPLIED, CUT-BACK ASPHALT DAMPPROOFING

- A. Trowel Grade: Trowel apply a coat of mastic asphalt dampproofing onto substrate at a minimum rate of 7 gal./100 sq. ft., to produce an average, dry-film thickness of 70 mils but not less than 30 mils at any point.

END OF SECTION 07 11 13

SECTION 07 21 00
THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Concealed building insulation.
 - 2. Exterior foundation wall insulation
 - 3. Under slab insulation
 - 4. Spray-on Acoustical Insulation for walls & Ceilings at Air Handler Room 115
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 7 Section "Firestopping" for fire safing insulation.
 - 2. Division 9 Section "Gypsum Board Assemblies" for acoustical insulation.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of insulation product specified.
- C. Product test reports from and based on tests performed by a qualified independent testing agency evidencing compliance of insulation products with specified requirements including those for thermal resistance, fire-test-response characteristics, water-vapor transmission, water absorption, and other properties, based on comprehensive testing of current products.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products complying with requirements indicated without delaying the Work.

- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated on Drawings or specified elsewhere in this Section as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect plastic insulation as follows:
 - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
 - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering insulation products that may be incorporated in the work include, but are not limited to, the following:
 - 1. Glass-Fiber Insulation:
 - a. CertainTeed Corporation.
 - b. Knauf Fiber Glass GmbH.
 - c. Owens-Corning Fiberglas Corporation.

2.2 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards.
 - 1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.

- B. Cellular Glass Insulation: Rigid cellular glass thermal insulation with closed-cell structure complying with ASTM C 552 for type and with other requirements indicated below:
1. Type I (flat block).
 2. Type IV (board) faced on both sides with manufacturer's special kraft paper sheets laminated to glass block with asphalt.
 3. Unfaced insulation passes ASTM E 136 for combustion characteristics.
- C. Unfaced Mineral-Fiber Blanket Insulation: Thermal insulation combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665, Type I (blankets without membrane facing).
1. Mineral-Fiber Type: Fibers manufactured from glass, slag wool, or rock wool.
 2. Mineral-Fiber Type: Fibers manufactured from glass.
 3. Mineral-Fiber Type: Fibers manufactured from slag or rock wool.
 4. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indices of 25 and 50, respectively.
 5. Certa Spray, CertainTeed Corporation.
- D. Exterior Foundation Wall Insulation: Extruded Polystyrene (XPS) Rigid Foam Insulation complying with ASTM C578 Type X, 15 psi minimum; R-5.0 per inch; thickness as shown on drawings
1. Owens Corning Foamular 150
 2. Equal as approved by Architect
- E. Under Slab Insulation: Extruded Polystyrene (XPS) Rigid Foam Insulation complying with ASTM C578, Compressive Strength 40 psi minimum, R-5.0 per inch; thickness as shown on drawings.
1. Owens Corning Foamular LT40
 2. Equal as approved by Architect.
- F. Wall & Ceiling Spray-on Acoustical Insulation at Air Handler Room 115: International Cellulose Corporation K-13 Custom Spray System; 2" thick at walls & ceilings; color to be selected from manufacturer's standard color selection.

2.3 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation, of thickness indicated, securely in position indicated with self-locking washer in place; and complying with the following requirements:
1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 2. Spindle: Copper-coated low carbon steel, fully annealed, 0.105 inches in diameter, length to suit depth of insulation indicated.

- B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
 - 1. Where spindles will be exposed to human contact after installation, protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap.

2.4 AUXILIARY INSULATING MATERIALS

- A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.
- B. Protection Board: Premolded, semirigid asphalt/fiber composition board, 1/4 inch thick, formed under heat and pressure, of standard sizes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Commencing installation of building insulation items shall constitute acceptance of existing conditions.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulations including removing projections that interfere with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, unsoiled, and has not been exposed at any time to ice and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Apply single layer of insulation to produce R value indicated, unless multiple layers are otherwise shown or required to produce R value indicated.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
 - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- C. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:
 - 1. Use blanket widths and lengths that fill cavities formed by framing members. Where more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
- D. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

3.5 PROTECTION

- A. General: Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00

SECTION 07 21 19

FOAMED IN PLACE INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. High density, closed celled, low VOC, water-blown polyurethane foam insulation, at the underside of roofing assembly.

1.3 REFERENCES

- A. American Society for Testing and Materials International (ASTM)
 - 1. ASTM C 518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
 - 2. ASTM E 84: Test Method for Surface Burning Characteristics of Building Materials
 - 3. ASTM E 96: Standard Test Methods for Water Vapor Transmission of Materials
 - 4. ASTM E 2178: Standard Test Method for Air Permeance of Building Materials
 - 5. ASTM E 283: Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
 - 6. ASTM C 1338: Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
- B. National Fire Protection Association (NFPA))
 - 1. NFPA 286 Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 01 Specification Sections.
- B. Product Data on materials, describing insulation properties, surface spread, smoke development, oxygen index and NY State Fire Gas Toxicity.
- C. Product test reports from and based on tests performed by a qualified independent testing agency evidencing compliance of insulation products with specified requirements including those for thermal resistance, fire-test-response characteristics, water-vapor

transmission, water absorption, and other properties, based on comprehensive testing of current products.

- D. Evaluation Report: Evidence of compliance of foam-plastic insulations with International Building Code (IBC), International Residential Code (IRC), International Energy Conservation Code (IECC), International Association of Plumbing and Mechanical Officials (IAPMO).
- E. Manufacturer's certificate showing the Huntsman installation certification
- F. Manufacturer's installation instructions.
- G. Document R-Value of insulation products.
- H. Products which contain recycled content shall be certified in accordance with the Submittal Requirements of this section.
- I. Sample warranty.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Product produced in an ISO9001 registered factory.
- B. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products complying with requirements indicated without delaying the Work.
- C. Installer Qualifications:
 - 1. Contractor performing work under this section shall be authorized by Huntsman Building Solutions in the art of applying spray polyurethane foam insulation.
 - 2. Provide current HUNTSMAN BUILDING SOLUTIONS Authorized Contractor Certificate.
- D. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated on Drawings or specified elsewhere in this Section as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.

1.6 QUALIFICATIONS

- A. Applicator: Company specializing in performing the work of this section with minimum three (3) years documented experience and certified by the manufacturer.

1.7 REGULATORY REQUIREMENTS

- A. Conform to ASTM E84 code for flame and smoke ratings, non-combustibility, and oxygen. Index ASTM D2863 and NY State Fire Gas Toxicity.

1.8 MOCK-UP

- A. Provide mock-up of polyurethane spray foam insulation.
- B. Construct mock-up, three (3) feet long by three (3) feet wide, including substrate construction of typical roof condition.
- C. Locate where directed by Architect.
- D. Mock-up may remain as part of the Work.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Toxicity/Hazardous Materials:
 - 1. Outgassing/Reactivity:
 - a. Formaldehyde: Products containing urea-formaldehyde will not be permitted.
 - b. Chlorofluorocarbons (CFCs)/HCFCs: Products and equipment requiring or using CFCs or HCFCs during the manufacturing process will not be permitted.
- B. Air tightness: Meet specific standards of the 2018 International Energy Conservation Code with blower door testing such that the assemblage of materials and components complies with an air leakage not greater than 0.04 cfm/sf under a pressure differential of 0.3 inch of water gauge (75 Pa) when tested in accordance with ASTM E2357, ASTM E1677 or ASTM E283.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
- B. Store materials in an area protected from freezing and overheating damage and in accordance with manufacturer's instructions.
- C. Protect materials during handling and application to prevent damage and contamination.
- D. Comply with manufacturer's written instructions for handling, storing and protection during installation.

1.11 WARRANTY

- A. Manufacturer's standard limited lifetime warranty.

PART 2 PRODUCTS

2.1 ACCEPTABLE PRODUCTS / MANUFACTURERS

A. Closed Cell Polyurethane Foam Insulation:

1. HEATLOK HFO High Lift as manufactured by Huntsman Building Solutions, 3315 East Division Street, Arlington, TX 76011; Tel. 855-942-7273, www.huntsmanbuildingsolutions.com

B. Thermal Barrier Coating (15 minute):

1. DC-315 as manufactured by International Fireproof Technology, Inc., 17528 Von Karman Avenue, Irvine, CA 92614.; Telephone: 949-975-8588; www.painttoprotect.com.

2.2 MATERIALS

A. Two-part spray applied closed cell polyurethane foam insulation conforming to the following:

1. Thermal Resistance: ASTM C518; 1" = R-6.3; 3.5" = R-26.
2. Water Vapor Transmission: ASTM E96; 1.56 Perms at 1" thickness.
3. Compressive Strength: ASTM D1621; 34.8 psi (nominal).
4. Core Density: ASTM D1622; 2.0 – 2.4 lbs./ft³ (nominal).
5. Closed Cell Content: ASTM D2856; 91%.
6. Tensile Strength: ASTM D1623; 101.3 psi (nominal).
7. Water Absorption: ASTM D2842; 0.87%.
8. Dimensional Stability (158 Degree F/97% Relative humidity): ASTM D2126 (percent change in volume); -3.7%.
9. Air Leakage Rate: ASTM E2178; less than 0.02 L s⁻¹ m⁻¹
10. Corrosion: No significant corrosion when in contact with steel under 85 percent relative humidity.
11. Bacterial or Fungal Growth: ASTM G-21; No growth; no material deterioration.
12. Flame Spread Index: ASTM E84; Class I, 10-15 (based on 4-inch thickness.)
13. Smoke Developed Index: ASTM E84; Class I, 350-400. (based on 4-inch thickness.)

C. Thermal Barrier Coating (15 minute): Intumescent coating designed for application as a 15-minute thermal barrier substitute over polyurethane spray foam insulation material.

1. Application Rates:
 - a. Thermal barrier shall not exceed 24 wet mils (WFT) in one pass.
 - b. Finish: Flat.
 - c. Color: Ice gray.
 - d. Volume Solids: 67%.
 - e. V.O.C. Content: 47g/l.
 - f. Drying Time: @77 degrees F & 50% RH to touch 1-2 hours to recoat 2 to 4 hours.
 - g. Type of Cure: Coalescence.
 - h. Flash Point: None.

- i. Reducer/Cleaner: Water.
- j. Shelf Life: 1 year (unopened).
- k. Packaging: 5 & 55-gallon containers.
- l. Application: Brush, roller, conventional and airless spray.
- m. Formaldehyde: None.
- n. Flame Spread Index: ASTM E84; 0.
- o. Smoke Developed Index: ASTM E84; less than 25.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected.
- B. Review placement area to determine final location will not be within 3 inches of any heat source where the temperature will exceed 200 deg F per ASTM C 411 or in accordance with authorities having jurisdiction.
 - 1. Verify existing conditions before starting work.
 - 2. Verify that substrate is free of any foreign material that will impede application.
 - 3.. Verify that other work on and within spaces to be insulated is complete prior to application.
 - 4. Notify Architect of conditions that would adversely affect the application.
 - 5. Beginning of installation means applicator accepts existing conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written installation instructions for preparing substrates indicated to receive insulation.
- B. Mask and protect adjacent surfaces from overspray or damage.
- C. Remove foreign materials, dirt, grease, oil, paint, laitance, efflorescence, and other substances that will affect application.

3.3 APPLICATION

- A. Site mix liquid components manufactured by Huntsman and supplied by Independent Huntsman Licensed Dealer
- B. Apply insulation in accordance with manufacturer's written application instructions.
- C. Apply insulation to a reasonably uniform monolithic density without voids.
- D. Apply to minimum cured thickness as scheduled.

- E. Extend insulation in thickness indicated to envelop entire area to be insulated.
- F. Where building is designed to meet the specific airtightness standards of the Energy Star Program, apply insulation as recommended by the manufacturer to provide airtight construction. Apply caulking to seal joints between structural assemblies.
- G. Provide 15-minute thermal barrier at all areas of spray foam insulation that is exposed.

3.4 FIELD QUALITY CONTROL

- A. Inspect application for insulation thickness and density.

3.5 PROTECTION OF FINISHED WORK

- A. Do not permit subsequent work to disturb applied insulation.

3.6 CONSTRUCTION WASTE MANAGEMENT

- A. Plan and coordinate the insulation work to minimize the generation of offcuts and waste. Reuse insulation scraps to the maximum extent feasible.
- B. Separate and recycle waste materials in accordance with the Waste Management Plan and to the extent economically feasible.

3.7 INSULATION SCHEDULE

- A. Location and Average Cured Thickness of Insulation:

- 1. At Entire underside of all roof assemblies where shown (Closed Cell) (R-38)

END OF SECTION

SECTION 07 27 26
FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes fluid-applied, vapor-retarding membrane air barriers for brick veneer cavity wall application & behind thin-set ground face CMU base assembly. See section 09 24 23 for air moisture barrier product required at stucco application.

1.3 DEFINITIONS

- A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air-Barrier Assembly: The collection of air-barrier materials and accessory materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.
- B. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- C. Product data for each type of product specified, including data substantiating that materials comply with requirements for each material specified. Include recommended method of application, recommended primer, number of coats, coverage or thickness, and recommended protection course.

- D. Shop Drawings: For air-barrier assemblies.
 - 1. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 2. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by the Installer, who work on Project.
- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.
- C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Mockups: Build mockups to set quality standards for materials and execution.
 - 1. Build integrated mockups of exterior wall assembly , 150 sq. ft., incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
 - a. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
 - b. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- B. Protect stored materials from direct sunlight.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.
 - 1. Protect substrates from environmental conditions that affect air-barrier performance.
 - 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Air barrier shall be capable of performing as a continuous vapor-retarding air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E 2357.

2.3 VAPOR-RETARDING MEMBRANE AIR BARRIER

- A. Brick Veneer Cavity Wall Application : Fluid-Applied, Vapor-Retarding Membrane Air Barrier
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Synthetic Polymer Membrane:

- 1) Hohmann & Barnard Enviro-Barrier VP.
- 2) Equal as approved by Architect.

2. Physical and Performance Properties:

- a. Air Permeance: Maximum 0.0008 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
- b. Vapor Permeance: Greater than 10 perm; ASTM E 96/E 96M.
- c. Ultimate Elongation: Minimum 600 percent; ASTM D 412, Die C.

2.4 ACCESSORY MATERIALS

- A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier material.
- B. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.
- C. Counterflashing Strip: Modified bituminous, 40-mil- thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to an 8-mil- thick, cross-laminated polyethylene film with release liner backing.
- D. Modified Bituminous Strip: Vapor retarding, 40 mils thick, smooth surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick polyethylene film with release liner backing.
- E. Joint Reinforcing Strip: Air-barrier manufacturer's glass-fiber-mesh tape.
- F. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- G. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- H. Sprayed Polyurethane Foam Sealant: One- or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to 2.0-lb/cu. ft density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- I. Modified Bituminous Transition Strip: Vapor retarding, 40 mils thick, smooth surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick polyethylene film with release liner backing.
- J. Elastomeric Flashing Sheet: ASTM D 2000, minimum 50- to 65-mil- thick, cured sheet neoprene with manufacturer-recommended contact adhesives and lap sealant with stainless-steel termination bars and fasteners.

- K. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Section 07920 "Joint Sealants."
- L. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.
 - 3. Verify that substrates are visibly dry and free of moisture. Test concrete substrates for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
- H. Bridge expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.3 ACCESSORIES INSTALLATION

- A. Install accessory materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
 - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 - 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
 - 3. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
- B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- D. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- E. Wall Openings: Prime concealed perimeter frame surfaces of windows, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
- F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.
- G. Seal top of through-wall flashings to air barrier with an additional 6-inch-wide, transition strip.
- H. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counter flashings or ending in reglets with termination mastic.

- I. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.4 PRIMARY AIR-BARRIER MATERIAL INSTALLATION

- A. Apply air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions and details. Apply air-barrier material within manufacturer's recommended application temperature ranges.
 1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
 2. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
 3. Where multiple prime coats are needed to achieve required bond, allow adequate drying time between coats.
- B. High-Build Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply air-barrier material in full contact around protrusions such as masonry ties.
 1. Vapor-Retarding, High-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements, but not less than 40 mils, applied in one or more equal coats.
- C. Do not cover air barrier until it has been tested and inspected by testing agency.
- D. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.5 FIELD QUALITY CONTROL

- A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 2. Air-barrier dry film thickness.
 3. Continuous structural support of air-barrier system has been provided.
 4. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
 5. Site conditions for application temperature and dryness of substrates have been maintained.

6. Maximum exposure time of materials to UV deterioration has not been exceeded.
7. Surfaces have been primed, if applicable.
8. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fish mouths.
9. Termination mastic has been applied on cut edges.
10. Strips and transition strips have been firmly adhered to substrate.
11. Compatible materials have been used.
12. Transitions at changes in direction and structural support at gaps have been provided.
13. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
14. All penetrations have been sealed.

D. Tests: As determined by testing agency from among the following tests:

1. Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186, chamber pressurization or depressurization with smoke tracers ASTM E 1186, chamber depressurization using blower door testing.
2. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate according to ASTM E 783 or ASTM E 2357.
3. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate according to ASTM D 4541 for each [600 sq. ft.] <Insert value> of installed air barrier or part thereof.

E. Air barriers will be considered defective if they do not pass tests and inspections.

1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
2. Remove and replace deficient air-barrier components for retesting as specified above.

F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

G. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing

- the overexposed materials according to air-barrier manufacturer's written instructions.
2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
-
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended in writing by manufacturer of affected construction.
 - C. Remove masking materials after installation.

END OF SECTION 07 27 26

SECTION 07 31 13

ASPHALT SHINGLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Agreement for Construction Services (hereinafter referred to as the Contract), Article I of the Contract, and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. All plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules and keynotes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Inspect the underside of the roof deck before starting work, and periodically as work occurs, to determine if there are conduits, pipes, ceiling hangers or fixtures next to the deck or fastened to the deck that could be affected as roof removal work occurs.
 - a. Perform roof work so any conduits, pipes, ceiling hangers or fixtures are not disturbed.
 - b. Replace and reset any conduits, pipes, ceiling hangers or fixtures that are affected by the work.
 - 2. Install a new asphalt shingle roofing system, including insulation, ice & water shield, underlayment, asphalt cement, fasteners, sealants and flashings.
 - 3. Coordinate the application of asphalt shingle roofing with the installation of all related components to provide a watertight installation.
- B. Related Requirements
 - 1. Carpentry - Division 06
 - 2. PVC Roofing - Section 07 54 19
 - 3. Sheet Metal Flashing & Specialties - Section 07 62 00
 - 4. Roof Accessories - Section 07 72 00

1.3 CODE APPROVAL

- A. Install roofing and insulation components to meet the following minimum requirements:

1. New York State Uniform Fire Prevention and Building Code, which includes by reference the New York State Energy Conservation Code.
2. Underwriters Laboratories Inc. Class A External Fire Rating for roof assemblies tested in accordance with ASTM E108 or UL 790.
3. Underwriters Laboratories Inc. Standard 1256 for roof assemblies with foam insulation.
4. Underwriters Laboratories Inc. 110 mph Wind Rating for Roof Covering Materials.

1.4 QUALITY ASSURANCE

- A. General: Do not apply any products when the substrate is wet.
- B. Installer Qualifications:
 1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 - c. Submit the supervisor's resume upon request.
 2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within fifty miles of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
 - b. Submit the reference list upon request.
- C. Material Quality: Obtain each type of material from a single source to ensure consistent quality, color, pattern, and texture.

1.5 PRE-CONSTRUCTION CONFERENCE

- A. Pre-Work Conference: Meet at the project site between one and two weeks prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:
1. How the roof deck and new insulation will be kept watertight as the work progresses.
 2. How the installation of asphalt shingles will be coordinated with the installation of insulation, ice & water shield, underlayment, flashings and other items to provide a watertight installation.
 3. Generally accepted industry practice, the Manufacturer's instructions for handling and installing his products, and specified work requirements.
 4. The condition of the substrate (deck), curbs, penetrations and other preparatory work needed.
 5. Incomplete submittals; note that progress payments will not be processed until all submittals are received and approved.
 6. The construction schedule, weather forecast, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
 7. A schedule for Owner and Architect inspections.

1.6 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work on site:
1. Manufacturer's technical literature for all materials.
 2. Test reports and certifications substantiating compliance with specification requirements if requested by the Architect.
 3. Samples of the Manufacturer's Warranty and Contractor's Guarantee forms.
- B. Simultaneously provide all roof related technical submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.
1. Submittals shall be prepared and made by the firm that will perform the actual work.
 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program isn't established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.

C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders for each building.

D. Payment requisitions will not be processed until all submittals are received and approved.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver material to the site in the Manufacturer's original and unopened packaging, bearing labels which identify the type and names of the products and Manufacturers, with Underwriters' Laboratories, Inc. labels intact and legible.

B. Store material on raised platforms and cover it immediately upon delivery. Keep material dry until installed.

C. Do not stack bundles of shingles more than 4 feet high.

D. Store rolled goods on end.

E. Do not overload the structure when storing materials on the roof.

F. Protect roof surfaces where material and equipment are placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.8 GUARANTEE

A. Provide the standard Manufacturer's 30 year "Lifetime" limited warranty against manufacturing defects.

B. Provide a written Contractor's Guarantee which guaranties that all work will remain free of material and workmanship defects and in a watertight condition for five years beginning upon Final Completion:

1. Defects include but are not limited to the following: leakage, delamination, lifting, loosening, splitting, cracking, joint separation and movement.

2. The Contractor shall make the repairs and modifications necessary to enable the work to perform as guaranteed at his own expense:

3. Guarantee coverage shall include removing and replacing items installed as part of the original work, if removal is needed to make repairs.

C. Provide one Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.

- D. The Guarantee shall take effect no more than 30 days before the satisfactory completion of all punch list work.
- E. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Performance Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.

PART 2 - PRODUCTS

2.1 INSULATION & FASTENERS

- A. Isocyanurate: Rigid cellular polyisocyanurate boards with fibrous felt/fiberglass mat facers, minimum compressive strength 20 psi, meeting ASTM C1289-01, Type II, Class 1, Grade 2.
- B. Nail board: Rigid cellular polyisocyanurate boards with fibrous felt/fiberglass mat facers, minimum compressive strength 20 psi, meeting ASTM C1289-01, Type II, Class 1, Grade 2 – overlaid with factory adhered spacers to create a 1 inch air gap, and factory adhered 5/8 inch thick APA rated CDX plywood.
- C. Screws: heavy duty #14 roofing screws with a proprietary rust inhibiting coating, and galvanized steel plates.

2.2 ASPHALT SHINGLES

- A. Shingles shall be 5 layer laminated fiberglass architectural textured shingles as manufactured by CertainTeed under the trade name Grand Manor Shingle, to comply with the following standards and characteristics:
 - 1. ASTM Specification D-3462.
 - 2. U.L. Class A Fire Rating.
 - 3. U.L. Wind Resistant Rating.
 - 4. Approximate Size: 36 inches long x 18 inches wide, 8 inch exposure.
 - 5. Approximate weight: 425 pounds per square.
 - 6. Color as selected.
- B. Utilize the Manufacturer's special starter, hip and ridge shingles.

2.3 ACCESSORY MATERIALS

- A. Ice and Water Shield:
 - 1. Standard - 40 mil thick slip resistant, rubberized asphalt adhesive sheet, backed with a layer of cross laminated polyethylene, with a release paper for peel and stick application directly to the prepared roof deck: W.R. Grace Ice & Water Shield.

2. High Temperature - 30 mil thick slip resistant, rubberized asphalt adhesive sheet, backed with a layer of cross laminated polyethylene, with a release paper for peel and stick application directly to a prepared substrate: Grace Ultra Ice & Water Shield.
 - a. Use high temperature ice & water shield where it is in contract with PVC roofing and sheet metal flashings.
- B. Underlayment: 12 mil thick spun-bonded polypropylene coated with UV stabilized polyolefin: WR Grace Tri-Flex 30.
- C. Asphalt Cement: Type 1, asbestos-free grade bituminous plastic cement complying with Federal Specification of SS-C-153B.
- D. Fasteners:
 1. Felt - galvanized or aluminum cap nails with low profile heads.
 2. Shingles - Hot dipped, 12 gauge barbed shank, galvanized roofing nails, long enough to penetrate through the underside of the sheathing about 1/4 inch.
- E. Ridge Vent: High density rigid corrugated black polyethylene sections with integral factory installed snow screens that provide 20 square inches of net free ventilation area per lineal foot, Cor-A-Vent Model V-600E.
- F. Soffit Vent: High density rigid corrugated polyethylene sections that provide 10 square inches of net free ventilation area per lineal foot, 1 inch by 1-1/2 inches nominal size, Cor-A-Vent Model S-400. Color as selected.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Inspect the roof decks and notify the Owner and Architect if the decks are not suitable for roofing work to begin, and to properly support the new asphalt shingle roofing system.
- B. Do not install new asphalt shingle roof system components until deck defects are corrected.
- C. Do not apply any new material over wet surfaces.

3.2 INSULATION

- A. Install isocyanurate insulation base layers, and the nail board overlay, and secure all layers to the underlying roof deck with screws and plates.
 1. Neatly cut insulation and cover board to fit neatly and without gaps. Fill any minor gaps that may occur, with low rise expanding foam insulation.

2. Offset and stagger insulation joints in each layer, and between boards in subsequent layers at least 12 inches.
3. Install 28 screws and plates per 4 by 8 foot board.

3.3 ICE AND WATER SHIELD

- A. Install ice & water shield, fully adhered to the deck surface and metal drip edge to shed water at all roof eaves, extending from the eave up the slope at least 6 feet, and at least 2 feet past the inside face of the building wall.
- B. Install ice & water shield over the entire surface of dormers and crickets, around penetrations, and on each side of metal valleys. Turn the ice shield up 6 inches at intersecting vertical walls, chimneys, and parapets.
- C. Overlap ice & water shield plies 3 inches and end laps 6 inches, minimum.
- D. Store ice & water shield between 60°F and 80°F when the outside temperature is 40°F or below; install the ice & water shield immediately after removing it from storage to assure it adheres to the substrate, and quickly install fasteners for the shingles and flashings through the ice and water shield - to assure self-sealing nail performance.

3.4 UNDERLAYMENT

- A. Install underlayment over the entire roof surface.
- B. Lap underlayment plies 3 inches toward the eaves and form 6 inch end laps.
- C. Fasten the underlayment with cap nails spaced 12 inches on center along the ply lines, at the end laps, and in all directions through-out the sheet.
- D. Lap underlayment at least 12 inches to form double thickness at ridges, and hips.

3.5 ASPHALT SHINGLES

- A. Install asphalt shingles strictly in accordance with the requirements and recommendations of the Manufacturer, except as modified herein.
- B. Utilize chalk lines and install the shingles with straight courses and uniform exposure. Do not exceed the Manufacturer's recommended course exposure.
- C. Nail each strip of asphalt shingles with a minimum of 7 nails. Leave no exposed nails in the completed installation.
- D. Fit shingles neatly around pipes, ventilators and other projections in roof; but do not cover the bottom flange of apron flashings. Position the shingles about 3/4 inch from cricket corners to create a drainage gap.
- E. Utilize the manufacturer's special starter, hip and ridge shingles.

- F. Form open valleys, which taper, increasing in size from the top to bottom.
- G. Do not puncture the sheet metal flashings with nails, as the shingles are installed.

3.6 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- B. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather - which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- C. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site are neat, orderly and workmanlike. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- D. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

END OF SECTION

SECTION 07 54 19

PVC ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Agreement for Construction Services (hereinafter referred to as the Contract), Article I of the Contract, and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. All plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules, and keynotes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Inspect the underside of the roof deck before starting work, and periodically each day as work occurs, to determine if there are conduits, pipes, ceiling hangers or fixtures next to the deck or fastened to the deck that could be affected as roof removal work occurs.
 - a. Perform roof work so any conduits, pipes, ceiling hangers or fixtures are not disturbed.
 - b. Replace and reset any conduits, pipes, ceiling hangers or fixtures that are affected by the work.
 - 2. Install a new fully adhered reinforced 60 mil thick PVC roofing system, including insulation, cover board, flashing, stripping and related accessories.
 - 3. Install standing seam PVC ribs heat welded to the surface of the sloped PVC roofs.
 - 4. Protect roof surfaces where material and equipment are placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.
 - 5. Provide any mechanical, electrical, hoisting and other work needed, and remove, adjust, reset and reconnect all roof-mounted and roof-penetrating devices.
 - 6. Install new flashings at all roof-mounted and roof-penetrating equipment.
- B. Related Requirements:
 - 1. Carpentry - Division 06

- | | | |
|----|------------------------------------|-------------------|
| 2. | Asphalt Shingles | - Section 07 3113 |
| 3. | Sheet Metal Flashing & Specialties | - Section 07 6200 |
| 4. | Roof Accessories | - Section 07 7200 |

1.3 CODE APPROVAL REQUIREMENTS

- A. Install roofing and insulation system components to meet the following minimum requirements:
1. New York State Uniform Fire Prevention and Building Code, which includes by reference the New York State Energy Conservation Code.
 2. Underwriters Laboratories Inc. Class A External Fire Rating for roof assemblies tested in accordance with ASTM E 108 or UL 790.
 3. Underwriters Laboratories Inc. Standard 1256 for roof assemblies with foam insulation.
 4. Minimum wind uplift pressure calculated using ASCE 7 and a safety factor of 2: 90 psf
- B. Provide written certification from the Manufacturer, before beginning work, to confirm the roofing system meets these requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
1. A firm (Installer) with not less than 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the specified work.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 - a. Submit the supervisor's resume upon request.
 2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within fifty miles of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.

- b. Submit the reference list upon request.
- 3. The Installer shall be acceptable to or licensed by the Manufacturer of the primary roofing materials, and provide written certification from the Manufacturer to confirm this prior to award if requested.
- B. Material Quality: Obtain each product, including the insulation, cover board, PVC roofing and flashing, and the cements, primers and adhesives from a single Manufacturer, which has manufactured the same products in the United States of America for not less than 5 continuous years.

1.5 PRE-CONSTRUCTION CONFERENCE:

- A. Meet at the project site approximately two weeks prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:
 - 1. How roofing will be coordinated with the installation of the insulation, cover board, flashings, roof top equipment and other items to provide a watertight installation.
 - 2. Generally accepted industry practice and the Manufacturer's instructions for handling and installing his products.
 - 3. The condition of the substrate (deck), curbs, penetrations and other preparatory work needed.
 - 4. Incomplete submittals; note that progress payments will be not processed until all submittals are received and approved.
 - 5. The construction schedule, forecast weather, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
 - 6. A schedule for Manufacturer and Architect inspections.

1.6 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work:
 - 1. Written certification from the Manufacturer which states that the Installer is acceptable or licensed to install the specified roofing; if not previously provided.
 - 2. Manufacturer's technical literature for all materials.
 - 3. Samples of the Contractor's guarantee and Manufacturer's warranty forms.
- B. Simultaneously provide all roof related technical submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.

1. Submittals shall be prepared and made by the firm that will perform the actual work.
 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program isn't established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
- C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders for each building.
- D. Payment requisitions will not be processed until all submittals are received and approved.

1.7 JOB CONDITIONS (CAUTIONS & WARNINGS)

- A. Do not use oil base or plastic roof cement with PVC roofing. Do not allow waste products, (petroleum grease or oil, solvents, vegetable or mineral oil, animal fat) or direct steam venting to come in contact with any roofing, insulation or flashing product. Do not expose PVC roofing and accessories to a temperature in excess of 175 degrees Fahrenheit.
- B. Splice cleaner, primers, cements and bonding adhesives are flammable. Do not breathe vapors or use near fire or flame or in a confined or unventilated area. Dispense only from a UL listed or approved safety can.
- C. Remove empty adhesive and solvent containers and contaminated rags from the roof daily and legally dispose of them daily.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver material to the site in the Manufacturer's original and unopened packaging, bearing labels which identify the type and names of the products and Manufacturers, with the labels intact and legible.
- B. Cover all stored materials, except rolls of PVC and sealed cans of adhesives, with watertight tarpaulins installed immediately upon delivery.
- C. Immediately remove any insulation which gets wet from the job site.
- D. Store and install all material within the Manufacturer's recommended temperature range.
- E. Do not overload the structure when storing materials on the roof.
- F. Protect roof surfaces where material and equipment is placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.9 GUARANTEE AND WARRANTY

- A. Provide a written Manufacturer's "Full System Warranty" which warrants that the roofing system, including the insulation, PVC roofing and flashings, will remain in a watertight condition for twenty years beginning upon Final Completion.
 - 1. Warranty coverage shall remain in effect for wind speeds up to 72 miles per hour measured at ground level at the site.
 - 2. Warranty coverage shall have no dollar value limit.
- B. Provide a written Contractor's Guarantee which guarantees that all work will remain free of material and workmanship defects and in a watertight condition for five years beginning upon Final Completion:
 - 1. Defects include but are not limited to the following: leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, movement and undue expansion.
 - 2. The Contractor shall make the repairs and modifications necessary to enable the work to perform as guaranteed at his own expense:
 - 3. Guarantee coverage shall include removing and replacing items installed as part of the original work, if removal is needed to make guaranteed repairs.
 - 4. Guaranty coverage shall remain in effect for wind speeds up to 72 miles per hour measured at ground level at the site.
 - 5. Guaranty coverage shall have no dollar value limit.
 - 6. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.
- C. Provide one Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- D. The Manufacturer's Warranty and Contractor's Guarantee shall take effect no more than 30 days before the satisfactory completion of all punch list work.
- E. Guarantee and Warranty coverage may be cancelled, for the affected portion of the roof, if the work is damaged by winds in excess of 72 mph, by hail, lightning, insects or animals, by failure of the structural substrate, by exposure to harmful chemicals, by other trades on the roof, or by vandalism, or if the Owner fails to maintain the roof in accordance with, or makes roof alterations contrary to, the Manufacturers printed recommendations.

- F. Guarantee and Warranty coverage shall be reinstated, for the remainder of the original term, if the Owner restores the roof to the condition it was in prior to the damage occurring.

1.10 SUBSTITUTIONS

- A. The following factors will be considered when evaluating a possible alternative to the roofing system specified:
 - 1. The wording and intent of the warranty to be issued.
 - 2. The financial status, numbers of years in business and stability of the entity that will issue the warranty.
 - 3. A reference list of at least five completed similar projects of comparable size, with a successful functional history of at least five years, within approximately fifty miles of the Project.
 - 4. Technical aspects of the system, especially relating to durability, serviceability and performance.
 - 5. The capacity and history of the Manufacturer in providing technical response, on-site inspections and assistance.
 - 6. The availability and prior experience of local authorized applicators to install and maintain the proposed alternate system.
 - 7. The willingness and history of the Manufacturer in responding to warranty claims previously made by the Owner, Architect or any Consultant involved in this project.

PART 2 - PRODUCTS

2.1 GENERAL

- A. PVC system components are specified as products of Sika Sarnafil Inc. to establish a standard of quality. Equal products and systems will be considered, if offered as a substitute with sufficient data to establish that the substitute meets the criteria established in this specification.
- B. Primary products required for this project include:
 - 1. Roof insulation
 - 2. Gypsum cover board
 - 3. PVC roofing
 - 4. Primers and adhesives
 - 5. Sealants
 - 6. PVC flashing
 - 7. Fasteners

2.2 MATERIALS:

A. Insulation:

1. Isocyanurate – Rigid cellular polyisocyanurate boards with fibrous felt/fiberglass mat facers, minimum compressive strength 20 psi, meeting ASTM C1289-01, Type II, Class 1, Grade 2, as manufactured by Sarnafil under the trade name Sarnatherm.
 - a. Tapered insulation sloping 1/4 per foot, minimum starting thickness as indicated on the roof plan.
 - b. Crickets sloping 1/2 inch per foot.
 - c. Isocyanurate tapered edge strips installed at transitions and the drain sumps.

- B. Gypsum Cover Board: 1/2 inch thick fire resistant gypsum board decking with inorganic glass mat facers and a water resistant core, formulated in 48 x 48 inch square edge boards, UL Class A, meeting ASTM C-1177, manufactured under the trade name Dens-Deck Prime.

- C. Insulation adhesive: Two component low rise elastomeric foam adhesive, installed with a mixing extruding dispenser (a Pace Cart or Heated Pleural Extruding Spray Rig) intended for application at the temperatures that will be encountered.

- D. PVC: minimum .060 inches thick, fire retardant, fiberglass reinforced, PVC (polyvinyl chloride) G410 lacquer coated sheet membrane conforming to the following minimum physical properties:

<u>Properties</u>	<u>ASTM Test Method</u>	<u>Minimum Property</u>
Fiberglass Reinforcing Material		
Overall Thickness, min., inches	D638	0.060
Tensile Strength, min., psi	D638	1500
Elongation at Break, min. (machine x transverse)	D638	250% X 230%
Seam strength, min. (% of tensile strength)	D638	75
Properties after Heat Aging per D3045	-	-
Tensile Strength, min. % of original	D638	90
Elongation, min. % of original	D751	90
Tearing Resistance, min., lbf	D1004	10
Low Temperature Bend @ -40°F	D136	Pass
Accelerated Weathering Test, Xenon Arc	D2565	5,000 Hrs
Cracking @ 7x magnification	-	None
Discoloration by observation	-	Negligible
Crazing @ 7 x magnification	-	None
Linear Dimensional Change, max.	D1204	0.10%
Weight Change after Immersion in Water, max.	D570	± 3.0%
Static Puncture Resistance, 33 lbf	D5602	Pass
Dynamic Puncture Resistance, 7.3 ft-lbf	D5635	Pass
Color: as selected from the full range of Manufacturer's standard and custom colors.		

- E. Walkway Pads: 96 mil thick, rolled-out, polyester reinforced heat-weldable protection mat as manufactured by Sarnafil under the trade name Sarnatred, or approved equal.

2.3 RELATED MATERIALS

- A. Cleaners, adhesives, sealants, caulking and fasteners furnished by the PVC system Manufacturer and as listed below. Use low VOC adhesives and cleaners as required by regulations in effect at the time of application.
 - 1. Wall and Curb Flashing: G410 fiberglass reinforced PVC, color to match the color of the roof
 - 2. Pitch Pocket Filler: Two component urethane sealant.
 - 3. Corners: Prefabricated outside and inside flashing corners made of 60 mil thick unreinforced PVC, color to match the color of the roof.
 - 4. Sealant: One component acrylic-based resin blended with solvent and inorganic adhesives.
 - 5. PVC Adhesive: Solvent-based reactivating-type adhesive, Sarnacol 2170.
 - 6. Insulation Plates: 3 inch square, 26 gauge stamping of SAE 1010 steel with an AZ 55 Galvalume coating.
 - 7. Fasteners: #14 corrosion-resistant screws.
 - 8. Aluminum Tape: 2 inch wide pressure-sensitive aluminum tape.
 - 9. Solvent Cleaner: One component liquid for the general cleaning of residual asphalt, scuff marks, etc., from the membrane surface and to clean seam areas prior to hot-air welding.

PART 3 - EXECUTION

3.1 GENERAL

- A. Perform the work in a watertight, workmanlike manner, meeting the guarantee requirements specified herein; in accordance with the drawings and in conformance with the Manufacturer's requirements, except as enhanced in this specification.
- B. Remove debris daily and as it is generated. Do not stock-pile debris on the roof. Do not leave any debris on the roof at the end of the day. Do not overload the roof structure when moving debris.
- C. Install roof system components on clean, dry surfaces only. Do not install any items when weather conditions and outside temperatures are not suitable in accordance with the Manufacturer's recommendations.

- D. Complete all work in sequence as quickly as possible so that as small an area as practicable is in the process of construction at any one time. Complete the entire area of work begun each day, the same day, and make all exposed edges watertight at the end of each day's work.

3.2 SUBSTRATE INSPECTION

- A. Carefully check the existing deck. To be an acceptable surface for the new roofing system, it is to be well secured to the underlying structure and not otherwise deteriorated.
- B. Immediately notify the Architect and Owner by telephone and in writing if defects in the substrate are discovered.
- C. Do not proceed with the installation of new roofing until defects have been corrected.

3.3 INSULATION AND COVER BOARD

- A. Install tapered insulation neatly cut at all miters and transitions. Do not lace corner boards.
- B. Install insulation with joints offset between rows and layers a minimum of 12 inches. Cut insulation to fit neatly at penetrations and joints. Fill any gap which is greater than 1/4 inch.
- C. Fasten all layers of insulation only to the top flutes of the steel decks, with screws and discs which penetrate through the deck a minimum of 3/4 inch and a maximum of 1-1/2 inches.
 - 1. Install 32 fasteners per 4 by 8 foot insulation board.
- D. Install the gypsum cover board in low rise polyurethane foam adhesive applied in accordance with the Manufacturer's recommendations and to achieve the specified minimum uplift resistance.
 - 1. Install 1/2 inch diameter adhesive beads spaced 6 inches on center
- E. Place 5 gallon pails half full of gravel or concrete on the gypsum cover board to hold it firmly in position while the low rise foam adhesive sets. Position the pails no more than 24 inches apart in all directions.
 - 1. Remove and replace coverboards installed without using weighted pails.

3.4 PVC

- A. Apply adhesive to the substrate using solvent-resistant 3/4 inch nap paint rollers, in a smooth, even coating with no gaps, globs, puddles or similar inconsistencies. Only apply adhesive to those areas that will be completely covered the same day. Allow the adhesive to dry completely prior to installing the PVC.

1. Open each can of adhesive and stir it with an electric paddle mixer for at least 5 minutes before applying the adhesive. Re-stir adhesive that isn't used within two hours of initial mixing.
 2. Do not punch holes in cans of adhesive and use them in a "better spreader" without mixing.
 3. Replace roller covers each day; discard covers after each day's use.
- B. Unroll the PVC when the adhesive on the substrate is dry, overlapping adjacent sheets a minimum of 4 inches. Turn back one-half of the sheet's length and roller coat the underside of the sheet with adhesive. Roll the PVC onto the adhesive coated substrate when the adhesive has dried slightly to produce strings when touched with a dry finger. Do not allow the adhesive on the underside of the PVC to dry completely before bonding the sheet to the substrate.
- C. Firmly press the sheet into the adhesive, and roll it with a water-filled, foam-covered lawn roller by frequent rolling in two directions.
- D. Fold the un-bonded half of the sheet back and repeat the procedure.
- E. Do not apply adhesive to seam areas.
- F. Roofing installed over improperly applied adhesive, and roofing installed with blisters, ridges, mole runs and similar deficiencies shall be removed and replaced at the Contractor's expense.
- G. Count and prepare a written log to show the number of pails of adhesive used in each roof area, each day, to verify to correct amount of adhesive is being applied. Provide copies of the log to the Manufacturer, and to the Architect with each Payment Requisition.

3.5 SEAMS

- A. General:
1. Clean PVC surfaces prior to hot-air heat welding. Weld dry surfaces only.
 2. Hot-air weld all PVC roof and flashing seams to finish 3 inches wide when automatic machine welded and 4 inches wide when hand welded.
 3. Use welding equipment that is provided by or approved by the material Manufacturer.
 4. Perform welding only using personnel that have successfully completed a training course provided by a Manufacturer's Technical Representative.
 5. Allow hot air welding equipment to warm up for at least one minute prior to welding.
- B. Hand Welding:
1. Complete hand welded seams in two stages.
 2. Form a narrow but continuous weld to close the back edge of the seam, and prevent loss of hot air during the final welding.

3. Insert the nozzle into the seam at a 45 degree angle to the edge of the membrane. Heat the PVC until it begins to "flow," then press the PVC sheets together, and use a hand roller to rub the seam.
4. Use a 1-1/2 inch wide nozzle for straight seams. Use a 3/4 inch wide nozzle for corners and compound seams.

C. Machine Welding:

1. Form machine welded seams using automatic welding equipment. Follow the machine Manufacturers instructions and local codes for electric current supply, grounding and over current protection. Utilize a dedicated circuit if connected to house power, or provide a dedicated portable generator. Do not run other equipment off the generator used to power the automatic welding machine.
2. Use metal tracks laid on the membrane, under the machine welder if needed to eliminate wrinkles.

D. Quality Control of Welded Seams:

1. Visually inspect all seams as they are formed, and then check the entire length of each seam for continuity using a rounded cotter pin removal tool.
 - a. Evidence that welding is proceeding correctly, is visible smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of a small amount of dark gray material from the underside of the top PVC sheet.
2. Evaluate all welded seams each day as they are formed, and at locations as directed by the Owner's or the Manufacturer's representatives.
 - a. Cut and examine 1 inch wide cross section samples of welded seams at least three times a day. Correct welds display failure from shearing of the PVC sheet, prior to separation of the weld. Install a target patch over each test cut.

3.6 FLASHING

- A. Install perimeter and penetration flashings daily with the PVC roof as the job progresses. Do not install temporary flashings.
- B. Fully adhere flashings to compatible, dry, smooth, and solvent-resistant surfaces, by applying adhesive in smooth, even coats with no gaps, globs or similar inconsistencies. Press the sheet firmly in place and thoroughly roll it with a hand roller.
- C. Do not apply adhesive in seam areas that are to be welded. Overlap edges of adjoining flashing sheets a minimum of 4 inches. Hot air weld all flashing seams.
- D. Install factory prefabricated corners on all inside and outside corners.
- E. Mechanically fasten the top edge of all flashings 6 inches on center.

3.7 WALKWAY PADS

- A. Install walkway pads heat welded to the roof surface around the roof hatch and rooftop equipment.

3.8 MISCELLANEOUS

- A. Provide any miscellaneous roofing, flashing, caulking, and metal work needed to leave the work complete and entirely watertight, neatly and carefully executed in a thorough and workmanlike manner.
- B. Perform work on mechanical and electrical items using mechanics skilled and licensed in these trades. Provide new material, couplings, transition pieces, blocking, fasteners and the like needed to complete the work.

3.9 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- B. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- C. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site are neat, orderly and workmanlike. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- D. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

3.10 ROOF INSPECTIONS BY MANUFACTURER

- A. Arrange for the roofing Manufacturer, or his authorized representative, to make a minimum of two inspections, and submit a written report of each inspection to the Architect within one week following each inspection.
 - 1. First inspection during the first two days of new roof installation.
 - 2. Final inspection at the completion of all work.
- B. Provide 48 hours advance written notice to the Architect, so he may have a representative attend the inspections.
- C. Payment requisitions will not be reviewed nor approved until the inspection reports are received.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHINGS & SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Agreement for Construction Services (hereinafter referred to as the Contract), Article I of the Contract, and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. All plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules and keynotes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Sheet metal work that is compatible with the roofing systems specified, including cap and through wall flashings, hook strips, fascia, drip edges, gravel stops, copings, gutters, leaders, valleys and miscellaneous flashings.
- B. Related Requirements
 - 1. Carpentry - Division 6
 - 2. Asphalt Shingles - Section 07 31 13
 - 3. PVC Roofing - Section 07 54 19
 - 4. Roof Accessories - Section 07 72 00

1.3 CODE APPROVAL REQUIREMENTS

- A. Fabricate and install roof perimeter flashings that comply with the NY State Uniform Fire Prevention and Building Code and with ANSI/SPRI ES-1 "Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems" requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience

with work similar in nature and scope to this project, and speak fluent English.

1. Submit the supervisor's resume upon request.
2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within fifty miles of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
 - b. Submit the reference list upon request.

B. Material Quality:

1. Obtain each product from a single Manufacturer which has manufactured the same product in the United States of America for not less than 5 continuous years.
2. Obtain copper and pre-finished sheet metal items from the same mill run to maintain consistent color hue and surface finish.

C. Pre-Construction Conference: Meet at the project site between one and two weeks prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:

1. How the new materials will be kept dry and protected as work progresses.
2. How sheet metal work will be coordinated with the installation of the vapor barrier, insulation, cover board, roofing, flashings, roof accessories and other items to provide a watertight installation.
3. Generally accepted industry practice and the Manufacturer's instructions for handling and installing his products.
4. The condition of the substrate, curbs, penetrations and other preparatory work needed.
5. Incomplete submittals; note that progress payments will not be processed until all submittals are received and approved.
6. The construction schedule, weather forecast, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
7. A schedule for Owner and Architect inspections.

1.5 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work on site:
 - 1. Manufacturer's technical literature for all materials.
 - 2. Test reports and certifications substantiating compliance with specification requirements if requested by the Architect.
 - 3. Shop drawings, or 2 foot long samples, for each sheet metal item, to show how it will relate to and fit on adjoining masonry and wood blocking assemblies, and with the roof, stripping, and flashings.
 - 4. 6 inch square pieces of each type of sheet metal to show surface finish, texture and color.
 - 5. A sample of the Contractor's guarantee form.
- B. Simultaneously provide all technical submittals needed for this project, for all roof related technical sections, collated by section. Incomplete submittals will not be reviewed.
 - 1. Submittals shall be prepared and made by the firm that will perform the actual work.
 - 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program isn't established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
- C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders for each building.
- D. Payment requisitions will not be processed until all submittals are received and approved.

1.6 JOB MOCK-UPS

- A. After the submittals are approved, prepare in actual job locations, mock-ups of cap and through wall flashings, hook strips, drip edges, fascia, gravel stops, copings, gutters, leaders, and all other items of sheet metal and related work, for inspection and approval by the Architect.
- B. Construct each mock-up of two full lengths of metal, fastened, connected and stripped-in to the related roofing system, to show the following:

1. Type, gauge, color, cross-sectional dimensions and shape, and joint and mitering techniques.
 2. Related masonry work, wood blocking, and the attachment techniques and fasteners for all wood and metal components.
 3. Other sheet metal related materials and their installation techniques to fully define the detailing of each mock-up.
- C. Mock-ups shall be constructed to establish the minimum standard of materials and workmanship, and to assure that completed work which matches the mock-ups will be fully functional and serve the purpose for it has been designed.
- D. Approved mock-ups may be left in place and incorporated into the permanent installation. Rejected mock-ups shall be removed and replaced until an acceptable mock-up is approved.
- E. Do not purchase or fabricate sheet metal items until mock-up installation, inspection and approval are completed and approval is documented in writing.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver material to the site in the Manufacturer's original and unopened packaging, with intact and legible labels which identify the products and Manufacturers,
- B. Cover all stored materials with watertight tarpaulins installed immediately upon delivery.
- C. Do not overload the structure when storing materials on the roof.
- D. Protect roof surfaces where material and equipment are placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.8 GUARANTEE

- A. Provide a written Contractor's Guarantee which guarantees that all work will remain free of material and workmanship defects and in a watertight condition for five years beginning upon Final Completion:
1. Defects include but are not limited to the following: peeling paint, leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, and undue expansion.
 2. The Contractor shall make the repairs and modifications necessary to enable the work to perform as warranted at his own expense.
 3. Guarantee coverage shall include removing and replacing materials installed as part of the original work, if removal is needed to affect guaranteed repairs.

4. Guarantee coverage shall have no dollar limit.
- B. Provide one Contractor's Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- C. The Guarantee coverage shall take affect no more than 30 days before the completion of all punch list work.
- D. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Copper sheet: ASTM B370, 99.0 % pure copper, thickness 16 ounces per square foot. Use copper for all metal items not otherwise indicated
- B. Solder: 50-50 tin and lead for plain copper, supplied in one pound bars with the alloy mixture stamped into the bar by the Manufacturer.
- C. Flux: Water-Soluble Liquid Flux, Kester #3345 for iron soldering of brass and copper.
- D. Shop fabricated aluminum fascias, hook strips, and miscellaneous trim for all other roof areas with #3105-H14 alloy aluminum, minimum thickness .040 inches unless otherwise indicated, factory finished with a Fluoropolymer Kynar 500 finish, color as selected by the Architect, from the full range of custom and standard colors.
- E. Fasteners: fabricated of stainless steel, or material that matches the sheet metal being fastened.
- F. Underlayment: one ply of high temperature ice & water shield and one ply of 5 pound rosin paper.
- G. Glass Cloth: open mesh glass fabric coated on each side with plasticized asphalt as manufactured by Karnak Corporation or equal.
- H. Asphalt cement: Federal Specification SS-C-153B, Type 1, asbestos free grade.
- I. Exterior mounted gutters: 7 inch wide, .050 inch thick aluminum seamless, factory finished with Kynar 500 finish, color as selected by the Architect, from the full range of custom and standard colors, box style gutters (manufactured by Garrety Gutters 800/628-5849) supported with concealed aluminum fascia brackets spaced 12 inches on center fastened with 1-1/2 inch long stainless steel screws.
- J. Exterior mounted leaders and straps: .027 inch thick rectangular corrugated aluminum leaders factory finished with baked acrylic enamel. Fasten each leader with 1/16 inch thick by 1 inch wide straps spaced 7 feet on center. Install aluminum wire baskets at all leader outlet tubes.

- K. Sealant: High performance, solvent free, formulated and moisture curing silyl-terminated polyether sealant, ASTM C-920, Type S, Grade NS, Class 25, NovaLink construction sealant by ChemLink, color as selected.
- L. Ice and Water Shield: high temperature 30 mil thick slip resistant buytl based adhesive coated sheet, with a plastic release layer for peel and stick application directly to a prepared roof deck: Grace Ultra.

PART 3 - EXECUTION

3.1 GENERAL

- A. Accurately reproduce the details and design shown, and form profiles, bends and intersections, sharp, true and even. Fabricate sheet metal in the shop whenever possible, and form joints, laps, splices and connections to shed water and condensation in the direction of flow.
- B. Provide any miscellaneous flashing and sheet metal work not shown on the drawings but otherwise needed to leave the project complete and entirely watertight, neatly and carefully executed in a thorough and workmanlike manner.

3.2 INSPECTION

- A. Examine surfaces to receive work of this section and report any defects to the Owner. Commencement of work will be construed as complete acceptance of surfaces.

3.3 INSTALLATION

- A. Fabricate and install copper work in accordance with the current edition of "Copper and Common Sense" as published by the Revere Copper and Brass Company, unless otherwise indicated.
 - 1. Form all joints, except loose locked sealant filled expansion joints, to overlap 2 inches.
 - 2. Secure the joints with rivets spaced 1 inch on center positioned about 1/2 inch from the top edge of the joint, then sweat solder the joint.
 - 3. Use solder only to fill and seal the joint, not for mechanical strength. Form soldered joints continuous, strong and free from defects, with well heated soldering irons. Do not use open flame torches for soldering.
 - 4. Clean soldered joints daily, immediately after soldering, by washing them with soap and water applied with a soft bristle brush, then rinsing with clear water.
- B. Securely fasten and anchor all work, and make provisions for thermal expansion. Submit details of expansion joints for approval. Install fasteners through one edge of metal only, use a hook strip on the other edge.

- C. Use stainless steel pin Zamac type nail-in fasteners, or stainless steel screws and washers with neoprene inserts where fasteners will be exposed.

3.4 CAP FLASHINGS

- A. Install new copper cap flashings above all roof and roof flashing components, including copings, wall penetrating ducts and gravel stops. Install cap flashings built into masonry walls; as they are constructed - properly joined to all related materials in a watertight manner.
 - 1. Solder all joints in the new cap flashing, except form 2 inch wide flat locked sealant filled expansion joints a maximum of 32 feet on center.
 - 2. Secure the joints with rivets spaced 1 inch on center positioned about 1/2 inch from the top edge of the joint, then sweat solder the joint.
 - 3. Form the flashing to turn up 2 inches inside the wall and finish with a hem on the bottom exposed edge.
 - 4. Fasten the top edge of the cap flashing to the backup wall 12 inches on center.
 - 5. Install the new cap flashing under flexible type wall flashings where possible. Where it is not possible to lap the new cap flashing under an existing wall flashing, install a ply of glass cloth set in and coated with asphalt cement to connect the new cap flashing to the existing wall flashing.
 - 6. Install new cap flashings where shown on the drawings, and at a height of 10 to 12 inches above the roof surface.
- B. Install new aluminum cap flashings on skylight and equipment curbs.
 - 1. Form the cap flashing to extend at least 2 inches under the equipment or skylight, 4 inches over the base flashing, and finish with a 1/2 inch hem on the bottom edge.
 - 2. Install a 1/2 inch thick by 2 inch wide continuous foam gasket between the cap flashing and mechanical equipment or skylight. Do not set the equipment or skylight in sealant.
 - 3. Secure the equipment or skylight to the curb with stainless steel screws spaced 12 inches on center.

3.5 COPINGS

- A. Fabricate new copings to engage a continuous 3/4 inch wide hook strip under the outside face, and fasten the copings with exposed stainless steel screws & washers with neoprene inserts / Zamac type nail-in fasteners, driven through 1 inch diameter stainless steel washers with neoprene inserts spaced 18 inches apart through the inside face 1 inch above the bottom hem.

1. Install 6 inch wide cover plates set into a solid bed of sealant at all joints. Overlap, rivet and install sealant at all miters and special conditions. Form the coping to turn up 6 inches at all rising walls, and cover the turn up with a cap flashing.

3.6 DRIP EDGES

- A. Fabricate eave drip edges to extend 1-1/2 inches past the roof edge, and turn down to ensure water cannot track back and run down the fascia. Fabricate rake drip edges to wrap over the rake trim. Secure the drip edges with roofing nails along the inside - top edges, spaced 4 inches apart along the raw metal edge. Form joints in the eave drip edge with 6 inch wide concealed under plates which duplicate the profile of the drip edge. Set the underplates in a full bed of sealant. Form joints in the rake drip edges to overlap and shed water.

3.7 HOOK STRIPS

- A. Form continuous hook strips with locks that engage the superimposed trim piece a minimum of 3/4 inch, and to cover the entire underside edge of the wood blocking and neatly extend to the building wall.
- B. Fasten hook strips along their bottom edge, just above the 45 degree bend, with nails spaced 4 inches on center into underlying wood blocking; Zamac type nail-in type fasteners spaced 8 inches on center into masonry surfaces, or screws spaced 8 inches on-center into sheet metal surfaces.

3.8 GRAVEL STOPS

- A. Fabricate new gravel stops with 4 inch wide nailing flanges. Secure the gravel stop with a continuous hook strip and by nailing the flange 4 inches apart along the raw edge with roofing nails. Form joints in the gravel stop with a 6 inch wide underplates set in a full bed of sealant. Form the gravel stop to turn up 5 inches at rising walls, extend the stripping up the wall and terminate it under a cap flashing.

3.9 MISCELLANEOUS FLASHINGS

- A. Fabricate and install copper flashings at sloped roof areas including: valleys; crickets; chimney and air shaft apron, step and built-in cap flashings; vent pipe flashings; change in elevation wall flashings; ventilator flashings, etc.
- B. Install an 18 inch wide piece of ice shield to strip over the up-hill side of metal flashings, crickets, and over both sides of valley flashings.
- C. Fabricate step flashings 1 inch longer than the unexposed length of a shingle, and to extend 4 inches up the wall and 4 inches onto the roof.
- D. Fabricate apron flashings with 4 inch wide exposed faces which finish with 1/2 inch hems and rounded corners. Fasten the exposed face with stainless steel screws and

washers with neoprene inserts spaced uniformly about 12 inches apart along the bottom edge.

3.10 GUTTERS AND DOWNSPOUTS

- A. Install seamless gutters that slope to the downspout outlet tubes, approximately 1/16 inch per foot.
 - 1. Secure the gutters with hidden extruded aluminum fascia brackets spaced 12 inches on center. Fasten each bracket with two #10 by 1-1/2 inch long stainless steel screws.
- B. Install the downspouts plumb and straight, extending from a drop tube in the gutter to the underground drain hub.
 - 1. Secure the downspouts approximately 7 feet on center, with .050 inch thick by 1-1/4 inch wide straps - color to match the downspouts. Secure each strap with stainless steel fasteners.
 - 2. Install aluminum wire basket strainers at all leader drop tube outlets.

3.11 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- B. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather - which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- C. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site are neat, orderly and workmanlike. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- D. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

END OF SECTION

SECTION 07 72 00

ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Agreement for Construction Services (hereinafter referred to as the Contract), Article I of the Contract, and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. All plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules and keynotes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Roof specialties that are compatible with the roofing systems specified, including:
 - a. Factory fabricated pipe curb portals
 - b. Aluminum access hatches.
 - c. Hatch safety rails.
 - d. Steel roof access ladders.
- B. Related Requirements
 - 1. Carpentry - Division 06
 - 2. Asphalt Shingles - Section 07 31 13
 - 3. PVC Roofing - Section 07 54 19
 - 4. Sheet Metal Flashing & Specialties - Section 07 62 00

1.3 CODE APPROVAL REQUIREMENTS

- A. Fabricate and install roof accessories that comply with the NY State Uniform Fire Prevention and Building Code.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.
 - a. The Installer shall directly employ the personnel performing the work of this section.

- b. The Installer shall have a supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 - 1. Submit the supervisor's resume upon request.
 - 2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within fifty miles of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number, and the Contractor's Supervisor's name.
 - b. Submit the reference list upon request.
- B. Material Quality: Obtain each product from a single Manufacturer which has manufactured the same product in the United States of America for not less than 5 continuous years.
- C. Pre-Construction Conference: Meet at the project site between one and two weeks prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:
 - 1. How roof accessory work will be coordinated with the installation of the vapor barrier, thermal barrier, insulation, cover board, roofing, flashings, and other items to provide a watertight installation.
 - 2. Generally accepted industry practice and the Manufacturer's instructions for handling and installing his products.
 - 3. The condition of the substrate, curbs, penetrations and other preparatory work needed.
 - 4. Incomplete submittals; note that progress payments will not be processed until all submittals are received and approved.
 - 5. The construction schedule, forecast weather, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
 - 6. A schedule for Manufacturer and Architect inspections.

1.5 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work:

1. Manufacturer's installation instructions and technical data sheets for each item. Material sample submittals are not needed unless requested to show color and texture.
 2. Samples of the Contractor's and Manufacturer's guarantee/warranty forms.
 3. Test reports and certifications substantiating compliance with specification requirements if requested by the Architect.
- B. Simultaneously provide all roof related technical submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.
1. Submittals shall be prepared and made by the firm that will perform the actual work.
 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program isn't established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
- C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders for each building.
- D. Payment requisitions will not be processed until all submittals are received and approved.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver material to the site in the Manufacturer's original and unopened packaging, with intact and legible labels which identify the products and Manufacturers,
- B. Cover all stored materials with watertight tarpaulins installed immediately upon delivery.
- C. Do not overload the structure when storing materials on the roof.
- D. Protect roof surfaces where material and equipment are placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.8 GUARANTEE

- A. Provide a written Contractor's Guarantee which guarantees that all work will remain free of material and workmanship defects and in a watertight condition for five years beginning upon Final Completion:
 1. Defects include but are not limited to the following: peeling paint, leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, movement and undue expansion.

2. The Contractor shall make the repairs and modifications necessary to enable the work to perform as warranted at his own expense.
 3. Guarantee coverage shall include removing and replacing materials installed as part of the original work, if removal is needed to affect repairs.
 4. Guarantee coverage shall have no dollar limit.
- B. Provide one Contractor's Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- C. The Guarantee shall take effect no more than 30 days before the satisfactory completion of all punch list work.
- D. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Performance Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide Manufacturer's standard units, modified as necessary to comply with the specified requirements. Fabricate each unit in a shop to the greatest extent possible, using the following components:
1. Aluminum Sheet: ASTM B 209 alloy 3003, tempered for forming and performance; mill finish, except as otherwise noted.
 2. Extruded Aluminum: Standard extrusions alloy 6063-T52; 0.078 inch minimum thicknesses for primary framing and curb member legs, 0.062 inch thickness for secondary framing and covers; mill finish, except as otherwise indicated.
 3. Insulation: Rigid fiber glass boards where encapsulated inside metal skirts, rigid isocyanurate where covered with roof flashings on the exterior of curbs.
 4. Wood Nailers: Dimension grade Douglas Fir, not less than 1-1/2 inches thick.
 5. Fasteners: Nonmagnetic stainless steel or hot dipped galvanized steel, to match the finish of the material being fastened.
 6. Gaskets: Tubular neoprene or polyvinyl chloride, or block sponge neoprene.
 7. Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

2.2 FACTORY FABRICATED PIPE CURB PORTALS

- A. Factory fabricated flashing systems, consisting of 9 inch high internally insulated galvanized steel curbs with 1-1/2 inch square wood nailers at the top edges, and 5 hole EPDM boots, with nipples that will accommodate pipes and conduits from 1/2 to 2-1/2 inches in diameter, with stainless steel hose clamps on each nipple - 5-Hole Pipe Portal Flashing System: C-555, by Portals Plus or equal.

2.3 ALUMINUM ACCESS HATCHES

- A. Hatches constructed of welded 11 gauge mill finish aluminum, with 12 inch high curbs and integral cap flashings, heavy pintle hinges, compression spring operators, a spring latch with interior and exterior handles, an interior padlock hasp, and stainless steel hardware, as manufactured by the Bilco Company, in the sizes needed to fit the deck openings.

2.4 HATCH SAFETY RAILS

- A. Safety rails shall comply with OSHA Standard CFR 29 1910.23 and CFR 29 1910.27
- B. Safety rails shall be bolted to the exterior surface of the curb above the flashing with 3/8 inch diameter stainless steel bolts, constructed of 1-1/2 inch diameter hot rolled electrically welded tubing meeting ASTM A500 Grade B, sized and configured to provide a safety railing on four sides of the hatch 42 inches above the roof surface with a self closing gate supported with heavy duty hinges with 5/8 inch diameter pins - basis of design: Roof Hatch Safety Rails by SafePro Roof Top Fall Protection.
- C. Gate shall be fabricated of galvanized steel tubing, with no chains or latches.
- D. Gate shall be powder paint coated, color shall be as selected by the Architect

2.5 STEEL ROOF ACCESS LADDERS

- A. Fabricate ladders from 1-1/4 inch inside diameter steel pipe rails, spaced 22 inches apart, and 3/4 inch solid steel rebar rungs spaced 12 inches on center. Fit the rungs into drilled holes in the centerline of the rails, weld and grind the welds smooth

2.6 SNOW GUARD ASSEMBLIES

- A. Asphalt shingle roof: 2 pipe snow guard assembly consisting of 1 inch outside diameter aluminum pipes, a 1/8 inch thick Type 302 stainless steel base plate, and milled 6061-T6 aluminum snow guard block as manufactured by Alpine Snow Guards, Model #125.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Field measure existing openings. Comply with manufacturer's instructions and recommendations. Coordinate with the installation of roof deck, other substrates to receive specialty units, vapor barriers, roof insulation, roofing and flashing to ensure that each element of the work performs and fits properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

3.2 FACTORY FABRICATED PIPE CURB PORTALS

- A. Install factory fabricated pipe portal flashing systems at all locations where more than one pipe or conduit penetrates the roof.
 - 1. Install the portal curbs on wood blocking that matches the thickness of the roof insulation.
 - 2. Disconnect and reconnect refrigerant, power, control and condensate lines and pipes as needed to install the pipes through the flashing nipples.
 - a. Install water cut off sealant between the lines / pipes and EPDM nipples, and then install a hose clamp on each nipple.
 - b. Remove and replace nipples that are incorrectly cut too large.

3.3 ROOF HATCHES AND GUARD RAILS

- A. Block solid under the hatch curb to support it at the level of the new roof.
- B. Orient the hatches for proper egress, and install new flashings.
- C. Install guard rails, fastened to the hatch frame, above the roof flashings.

3.4 STEEL ROOF ACCESS LADDERS

- A. Install an interior ladder at the roof hatch. Support and secure each ladder at the top and bottom and at intermediate points spaced a maximum of 5 feet on center. Use bolted steel brackets, anchored with 1/2 inch diameter stainless steel epoxy set bolts. Space the ladders to provide 7 inches of toe clearance.

3.5 SNOW GUARD ASSEMBLIES

- A. Install brackets spaced 4 feet on center, and fasten each bracket plate to the roof deck with six #14 flat head stainless steel screws. Join pipe sections with couplings, and install end caps onto each end of all pipes. Secure each length of pipe with set screw collars or by inserting 3/16 inch cotter pins into holes drilled on each side of the center bracket.
- B. Install ice flags spaced 8 inches on center. Keep ice flags 1/2 inch above the roof membrane. Secure each ice flag with a # 8 stainless steel self-drilling screw.

3.6 MISCELLANEOUS

- A. Provide and install any sealants needed, where shown or required.
- B. Perform mechanical and electrical work using skilled and licensed tradesmen.
- C. Provide new material, couplings, transition pieces, blocking, fasteners and the similar accessories needed to complete the work.

3.7 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- B. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather - which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- C. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site are neat, orderly and workmanlike. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- D. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

END OF SECTION

SECTION 07 84 13
THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
 - 1. Floors.
 - 2. Roofs.
 - 3. Walls and partitions.
 - 4. Smoke barriers.
- B. Related Sections include the following:
 - 1. Division 7 Section "Joint Sealants" for non-fire-resistive-rated joint sealants.
 - 2. See Drawings A-980 and A-981 for firestopping details.
 - 3. See Drawings M-101 and M-102 for specifications.
 - 4. See Drawings E-101 through E-103 for electrical specifications.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
 - 1. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 - 2. Fire-resistance-rated floor assemblies.
 - 3. Fire-resistance-rated roof assemblies.
- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - 1. Penetrations located outside wall cavities.
 - 2. Penetrations located outside fire-resistive shaft enclosures.
 - 3. Penetrations located in construction containing fire-protection-rated openings.
 - 4. Penetrating items larger than 4-inch- diameter nominal pipe or 16 sq. in. in overall cross-sectional area.
- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
 - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 - 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.

- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to an installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, Warnock Hersey, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by UL in their "Fire Resistance Directory," by Warnock Hersey or by another qualified testing and inspecting agency.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Hilti Construction Chemicals, Inc.
 2. International Protective Coatings Corp.
 3. RectorSeal Corporation (The).
 4. Specified Technologies Inc.
 5. 3M Fire Protection Products.
 6. Tremco.
 7. Bio Fireshield, Inc.
 8. Dow Corning, Corp.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

2.3 FILL MATERIALS

- A. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- C. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- D. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- E. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- F. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- G. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
- H. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and non-sag formulation for openings in vertical and other surfaces requiring a nonslumping, gun-able sealant, unless indicated firestop system limits use to non-sag grade for both opening conditions.

2.4 FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.
- B. Sealant Colors: Provide color of exposed joint sealants to comply with the following:
 - 1. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.
- C. Single-Component, Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure related Use NT, and joint substrate related Uses M, G, A, and (as applicable to joint substrates indicated) O.

1. Additional Movement Capability: Provide sealant with the capability to withstand the following percentage changes in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated:
 - a. 50 percent movement in both extension and compression for a total of 100 percent movement.
 - b. 100 percent movement in extension and 50 percent movement in compression for a total of 150 percent movement.

2.5 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Commencing installation of firestopping shall constitute acceptance of existing conditions.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.

2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
- C. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
1. Install fill materials for firestop systems by proven techniques to produce the following results:
 2. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 3. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 4. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 INSTALLING FIRE RESISTIVE JOINT SEALANTS

- A. General: Comply with the "System Performance Requirements" article in Part 1, with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install joint fillers to provide support of sealants during application and at position required to produce the cross sectional shapes and depths of installed sealants relative

to joint widths that allow optimum sealant movement capability and develop fire resistance rating required.

- C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing: uniform, cross sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.
- D. Tool non-sag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.5 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration fire-stop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration fire-stop systems complying with specified requirements.

END OF SECTION 07 84 13

SECTION 07 92 00
JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes sealants for the following applications:
 - 1. Exterior joints in the following surfaces:
 - a. Joints between different materials.
 - b. Other joints as indicated.
 - 2. Interior joints in the following horizontal traffic surfaces:
 - a. Control and expansion joints in flooring.
 - b. Other joints as indicated.
- B. Related Sections include the following:
 - 1. Division 7 Section "Firestopping" for fire-resistant building joint-sealant systems.
 - 2. Division 8 Section "Glazing" for glazing sealants.
 - 3. Division 9 Section "Gypsum Board Assemblies" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
 - 4. Division 9 Section "Acoustical Panel Ceilings" for sealing edge moldings at perimeters of acoustical ceilings.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each type and color of joint sealant required. Install joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.
- E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.
- F. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- G. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.
- H. Field Test Report Log: For each elastomeric sealant application. Include information specified in "Field Quality Control" Article.
- I. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- J. Product Test Reports: From a qualified testing agency indicating sealants comply with requirements, based on comprehensive testing of current product formulations.
- K. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates as follows:
 - 1. Locate test joints where indicated or, if not indicated, as directed by Architect.
 - 2. Conduct field tests for each application indicated below:
 - a. Each type of elastomeric sealant and joint substrate indicated.
 - b. Each type of non-elastomeric sealant and joint substrate indicated.
 - 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 - 4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
 - 5. Test Method: Test joint sealants by hand-pull method described below:
 - a. Install joint sealants in 60-inch- long joints using same materials and methods for joint preparation and joint-sealant installation required for the completed Work. Allow sealants to cure fully before testing.
 - b. Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2-inch piece.
 - c. Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
 - d. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
 - 6. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull

distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.

7. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

- D. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution:

1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
 2. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F.
 3. When joint substrates are wet.
- B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- C. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.
- D. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
 - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified in the sealant schedules below.

2.2 MATERIALS, GENERAL

- A. VOC Content of Interior Sealants and Sealant Primers: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Sealants: Not more than 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: Not more than 250 g/L.

3. Sealant Primers for Porous Substrates: Not more than 775 g/L.
- B. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range for this characteristic.

2.3 ELASTOMERIC JOINT SEALANTS

- A. SINGLE-PART URETHANE SEALANT (Sealant No. 1)
 1. Polyurethane Sealant: Single component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging, self-leveling type; complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, A, O.
 2. Products: Subject to compliance with requirements, provide the following:
 - a. Urethane Sealant: Dynatrol I Urethane Sealant, product of Pecora.
- B. SINGLE-PART SILICONE SEALANTS (Sealant No. 2)
 1. Silicone Sealant: Single component solvent curing, non-sagging, non-staining, fungus resistant, non-bleeding; complying with ASTM C 920, Type S, NS, Class 25.
 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Silicone Sealant:
 - b. Silpruf Silicone Sealant, product of GE Silicones.
 - c. Dow 795 Silicone Sealant, product of Dow Corning.
 - d. Pecora 864 Silicone Sealant, product of Pecora.
- C. ACRYLIC LATEX SEALANT (Sealant No. 3)
 1. Sealant for interior joints, exposed or paint-finished Tremco Acrylic Latex sealant manufactured by the Tremco Manufacturing Company meeting the requirements of ASTM C834.
- D. ACOUSTICAL JOINT SEALANTS

1. Acoustical Sealant: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C 834 and the following requirements:
 - a. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies per ASTM E 90
 - b. Product has flame spread and smoke developed ratings of less than 25 per ASTM E 84, non-skinning, non-staining, gun-able, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.
2. Products: Subject to compliance with requirements, provide one of the following:
 - a. SHEETROCK Acoustical Sealant, product of United States Gypsum Co.
 - b. AC-20 FTR Acoustical and Insulation Sealant, product of Pecora Corp.
3. Acoustical Sealant for Concealed Joints:
 - a. BA-98, product of Pecora Corp.
 - b. Tremco Acoustical Sealant, product of Tremco, Inc.

2.4 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 1. Type O: Open-cell material.
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

PREPARATION

- C. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning

operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:

- a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
 - a. Glass.
 - b. Porcelain enamel.
 - c. Glazed surfaces of ceramic tile.
- D. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- E. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.

3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.
- F. Install sealants by proven techniques to comply with the following and at the same time backings are installed:
 1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses provided for each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- G. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 1. Remove excess sealants from surfaces adjacent to joint.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 4. Provide flush joint configuration, per Figure 5B in ASTM C 1193, where indicated.
 5. Provide recessed joint configuration, per Figure 5C in ASTM C 1193, of recess depth and at locations indicated.
 - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.3 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as follows:
 1. Extent of Testing: Test completed elastomeric sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and joint substrate.
 - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
 2. Test Method: Test joint sealants by hand-pull method described below:
 - a. Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches long at sides of joint and

- meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2-inch piece.
 - b. Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
 - c. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
 - 3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.
 - 4. Inspect tested joints and report on the following:
 - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field- adhesion hand-pull test criteria.
 - b. Whether sealants filled joint cavities and are free from voids.
 - c. Whether sealant dimensions and configurations comply with specified requirements.
 - 5. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
 - 6. Repair sealants pulled from test area by applying new sealants following same procedures used to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.
- B. Evaluation of Field-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements, will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

CLEANING

- C. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.4 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

3.5 ELASTOMERIC JOINT-SEALANT SCHEDULE

- A. Unless indicated otherwise on the Drawings or in other Sections, provide the following type of joint with the sealant type indicated. For joint types not indicated below, request Architect's selection of sealant type and required procedures.
- B. Interior and exterior joints
 - 1. Joints in finish carpentry and trim: Sealant No. 3.
 - 2. Interior joints for paint finish: Sealant No. 3.
 - 3. Masonry, terrazzo and stone joints: Sealant No. 1.
 - 4. Concrete joints: Sealant No. 1.
 - 5. Glass/metal joints: Sealant No. 2.
 - 6. Metal/metal joints: Sealant No. 2.
 - 7. Metal/masonry joints: Sealant No. 1.
 - 8. Metal/stone joints: Sealant No. 1.
 - 9. Metal/wood joints: Sealant No. 3.
 - 10. Metal/gypsum board joints: Sealant No. 3.
 - 11. Gypsum board/plaster joints: Sealant No. 3.
 - 12. Ceramic tile joints: Sealant No. 2.
 - 13. Ceramic tile/porcelain fixture joints: Sealant No. 2.

END OF SECTION 07 92 00

SECTION 08 12 13
STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Steel doors and frames.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 4 Section "Unit Masonry" for building anchors into and grouting frames in masonry construction.
 - 2. Division 6 Section "Rough Carpentry" for carpentry for wood framing and blocking.
 - 3. Division 9 Section "Gypsum Board Assemblies" for spot grouting frames in gypsum board partitions.
 - 4. Division 9 Section "Painting" for field painting primed frames.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of door frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.
- C. Shop Drawings showing fabrication and installation of steel door frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
- D. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings.

1. Indicate coordination of glazing frames and stops with glass and glazing requirements.

1.4 QUALITY ASSURANCE

- A. Provide doors and frames complying with ANSI/SDI 100 "Recommended Specifications for Standard Steel Doors and Frames" and as specified.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.
- B. Inspect doors and frames on delivery for damage. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4-inch-high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If cardboard wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 1. Steel Doors and Frames:
 - a. Pioneer Industries.
 - b. Ceco Door Products.
 - c. Republic Builders Products.
 - d. Steelcraft.

2.2 MATERIALS

- A. Hot-Rolled Steel Sheets and Strip: Commercial-quality carbon steel, pickled and oiled, complying with ASTM A 569.
- B. Cold-Rolled Steel Sheets: Carbon steel complying with ASTM A 366, commercial quality, or ASTM A 620, drawing quality, special killed.
- C. Galvanized Steel Sheets: Zinc-coated carbon steel complying with ASTM A 526, commercial quality, or ASTM A 642, drawing quality, hot-dip galvanized according to ASTM A 525, with A 60 or G 60 coating designation, mill phosphatized.
- D. Supports and Anchors: Fabricated from not less than 0.0478-inch- thick steel sheet; 0.0516-inch- thick galvanized steel where used with galvanized steel frames.
- E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize complying with ASTM A 153, Class C or D as applicable.
- F. DOORS
- G. Steel Doors: Provide 1-3/4-inch- thick doors of materials and ANSI/SDI 100 grades and models specified below, or as indicated on Drawings or schedules:
 - 1. Interior Doors: Provide doors complying with requirements indicated below by referencing ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level:
 - a. Level 2 and Physical Performance Level B (Extra Heavy Duty), Model 2 (Seamless).

2.3 FRAMES

- A. General: Provide steel frames for doors, transoms and other openings that comply with ANSI A250.8 and with details indicated for type and profile. Conceal fastenings, unless otherwise indicated.
- B. Interior Frames: Fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior frame requirements.
 - 1. Fabricate frames with mitered or coped and welded face corners and seamless face joints.
 - 2. Frames of 0.053-inch-thick steel sheet for:
 - a. Level 2 steel doors.
- C. Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.

- D. Plaster Guards: Provide minimum 0.0179-inch- thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.
- E. Grout: When required in masonry construction, as specified in Division 4 Section "Unit Masonry."

2.4 FABRICATION

- A. Fabricate steel door frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ANSI/SDI 100 requirements.
- B. Interior Door Frames: Fabricate exposed faces of doors frames from the following material:
 - 1. Cold-rolled steel sheet.
 - 2. Where indicated, fabricate doors and frames from galvanized steel sheet.
- C. Clearances: Not more than 1/8 inch at jambs and heads, except not more than 1/4 inch between non-fire-rated pairs of doors. Not more than 3/4 inch at bottom.
 - 1. Fire Doors: Provide clearances according to NFPA 80.
- D. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- E. Hardware Preparation: Prepare door frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI 107 and ANSI A115 Series specifications for door and frame preparation for hardware.
 - 1. For concealed overhead door closers, provide space, cutouts, reinforcing, and provisions for fastening in top rail of head of frames, as applicable.
- F. Frame Construction: Fabricate frames to shape shown.
 - 1. Fabricate frames with mitered or coped and continuously welded corners and seamless face joints.
- G. Reinforce frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.
- H. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual" for recommendations relative to applying and designating finishes.
- B. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for steel sheet finishes.
- C. Except for frames noted to have a galvanized finish, apply primers to frames after fabrication.

2.6 STEEL SHEET FINISHES

- A. Surface Preparation: Solvent-clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel to comply with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).
- B. Pretreatment: Immediately after surface preparation, apply a conversion coating of type suited to organic coating applied over it.
- C. Factory Priming for Field-Painted Finish: Apply shop primer that complies with ANSI A224.1 acceptance criteria, is compatible with finish paint systems indicated, and has capability to provide a sound foundation for field-applied topcoats. Apply primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install steel frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.
- B. Placing Frames: Comply with provisions of SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
 - 1. Except for frames located in existing concrete, masonry, or gypsum board assembly construction, place frames before constructing enclosing walls and ceilings.
 - 2. In masonry construction, install at least 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.

3. At existing concrete or masonry construction, install at least 3 completed opening anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices.
4. In metal-stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.
5. Install fire-rated frames according to NFPA 80.

3.2 ADJUSTING AND CLEANING

- A. Prime Coat Touchup: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
- B. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION 08 12 13

SECTION 08 12 55
INTERIOR ALUMINUM FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior aluminum frames for doors.
 - 2. Interior aluminum frames for glazing.
- B. Related Sections include the following:
 - 1. Division 6 Section "Rough Carpentry" for carpentry for wood framing and blocking.
 - 2. Division 7 Section "Joint Sealants" for joint sealants installed with interior aluminum frames and for sealants to the extent not specified in this Section.
 - 3. Division 8 Section "Door Hardware" for door hardware.
 - 4. Division 8 Section "Glazing" for glass in interior aluminum frames.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of interior aluminum frame indicated.
- B. Shop Drawings: For interior aluminum frames. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Verification: 12-inch- long framing member with factory-applied finish for each type of interior aluminum frame indicated.
- D. Fabrication Sample: For each vertical-to-horizontal intersection of systems, made from 12-inch lengths of full-size components and showing details of assembly.
- E. Maintenance Data: For interior aluminum frames to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of interior aluminum frames and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

1.5 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Kawneer TriFab 451 non-thermal system
 - 2. Equal as approved by Architect.

2.2 COMPONENTS

- A. Aluminum Framing, General: ASTM B 221, Alloy 6063-T5 or alloy and temper required to suit structural and finish requirements, not less than 0.062 inch thick.
- B. Door Frames: Reinforced for hinges and strikes.
- C. Glazing Frames: For glazing thickness indicated.
- D. Trim: Extruded aluminum, not less than 0.062 inch thick, with removable snap-in casing trim glazing stops and door stops without exposed fasteners.

2.3 ACCESSORIES

- A. Fasteners: Aluminum, nonmagnetic stainless-steel or other noncorrosive metal fasteners compatible with frames, stops, panels, reinforcement plates, hardware, anchors, and other items being fastened.
- B. Sound Seals: Manufacturer's standard continuous mohair, wool pile, or vinyl seals.
- C. Glazing Gaskets: Manufacturer's standard extruded or molded plastic, to accommodate glazing thickness indicated.
- D. Glazing: Comply with requirements in Division 8 Section "Glazing."
- E. Hardware: Comply with requirements in Division 8 door hardware Sections.

2.4 FABRICATION

- A. Machine jambs and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required, and fastened within frame with concealed screws.
- B. Provide concealed corner reinforcements and alignment clips for accurately fitted hairline joints at butted or mitered connections.
- C. Fabricate frames for glazing with removable stops to allow glazing replacement without dismantling frame.
- D. Fabricate all components to allow secure installation without exposed fasteners.

2.5 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls, floors, and ceilings, with Installer present, for conditions affecting performance of work.
 - 1. Verify that wall thickness does not exceed standard tolerances allowed by throat size indicated.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with frame manufacturer's written installation instructions.
- B. Install frames plumb and square, securely anchored to substrates.
- C. Install frame components in the longest possible lengths; components up to 72 inches long must be 1 piece.
 1. Use concealed installation clips to produce tightly fitted and aligned splices and connections.
 2. Secure clips to main structural extrusion components and not to snap-in or trim members.
 3. Do not leave screws or other fasteners exposed to view when installation is complete.

3.3 CLEANING

- A. Clean exposed frame surfaces promptly after installation, using cleaning methods recommended by frame manufacturer and according to AAMA 609 & 610.
- B. Touch up marred frame surfaces. Remove and replace frames with damaged finish that cannot be satisfactorily repaired.

END OF SECTION 08 12 55

SECTION 08 31 13
ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Access doors and frames for walls and ceilings.
- B. Related Sections include the following:
 - 1. Division 8 Section "Door Hardware" for mortise or rim cylinder locks and master keying.
 - 2. Division 9 Section "Acoustical Panel Ceilings" for suspended acoustical panel ceilings.
 - 3. Division 23 Section "Duct Accessories" See drawings M-101 and M-102 for Mechanical Specifications for heating and air conditioning duct access doors.

1.3 SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.
- B. Samples: For each door face material, at least 3 by 5 inches in size, in specified finish.
- C. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.
- D. Ceiling Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim are shown and coordinated with each other.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of access door(s) and frame(s) through one source from a single manufacturer.

- B. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. NFPA 252 for vertical access doors and frames.
- C. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.
- D. Field applied prime painting shall comply with the low VOC requirements called out in Section 09 91 23, Painting.

1.5 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
 - 1. ASTM A 123/A 123M, for galvanizing steel and iron products.
 - 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- B. Steel Sheet: Uncoated or electrolytic zinc-coated, ASTM A 591/A 591M with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
 - 2. Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating.
- D. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Babcock-Davis; A Cierra Products Co.
 2. Jensen Industries.
 3. J. L. Industries, Inc.
 4. Larsen's Manufacturing Company.
 5. Milcor Inc.
- B. Flush Access Doors and Trimless Frames: Fabricated from steel sheet.
1. Locations: Wall and ceiling surfaces.
 2. Door: Minimum 0.060-inch- thick sheet metal, set flush with surrounding finish surfaces.
 3. Frame: Minimum 0.060-inch- thick sheet metal with drywall bead flange.
 4. Hinges: Spring-loaded, concealed-pin type.
 5. Lock: Cylinder.
- C. Recessed Access Doors and Trimless Frames: Fabricated from steel sheet.
1. Locations: Ceiling surfaces.
 2. Door: Minimum 0.060-inch- thick sheet metal in the form of a pan recessed 1 inch for acoustical tile infill.
 3. Frame: Minimum 0.060-inch- thick sheet metal designed for insertion into acoustical tile ceiling.
 4. Lock: Cylinder.

2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
1. For trimless frames with drywall bead, provide edge trim for gypsum board and gypsum base securely attached to perimeter of frames.
 2. Provide mounting holes in frames for attachment of units to metal framing.
- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.

- E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
 - 1. For cylinder lock, furnish two keys per lock and key all locks alike.
 - 2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

2.4 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
- B. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- C. Aluminum Sheet: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15; with minimum sheet thickness according to ANSI H35.2.
- D. Frame Anchors: Same type as door face.
- E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.5 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
- E. Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Aluminum Finishes:
 - 1. Mill finish.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08 31 13

SECTION 08 41 13
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Exterior aluminum-framed storefronts and fixed windows.
 - a. Glazing is retained mechanically with gaskets on four sides.
 - 2. Exterior and interior manual-swing aluminum doors.
- B. Related Sections include the following:
 - 1. Division 7 Section "Joint Sealants" for installation of joint sealants installed with aluminum-framed systems and for sealants to the extent not specified in this Section.
 - 2. Division 8 Section "Door Hardware" for finish hardware.
 - 3. Division 8 Section "Glazing" for glazing requirements to the extent not specified in this Section.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:
 - 1. Structural loads.
 - 2. Thermal movements.
 - 3. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
 - 4. Dimensional tolerances of building frame and other adjacent construction.
 - 5. Failure includes the following:
 - a. Deflection exceeding specified limits.
 - b. Thermal stresses transferred to building structure.
 - c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.

- d. Noise or vibration created by wind and thermal and structural movements.
 - e. Loosening or weakening of fasteners, attachments, and other components.
 - f. Sealant failure.
 - g. Failure of operating units to function properly.
- B. Structural Loads:
 - 1. Wind Loads: 40 lbs/sf.
- C. Deflection of Framing Members:
 - 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
 - 2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.
- D. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:
 - 1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
 - 2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 - 3. Test Durations: As required by design wind velocity but not less than 10 seconds.
- E. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- F. Air Infiltration:
 - a. Fixed Storefronts: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft..
 - b. Swinging Doors: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.20 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft..

- G. Water Penetration Under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
- H. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 59 when tested according to AAMA 1503.
- I. Average Thermal Conductance:
 - a. Fixed Units: Provide aluminum-framed systems with fixed glazing and framing areas having average U-factor of not more than 0.38 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.
 - b. Entry Doors: Provide aluminum-framed systems with fixed glazing and framing areas having average U-factor of not more than 0.77 Btu/sq. ft. x h x deg F when tested according to AAMA 1503
- J. Maximum Solar Heat Gain Coefficient (SHGC)
 - a. All north facing units maximum value of 0.36
 - b. South, East and West facing units maximum value of 0.36

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.
- B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 2. Include details of provisions for system expansion and contraction and for draining moisture occurring within the system to the exterior.
 - 3. For entrances, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- D. Fabrication Sample: Of each vertical-to-horizontal intersection of systems, made from 12-inch lengths of full-size components and showing details of the following:
 - 1. Joinery.
 - 2. Anchorage.
 - 3. Expansion provisions.
 - 4. Glazing.
 - 5. Flashing and drainage.
- E. Welding certificates.

- F. Qualification Data: For Installer.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems.
- H. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.
- I. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.
 - 1. Engineering Responsibility: Preparation of data for aluminum-framed systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- C. Welding: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code--Aluminum."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating aluminum-framed systems without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Deterioration of metals and other materials beyond normal weathering.
 - d. Water leakage through fixed glazing and framing areas.
 - e. Failure of operating components to function properly.
 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Kawneer TriFab VersaGlaze 451T framing system, 2" sight line, 4 ½" frame, 1" insulated glazing, U factor max. 0.38 for fixed units; Entrance Doors shall be Kawneer 500 Standard Entrances with 1 ¾" depth and U factor max 0.77.
 2. Equal as approved by the Architect.

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209.
 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 4. Structural Profiles: ASTM B 308/B 308M.
 5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
- B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface

preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING SYSTEMS

- A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
- B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 1. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 2. Reinforce members as required to receive fastener threads.
- C. Concrete Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- D. Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.
- E. Framing System Gaskets and Sealants: Manufacturer's standard recommended by manufacturer for joint type.

2.4 GLAZING SYSTEMS

- A. Glazing: As indicated on the drawings and specified in Division 8 Section "Glazing."
- B. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.

2.5 DOORS

- A. Doors: Manufacturer's standard glazed doors, for manual swing operation.
 1. Door Construction: 1 3/4 -inch overall thickness, with minimum 0.125-inch-thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie rods.

- a. Thermal Construction: Exterior high-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior. Interior nonthermal.
- 2. Door Design: Wide stile; 5-inch nominal width. Refer to drawings for design.
 - a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches above floor or ground plane.
- 3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
- B. Door Hardware: As specified in Division 8 Section "Finish Hardware."

2.6 ACCESSORY MATERIALS

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 7 Section "Joint Sealants."
- B. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.7 FABRICATION

- A. Form aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
 - 4. Physical and thermal isolation of glazing from framing members.
 - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 6. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or panels.
 - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing (without projecting stops).

- E. Storefront Framing: Fabricate components for assembly using shear-block system.
- F. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.
 - 1. At exterior doors, provide compression weather stripping at fixed stops.
- G. Doors: Reinforce doors as required for installing hardware.
 - 1. At pairs of exterior doors, provide sliding weather stripping retained in adjustable strip mortised into door edge.
 - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- H. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.
- I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Exterior Framing and Doors High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
 - 1. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
 - a. Color and Gloss: Architect to select from manufacturers standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Commencing installation of aluminum entrances and storefront shall constitute acceptance of existing conditions.

3.2 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's written instructions.
 - 2. Do not install damaged components.
 - 3. Fit joints to produce hairline joints free of burrs and distortion.
 - 4. Rigidly secure nonmovement joints.
 - 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
 - 6. Seal joints watertight, unless otherwise indicated.
- B. Metal Protection:
 - 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
 - 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- D. Set continuous sill members and flashing in full sealant bed as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.
- E. Install components plumb and true in alignment with established lines and grades, without warp or rack.
- F. Install glazing as specified in Division 8 Section "Glazing."
- G. Entrances: Install to produce smooth operation and tight fit at contact points.
 - 1. Exterior Entrances: Install to produce tight fit at weather stripping and weathertight closure.

2. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
- H. Install insulation materials as specified in Division 7 Section "Building Insulation."
- I. Install perimeter joint sealants as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.
- J. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:
1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
 2. Alignment:
 - a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch .
 - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
 3. Diagonal Measurements: Limit difference between diagonal measurement to 1/8 inch.

3.3 ADJUSTING

- A. Entrances: Adjust operating hardware for smooth operation according to hardware manufacturers' written instructions.
1. For doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch measured to the leading door edge.

3.4 PROTECTION AND CLEANING

- A. Protect surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact surfaces, remove contaminants immediately according to manufacturer's written recommendations.
- B. Clean aluminum surfaces immediately after installation. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Clean factory-glazed glass immediately after installation. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.

- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 08 41 13

SECTION 08 51 13
ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following types of aluminum-framed windows:
 - 1. Projected windows.
- B. Related Sections include the following:
 - 1. Division 8 Section "Aluminum Storefront."
 - 2. Division 8 Section "Glazing" for glazing requirements for aluminum windows, including those specified to be factory glazed.

1.3 DEFINITIONS

- A. AW: Architectural.
- B. C: Commercial.
- C. HC: Heavy Commercial.
- D. LC: Light Commercial.
- E. R: Residential.
- F. Performance grade number, included as part of the AAMA/NWWDA product designation code, is actual design pressure in pounds force per square foot used to determine structural test pressure and water test pressure.
- G. Structural test pressure, for uniform load structural test, is equivalent to 150 percent of design pressure.
- H. Minimum test size is smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified and that are of test size indicated below:
 - 1. Minimum size required by AAMA/NWWDA 101/I.S.2.
- B. AAMA/NWWDA Performance Requirements: Provide aluminum windows of the performance class and grade indicated that comply with AAMA/NWWDA 101/I.S.2.
 - 1. AW: Architectural
- C. Air Infiltration: Maximum rate not more than indicated when tested according to ASTM E 283, Air Infiltration Test.
 - 1. Maximum Rate: 0.20 cfm/sq. ft. of area at a static test pressure differential of 6.24 lbf/sq. ft.
- D. Water Resistance: No water leakage as defined in ASTM E 547 and ASTM E 331 referenced test methods at a water test pressure at a static air pressure differential of 12 PSF.
- E. Forced-Entry Resistance: Comply with Performance Level 10 requirements when tested according to ASTM F 588.
- F. Condensation-Resistance Factor: Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of 54, where windows are indicated to be "thermally improved."
- G. Thermal Movements: Provide aluminum windows, including anchorage, that accommodate thermal movements of units resulting from the following maximum change (range) in ambient and surface temperatures without buckling, distortion, opening of joints, failure of joint sealants, damaging loads and stresses on glazing and connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.
- H. Average Thermal Conductance:
 - a. Fixed Units: Provide aluminum-framed systems with fixed glazing and framing areas having average U-factor of not more than 0.38 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.
 - b. Operable Units: Provide aluminum-framed systems with fixed glazing and framing areas having average U-factor of not more than 0.45 Btu/sq. ft. x h x deg F when tested according to AAMA 1503
- I. Maximum Solar Heat Gain Coefficient (SHGC)
 - a. All north facing units maximum value of 0.36
 - b. South, East and West facing units maximum value of 0.36

1.5 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other Work, operational clearances, and the following:
 - 1. Mullion details, including reinforcement and stiffeners.
 - 2. Joinery details.
 - 3. Expansion provisions.
 - 4. Flashing and drainage details.
 - 5. Weather-stripping details.
 - 6. Thermal-break details.
 - 7. Glazing details.
 - 8. Window System Operators: Show locations, mounting, and details for installing operator components and controls.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For aluminum window components required, prepared on Samples of size indicated below.
 - 1. Main Framing Member: 12-inch- long, full-size sections of extrusions with factory-applied color finish.
 - 2. Hardware: Full-size units with factory-applied finish.
 - 3. Weather Stripping: 12-inch- long sections.
 - 4. Architect reserves the right to require additional samples that show fabrication techniques, workmanship, and design of hardware and accessories.
- E. Qualification Data: For Installer.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years by a qualified testing agency, for each type, grade, and size of aluminum window. Test results based on use of down-sized test units will not be accepted.
- G. Maintenance Data: For operable window sash operating hardware weather stripping window system operators and finishes to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain aluminum windows through same source as aluminum storefront assemblies; Section 08 41 13.

- B. Product Options: Information on Drawings and in Specifications establishes requirements for aluminum windows' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
- C. Glazing Publications: Comply with published recommendations of glass manufacturers and GANA's "Glazing Manual" unless more stringent requirements are indicated.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating aluminum windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Failure to meet performance requirements.
 - 2. Structural failures including excessive deflection.
 - 3. Water leakage, air infiltration, or condensation.
 - 4. Faulty operation of movable sash and hardware.
 - 5. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- B. Warranty Period: Two years from date of Substantial Completion.
- C. Warranty Period for Metal Finishes: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Fixed Units: Kawneer Company, Inc., TriFab VersaGlaze 451T Framing System
2. Operable Units: Kawneer Company, Inc. GlassVent UT Windows, 3 1/8" System Depth, Project-Out window.
3. Equal as approved by the Architect.

2.2 MATERIALS, GENERAL

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi ultimate tensile strength, not less than 16,000-psi minimum yield strength, and not less than 0.062-inch thickness at any location for the main frame and sash members.
- B. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components. Cadmium-plated steel fasteners are not permitted.
 1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125 inch thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, splined grommet nuts.
 2. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.
- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated. Cadmium-plated steel anchors, clips, and accessories are not permitted.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated. Cadmium-plated steel reinforcing members are not permitted.
- E. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action, and completely concealed when aluminum window is closed.
 1. Weather-Stripping Material: Manufacturer's standard system and materials complying with AAMA/NWWDA 101/I.S.2.
- F. Replaceable Weather Seals: Comply with AAMA 701/702.
- G. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, nonshrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.

2.3 GLAZING

- A. Glass and Glazing Materials: Refer to Division 8 Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.
- B. Units shall be factory glazed with insulated glass units as specified in Division 8 Section "Glazing."

2.4 HARDWARE

- A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows and sized to accommodate sash or ventilator weight and dimensions. Cadmium-plated hardware is not permitted. Do not use aluminum in frictional contact with other metals. Where exposed, provide solid bronze.
- B. Locks and Latches: Designed to allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
- C. Four- or Six-Bar Friction Hinges: Comply with AAMA 904.
 - 1. Locking mechanism and handles for manual operation.
 - 2. Friction Shoes: Provide friction shoes of nylon or other nonabrasive, nonstaining, noncorrosive, durable material.
- D. Awning Windows: Provide the following operating hardware:
 - 1. Operator: Gear-type rotary operator located on jamb at sill.
 - 2. Hinges: Concealed four- or six-bar friction hinges located on each jamb near top rail; two per ventilator.
 - 3. Lock: Face-mounted transom latch and keeper.

2.5 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and

fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

- a. Color and Gloss: Custom color to match Architect's sample.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances; rough opening dimensions; levelness of sill plate; coordination with wall flashings, vapor retarders, and other built-in components; operational clearances; and other conditions affecting performance of work.
 1. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components; Drawings; and Shop Drawings.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- E. Metal Protection: Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in "Dissimilar Materials" Paragraph in Appendix B in AAMA/NWWDA 101/I.S.2.

3.3 ADJUSTING

- A. Adjust operating sashes and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

3.4 PROTECTION AND CLEANING

- A. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.
- B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.
- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 08 51 13

SECTION 08 71 00
DOOR HARDWARE

GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes:
 - 1. Mechanical and electrified door hardware for:
 - a. Swinging doors.
 - 2. Electronic access control system components, including:
 - 3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
 - 4. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:
 - 1. Windows
 - 2. Cabinets (casework), including locks in cabinets
 - 3. Signage
 - 4. Toilet accessories
 - 5. Overhead doors
- C. Related Sections:
 - 1. Division 1 Section "Alternates" for alternates affecting this section.
 - 2. Division 7 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
 - 3. Division 9 sections for touchup, finishing or refinishing of existing openings modified by this section.
 - 4. Division 26 sections for connections to electrical power system and for low-voltage wiring.

1.03 REFERENCES

- A. UL - Underwriters Laboratories
 - 1. UL 10B - Fire Test of Door Assemblies
 - 2. UL 10C - Positive Pressure Test of Fire Door Assemblies
 - 3. UL 1784 - Air Leakage Tests of Door Assemblies
 - 4. UL 305 - Panic Hardware
- B. DHI - Door and Hardware Institute
 - 1. Sequence and Format for the Hardware Schedule
 - 2. Recommended Locations for Builders Hardware
 - 3. Key Systems and Nomenclature
- C. NFPA – National Fire Protection Association
 - 1. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
 - 2. NFPA 101 – Life Safety Code
 - 3. NFPA 105 – Smoke and Draft Control Door Assemblies
 - 4. NFPA 252 – Fire Tests of Door Assemblies
- D. ANSI - American National Standards Institute
 - 1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
 - 2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
 - 3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
 - 4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
 - 5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.04 SUBMITTALS

- A. General:
 - 1. Submit in accordance with Conditions of Contract and Division 1 requirements.
 - 2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
 - 3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, “EXAMINATION” article, herein.
- B. Action Submittals:
 - 1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated, and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
 - a. Door Index; include door number, heading number, and Architects hardware set number.
 - b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
 - c. Quantity, type, style, function, size, and finish of each hardware item.
 - d. Name and manufacturer of each item.
 - e. Fastenings and other pertinent information.
 - f. Location of each hardware set cross-referenced to indications on Drawings.
 - g. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - h. Mounting locations for hardware.
 - i. Door and frame sizes and materials.
 - j. Name and phone number for local manufacturer's representative for each product.
5. Key Schedule:
 - a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
 - 1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.

- f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
 - 6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.
- C. Informational Submittals:
 - 1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
 - 2. Product data for electrified door hardware:
 - 3. Warranty: Special warranty specified in this Section.
- D. Closeout Submittals:
 - 1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Factory order acknowledgement numbers (for warranty and service)
 - d. Name, address, and phone number of local representative for each manufacturer.
 - e. Parts list for each product.
 - f. Final approved hardware schedule, edited to reflect conditions as-installed.
 - g. Final keying schedule
 - h. Copies of floor plans with keying nomenclature
 - i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.05 QUALITY ASSURANCE

- A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
 - 1. Warehousing Facilities: In Project's vicinity.
 - 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 - 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

- B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC).
 2. Can provide installation and technical data to Architect and other related subcontractors.
 3. Can inspect and verify components are in working order upon completion of installation.
 4. Capable of producing wiring diagrams.
 5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.
- C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.
- D. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in "REFERENCES" article, herein.
- F. Keying Conference
1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for key control system.
 - d. Requirements for access control.
 - e. Address for delivery of keys.
- G. Pre-installation Conference
1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 2. Inspect and discuss preparatory work performed by other trades.
 3. Review sequence of operation for each type of electrified door hardware.
 4. Review required testing, inspecting, and certifying procedures.

H. Coordination Conferences:

1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1. Deliver each article of hardware in manufacturer's original packaging.

C. Project Conditions:

1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:

1. Promptly replace products damaged during shipping.
2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.07 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware and keying with Owner's security consultant.

1.08 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.
 - a. Closers: 30 years.
 - b. Exit Devices:
 - 1) Mechanical: 3 years.
 - c. Locksets: 10 years.
 - d. Continuous Hinges: Lifetime warranty.
 - e. Key Blanks: Lifetime.
 - 2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

1.09 MAINTENANCE

- A. Maintenance Tools: Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PRODUCTS

2.01 MANUFACTURERS

- A. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
- B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series
2. Acceptable Manufacturers and Products:
 - a. Stanley FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.

7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins

2.04 FLUSH BOLTS

- A. Manufacturers:
 1. Scheduled Manufacturer:
 - a. Ives
 2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
- B. Requirements:
 1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.05 MORTISE LOCKS

- A. Manufacturers and Products:
 1. Scheduled Manufacturer and Product:
 - a. Schlage L9000 series
 2. Acceptable Manufacturers and Products:
 - a. Sargent 8200 series
- B. Requirements:
 1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.

2. Indicators: Where specified, provide indicator window measuring a minimum 2-inch x 1/2 inch with 180-degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
7. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.

2.06 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage ND series
2. Acceptable Manufacturers and Products:
 - a. Sargent 11-Line
 - b. Corbin-Russwin CL3100 series

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.

2.07 DEADBOLTS

- A. Manufacturers and Products:
 - 1. Scheduled Manufacturer and Product:
 - a. Schlage B600/B700/B800 Series
 - 2. Acceptable Manufacturers and Products:
 - a. Sargent 480 Series
- B. Requirements:
 - 1. Provide grade 1 deadbolt series conforming to ANSI/BHMA A156.
 - 2. Cylinders: Refer to "KEYING" article, herein.
 - 3. Provide deadbolts with standard 2-3/4 inches (70 mm) backset. Provide 2-3/8 inches (60 mm) where noted or if door or frame detail requires. Provide deadbolt with full 1-inch (25 mm) throw, constructed of steel alloy.
 - 4. Provide manufacturer's standard strike.

2.08 EXIT DEVICES

- A. Manufacturers and Products:
 - 1. Scheduled Manufacturer and Product:
 - a. Von Duprin 98/35A series
 - 2. Acceptable Manufacturers and Products:
 - a. Precision APEX 2000 series
 - b. Sargent 19-43-GL-80 series
- B. Requirements:
 - 1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
 - 2. Cylinders: Refer to "KEYING" article, herein.
 - 3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
 - 4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
 - 5. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
 - 6. Provide flush end caps for exit devices.
 - 7. Provide exit devices with manufacturer's approved strikes.

8. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
9. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
13. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
14. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.09 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage Everest 29 R
2. Acceptable Manufacturers and Products:
 - a. Medeco X4
 - b. Instakey

B. Requirements:

1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
 - a. Conventional Patented Restricted Small Format: cylinder with small format interchangeable cores (SFIC) with restricted, patented keyway.
3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
4. Nickel silver bottom pins.

2.10 KEYING

A. Scheduled System:

1. New factory registered system:
 - a. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- B. Requirements:
 1. Construction Keying:
 - a. Replaceable Construction Cores.
 - 1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - a) 3 construction control keys
 - b) 12 construction change (day) keys.
 - 2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.
 2. Permanent Keying:
 - a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - 1) Master Keying system as directed by the Owner.
 - b. Forward biting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 - c. Provide keys with the following features:
 - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - 2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
 - d. Identification:
 - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 - 2) Identification stamping provisions must be approved by the Architect and Owner.
 - 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 - 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
 - e. Quantity: Furnish in the following quantities.
 - 1) Change (Day) Keys: 3 per cylinder/core.
 - 2) Permanent Control Keys: 3.
 - 3) Master Keys: 6.

2.11 DOOR CLOSERS

- A. Manufacturers and Products:
 1. Scheduled Manufacturer and Product:
 - a. LCN 4050A series

2. Acceptable Manufacturers and Products:

- a. Falcon SC70A series
- b. Norton 7500 series

B. Requirements:

- 1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
- 2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
- 3. Closer Body: 1-1/2-inch (38 mm) diameter with 11/16-inch (17 mm) diameter heat-treated pinion journal and full complement bearings.
- 4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and all weather requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
- 5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
- 6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
- 7. Pressure Relief Valve (PRV) Technology: Not permitted.
- 8. Provide stick on templates, special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.12 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:

- a. Ives

2. Acceptable Manufacturers:

- a. Elmes
- b. Burns

B. Requirements:

- 1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.13 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:

- a. Ives
- 2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
- B. Requirements:
 - 1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
 - 2. Size plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
 - 3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.14 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

- A. Manufacturers:
 - 1. Scheduled Manufacturers:
 - a. Glynn-Johnson
 - 2. Acceptable Manufacturers:
 - a. Rixson
 - b. ABH
- B. Requirements:
 - 1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
 - 2. Provide friction type at doors without closer and positive type at doors with closer.

2.15 DOOR STOPS AND HOLDERS

- A. Manufacturers:
 - 1. Scheduled Manufacturer:
 - a. Ives
 - 2. Acceptable Manufacturers:
 - a. Trimco
 - b. Burns
- B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button or thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.16 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Zero International
2. Acceptable Manufacturers:
 - a. National Guard
 - b. Reese

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.17 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.

2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.18 COAT HOOKS

- A. Manufacturers:
 1. Scheduled Manufacturer:
 - a. Ives
 2. Acceptable Manufacturers:
 - a. Burns
 - b. Rockwood
- B. Provide coat hooks as specified.

EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

3.03 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 2. Custom Steel Doors and Frames: HMMA 831.
 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.

- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I. Lock Cylinders:
 - 1. Install construction cores to secure building and areas during construction period.
 - 2. Replace construction cores with permanent cores as indicated in keying section.
 - 3. Furnish permanent cores to Owner for installation.
- J. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- L. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- M. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- N. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- O. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- P. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- Q. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.04 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
 - 2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.05 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer's instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.06 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets:

Abbreviation	Name
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LCN	Lcn Commercial Division
SCH	Schlage Lock Company
VON	Von Duprin
ZER	Zero International Inc

74142 OPT0281424 Version 1

Hardware Group No. 00

For use on Door #(s):






Provide each CO door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
	EA	CASED OPENING	NO HARDWARE		

Hardware Group No. 01

For use on Door #(s):










Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM LOCK	ND70HD BRW		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	SURFACE CLOSER	4050A H		689	LCN
1	EA	FLOOR STOP	FS13		626	IVE
1	EA	DOOR SEALS	BY ALUM DOOR MANUFACTURER			

Hardware Group No. 01-1

For use on Door #(s):







Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM LOCK	ND70HD BRW		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	SURFACE CLOSER	4050A H		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS13		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	360AA		AA	ZER

Hardware Group No. 01-2

For use on Door #(s):










Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM LOCK	ND70HD BRW		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4050A RW/PA ST-5003		689	LCN
1	EA	MOUNTING PLATE	4050A-18 ST-5003		689	LCN
	EA	DOOR SEALS	BY ALUM DOOR MANUFACTURER			

Hardware Group No. 01-3

For use on Door #(s):











Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM LOCK	ND70HD BRW		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4050A RW/PA ST-5003		689	LCN
1	EA	MOUNTING PLATE	4050A-18 ST-5003		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

Hardware Group No. 02

For use on Door #(s):









Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM DEADBOLT	B663HD		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	PUSH PLATE	8200 4" X 16" CFC		630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16" CFT		630	IVE
1	EA	SURFACE CLOSER	4050A REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS13		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

Hardware Group No. 03

For use on Door #(s):















Provide each PR door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
6	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
2	EA	MANUAL FLUSH BOLT	FB458		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	STOREROOM LOCK	ND80HD BRW		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	OH STOP	450S		689	GLY
1	EA	FLOOR STOP	FS13		626	IVE
2	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 03-1

For use on Door #(s):









Provide each PR door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
2	EA	MANUAL FLUSH BOLT	FB458		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	STOREROOM LOCK	ND80HD BRW		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4050A CUSH		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
2	EA	MEETING STILE	328AA		AA	ZER
2	EA	DOOR SWEEP	328BK		BK	ZER
1	SET	GASKETING	328BK-S		BK	ZER
1	EA	THRESHOLD	625A		A	ZER
1	EA	MOUNTING BRACKET	328SPB			ZER

Hardware Group No. 04

For use on Door #(s):









Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80HD BRW		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	SURFACE CLOSER	4050A REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS13		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 04-1

For use on Door #(s):











Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	ND80HD BRW		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	SURFACE CLOSER	4050A EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS13		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 04-2

For use on Door #(s):










Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM LOCK	ND70HD BRW		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4050A RW/PA ST-5003		689	LCN
1	EA	MOUNTING PLATE	4050A-18 ST-5003		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	360AA		AA	ZER

Hardware Group No. 04-3

For use on Door #(s):









Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80HD BRW		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	SURFACE CLOSER	4050A REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS13		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	355AA		AA	ZER

Hardware Group No. 05

For use on Door #(s):










Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PRIVACY W/DEADBOLT	L9440 18A 09-544 L283-722		626	SCH
1	EA	SURFACE CLOSER	4050A REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS13		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	COAT AND HAT HOOK	582		626	IVE

Hardware Group No. 06

For use on Door #(s):










Provide each PR door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
8	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	PANIC HARDWARE	CD-9848-L-DT-18		626	VON
1	EA	PANIC HARDWARE	CD-9848-L-NL-18		626	VON
2	EA	SFIC MORTISE CYL.	80-132 X XQ11-948 36-083 36-082-025		626	SCH
			DOGGING CYLINDER			
1	EA	SFIC RIM CYLINDER	80-159		626	SCH
			TRIM CYLINDER			
3	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
2	EA	SURFACE CLOSER	4050A CUSH		689	LCN
2	EA	DOOR SWEEP	328BK		BK	ZER
1	EA	THRESHOLD	625A		A	ZER
1	EA	DOOR SEALS	BY ALUM DOOR MANUFACTURER			

Hardware Group No. 06-1

For use on Door #(s):







Provide each PR door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	PANIC HARDWARE	CD-9848-L-DT-18		626	VON
1	EA	PANIC HARDWARE	CD-9848-L-NL-18		626	VON
2	EA	SFIC MORTISE CYL.	80-132 X XQ11-948 36-083 36-082-025		626	SCH
			DOGGING CYLINDER			
1	EA	SFIC RIM CYLINDER	80-159		626	SCH
			TRIM CYLINDER			
3	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
2	EA	SURFACE CLOSER	4050A CUSH		689	LCN
2	EA	DOOR SWEEP	328BK		BK	ZER
1	EA	THRESHOLD	625A		A	ZER
1	EA	DOOR SEALS	BY ALUM DOOR MANUFACTURER			

Hardware Group No. 07

For use on Door #(s):











Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	CLASSROOM LOCK	ND70HD BRW		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	SURFACE CLOSER	4050A CUSH		689	LCN
1	EA	DOOR SWEEP	328BK		BK	ZER
1	EA	THRESHOLD	625A		A	ZER
1	EA	DOOR SEALS	BY ALUM DOOR MANUFACTURER			

Hardware Group No. 07-1

For use on Door #(s):












Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5		630	IVE
1	EA	STOREROOM LOCK	ND80HD BRW		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	SURFACE CLOSER	4050A REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS13		626	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	DOOR SWEEP	328BK		BK	ZER
1	SET	GASKETING	328BK-S		BK	ZER
1	EA	THRESHOLD	625A		A	ZER

Hardware Group No. 08

For use on Door #(s):











Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	PANIC HARDWARE	CD-98-L-NL-18		626	VON
1	EA	SFIC MORTISE CYL.	80-132 X XQ11-948 36-083 36-082-025		626	SCH
			DOGGING CYLINDER			
1	EA	SFIC RIM CYLINDER	80-159		626	SCH
			TRIM CYLINDER			
2	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	SURFACE CLOSER	4050A CUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	DOOR SWEEP	328BK		BK	ZER
1	SET	GASKETING	328BK-S		BK	ZER
1	EA	THRESHOLD	625A		A	ZER

Hardware Group No. 09

For use on Door #(s):

Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	PANIC HARDWARE	98-L-NL-18		626	VON
1	EA	CYLINDER	AS REQUIRED		626	SCH
1	EA	SFIC EVEREST CORE	80-037 EV29 R		626	SCH
1	EA	SURFACE CLOSER	4050A CUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	DOOR SWEEP	328BK		BK	ZER
1	SET	GASKETING	328BK-S		BK	ZER
1	EA	THRESHOLD	625A		A	ZER

END OF SECTION

SECTION 08 80 00
GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Windows.
 - 2. Doors.
- B. Related Sections include the following:
 - 1. Division 8 Section "Flush Wood Doors
 - 2. Division 8 Section "Access Doors and Frames".
 - 3. Division 8 Section "Aluminum Storefront."
 - 4. Division Section 8 "Interior Aluminum Frames".
 - 5. Division 8 Section n "Aluminum Windows".

1.3 DEFINITIONS

- A. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.
- B. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.
- C. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
 1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
 - a. Specified Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour at 33 feet above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.4.2, "Analytic Procedure," based on mean roof heights above grade indicated on Drawings.
 - b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
 - 1) Load Duration: 60 seconds or less.
 - c. Maximum Lateral Deflection: For the following types of glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.
 - 1) For monolithic-glass lites heat treated to resist wind loads.
 - 2) For insulating glass.
 - d. Minimum Glass Thickness for Exterior Lites: Not less than 6 mm.
- C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.

2. For insulating-glass units, properties are based on units with lites 6 mm thick and a nominal 1/2-inch- wide interspace.
3. Center-of-Glass U-Values: NFRC 100 methodology using LBL-35298 WINDOW 4.1 computer program, expressed as Btu/ sq. ft. x h x deg F.
4. Center-of-Glass Solar Heat Gain Coefficient: NFRC 200 methodology using LBL-35298 WINDOW 4.1 computer program.
5. Solar Optical Properties: NFRC 300.

1.5 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Samples: For the following products, in the form of 12-inch- square Samples for glass and of 12-inch- long Samples for sealants. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
- C. Samples: For the following products, in the form of 12-inch- square Samples for glass.
 1. Insulating glass for each designation indicated.
- D. Product Test Reports: For each of the following types of glazing products:
 1. Insulating glass.
- E. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.
- F. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
- G. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass coated float glass laminated glass and insulating glass.
- C. Source Limitations for Insulating Glass: Obtain insulating-glass units from one manufacturer using the same type of glass and other components for each type of unit indicated.
- D. Source Limitations for Glass Sputter-Coated with Solar-Control Low-E Coatings: Where solar-control low-e coatings of a primary glass manufacturer that has established a

certified fabricator program is specified, obtain sputter-coated solar-control low-e-coated glass in fabricated units from a manufacturer that is certified by coated-glass manufacturer.

- E. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.
- F. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.
- G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: GANA'S "Glazing Manual" and "Laminated Glass Design Guide."
 - 2. SIGMA Publications: SIGMA TM-3000, "Vertical Glazing Guidelines".
- H. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following inspecting and testing agency:
 - 1. Insulating Glass Certification Council.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.9 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
 - 1. Warranty Period: Five years from date of Substantial Completion.

- B. Manufacturer's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass manufacturer agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products indicated in schedules at the end of Part 3.

2.2 PRIMARY FLOAT GLASS

- A. Float Glass: ASTM C 1036, Type I (transparent glass, flat), Quality q3 (glazing select); class as indicated in schedules at the end of Part 3.

2.3 HEAT-TREATED FLOAT GLASS

- A. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
- B. Heat-Strengthened Float Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.4 LAMINATED GLASS

- A. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
1. Construction: Laminate glass with Inter Active Layer to comply with interlayer manufacturer's written instructions.
 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 3. Inter active as layer manufactured by Responsive Glass
 4. Interlayer Color: Clear unless otherwise indicated.

2.5 INSULATING GLASS

- A. Insulating-Glass Units: Preassembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in the Insulating-Glass Schedule at the end of Part 3.
 - 1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in "Performance Requirements" Article. Provide Kind FT (fully tempered) where safety glass is indicated.
- B. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated in the Insulating-Glass Schedule at the end of Part 3 are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
- C. Sealing System: Dual seal, with primary and secondary sealants as follows:
 - 1. Manufacturer's standard sealants.
- D. Spacer Specifications: Manufacturer's standard spacer material and construction.

2.6 FIRE-PROTECTION-RATED GLAZING

- A. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, ultraclear float glass; with intumescent interlayers; and complying with 16 CFR 1201, Category II.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Technical Glass Products; Pyrostop. Basis of Design.
 - b. InterEdge; Pyrobel.
 - c. Pilkington North America Inc.; Pyrostop.
 - d. Vetrotech Saint-Gobain; Contraflam.

2.7 ELASTOMERIC GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
 - 1. VOC Content: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of

- service and application, as demonstrated by sealant manufacturer based on testing and field experience.
3. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range for this characteristic.
- B. Elastomeric Glazing Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied, chemically curing sealant in the Glazing Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

2.8 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.9 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.
- B. Grind smooth and polish exposed glass edges.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep system.
 - 3. Minimum required face or edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where the length plus width is larger than 50 inches as follows:
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to

maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to

lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

- D. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 PROTECTION AND CLEANING

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

3.8 INSULATING-GLASS, LOW E SCHEDULE

- A. Insulating-Glass Units: Preassembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article
- B. Type GL-3 Insulating Glass Units in certain storefront, exterior windows as indicated on the drawings: Where this glass is indicated, provide insulating-glass units complying with the following:
 - 1. Overall Unit Thickness and Thickness of Each Lite: 25 and 6 mm.
 - 2. Interspace Content: Argon
 - 3. Indoor Lite: Type I (transparent glass, flat), Class 1 (clear) float glass.
 - a. Safety Glass (uncoated surfaces).
 - 4. Outdoor Lite: Type I (transparent glass, flat) float glass, Class 1 (clear).
 - a. Safety Glass (uncoated surfaces).
 - 5. Low-Emissivity Coating: Sputtered on second or third surface.
- C. Type GL-3T Insulating Glass Units in certain storefront, exterior windows as indicated on the drawings: Where this glass is indicated, provide insulating-glass units complying with the following:
 - 1. Overall Unit Thickness and Thickness of Each Lite: 25 and 6 mm.
 - 2. Interspace Content: Argon
 - 3. Indoor Lite: Type I (transparent glass, flat), Class 1 (clear) float glass.
 - a. Kind FT (Fully Tempered), Condition A (uncoated surfaces).
 - 4. Outdoor Lite: Type I (transparent glass, flat) float glass, Class 1 (clear).
 - a. Kind FT (Fully Tempered), Condition A (uncoated surfaces).
 - 5. Low-Emissivity Coating: Sputtered on second or third surface.
- D. Type GL-5 Water White Glass 1 Sided Anti-Reflective, 6mm, tempered
 - 1. Acceptable Manufacturers:
 - a. Water White Glass; waterwhiteglass.com, 949-789-7700
 - b. Equal as approved by Architect

END OF SECTION 08 80 00

SECTION 08 83 00
MIRRORED GLASS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Safety (tempered) mirrored glass.

1.3 DEFINITIONS

- A. Deterioration of Silvered Mirrored Glass: Defects developed from normal use that are attributable to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning silvered mirrored glass contrary to mirrored glass manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1.4 PERFORMANCE REQUIREMENTS

- A. Provide mirrored glass that will not fail under normal usage. Failure includes glass breakage and deterioration attributable to defective manufacture, fabrication, and installation.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Silvered mirrored glass. Include description of materials and process used to produce mirrored glass that indicates source of glass, glass coating components, edge sealer, and quality-control provisions.
 - 2. Mirror mastic.
 - 3. Mirror hardware.
- B. Shop Drawings: Include elevations, sections, details, and attachments to other Work.

- C. Samples for Verification: For the following products, in sizes indicated below:
 - 1. Mirrored glass, 12 inches square, including edge treatment on 2 adjoining edges.
 - 2. Mirror trim, 12 inches long.
- D. Product Certificates: Signed by manufacturers of mirrored glass and mirror mastic certifying that products furnished comply with requirements.
- E. Mirror Mastic Glass Coating Compatibility Test Reports: From an organic protective coating manufacturer indicating that mirror mastic has been tested for compatibility and adhesion with organic protective coating applied to silvered mirrored glass. Include organic coating manufacturers' interpretation of test results relative to performance and recommendations for use of mastics with organic protective coating.
- F. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed mirrored glass installations similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations for Mirrored Glass: Obtain mirrored glass from one source for each type of mirrored glass indicated.
- C. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each type of accessory indicated.
- D. Glazing Publications: Comply with published recommendations in GANA's "Glazing Manual," unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
- E. NAAMM's Publication: For silvered mirrored glass, comply with recommendations in NAAMM's "Mirrors, Handle with Extreme Care, Tips for the Professional on the Care and Handling of Mirrors."
- F. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.
- G. Preconstruction Mirror Mastic Glass Coating Compatibility Test: Submit mirror mastic products to organic protective coating manufacturer for testing to determine compatibility of adhesive with mirrored glass coating.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to mirrored glass manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. For silvered mirrored glass, comply with mirrored glass manufacturer's written instructions for shipping, storing, and handling mirrored glass as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors, protected from moisture including condensation.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install mirrored glass until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.9 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Manufacturer's Special Warranty for Silvered Mirrored Glass: Written warranty, made out to Owner and signed by mirrored glass manufacturer agreeing to replace silvered mirrored glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below:
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Mirror Company, Inc.
 - 2. Carolina Mirror Company.
 - 3. Gardner Glass Products.
 - 4. Lenoir Mirror Company.
 - 5. Stroupe Mirror Co., Inc.
 - 6. VVP America, Inc.; Binswanger Mirror Products.

2.2 FLOAT GLASS

- A. Tempered Float Glass: ASTM C 1048, Type I (transparent glass, flat), Condition A (uncoated), Kind FT (fully tempered), Quality q3 (glazing select) float glass, complying with the following requirements:
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of mirror as installed, unless otherwise indicated.
 - 2. Clear Tempered Float Glass: Class 1 (clear).
 - a. Thickness: 6 mm.

2.3 MIRRORED GLASS

- A. Silvered Mirrored Glass: Tempered, clear float glass with successive layers of chemically deposited silver, electrically or chemically deposited copper, and manufacturer's standard organic protective coating applied to second glass surface to produce a coating system complying with FS DD-M-411.

2.4 FABRICATION

- A. Mirrored Glass Sizes: Cut mirrored glass to final sizes and shapes as indicated on the drawings.
- B. Cutouts: Fabricate cutouts for notches and holes in mirrored glass without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrored glass.
- C. Mirrored Glass Edge Treatment: Treat edges as indicated below.
 - 1. Flat polished edge.
 - 2. Seal edges of silvered mirrored glass after edge treatment to prevent chemical or atmospheric penetration of glass coating.
 - 3. Require mirrored glass manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

2.5 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Neoprene, 70 to 90 Shore A hardness.
- B. Edge Sealer: Coating compatible with glass coating and approved by mirrored glass manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C. Mirror Mastic: An adhesive setting compound, produced specifically for setting mirrored glass by spot application, certified by both mirrored glass manufacturer and

mastic manufacturer as compatible with glass coating and substrates on which mirrored glass will be installed.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Gunther Mirror Mastics.
 - b. Palmer Products Corporation.
- D. Extruded-Aluminum Top and Bottom Trim: J-channels formed with a return deep enough to produce a glazing channel to accommodate mirrored glass units of thickness indicated and in lengths required to cover bottom edge of each mirrored glass unit in a single piece.
 1. Bottom Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.05 inch.
 2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch in height, respectively, and a thickness of not less than 0.062 inch.
 3. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 4. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bottom Trim:
 - 1) CRL Standard "J" Channel; C. R. Laurence Co., Inc.
 - 2) Heavy Gauge Aluminum Shallow Nose "J" Moulding Lower Bar; Sommer & Maca Industries, Inc.
 - b. Top Trim:
 - 1) CRL Deep "J" Channel; C. R. Laurence Co., Inc.
 - 2) Heavy Gauge Aluminum Deep Nose "J" Moulding Lower Bar; Sommer & Maca Industries, Inc.
- E. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- F. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrored glass units are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance.
 - 1. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
 - 2. Proceed with mirrored glass installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating surfaces with mastic manufacturer's special bond coating where applicable.

3.3 GLAZING

- A. General: Install mirrored glass units to comply with written instructions of mirrored glass manufacturer and with referenced GANA and NAAMM publications. Mount mirrored glass accurately in place in a manner that avoids distorting reflected images.
- B. Provide space for air circulation between back of mirrored glass units and face of mounting surface.
- C. Mastic Spot Installation System: Install mirrored glass units with mastic as follows:
 - 1. Apply barrier coat to mirrored glass backing where approved in writing by manufacturers of mirrored glass and backing material.
 - 2. Apply mastic in spots to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrored glass units and face of mounting surface.
 - 3. After mastic is applied, align mirrored glass units and press into place while maintaining a minimum air space of 1/8 inch between back of mirrored glass and mounting surface.
- D. For wall-mounted mirrored glass units, install permanent means of support at bottom and top edges with bottom support designed to withstand mirrored glass weight and top support designed to prevent mirrored glass from coming away from wall along top edges.
 - 1. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrored glass units.

2. For continuous bottom supports, provide setting blocks 1/8 inch thick by 4 inches long at quarter points. For channels or other continuous supports in which water could be trapped, provide, between setting blocks, two slotted weeps not less than 1/4 inch wide by 3/8 inch long.
3. Where indicated, install bottom and top trim. Fabricate trim in single lengths to fit and cover top and bottom edges of mirrored glass units.

3.4 PROTECTION AND CLEANING

- A. Protect mirrored glass from breakage and contaminating substances resulting from construction operations.
 1. Do not permit edges of silvered mirrored glass to be exposed to standing water.
 2. Maintain environmental conditions that will prevent silvered mirrored glass from being exposed to moisture from condensation or other sources for continuous periods of time.
- B. Wash mirrored glass not more than four days before date scheduled for inspections intended to establish date for Substantial Completion. Wash mirrored glass by methods recommended in NAAMM publication and in writing by mirrored glass manufacturer. Use water and glass cleaners free from substances capable of damaging mirrored glass edges or coatings.

END OF SECTION 08 83 00

SECTION 08 91 19
FIXED LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Fixed, extruded-aluminum louvers.
- B. Related Sections include the following:
 - 1. Division 7 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.
 - 2. See Mechanical Drawings for louvers that are a part of mechanical equipment.

1.3 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section, unless otherwise defined in this Section or in referenced standards.

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide exterior metal louvers capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of louver components including blades, frames, and supports; noise or metal fatigue caused by louver blade rattle or flutter; or permanent damage to fasteners and anchors.
 - 1. Wind Load: Uniform pressure (velocity pressure) of 30 lbf/sq. ft., acting inward or outward.
 - 2. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, and other detrimental effects:

- a. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.5 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Shop Drawings: For louver units and accessories. Include plans; elevations; sections; and details showing profiles, angles, and spacing of louver blades. Show unit dimensions related to wall openings and construction; free area for each size indicated; profiles of frames at jambs, heads, and sills; and anchorage details and locations.
- C. Samples for Verification: Of each type of metal finish required, prepared on Samples of same thickness and material indicated for final Work. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.
- D. Product Certificates: Signed by manufacturers of louvers certifying that the products furnished comply with requirements and are licensed to bear the AMCA seal based on tests made according to AMCA 500 and complying with AMCA's Certified Ratings Program.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where alike in one or more respects regarding type, design, or factory-applied color finish.
- B. Welding Standards: As follows:
 - 1. Comply with AWS D1.2, "Structural Welding Code--Aluminum."
- C. SMACNA Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" recommendations for fabrication, construction details, and installation procedures.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Airolite Co.
 2. American Warming and Ventilating, Inc.
 3. Construction Specialties, Inc.

2.2 MATERIALS

- A. Aluminium Extrusions: ASTM B 221, alloy 6063-T5 or T-52.
- B. Aluminum Sheet: ASTM B 209, alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Aluminum Castings: ASTM B 26/B 26M, alloy 319.
- D. Fasteners: Of same basic metal and alloy as fastened metal or 300 series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
1. Use types and sizes to suit unit installation conditions.
 2. Use Phillips flat-head screws for exposed fasteners, unless otherwise indicated.
- E. Anchors and Inserts: Of type, size, and material required for loading and installation indicated. Use nonferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as needed for corrosion resistance. Use toothed steel or expansion bolt devices for drilled-in-place anchors.
- F. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 but containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Maintain equal louver blade spacing to produce uniform appearance.
- C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining materials' tolerances, and perimeter sealant joints.
 - 1. Frame Type: Channel type, unless otherwise indicated.
- D. Include supports, anchorages, and accessories required for complete assembly.
- E. Provide horizontal mullions, as indicated.
- F. Provide sill extensions and loose sills made of same material as louvers where indicated or required for drainage to exterior and to prevent water penetrating to interior.
- G. Join frame members to one another and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view; unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Louver Construction: Provide fixed-blade louvers with extruded-aluminum frames and blades.
- B. Horizontal, Drainable-Blade Louvers: As follows:
 - 1. Louver Depth: 4 inches, unless otherwise indicated.
 - 2. Frame Thickness: 0.125 inch.
 - 3. Blade Thickness: 0.081 inch.

2.5 LOUVER SCREENS

- A. General: Provide each exterior louver with louver screens complying with the following requirements:
 - 1. Screen Location for Fixed Louvers: Interior face.
 - 2. Screening Type: Bird screening, unless otherwise indicated.
- B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

- C. Louver Screen Frames: Fabricate screen frames with mitered corners to louver sizes indicated and to comply with the following requirements:
1. Metal: Same kind and form of metal as indicated for louver to which screens are attached.
 - a. Reinforce extruded-aluminum screen frames at corners with clips.
 2. Finish: Same finish as louver frames to which louver screens are attached.
 3. Type: Rewirable frames with a driven spline or insert for securing screen mesh.

2.6 BLANK-OFF PANELS

- A. General: Fabricate blank-off panels from materials and to sizes indicated and comply with the following requirements:
1. Finish: Same as finish applied to louvers.
 2. Attach blank-off panels to back of louver frames with stainless-steel sheet-metal screws.
- B. Uninsulated, Blank-off Panels: Metal sheet complying with the following requirements:
1. Aluminum sheet for aluminum louvers, as follows:
 - a. Thickness: 0.050 inch, unless otherwise indicated.
- C. Insulated, Blank-off Panels: Laminated metal-faced panels consisting of insulating core surfaced on back and front with metal sheets.
1. Thickness: 2 inches.
 2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch nominal thickness.
 3. Insulating Core: Unfaced mineral-fiber or foamed-plastic rigid insulation board.
 4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard extruded-aluminum-channel frames, not less than 0.080-inch nominal thickness, with corners mitered and with same finish as panels.
 5. Seal perimeter joints between panel faces and louver frames with 1/8-by-1-inch PVC compression gaskets.
 6. Panel Finish: Same finish applied to louvers.
 7. Attach blank-off panels to back of louver frames with stainless-steel, sheet metal screws.

2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish louvers after assembly.

2.8 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
- B. 2-coat 70% KNAR 500 / HYLAR 5000 AAMA 2605-Dry film thickness 1.2 mil. Selected from Manufacturer's standard colors.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate Setting Drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.2 INSTALLATION

- A. Locate and place louver units level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- F. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

- G. Install concealed gaskets, flashings, joint fillers, and insulation, as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.3 ADJUSTING, CLEANING, AND PROTECTING

- A. Periodically clean exposed surfaces of louvers and vents that are not protected by temporary covering to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
 - B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
 - C. Protect louvers and vents from damage during construction. Use temporary protective coverings where needed and approved by louver manufacturer. Remove protective covering at the time of Substantial Completion.
 - D. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
- 1. Clean and touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 08 91 19

SECTION 09 21 16
GYPSUM BOARD SHAFT-WALL ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Shaft enclosures.
- B. Related Sections include the following:
 - 1. Division 1, Section "Submittals."
 - 2. Division 9 "Gypsum Board" for applying and finishing panels in gypsum board shaft-wall assemblies.

1.3 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board construction not defined in this Section or in other referenced standards.

1.4 SUBMITTALS

- A. Product Data: For each gypsum board shaft-wall assembly indicated.
- B. Fire-Test-Response Reports: From a qualified independent testing and inspecting agency substantiating each gypsum board shaft-wall assembly's required fire-resistance rating as required by applicable building codes.
 - 1. Include data substantiating that items that penetrate each gypsum board shaft-wall assembly do not negate fire-resistance rating.
- C. Acoustical-Test-Response Reports: From a qualified independent testing agency substantiating required STC rating for each gypsum board shaft-wall assembly.

1.5 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

- B. STC-Rated Assemblies: For gypsum board shaft-wall assemblies indicated to have STC ratings, provide assembly materials and construction complying with requirements of assemblies whose STC ratings were determined according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, and bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat on leveled supports off the ground to prevent sagging.

1.7 PROJECT CONDITIONS

- A. Comply with requirements for environmental conditions, room temperatures, and ventilation specified in Division 9 Section " Gypsum Board."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. American Gypsum Co.
 2. G-P Gypsum Corp.
 3. National Gypsum Company.
 4. United States Gypsum Co.

2.2 ASSEMBLY MATERIALS

- A. General: Provide materials and components complying with requirements of fire-resistance-rated assemblies indicated.
 1. Provide panels in maximum lengths available to eliminate or minimize end-to-end butt joints.
 2. Provide auxiliary materials complying with gypsum board shaft-wall assembly manufacturer's written recommendations.
- B. Steel Framing: ASTM C 645.
 1. Protective Coating: Manufacturer's standard corrosion-resistant zinc coating.

- C. Gypsum Liner Panels: Manufacturer's proprietary liner panels in 1-inch thickness and with moisture-resistant paper faces.
- D. Gypsum Wallboard: ASTM C 36, core type as required by fire-resistance-rated assembly indicated.
 - 1. Edges: Tapered.
- E. Accessories: Cornerbead, edge trim, and control joints of material and shapes specified in Division 9 Section "Gypsum Board Assemblies" that comply with gypsum board shaft-wall assembly manufacturer's written recommendations for application indicated.
- F. Gypsum Wallboard Joint-Treatment Materials: ASTM C 475 and as specified in Division 9 Section "Gypsum Board."
- G. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
- H. Track (Runner) Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft-wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
 - 1. Powder-Actuated Fasteners: Provide powder-actuated fasteners with capability to sustain, without failure, a load equal to 10 times that imposed by shaft-wall assemblies, as determined by testing conducted by a qualified independent testing agency according to ASTM E 1190.
- I. Acoustical Sealant: As recommended by gypsum board shaft-wall assembly manufacturer for application indicated.
- J. Sound Attenuation Blankets: ASTM C 665 for Type I, unfaced mineral-fiber-blanket insulation produced by combining thermosetting resins with mineral fibers manufactured from slag or rock wool.

2.3 GYPSUM BOARD SHAFT WALL

- A. Deflection Limit: $L/240$.
- B. Studs: Manufacturer's standard profile for repetitive members and corner and end members and for fire-resistance-rated assembly indicated.
 - 1. Depth: As indicated.
 - 2. Minimum Base Metal Thickness: Manufacturer's standard thicknesses that comply with structural performance requirements for stud depth indicated.
- C. Track (Runner): Manufacturer's standard J-profile track with long-leg length as standard with manufacturer, but at least, in depth matching studs.

1. Minimum Base Metal Thickness: Manufacturer's standard thicknesses that comply with structural performance requirements for stud depth indicated.
- D. Jamb Struts: Manufacturer's standard J-profile strut with long-leg length of 3 inches, in depth matching studs, and not less than 0.0341 inch thick.
- E. STC Rating: As indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which gypsum board shaft-wall assemblies attach or abut, with Installer present, including hollow-metal frames, cast-in anchors, and structural framing. Examine for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install gypsum board shaft-wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated, manufacturer's written installation instructions, and the following:
 1. ASTM C 754 for installing steel framing.
 2. Division 9 Section " Gypsum Board Assemblies " for applying and finishing panels.
- B. Install supplementary framing in gypsum board shaft-wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, and similar items that cannot be supported directly by shaft-wall assembly framing.
- C. At penetrations in shaft wall, maintain fire-resistance rating of shaft-wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, , and similar items.
- D. Isolate gypsum finish panels from building structure to prevent cracking of finish panels while maintaining continuity of fire-rated construction.
- E. Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly. Install acoustical sealant to withstand dislocation by air-pressure differential between shaft and external spaces; maintain an airtight and smoke-tight seal; and comply with manufacturer's written instructions or ASTM C 919, whichever is more stringent.

END OF SECTION 09 21 16

SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes non-load-bearing steel framing members for the following applications:
 - 1. Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).
 - 2. Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).
 - 3. 'Z' Girt framing between rigid insulation behind thin-set ground face CMU base.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

PART 2 - PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized, unless otherwise indicated.

2.2 SUSPENSION SYSTEM COMPONENTS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch-diameter wire.
- B. Hanger Attachments to Concrete:
 1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
 - a. Type: Postinstalled, expansion anchor.
 2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.
- D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.
 1. Depth: As indicated on Drawings.
- E. Furring Channels (Furring Members):
 1. Cold-Rolled Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
- F. Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Armstrong World Industries, Inc.; Drywall Grid Systems.
 - b. Chicago Metallic Corporation; Drywall Furring System.
 - c. USG Corporation; Drywall Suspension System.

2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES

- A. Steel Studs and Runners: ASTM C 645.
 - 1. Minimum Base-Metal Thickness: 0.0312 inch.
 - 2. Depth: As indicated on Drawings.
- B. Cold-Rolled Channel Bridging: 0.0538-inch bare-steel thickness, with minimum 1/2-inch- wide flanges.
 - 1. Depth: As indicated on Drawings.
 - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.
- C. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - 1. Minimum Base Metal Thickness: 0.0312 inch.
 - 2. Depth: As indicated on Drawings.
- D. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.
 - 1. Configuration: Asymmetrical or hat shaped.
- E. Cold-Rolled Furring Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch- wide flanges.
 - 1. Depth: 3/4 inch.
 - 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare-steel thickness of 0.0312 inch.
 - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch- diameter wire.
- F. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum bare-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.
- G. Z-shaped Furring at decorative CMU base or decorative stucco base: G90 galvanized finish without ventilation holes, face flange of 1 inch, wall attachment flange of 1 inch, minimum bare-metal thickness of 16 gauge (0.063"), and depth required to fit insulation thickness indicated.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide the following:
 1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.3 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

- C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- B. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
1. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

- a. Install two studs at each jamb, unless otherwise indicated.
 - b. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 2. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 3. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- C. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 09 22 16

SECTION 09 24 23
PORTLAND CEMENT STUCCO

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Materials and installation of exterior stucco wall covering backed with continuous insulation, air/moisture barrier, and drainage mat for frame walls.

1.01.1 RELATED SECTIONS

- A. Section 03 30 00 Cast-In-Place Concrete
- B. Section 04 20 00 Unit Masonry
- C. Section 07 92 00 Joint Sealants
- D. Section 08 51 13 Aluminum Windows
- E. Section 09 29 00 Gypsum Board

1.03 REFERENCED DOCUMENTS

A. ASTM Standards:

- | | | |
|-----|--------|--|
| 1. | A 641 | Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire |
| 2. | A 653 | Specification for Sheet Steel Zinc coated (Galvanized) by the Hot-Dip Process, Commercial Quality |
| 3. | B 69 | Specification for Rolled Zinc |
| 4. | C 144 | Specification for Aggregate for Masonry Mortar |
| 5. | C 578 | Specification for Preformed, Cellular Polystyrene Thermal Insulation |
| 6. | C 847 | Standard Specification for Metal Lath |
| 7. | C 897 | Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters |
| 8. | C 926 | Standard Specification for Application of Portland Cement-Based Plaster |
| 9. | C 1063 | Standard Specification for Installation of Lathing and Furring for Portland Cement Plaster |
| 10. | C 1177 | Specification for Glass Mat Gypsum for Use as Sheathing |
| 11. | C 1513 | Standard Specification for Steel Tapping Screws for Cold-Formed Steel |
| | | Framing Connections |
| 12. | D 226 | Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing |
| 13. | D 1784 | Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds |
| 14. | D 4541 | Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers |
| 15. | E 84 | Test Method for Surface Burning Characteristics of Building Materials |

16. E 96 Standard Test Methods for Water Vapor Transmission of Materials
 17. E 283 Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
 18. E 330 Test Method for Structural Performance of Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
 19. E 331 Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
 20. E 783 Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
 21. E 2178 Standard Test Method for Air Permeance of Building Materials
 22. E 2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
 23. E 2430 Standard Specification for Expanded Polystyrene ("EPS") Thermal Insulation Boards For Use in Exterior Insulation and Finish Systems ("EIFS")
 24. G 154 Recommended Practice for Operating Light-and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials
- B. APA Engineered Wood Association
1. PS 1 Voluntary Product Standard, Structural Plywood
 2. PS 2 Performance Standard for Wood-Based Structural-Use Panels
 3. E 30 APA Engineered Wood Construction Guide
- C. AISI (American Iron and Steel Institute)
1. AISI S200-2007 North American Standard for Cold-Formed Steel Framing-General Provisions
- D. ICC (International Code Council)
1. 2012 and 2015 IBC (International Building Code)
- E. ICC ES (International Code Council Evaluation Service)
1. AC 11, Acceptance Criteria for Cementitious Exterior Wall Coatings
 2. AC 212, Acceptance Criteria for Water-resistive Coatings used as Water-resistive
 3. Barriers over Exterior Sheathing
 4. ICC ESR 1233: StoGuard with Gold Coat, StoGuard with EmeraldCoat, and StoGuard VaporSeal Water-resistive Barriers, and StoEnergy Guard
 5. ICC ESR 2323: StoPowerwall and StoPowerwall NExT Stucco Systems
 6. ICC ESR 2142: Styrofoam Brand Insulation Boards and Dow Fan-Fold Products
- F. National Fire Protection Association (NFPA) Standards
1. NFPA 285, Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies containing Combustible Components Using the Intermediate-Scale, Multistory Test Apparatus
 2. NFPA 268, Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source
- G. South Coast Air Quality Management District (SCAQMD)

1. Rule 1113 (2007) – Architectural Coatings

H. Sto Corp. Addendum to Sto Stucco Specifications

I. US EPA (United States Environmental Protection Agency)

1. 40 CFR Part 59 (Code of Federal Regulations Title 40 Part 59 – National Volatile Organic Compound Emission Standards for Consumer and Commercial Products)

1.04 DESIGN REQUIREMENTS

A. Structural (wind and axial loads)

1. Design for maximum allowable deflection, normal to the plane of the wall of L/360
2. Design for wind load in conformance with code requirements
3. Metal framing: 18 gage (0.043 mil) or heavier, maximum 1-5/8 inch flange width, cold formed steel stud framing in conformance with AISI Standard S200-07
4. Maximum stud spacing: 16 inches (406 mm) on center
5. Sheathing: minimum 5/8 inch (19 mm) glass mat faced gypsum sheathing in conformance with ASTM C 1177
6. Insulation board: minimum 1 inch (25 mm), maximum 2 inch (51 mm) XPS (extruded polystyrene) insulation board in conformance with ASTM C 578 Type IV requirements
7. Drainage mat: maximum 1/4 inch (6 mm) thick tangled filament nylon core with fabric facing
8. Metal Lath: minimum 2.5 lb / yd² (1.4 kg / m²) self-furred galvanized steel diamond mesh metal lath in conformance with C 847
9. Lath fasteners and plates: corrosion resistant fasteners in conformance with AISI Standard S200-2007 and ASTM C 1513 with minimum three thread penetration beyond steel framing members, and minimum 1-1/4 inch (32 mm) corrosion resistant lath plates, with minimum fastener size and length of,
 - #8 x 3 inch (76 mm) for 1 inch (25 mm) insulation board thickness
 - #10 x 3-1/2 inches (89 mm) for 1-1/2 inch (38 mm) insulation board thickness
 - #10 x 4 inch (102 mm) for 2 inch (51 mm) insulation board thickness
10. Lath fastener spacing: maximum 6 inches (152 mm) vertically along studs
11. Stucco: minimum 3/4 inch (19 mm) or 7/8 inch (22 mm) portland cement stucco in conformance with ASTM C 926 of uniform thickness applied in two coats, scratch and brown coat.

B. Moisture Control

1. Prevent the accumulation of water into or behind the stucco, either by condensation or leakage into the wall construction, in the design and detailing of the wall assembly:
 - a. Provide corrosion resistant flashing to protect exposed elements and to direct water to the exterior, including, above window and door heads, beneath window and door sills, at floor lines, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, and at the base of the wall.
 - b. Air Leakage Prevention—prevent excess air leakage in the design and detailing of the wall assembly. Provide continuity between air barrier components in the wall assembly.
 - c. Vapor Diffusion and Condensation -- perform a dew point analysis of the wall assembly to determine the potential for accumulation of moisture in the wall assembly as a result of water vapor diffusion and condensation.

Adjust wall assembly components accordingly to minimize the risk of condensation. Avoid the use of vapor retarders on the interior side of the wall in warm, humid climates.

- d. Provide StoGuard Air/Moisture Barrier over sheathing.
- e. At through wall expansion joints and at joints formed with back-to-back casing beads, back joints with StoGuard Transition Membrane. Refer to Sto Guide Details at www.stocorp.com.
- f. Seal stucco terminations and accessory butt joints with appropriate sealant. Seal all penetrations through the stucco wall assembly with appropriate sealant, or backer rod and sealant, as dictated by joint type.

C. Grade Condition

1. Do not specify stucco for use below grade or on surfaces subject to continuous or intermittent water immersion or hydrostatic pressure. Provide minimum 4 inch (100 mm) clearance above earth grade, minimum 2 inch (51 mm) clearance above finished grade (pavers/sidewalk). Provide increased clearance in freeze/thaw climate zones.

D. Sloped surfaces, Including Foam Trim and Projecting Architectural Features Attached to Stucco.

1. Avoid the use of stucco on build-outs or weather exposed sloped and horizontal surfaces (refer to 2 and 3 below).
2. Build out trim and projecting architectural features from the stucco wall surface with code compliant EPS foam. All foam trim and projecting architectural features must have a minimum 1:2 [27°] slope along their top surface. All foam horizontal reveals must have a minimum 1:2 [27°] slope along their bottom surface. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface. Where trim/feature or bottom surface of reveal projects more than 2 inches (51 mm) from the face of the wall plane, protect the top surface with waterproof base coat. Limit foam thickness to a maximum of 4 inches (102 mm). Periodic inspections and increased maintenance may be required to maintain surface integrity of finishes on weather exposed sloped surfaces. Limit projecting features to easily accessible areas and limit total area to facilitate maintenance and minimize maintenance burden. Refer to Sto Guide Details at www.stocorp.com
3. Do not use foam on weather exposed projecting ledges, sills, or other projecting features unless supported by framing or other structural support and protected with metal coping or flashing. Refer to Sto Guide Details at www.sto-corp.com

E. Joints and Accessories

1. Provide two piece expansion joints in the stucco system where building movement is anticipated: at joints in the substrate or supporting construction, where the system is to be installed over dissimilar construction or substrates, at changes in building height, at floor lines, at columns and cantilevered areas.
2. Provide one piece expansion joints every 144 ft² (13 m²). Cut and wire tie lath to the expansion joint accessory so lath is discontinuous at or beneath the accessory. Do not exceed length to width ratio of 2-1/2:1 in expansion joint layout and do not exceed more than 18 feet (5.5 m) in any direction without an expansion joint. Where casing bead is used back-to-back as the expansion joint, back the joint with StoGuard Transition Membrane.
3. Provide one piece expansion joints at through wall penetrations, for example, above and below doors or windows.
4. Provide minimum 3/8 inch (9 mm) wide joints where the system abuts windows, doors and other through wall penetrations.

5. Provide appropriate accessories at stucco terminations and joints.
6. Avoid the use of channel reveal accessories which can interfere with proper drainage and proper stress relief.
7. Provide appropriate sealant at stucco terminations and at stucco accessory butt joints.
8. Indicate location of joints, accessories and accessory type on architectural drawings.

F. Fire Protection

1. Provide 15 minute thermal barrier, typically minimum ½ inch thick interior gypsum wall board, to separate foam plastic insulation from interior.
2. Noncombustible Type Construction: provide full width firestops at floor lines, typically 4 pcf (64 kg/m³) semi-rigid mineral wool, where metal framing runs continuously past floor line and provide minimum ¾ inch (19 mm) stucco thickness.
3. Fire Resistance Rated Non-load Bearing Wall Assembly: provide ¾ or 7/8 inch (19 or 22 mm) uniform stucco thickness. Refer to Sto Guide Details for one hour non-load bearing fire-resistive rated wall assembly.

G. Stucco Thickness (*does not include primer or textured finish coat*)

1. Application to Metal Plaster Bases: stucco thickness shall be uniform ¾ inch or 7/8 inch (19 or 22 mm). Stucco thickness shall not exceed 7/8 inch (22 mm).
2. Stucco shall be applied in 2 coats, scratch and brown coat, to achieve the prescribed thickness.
3. Thickness shall be uniform throughout the wall area.

1.03 PERFORMANCE REQUIREMENTS

A. Continuous Insulation

1. Compliant with ASTM C 578 Type IV requirements

B. Waterproof Air Barrier

1. Compliant with ICC ES Acceptance Criteria AC 212 (ICC ESR 1233)
2. Material Air Leakage Resistance, ASTM E 2178: less than 0.02 L/s·m² (0.004 cfm/ft² at 1.57 psf)
3. Assembly Air Leakage Resistance, ASTM E 2357: less than 0.2 L/s·m² (0.04 cfm/ft² at 1.57 psf)
4. Water Vapor Permeance, ASTM E 96, Method B: greater than 10 perms [573 ng/(Pa·s·m²)]
5. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed, less than 450, Class A Building Material
6. Tensile Adhesion, ASTM C 297:
 - Gypsum Sheathing, exceeds strength of substrate
 - Plywood, > 85 psi (590 kPa)
 - OSB, > 30 psi (206 kPa)
 - 7. VOC, calculation:
 - a. Less than 100 g/L
 - b. Compliant with US EPA 40 CFR 59 for waterproofing/sealer
 - c. Compliant with South Coast AQMD Rule 1113 for waterproofing/sealer

B. Drainage Mat

1. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A Building Material
2. Flame Propagation, NFPA 285: meets requirements for use on noncombustible (Types I,II,III, and IV) construction.

C. Stucco Base (*select one*)

1. Stucco scratch and brown coat material in compliance with ASTM C 926 and manufactured or listed by Sto Corp. (see Addendum)
2. One coat stucco material in compliance with ICC AC 11, listed by ICC ES, and manufactured or listed by Sto Corp. (see Addendum)

D. Primers

1. Alkaline Resistant Primer for freshly placed (minimum 4 day old) stucco surfaces:
 - a. Resistant to alkaline surfaces with pH of 13 or less
 - b. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
 - c. VOC: less than 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings

E. Finishes

1. Lotus-Effect Technology Finish (Stolit Lotusan)
 - a. Super-hydrophobic textured finish with Lotus-Effect Technology
 - b. Accelerated Weathering, ASTM G 154: 2500 hours, no blistering, checking, cracking, crazing, or other deleterious effects
 - c. Water Vapor Permeability, ASTM E 96, Method B: > 30 perms [(1172 ng/(Pa·s·m²))]
 - d. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
 - e. VOC: less than 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings

1.06 SUBMITTALS

- A. Manufacturer's specifications, details, installation instructions and product data.
- B. Manufacturer's code compliance report and UL Listing for continuous insulation
- C. Manufacturer's code compliance report for air barrier and water-resistive barrier
- D. Manufacturer's NFPA 285 assembly report or ICC ESR indicating compliance of stucco assembly, including continuous insulation, air/moisture barrier, and drainage mat, with requirements of NFPA 285 for use on Types I, II, III, and IV construction
- E. Manufacturer's code compliance report for stucco where ICC listed one coat stucco is used
- F. Manufacturer's standard warranty
- G. Samples for approval as directed by architect or owner
- H. Fastener manufacturer's pull-out or withdrawal capacity testing for frame construction
- I. Prepare and submit project-specific details (when required by contract documents)

1.07 QUALITY ASSURANCE

A. Manufacturer requirements

1. Stucco and air barrier products manufacturer for a minimum of twenty (20) years.
2. Stucco finish products and air/moisture barrier products manufactured under ISO 9001:2008 Quality System and 14001:2004 Environmental Management System.

B. Contractor requirements

1. Licensed, insured and engaged in application of portland cement stucco for a minimum of three (3) years.
2. Knowledgeable in the proper use and handling of Sto materials.
3. Employ skilled mechanics who are experienced and knowledgeable in portland cement stucco application, and familiar with the requirements of the specified work.
4. Successful completion of minimum of three (3) projects of similar size and complexity to the specified project.
5. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with Sto's published specifications and details and the project plans and specifications.

C. Insulation board manufacturer requirements

1. Listed by an approved agency. Label insulation board with information required by Sto, the approved listing agency, and the applicable building code. 2" (R-10) Type IV XPS Insulation Board. Provide manufacturer's approved spray foam and or tape to seal gaps between boards. Follow manufacturer's installation requirements and use manufacturer's approved fasteners and spacing.

D. Testing

1. Construct full-scale mock-up of typical stucco/window wall assembly with specified tools and materials and test air and water infiltration and structural performance in accordance with ASTM E 283, E 331 and E 330, respectively, through independent laboratory. Mock-up shall comply with requirements of project specifications. Where mock-up is tested at job site maintain approved mock-up at site as reference standard. If tested off-site accurately record construction detailing and sequencing of approved mock-up for replication during construction.
2. Conduct air barrier adhesion testing in accordance with ASTM D 4541.
3. Conduct air barrier assembly testing in accordance with ASTM E 783.
4. Verify adequacy of pull-out or withdrawal capacity of fasteners used for frame construction with manufacturer in relation to negative design wind pressures.
5. Conduct pH testing to check stucco surface alkalinity before application of primer or finish materials. Where alkaline resistant primer is used pH testing may be waived.
6. Conduct wet sealant adhesion testing in accordance with sealant manufacturer's field quality control test procedure.
7. Notify design professional minimum 7 days prior to testing.

E. Inspections

1. Provide independent third party inspection where required by code or contract documents.
2. Conduct inspections in accordance with code requirements and contract documents.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.
- B. Protect insulation materials from prolonged UV exposure, keep away from sources of heat, sparks, flame, flammable or volatile materials. Store on a clean, flat surface, off the ground in a dry area.
- C. Protect coatings (pail products) from freezing and temperatures in excess of 90°F (32°C). Store away from direct sunlight.
- D. Protect portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.
- E. Handle all products as directed on labeling.

1.09 PROJECT/SITE CONDITIONS

- A. Maintain ambient and surface temperatures above 40°F (4°C) during application and for 24 hours after set of stucco, and application of waterproof air barrier and finish materials.
- B. Provide supplementary heat for installation in temperatures less than 40°F (4°C) such that material temperatures are maintained as in 1.09A. Prevent concentration of heat on uncured stucco and vent fumes and other products of combustion to the outside to prevent contact with stucco.
- C. Prevent uneven or excessive evaporation of moisture from stucco during hot, dry or windy weather. For installation under any of these conditions provide special measures to properly moist cure the stucco. Do not install stucco if ambient temperatures are expected to rise above 100°F (38°C) within a 24 hour period.
- D. Provide protection of surrounding areas and adjacent surfaces from application of materials.

1.10 COORDINATION/SCHEDULING

- A. Protect continuous insulation from prolonged UV exposure. Protect with wall covering within 60 days of installation.
- B. Protect sheathing from climatic conditions to prevent weather damage until the installation of the waterproof air barrier.
- C. Install diverter flashings wherever water can enter the wall assembly to direct water to the exterior.
- D. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuous air barrier and continuous moisture protection. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall and provide sill flashing. Coordinate

installation of air/moisture barrier components with window and door installation to provide weather proofing of the structure and to prevent moisture infiltration and excess air infiltration.

- E. Install window and door head flashing immediately after windows and doors are installed.
- F. Protect air/moisture barrier with stucco cladding within 180 days of installation.
- G. Protect drainage mat with stucco cladding within 30 days of installation.
- H. Commence the stucco installation after completion of all floor, roof construction and other construction that imposes dead loads on the walls to prevent excessive deflection (and potential cracking) of the stucco.
- I. Sequence interior work such as drywall installation prior to stucco installation to prevent stud distortion (and potential cracking) of the stucco.
- J. Provide site grading such that the stucco terminates above earth grade minimum 4 inches (100 mm) and above finished grade (pavers/sidewalk) minimum 2 inches (51 mm). Provide increased clearance in freeze/thaw climate zones.
- K. Install copings and sealant immediately after installation of the stucco and when finish coatings are dry.
- L. Attach penetrations through stucco to structural support and provide air tight and water tight seals at penetrations.

1.11 WARRANTY

- A. Provide manufacturer's standard warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Air/Moisture Barrier, Drainage Mat, Portland Cement Stucco, Stucco Primers, and Stucco Finishes
 - 1. Sto Corp., 3800 Camp Creek Parkway, Building 1400, Suite 120. Atlanta, GA 30331

2.02 AIR/MOISTURE BARRIER

- A. StoGuard-- fluid applied waterproof air barrier for sheathing, concrete, and concrete masonry substrates consisting of multiple compatible components:
 - 1. Sto Gold Fill -- ready mixed acrylic based flexible joint treatment for rough opening protection, joint treatment of wall sheathing, CMU crack repair, and detail component for shiplap connections with flashing, weep screed, and similar ship lap details.
 - 2. Sto EmeraldCoat -- ready mixed flexible waterproof coating for wall sheathing, concrete and CMU wall surfaces
 - 3. Sto AirSeal™ -- ready mixed medium-high build coating applied by brush, roller or spray for rough opening protection of frame walls and joint treatment of sheathing when used with StoGuard Fabric. Also used as a detail

- component with StoGuard Fabric to splice over back flange of starter track, flashing, and similar shingle lap details
4. StoGuard Mesh-- nominal 4.2 oz/yd² (142 g/m²), self-adhesive, flexible, symmetrical, interlaced glass fiber mesh, with alkaline resistant coating for compatibility with Sto materials, used with Sto Gold Fill to reinforce rough openings, inside and outside corners, sheathing joints, and shiplap connections with flashing, weep screed, and similar shingle lap details
5. StoGuard Fabric - nonwoven cloth reinforcement used with Sto EmeraldCoat for rough opening protection, joint treatment of wall sheathing, and detail component for shiplap connections with flashing, weep screed, and similar shingle lap details
6. StoGuard RediCorner - a preformed fabric piece used in the corners of rough openings in tandem with StoGuard Fabric for quicker installation
7. StoGuard Tape – self adhering rubberized asphalt tape for rough opening protection in wood or metal frame construction
8. StoGuard Primer – primer for use with StoGuard Tape
9. StoGuard Transition Membrane - flexible air barrier membrane for continuity at static transitions: sheathing to foundation, dissimilar materials (CMU to frame wall), wall to balcony floor slab or ceiling, flashing shingle lap transitions. Also used for dynamic joints: floor line deflection joints, masonry control joints, and through wall joints in masonry or frame construction.
10. Sto RapidGuard™ - one component STPE rapid drying gun-applied treatment for sheathing joints, rough openings, seams, cracks, penetrations and other static transitions in above grade wall construction such as: shingle lap over flashing, wall to balcony floor slab or ceiling, and through wall penetrations – pipes, electrical boxes, and scupper penetrations
11. StoGuard RapidSeal – one component quick drying waterproof air barrier material for rough opening protection, sheathing joints (with StoGuard Mesh), CMU crack repair, and for sealing fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air barrier materials
12. StoGuard RapidFill - one component rapid drying gun-applied joint treatment for sheathing. Also used at static transition joints or seams in construction and to seal fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air barrier materials. Also used as a detail component for shiplap connections to flashing, weep screed, and similar ship lap details

2.03 CONTINUOUS INSULATION

- A. Owens Corning Type IV XPS rigid insulation board in compliance with ASTM C 578.
- B. Dow Type IV XPS rigid insulation board in compliance with ASTM C 578.

2.04 SPRAY FOAM ADHESIVE, CI SEAM AND GAP FILLER

- A. Sto TurboStick – single component polyurethane spray foam adhesive for attaching foam insulation and filling seams and gaps in insulation board surface.

2.05 WATER-RESISTIVE BARRIER

- A. Minimum No. 15 asphalt saturated felt complying with ASTM D 226, Type 1, or one layer of Grade D kraft building paper, or paper-backed stucco lath conforming to 2.07.

2.06 DRAINAGE MAT

- A. Sto DrainScreen 6mm – nominal ¼" (6 mm) tangled filament nylon core drainage mat with fabric facing.

2.07 LATH

- A. Minimum 2.5 lb./yd² (1.4 kg/m²) self-furred galvanized steel diamond mesh metal lath in compliance with ASTM C 847

2.08 MECHANICAL FASTENERS FOR METAL LATH

- A. Non-corroding fasteners in compliance with AISI S200 – 2007 and ASTM C 1513:
1. Wood Framing--minimum #10 Type S wafer head fully threaded corrosion resistant screws with minimum 1 inch (25 mm) penetration into studs.
 2. Steel Framing— corrosion resistant fasteners and plates with minimum three thread penetration beyond steel framing members, and with minimum fastener size and length of,
 - #8 x 3 inch (76 mm) for 1 inch (25 mm) insulation board thickness
 - #10 x 3-1/2 inches (89 mm) for 1-1/2 inch (38 mm) insulation board thickness
 - #10 x 4 inch (102 mm) for 2 inch (51 mm) insulation board thickness
- B. Tie Wire—18 gauge galvanized and annealed low-carbon steel in compliance with ASTM A 641 with Class I coating.

2.09 ACCESSORIES

- A. Weep screed, casing bead, corner bead, corner lath, expansion and control joint accessories. All accessories shall meet the requirements of ASTM C 1063 and its referenced documents
1. Zinc in compliance with ASTM B 69, 99% pure zinc.
- B. All accessories shall have perforated or expanded flanges and shall be designed with grounds for the specified thickness of stucco.

2.10 JOB MIXED INGREDIENTS

- A. Water: clean and potable.
- B. Sand: in compliance with ASTM C 897 or C 144, for use with one coat and C 926 stucco concentrates

2.11 STUCCO

- A. 102 StoPowerwall Stucco Pre-Blended: fiber reinforced one coat portland cement stucco pre-blended with graded sand, and in compliance with ICC AC 11. See ICC ESR 2323.
- B. 103 StoPowerwall Stucco: fiber reinforced one coat portland cement stucco concentrate in compliance with ICC AC 11. See ICC ESR 2323.

- C. 108 StoPowerwall Scratch & Brown: portland cement-based stucco concentrate in compliance with ASTM C 926.

- D. Other code compliant portland cement stucco as listed by Sto Corp. (refer to Addendum)

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2.12 FOAM TRIM AND BUILD-OUTS

- A. Adhesive and Base Coat (*select one*)

1. Sto BTS Xtra - light weight one component polymer modified cement-based extra high build base coat material
2. Sto BTS Plus - one component polymer modified cement-based high build base coat material
3. Sto Primer/Adhesive-B - one component polymer modified cement-based base coat material
4. Sto Primer/Adhesive – two component acrylic based base coat material field mixed with portland cement
5. Sto RFP – ready mixed non-cementitious fiber reinforced base coat material
6. Sto Flexyl – two component fiber reinforced acrylic based waterproof base coat material field mixed with portland cement (for use as a waterproof base coat to waterproof foundations, parapets, splash areas, trim and other projecting architectural features).

- B. Foam Insulation Board for Trim

1. Sto EPS Insulation Board--nominal 1.0 lb/ft³ (16 kg/m³) Expanded Polystyrene (EPS) Insulation Board in compliance with ASTM C 578 Type I requirements, and ASTM E 2430,

- C. Reinforcing Mesh

1. Sto Mesh--nominal 4.5 oz./yd² (153 g/m²), symmetrical, interlaced open-weave glass fiber mesh treated with alkaline resistant coating for compatibility with Sto materials
2. Sto Detail Mesh--nominal 4.2 oz/yd² (143 g/m²), flexible, symmetrical, interlaced open-weave glass fiber fabric treated with alkaline resistant coating for compatibility with Sto materials
- 3.

2.13 CRACK DEFENSE

- A. Base Coat

1. Sto BTS Plus - one component polymer modified cement-based high build base coat material

- B. Reinforcing Mesh

1. Sto Mesh - nominal 4.5 oz./yd² (153 g/m²), symmetrical, interlaced open-weave glass fiber mesh made with alkaline resistant coating for compatibility with Sto materials.

2.14 PRIMER

- A. StoPrime Hot—acrylic based primer/sealer for freshly placed (minimum 4 day old) and high pH stucco surfaces.

2.15 FINISH COAT

- A. Stolit Lotusan Finish - integrally colored, factory blended textured Lotus-Effect Technology wall finish with graded marble aggregate
- B. StoSignature Finishes – Stolit acrylic based textured wall finish applied over Sto Crack Defense with specialized techniques to achieve unique textures, impressions or effects. Refer to www.stocorp.com for StoSignature Finishes Brochure and Installation Guides.

2.16 MIXING

- A. StoGuard
 - 1. Sto Gold Fill - mix with a clean, rust-free electric drill and paddle to a uniform consistency. Do not thin, or dilute with water.
 - 2. Sto AirSeal – mix with a clean, rust-free electric drill and paddle to a uniform consistency. Do not thin, or dilute with water.
 - 3. Sto EmeraldCoat - mix with a clean, rust-free electric drill and paddle to a uniform consistency. Do not thin, or dilute with water.
- B. StoPowerwall Stucco
 - 1. Refer to mix instructions on packaging. USE ONLY THE AMOUNT OF WATER NECESSARY FOR A WORKABLE MIX. Use of excess water is detrimental to performance.
- C. Adhesive and Base Coats for Sto Crack Defense and Foam Build-outs:
 - 1. Refer to applicable Sto [Product Bulletin](#) for selected adhesive/base coat material(s).
- D. Primer--mix with a clean, rust-free high speed mixer to a uniform consistency.
- E. Finish--mix with a clean, rust-free high speed mixer to a uniform consistency. A small amount of water (up to 12 ounces [0.4 L]) may be added to adjust workability. Limit addition of water to amount needed to achieve the finish texture.
- F. Mix only as much material as can readily be used.
- G. Do not add lime, anti-freeze compounds, or other additives to any of the materials.

PART 3 EXECUTION

3.01 ACCEPTABLE INSTALLERS

- A. Pre-qualify under Quality Assurance requirements of this specification (section 1.07.B).

3.02 EXAMINATION

- A. Inspect sheathing surfaces for:

1. Damage and deterioration.
 2. Moisture damage—record any areas of moisture damage.
- B. Inspect sheathing application for compliance with applicable requirement:
1. Glass Mat Faced Gypsum Sheathing in compliance with ASTM C 1177—refer to manufacturer's instructions and/or ICC evaluation report
 2. Exterior Grade and Exposure 1 wood based sheathing—APA Engineered Wood Association E 30.
- C. Report deviations from the requirements of project specifications or other conditions that might adversely affect the waterproof air barrier, CI, or stucco installation to the General Contractor. Do not proceed with air barrier, CI, or stucco installation until deviations are corrected.

3.03 SURFACE PREPARATION.

- C. Sheathing
1. Remove surface contaminants and replace damaged sheathing.
 2. All sheathing must be handled and installed in compliance with applicable building code and/or manufacturer requirements. Installed sheathing must be clean, dry and free from damage, frost, and all bond-inhibiting materials. Abut gypsum sheathing joints. Gap wood sheathing 1/8 inch (3 mm) at joints. Should gaps exceed 1/8 inch (3 mm) up to 1/2 inch (13 mm) wide, use Sto RapidGuard or StoGuard RapidFill to fill joints, or apply low expanding urethane foam into joints and rasp or shave flush with sheathing surface in preparation for installation of StoGuard joint treatment.
 3. Spot surface defects in sheathing with joint treatment (Sto Gold Fill, Sto RapidGuard, StoGuard RapidSeal, StoGuard RapidFill, or Sto EmeraldCoat).

3.04 AIR/MOISTURE BARRIER INSTALLATION

- A. The following instructions are applicable to:
1. Exterior or Exposure I Plywood in compliance with PS-1
 2. OSB (Oriented Strand Board) in compliance with PS-1 or PS-2
 3. Glass Mat Faced Gypsum Sheathing in compliance with ASTM C 1177
- B. Transition Detailing
1. Detail transition areas with Sto RapidGuard (static joints and seams) or StoGuard Transition Membrane (dynamic joints and seams) to achieve air barrier continuity. For illustrations of installation, refer to Sto Guide Details and Sto RapidGuard Installation Guide or StoGuard Transition Membrane Installation Guide (www.stocop.com)
- C. Rough Opening Protection Sto Gold Fill with StoGuard Mesh: apply 9 inch (229 mm) wide StoGuard Mesh at rough openings. Immediately apply Sto Gold Fill by spray or trowel over the mesh and spread smooth with a trowel to completely cover the mesh (refer to Sto Detail 20.20M).
- D. Sheathing Joint Treatment
1. Sto Gold Fill with StoGuard Mesh: place 4 inch (102 mm) wide mesh centered along sheathing joints and minimum 9 inch (229 mm) wide mesh centered and folded at inside and outside corners. Immediately apply Sto Gold Fill by

spray or trowel and spread smooth with a trowel to completely cover the mesh.

E. Air/Moisture Barrier Coating Installation

1. Plywood and Gypsum Sheathing: apply waterproof coating by spray or roller over sheathing surface, including the dry joint treatment, rough opening protection, and transition areas, to a uniform thickness of 10 wet mils in one coat (Sto EmeraldCoat) or 50 wet mils in one coat (Sto AirSeal). Use ½ inch (13 mm) nap roller for plywood. Use ¾ inch (19 mm) nap roller for glass mat faced gypsum sheathing. Protect from weather until dry.
2. OSB Sheathing: apply waterproof coating by spray or with a ¾ inch (19 mm) nap roller to sheathing surface to a uniform thickness of 10 wet mils (Sto EmeraldCoat) or 50 wet mils in one coat (Sto AirSeal). Protect rough openings, joints, and parapets (Paragraph 3.04D), then apply a second coat of waterproof coating.

F. Air /Moisture Barrier Connections and Shingle Laps

1. Coordinate installation of connecting air barrier components with other trades to provide a continuous air tight membrane.
2. Coordinate installation of flashing and other moisture protection components with other trades to achieve complete moisture protection such that water is directed to the exterior, not into the wall assembly, and drained to the exterior at sources of leaks (windows, doors and similar penetrations through the wall assembly).
3. Splice-in head flashings above windows, doors, floor lines, roof/sidewall step flashing, and similar locations with StoGuard detail component to achieve shingle lap of the air/moisture barrier such that water is directed to the exterior.

NOTE: DO NOT ALLOW WATERPROOF AIR BARRIER INSTALLATION TO REMAIN EXPOSED MORE THAN 180 DAYS. PROTECT WITH STUCCO WALL COVERING PROMPTLY AFTER INSTALLATION.

3.05 CONTINUOUS INSULATION INSTALLATION

- A. Attach insulation boards to framing with corrosion resistant bugle head metal screws and 1-1/4 inch metal lath locks or other corrosion resistant cap fastener. Use only enough fasteners (typically 3 per board mid-span) to temporarily hold the board in place. Sto TurboStick can also be applied on the back of the insulation board (minimum 4 – 8 vertical ribbons per board) to temporarily hold the insulation in place. (lath attachment is intended to permanently hold it in place).
- B. Attach in courses with vertical joint staggered.
- C. Cut insulation board in an “L” shape around openings. Tightly abut insulation board joints and interlock inside and outside corners. Trim or rasp board flush for square corners.
- D. Seal gaps or open joints with Sto TurboStick spray foam and rasp or shave flush with surface.
- E. Do not allow insulation board to be exposed to weather from more than 60 days.

3.06 SHEET WATER-RESISTIVE BARRIER INSTALLATION

- A. Install in compliance with the applicable building code requirements for building paper. Lap paper over foundation weep screed attachment flange, floor line flashing, and window/door head flashings. Refer to Sto Gide Details at www.stocorp.com

3.07 DRAINAGE MAT INSTALLATION

- A. Place drainage mat against the wall surface and unroll horizontally with the fabric facing out. Hammer-tack or staple into continuous insulation with corrosion-resistant fasteners. Use as few fasteners as needed to hold the mat in place, starting from the bottom of the wall at base flashing or weep screed and working up. Do not fasten through flashing. Shingle lap fabric at horizontal courses. Shingle lap drainage mat over weep screeds, flashing at floor lines, decks, roof lines, window heads, and other areas where flashing is required, to direct water to the exterior. Butt ends of rolls and vertical seams. Trim around windows, doors, vents, or other penetrations through the wall. Do not install behind window nail flanges. Immediately follow installation of drainage mat with stucco lath installation. Where stucco lath installation will not immediately follow installation of drainage mat, use corrosion-resistant cap nails, cap staples, or cap screws every 16 inches (406 mm) on center along framing for more secure attachment. Cover drainage mat with stucco within 30 days of installation.

3.08 STUCCO INSTALLATION

Apply the stucco in discrete panels without interruption to avoid cold joints and differences in appearance. Abut wet stucco to set stucco at natural or architectural breaks in the wall such as expansion joints, pilasters, terminations, or changes in plane. Hot or dry conditions accelerate drying and moisture loss from stucco which can diminish strength and resistance to cracking. Under these conditions adjustments in the application, scheduling and curing of stucco to prevent rapid loss of moisture are necessary to achieve a satisfactory stucco installation. Cold temperatures retard drying and strength gain and adjustments may have to be made in the application, scheduling and curing of stucco to prevent damage from frost and other trades. Do not install stucco during extremely hot, dry and/or windy conditions. Do not install stucco during freezing conditions or on frozen substrates. Do not install stucco onto grounds of accessories. Completely embed lath and flanges of accessories and completely cover fastener attachments with stucco. Moist cure stucco minimum 48 hours for optimum strength gain and resistance to cracking. Allow final stucco application to completely dry (28 days) before applying primer or finish or until pH of stucco surface is less than 10 (except in the case of StoPrime Hot which can be applied 48 hours after completing moist cure of stucco). The finished installation must be true, plumb and square. Should stucco get into control or expansion joints, remove the stucco from within the joint before the stucco sets.

After satisfactory inspection of surfaces and correction of any deviations from specification requirements commence the stucco installation as described below:

- A. Installation over StoGuard/Sto DrainScreen
 - 1. Weep Screed Installation
 - a. Install foundation weep screed at the base of the wall securely to solid substrate or framing with the appropriate fastener. Locate foundation weep screed so that it overlaps the joint between the foundation and framing by a minimum of 1 inch (25 mm). Locate the foundation weep screed nosing minimum 4 inches (100 mm) above earth grade, 2 inches (51 mm) above finished grade (paved surfaces, for example). Lap water-proof air barrier, sheet water-resistive barrier, and drainage mat over the weep screed attachment flange.

2. Casing Bead and Two Piece Expansion Joint Installation
 - a. Install casing beads at stucco terminations—doors, windows and other through wall penetrations. Install two piece expansion joints (or back-to-back casing beads) at building expansion joints, thru-wall joints in concrete or CMU, where the stucco is to be installed over dissimilar construction or substrates, at changes in building height, at floor lines, columns, and cantilevered areas. Install full accessory pieces where possible and avoid small pieces. Seal adjoining pieces by embedding ends in sealant. Abut horizontal into vertical joint accessories (except where horizontal movement joints exist that prevent continuous vertical runs of accessories). Attach at no more than 7 inches (178 mm) into solid substrate/framing with appropriate fasteners.
3. Lath Installation
 - a. Diamond Mesh Metal Lath – conform to ASTM C 1063
 - i. General--install metal lath with the long dimension at right angles to structural framing (horizontally on solid substrates). Terminate lath at expansion joints. Do not install continuously at joints.
 - ii. Seams/Overlaps--overlap side seams minimum 1/2 inch (13 mm) and end seams minimum 1 inch (25 mm). Stagger end seams. Overlap casing beads and expansion joints minimum 1 inch (25 mm) over narrow wing accessories, minimum 2 inches (51 mm) over expanded flange accessories. Do not install lath continuously beneath expansion joints.
 - iii. Attachment--fasten securely through sheathing into structural framing at 6 inches (152 mm) on center maximum vertically and 16 inches (406 mm) on center horizontally*. Wire tie at no more than 9 inches (225 mm) on center at: side laps, accessory overlaps, and where end laps occur between supports.
 - b. Paper-backed lath—follow installation as for diamond mesh metal lath. Lap lath over lath, not paper to lath overlap. For horizontal overlaps the paper backing must lap shingle style behind the lath to lath overlap.
4. One Piece Expansion Joint Installation
 - a. Install one piece expansion joints at through wall penetrations, for example, above and below doors and windows. Install one piece expansion joints at every 144 ft² (13 m²). Wire tie one piece expansion joints to lath at no more than 7 inches (178 mm) on center. Seal adjoining pieces by embedding ends in sealant. Make certain lath is DISCONTINUOUS at or beneath joints.
5. Inside and Outside Corners
 - a. Install corner lath at inside corners and corner bead at outside corners over lath. Attach through lath into solid substrate or framing at no more than 7 inches (178 mm) on center with appropriate fasteners.
6. Stucco Installation
 - a. Scratch Coat: apply stucco with sufficient pressure to key into and embed the metal lath. Apply sufficient material, 3/8 or 1/2 inch (9 or 12 mm), to cover the metal lath and to permit scoring the surface. Score the stucco upon completion of each panel in preparation for a second coat. Score horizontally.
 - b. Brown Coat: as soon as the first coat is firm enough to receive the second coat without damage, apply the second coat. Alternatively, moist cure the first coat up to 48 hours and dampen the scratched surface with water immediately before applying the second coat. Apply the second coat with sufficient pressure to ensure intimate contact with the first coat and as

needed to bring the stucco to a uniform thickness that matches the grounds of the accessories. Use a rod or straight edge to bring the surface to a true, even plane. Fill depressions in plane with stucco. Final thickness of stucco shall be uniform throughout the wall area and shall be either 3/4 inch or 7/8 inch (19 or 22 mm), and shall not exceed 7/8 inch (22 mm).

- c. After the stucco has become slightly firm float the surface lightly with a darby or wood float to densify the surface and to provide a smooth, even surface. The proper time to float is when the wood float no longer sticks to the surface of the stucco.
- d. Moist cure after the stucco has set by lightly fogging for at least 48 hours. Fog as frequently as required during the 48 hour period to prevent loss of moisture from the stucco. Avoid eroding the stucco surface with excess moisture. If relative humidity exceeds 75% the frequency of moist curing can be diminished.

B. Foam Trim and Build-Outs

1. Where foam build-outs terminate at a dissimilar material such as a window, door or other non-stucco surface, backwrap the foam build-out by installing detail mesh onto the terminating edge of the stucco. Embed the mesh in the foam trim adhesive. Allow the mesh to dangle until the backwrapping procedure is completed (B4).
2. Install foam build-outs directly over hardened stucco with foam trim adhesive. Apply adhesive with the appropriate size notched trowel to the back of the insulation board and immediately place build-out in the proper location on the wall. Press firmly into place and trim or tool excess adhesive from ends and edges of foam trim for a smooth void-free connection to the stucco substrate.
3. After the adhesive has cured sufficiently to hold the build-out firmly in place, rasp the entire foam surface smooth.
4. Complete the backwrapping procedure by applying the foam trim base coat to the exposed edges of the foam build-out and minimum 2-1/2 inches (64 mm) onto the face. Pull the backwrap mesh around the foam build-out and fully embed it into the base coat. Use a corner trowel for neat straight corners.
5. Apply the base coat to the foam build-out and approximately 3 inches (76 mm) onto the adjacent stucco surfaces to an approximate thickness of 1/8 inch (3 mm). Immediately embed the reinforcing mesh in the wet base coat. Trowel from the center to the edges of the mesh to avoid wrinkles and remove excess base coat. Overlap mesh seams minimum 2-1/2 inches (64 mm). Overlap mesh onto adjacent stucco wall surfaces minimum 2-1/2 inches (64 mm) at terminations of the foam build-out and feather onto the stucco wall surface. Alternatively, If Crack Defense is used apply Crack Defense with its reinforcing mesh continuously from the stucco wall surface over foam build-outs (refer to 3.08 C).

C. Crack Defense

1. Apply base coat over the moist cured stucco (and foam build-outs if not already reinforced with mesh) with appropriate spray equipment or a stainless steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Overlap mesh not less than 2-1/2 inches (64 mm) at mesh seams and at overlaps of detail mesh. Feather seams and edges. Avoid wrinkles in the mesh. The mesh must be fully embedded so that no mesh color shows through the base coat when it is dry. Re-skim with additional base coat if

mesh color is visible. Do not install base coat or mesh over joints or accessories in the stucco wall assembly.

D. Primer Installation

1. StoPrime Hot—Moist cure stucco for a minimum of 48 hours. Allow stucco to dry an additional 48 hours, then apply primer evenly with brush, roller or proper spray equipment over the clean, dry stucco and foam build-outs, and allow to dry. Final age of primed stucco application must be minimum 7 days before application of finish.
2. StoPrime Sand—Moist cure stucco for a minimum of 48 hours. Wait until stucco is 28 days old or the pH level of the surface is below 10 before applying primer. Final age of primed stucco application must be minimum 28 days before application of finish or pH must be below 10.
3. StoPrime— Moist cure stucco for a minimum of 48 hours. Wait until stucco is 28 days old or the pH level of the surface is below 10 before applying primer. Final age of primed stucco application must be minimum 28 days before application of finish or the pH must be below 10.

D. Finish Installation

1. Apply finish to minimum 28 day old stucco or primed stucco and foam build-outs, or when pH of stucco surface is less than 10. If StoPrime Hot is used as the primer the primed stucco/foam build-out surfaces need only be minimum 7 days old. Apply finish by spraying or troweling with a stainless steel trowel, depending on the finish specified. Follow these general rules for application of finish:
 - a. Avoid application in direct sunlight.
 - b. Apply finish in a continuous application, and work a wet edge towards the unfinished wall area. Work to an architectural break in the wall before stopping to avoid cold joints.
 - c. Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying. Adjustments in the scheduling of work may be required to achieve desired results; cool or damp conditions extend working time and retard drying and may require added measures of protection against wind, dust, dirt, rain and freezing. Adjust work schedule and provide protection.
 - d. Float "R" (rilled or swirl texture) finishes with a plastic float to achieve their rilled texture
 - e. Do not install separate batches of finish side-by-side.
 - f. Do not apply finish into or over sealant joints. Apply finish to outside face of wall only.
 - g. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.
 - h. Do not install finish over high pH (≥ 10) stucco surfaces or surfaces that have not been fully cured.

3.09 PROTECTION

- A. Provide protection of installed materials from water infiltration into or behind them.
- B. Provide protection of installed stucco from dust, dirt, precipitation, and freezing.
- C. Provide protection of installed primer and finish from dust, dirt, precipitation, freezing and continuous high humidity until fully dry.

- D. Provide sealant and backer material at stucco terminations and at fixture penetrations through the stucco to protect against air, water and insect infiltration. Provide weeps at floor lines, window and door heads, and other areas to conduct water to the exterior.

3.10 CLEANING, REPAIR AND MAINTENANCE

- A. Clean and maintain the stucco finish for a fresh appearance and to prevent water entry into and behind the stucco. Repair cracks, impact damage, spalls or delamination promptly.
- B. Maintain adjacent components of construction such as sealants, windows, doors, and flashing, to prevent water entry into the wall assembly.
- C. Refer to Sto reStore Repair and Maintenance Guide ([reStore Program](#)) for detailed information on stucco restoration - cleaning, repairs, recoating, resurfacing and refinishing, or re-cladding.

SECTION 09 29 00
GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior gypsum board.
 - 2. Tile backing panels.
 - 3. Exterior Sheathing
- B. Related Sections include the following:
 - 1. Division 7 Section "Thermal Insulation" for insulation and vapor retarders installed in assemblies that incorporate gypsum board.
 - 2. Division 7 Section "Foamed in Place Insulation" for insulation installed in assemblies that incorporate gypsum sheathing
 - 3. Division 9 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board.

1.3 SUBMITTALS

- A. Samples: For the following products:
 - 1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

1.4 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

- C. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - b. Each texture finish indicated.
 - 2. Apply or install final decoration indicated, including painting and wall coverings, on exposed surfaces for review of mockups.
 - 3. Simulate finished lighting conditions for review of mockups.
 - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PANELS, GENERAL

- A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated
- B. Type: All gypsum board shall be Type 'X'.

2.2 INTERIOR GYPSUM BOARD

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Continental Building Products
 - b. G-P Gypsum
 - c. National Gypsum Company
 - d. USG Corporation.
- B. Type X:
 - 1. Thickness: 5/8 inch.
 - 2. Long Edges: Tapered.
- C. Moisture and Mold-Resistant Type: With moisture and mold-resistant core and surfaces.
 - 1. Core: 5/8 inch, Type X.
 - 2. Long Edges: Tapered.
- D. Acoustically Enhanced Gypsum Board: ASTM C1396/C1396M. Multilayer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core.
 - 1. Core: 5/8 inch, Type X.
 - 2. Long Edges: Tapered.
- E. Impact-Resistant Gypsum Board: complying with ASTM C1629. Constructed of high-density, mold and moisture resistant, Type X core covered front and back in heavyweight paper facers or tough fiberglass mats.
 - 1. Core: 5/8 inch, Type X.
 - 2. Long Edges: Tapered.

2.3 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board:
 - 1. Complying with ASTM C 1178/C 1178M.
 - a. Product: Subject to compliance with requirements, provide "DensShield Tile Guard" by G-P Gypsum.
 - 2. Complying with ASTM C1177/C 1177M.

- a. Product: Subject to compliance with requirements, provide "DensArmor Plus Interior Guard" by G-P Gypsum.

2.4 EXTERIOR SHEATHING

- A. Paperless sheathing panel made of a treated, water resistant core, surface with glass mat facings:
 - 1. Complying with ASTM C1177, ASTM E119.
 - a. Product: Subject to compliance with requirements, provide "DensGlassGold" by G-P Gypsum.

2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 - 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Wallboard: Paper.
 - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant: As specified in Division 7 Section "Joint Sealants."
- F. Thermal Insulation: As specified in Division 7 Section "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: Vertical surfaces, unless otherwise indicated.
 - 2. Moisture- and Mold-Resistant Type: As indicated on Drawings.

- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

- C. Multilayer Application:
 - 1. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 - 2. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
 - 3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panel: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners.
 - 2. LC-Bead: Use at exposed panel edges.
 - 3. L-Bead: Use where indicated.
 - 4. Curved-Edge Cornerbead: Use at curved openings.

3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in other Division 9 Sections.

- E. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.

3.7 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

SECTION 09 30 00
CERAMIC TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes, but is not limited to, the following:
 - 1. Ceramic floor tile.
 - 2. Glazed wall tile.
 - 3. Quarry Tile
 - 4. Waterproof membranes for tile installations.
 - 5. Stone thresholds installed as part of the tile installation.
- B. Related Sections include the following:
 - 1. Division 7 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
 - 2. Division 9 Section "Gypsum Board" for tile backing panels.

1.3 DEFINITIONS

- A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.
- B. Facial Dimension: Actual tile size (minor facial dimension as measured per ASTM C 499).
- C. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

1.4 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 - 1. Level Surfaces: Minimum 0.6.

- B. Load-Bearing Performance: For ceramic tile installed on walkway surfaces, provide installations rated for the following load-bearing performance level based on testing assemblies according to ASTM C 627 that are representative of those indicated for this Project:

- 1. Heavy: Passes cycles 1 through 12.

1.5 SUBMITTALS

- A. Product Data: For each type of tile, mortar, grout, and other products specified.
- B. Shop Drawings: For the following:
 - 1. Tile patterns and locations.
 - 2. Widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification: Of each item listed below, prepared on Samples of size and construction indicated. Where products involve normal color and texture variations, include Sample sets showing the full range of variations expected.
 - 1. Each type and composition of tile and for each color and texture required, at least 12 inches square, mounted on braced cementitious backer units, and with grouted joints using product complying with specified requirements and approved for completed work in color or colors selected by Architect.
 - 2. Full-size units of each type of trim and accessory for each color required.
 - 3. Stone thresholds in 6-inch lengths.
 - 4. Metal edge strips in 6-inch lengths.
- D. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- E. Product Certificates: Signed by manufacturers certifying that the products furnished comply with requirements.
- F. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names of architects and owners, and other information specified.
- G. Tile Test Reports: Indicate and interpret test results for compliance of special-purpose tile with specified requirements.
- H. Setting Material Test Reports: Indicate and interpret test results for compliance of tile-setting and -grouting products with specified requirements.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.
- C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- D. Source Limitations for Other Products: Obtain each of the following products specified in this Section from one source and by a single manufacturer for each product:
 - 1. Stone thresholds.
 - 2. Joint sealants.
- E. Mockups: Before installing tile, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for completed Work.
 - 1. Locate mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Architect's approval of mockups before proceeding with final unit of Work.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. When directed, demolish and remove mockups from Project site.
 - b. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.
- B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

- C. Handle tile with temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 1. Tile Products:
 - a. As noted on the drawings
 - b. Equal as approved by the Architect.
 - 2. Tile-Setting and -Grouting Materials:
 - a. American Olean Tile Company.
 - b. Dal-Tile Corporation.
 - c. DAP, Inc.
 - d. Laticrete International, Inc.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard Grade requirements, unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials" articles.
- C. Sizes, Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. As indicated on the drawings.
2. Provide tile trim and accessories that match color and finish of adjoining flat tile.

2.3 TILE PRODUCTS

- A. Ceramic Tile: Provide factory-mounted flat tile complying with the following requirements:
1. Module Size: as indicated on the drawings.
 2. Nominal Thickness: 1/4 inch.
 3. Face: Plain with cushion edges.
 4. Styles, colors and patterns: As indicated on the drawings
- B. Glazed Wall Tile: Provide flat tile complying with the following requirements:
1. Module Sizes: as indicated on the drawings.
 2. Thickness: 5/16 inch.
 3. Face: Plain with modified square edges or cushion edges.
 4. Styles colors and patterns: As indicated on the drawings.
- C. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with the following requirements:
1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
 2. Shapes: As follows, selected from manufacturer's standard shapes:
 - a. Base for Portland Cement Mortar Installations: Coved.
 - b. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose.
 - c. External Corners for Thin-Set Mortar Installations: Surface bullnose.
- D. QUARRY FLOOR TILE AND BASE
1. Tile selections shall be as shown on the Drawings.

2.4 WATERPROOFING MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.10.
- B. Typical Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber and fabric reinforcement.
1. LATICRETE International Inc.; Laticrete 9237 Waterproof Membrane.
- C. Polyethylene Waterproofing Uncoupling Membrane with grid structure of square cavities and an anchoring fleece laminated to the underside.
1. Schluter Systems "DITRA" Uncoupling membrane

2.5 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
 - 1. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch or less, and finish bevel to match face of threshold.
- B. Marble Thresholds: ASTM C 503 with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241 and with honed finish.
 - 1. Description: Match Architect's sample.

2.6 SETTING MATERIALS

- A. Latex-Portland Cement Mortar: ANSI A118.4, composed as follows:
 - 1. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.
 - a. For wall applications, provide nonsagging, latex-portland cement mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.
- B. Water-Cleanable, Tile-Setting Epoxy Mortar: ANSI A118.3.
 - 1. Pro-Spec B-7000 Epoxy Mortar.

2.7 GROUTING MATERIALS

- A. Latex-Portland Cement Grout: ANSI A118.6 for materials described in Section H-2.4, composed as follows:
 - 1. Factory-Prepared, Dry-Grout Mixture: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to produce the following:
 - a. Unsanded grout mixture for joints 1/8 inch and narrower.
 - b. Sanded grout mixture for joints 1/8 inch and wider.
- B. Epoxy Grout
 - 1. Pro-Spec B-7000 Epoxy Grout.

2.8 ELASTOMERIC SEALANTS

- A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements of Division 7 Section "Joint Sealants."
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.
- C. Products: Subject to compliance with requirements, provide one of the following:
 - 1. One-Part, Mildew-Resistant Silicone Sealants:
 - a. Dow Corning 786; Dow Corning Corporation.
 - b. Sanitary 1700; GE Silicones.
 - c. Pecora 898 Sanitary Silicone Sealant; Pecora Corp.
 - d. Tremsil 600 White; Tremco, Inc.

2.9 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Temporary Protective Coating: Provide product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; is compatible with tile, mortar, and grout products; and is easily removable after grouting is completed without damaging grout or tile.
 - 1. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as a temporary protective coating for tile.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.10 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.
- C. Commencing installation of ceramic tile items shall constitute acceptance of existing conditions.

3.2 PREPARATION

- A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- B. Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.
 - 1. Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill cracks, holes, and depressions.
 - 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- C. Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

- D. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent adhesion or staining of exposed tile surfaces by grout, protect exposed surfaces of tile against adherence of mortar and grout by precoating them with a continuous film of temporary protective coating indicated below, taking care not to coat unexposed tile surfaces:

1. Petroleum paraffin wax or grout release.

3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."
- H. Grout tile to comply with the requirements of the following tile installation standards:
1. For ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement grouts), comply with ANSI A108.10.

3.4 WATERPROOFING MEMBRANE INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate. FLOOR TILE INSTALLATION
- B. General: Install tile to comply with requirements in the Ceramic Tile Floor Installation Schedule, including those referencing TCA installation methods and ANSI A108 series of tile installation standards.
- C. Joint Widths: Install tile on floors with the following joint widths:
 - 1. Ceramic Floor Tile: 1/16 inch.
 - 2. Quarry Tile: 1/4 inch
- D. Back Buttering: For installations indicated, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:
 - 1. Tile floors composed of rib-backed tiles.
- E. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.

3.5 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Ceramic Tile Wall Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.
- B. Joint Widths: Install tile on walls with the following joint widths:
 - 1. Wall Tile: 1/16 inch.
- C. Back Buttering: Obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:

3.6 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove latex-portland cement grout residue from tile as soon as possible.
 - 2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to brick and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure tile is without damage or deterioration at the time of Substantial Completion.
1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
 2. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.
- D. Before final inspection, remove any protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09 30 00

SECTION 09 51 13
ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes ceilings consisting of acoustical panels and exposed suspension systems.

1.3 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
 - 1. Ceiling suspension system members.
 - 2. Method of attaching suspension system hangers to building structure.
 - 3. Ceiling-mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
 - 4. Minimum Drawing Scale: 1/4 inch = 1 foot.
- C. Samples for Verification: Full-size units of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
 - 1. Full-size samples of each acoustical panel type, pattern, and color.
 - 2. Set of 12-inch-long samples of exposed suspension system members, including moldings, for each color and system type required.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

- B. Source Limitations for Ceiling Units: Obtain each acoustical ceiling panel from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- C. Source Limitations for Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- D. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
 - 1. Fire-response tests were performed by UL, ITS/Warnock Hersey, or another independent testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated below.

2.2 ACOUSTICAL PANELS

- A. Refer to drawings for acoustical panel selections.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Refer to drawings for suspension system selections.
- B. General: Direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.
- C. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
- D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
- E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch-diameter wire.
- F. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- G. Ceiling Isolation Hangers: Kinetics Noise Control model ICC-100 Isolation Hanger.
- H. Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.
 - 1. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.

2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
3. For narrow-face suspension systems, provide suspension system and manufacturer's standard edge moldings that match width and configuration of exposed runners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel ceilings.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

PREPARATION

- B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.2 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
 1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
- B. Suspend ceiling hangers from building's structural members and as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, powder-actuated fasteners, or drilled-in anchors that extend through forms into concrete.
 6. Do not attach hangers to steel deck tabs.
 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 8. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches from ends of each member.
 9. Install ceiling isolation hangers a maximum of 48" on center.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
 3. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated or required.

3.3 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 65 19
RESILIENT FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Solid Vinyl floor tile.
 - 2. Resilient wall base and accessories.
 - 3. Vinyl composition tile

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing resilient products similar to those required for this Project and with a record of successful in-service performance.
- B. Source Limitations: Obtain each type, color, and pattern of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 deg F.
- C. Store tiles on flat surfaces.
- D. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.5 PROJECT CONDITIONS

- A. Maintain a temperature of not less than 70 deg F or more than 95 deg F in spaces to receive products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless manufacturer's written recommendations specify longer time periods. After post installation period, maintain a temperature of not less than 55 deg F or more than 95 deg F.
- B. Do not install products until they are at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by manufacturer.
- D. Install tiles and accessories after other finishing operations, including painting, have been completed.
- E. Do not install flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended bond and moisture test.

PART 2 - PRODUCTS

2.1 SOLID VINYL RESILIENT TILE

- A. Solid Vinyl Tile shall be as selected from manufacturer's premium color and pattern. Selections shall be as shown on drawings.
- B. Vinyl Composition Tile shall be as selected from manufacturer's premium color and pattern. Selections shall be as shown on drawings.

2.2 RESILIENT ACCESSORIES

- A. Rubber Wall Base: Products complying with FS SS-W-40, Type I. Selections shall be as shown on drawings

2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement-based formulation provided or approved by flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

- C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of tiles, and in maximum available lengths to minimize running joints.
- D. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by flooring manufacturer.
 - 2. Subfloor finishes comply with requirements specified in Division 3 Section "Cast-in-Place Concrete" for slabs receiving resilient flooring.
 - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.
- D. Commencing installation of resilient flooring shall constitute acceptance of existing conditions.

3.2 PREPARATION

- A. General: Comply with resilient product manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- D. Use stair-tread-nose filler, according to resilient tread manufacturer's written instructions, to fill nosing substrates that do not conform to tread contours.

- E. Broom and vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 TILE INSTALLATION

- A. General: Comply with tile manufacturer's written installation instructions.
- B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half of a tile at perimeter.
 - 1. Lay tiles square with room axis, unless otherwise indicated.
- C. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles with grain running in one direction.
- D. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures, including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.
- E. Extend tiles into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent, non-staining marking device.
- G. Install tiles on covers for telephone and electrical ducts, and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on covers. Tightly adhere edges to perimeter of floor around covers and to covers.
- H. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to comply with tile manufacturer's written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.
 - 1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- I. Hand roll tiles according to tile manufacturer's written instructions.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. General: Install resilient accessories according to manufacturer's written installation instructions.
- B. Apply resilient wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
 - 1. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
 - 2. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
 - 3. Do not stretch base during installation.
 - 4. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
 - 5. Install pre-molded outside and inside corners before installing straight pieces.
- C. Place resilient accessories so they are butted to adjacent materials and bond to substrates with adhesive. Install reducer strips at edges of flooring that would otherwise be exposed.

3.5 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing resilient products:
 - 1. Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturers.
 - 2. Sweep or vacuum floor thoroughly.
 - 3. Do not wash floor until after time period recommended by flooring manufacturer.
 - 4. Damp-mop floor to remove marks and soil.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by flooring manufacturer.
 - 1. Apply protective floor polish to floor surfaces that are free from soil, visible adhesive, and surface blemishes, if recommended in writing by manufacturer.
 - a. Use commercially available product acceptable to flooring manufacturer.
 - 2. Cover products installed on floor surfaces with undyed, untreated building paper until inspection for Substantial Completion.
 - 3. Do not move heavy and sharp objects directly over floor surfaces. Place plywood or hardboard panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

- C. Clean floor surfaces not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products according to manufacturer's written recommendations.
 - 1. Before cleaning, strip protective floor polish that was applied after completing installation only if required to restore polish finish and if recommended by flooring manufacturer.
 - 2. After cleaning, reapply polish to floor surfaces to restore protective floor finish according to flooring manufacturer's written recommendations.

END OF SECTION 09 65 19

SECTION 09 91 23
PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Commercial painting, including surface preparation, for projects in the United States.
 - 1. Interior high-performance commercial painting.
 - 2. Exterior commercial painting.

1.2 RELATED SECTIONS - INTERIOR

- A. Division 3 - Concrete - Walls and Ceilings, Poured Concrete, Precast Concrete, Cast-In-Place including Plaster (Walls, Ceilings, Concrete - (Floors, non-vehicular).
- B. Division 5 - Metal - Galvanized.
- C. Division 6 - Wood - Doors, Trim, Paneling.
- D. Division 9 - Drywall - (Walls, Ceilings, Gypsum Board and similar items).

1.3 RELATED SECTIONS - EXTERIOR

- A. Division 3 - Concrete - Precast, and Poured-in-place Cement.
- B. Division 4 - Concrete Block, Floors (Non-Vehicular).
- C. Division 5 - Metal - Galvanized, Miscellaneous Iron, Ornamental Iron, Structural Iron and Steel, Ferrous Metal.

1.4 REFERENCES

- A. American National Standards Institute (ANSI) - Performance Standards.
- B. Asthma and Allergy Foundation of America and Allergy Standards, Ltd.
 - 1. The Certified Asthma and Allergy Friendly Mark. A registered certification mark.
- C. American Society for Testing Materials (ASTM) - Testing Methods.
- D. Cradle to Cradle Products Innovation Institute.
 - 1. Cradle to Cradle Certification.
- E. Environmental Protection Agency; Electronic Code of Federal Regulations (CFR):
 - 1. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- F. Green Seal Standards (GS-11):
 - 1. GS-11; May 20, 1993.
- G. Master Paint Institute (MPI #) - Established paint categories and standards.

- H. National Paint and Coatings Association (NPCA) - Gloss Standard.
- I. Occupational Safety and Health Act (OSHA) - Safety Standards.
- J. Ozone Transmission Commission (OTC) - Established levels of Volatile Organic Compounds.
- K. Paint Decorating Contractors of America (PDCA) - Application Standard.
- L. Society of Protective Coatings (SSPC):
 - 1. SSPC (PM1) - Steel Structures Painting Manual, Vol. 1, Good Painting Practice; 1993, Third Edition.
 - 2. SSPC (PM2) - Steel Structures Painting Manual, Vol. 2, Systems and Specifications; 1995, Seventh Edition.
- M. South Coast Air Quality Management District (SCAQMD):
 - 1. SCAQMD Rule #1168; October 3, 2003.

1.5 DEFINITIONS

- A. Commercial as used in this Section refers to a product well suited for a commercial application.
- B. DFT as used in this Section refers to the Dry Film Thickness of the coating.
- C. Enamel refers to any acrylic or alkyd (oil) base paint which dries leaving an eggshell, pearl, satin, semi-gloss or high gloss enamel finish.
- D. DTM as used in this Section refers to paint that is applied Direct To Metal.
- E. OTC as used in this Section refers to the Ozone Transmission Commission. OTC has established the following VOC levels for the Northeastern United States. Products shall meet the following OTC limits for VOC's.
 - 1. Interior flat paints: 100 grams per liter or less, per gallon.
 - 2. Interior enamels: 150 grams per liter or less, per gallon.
 - 3. Interior stains: 250 grams per liter or less, per gallon.
 - 4. Interior primers: 200 grams per liter or less, per gallon.
 - 5. Rust preventive coatings: 400 grams per liter or less, per gallon.
 - 6. Dry fog coatings: 400 grams per liter or less, per gallon.
 - 7. Floor coatings: 250 grams per liter or less, per gallon.
- F. Premium as used in this Section refers to the best quality product "top of the line".
- G. VOC as used in this Section refers to Volatile Organic Compounds found in primers, paints, sealers and stains. The level of VOCs appears after each product listed in the Schedule in grams per liter (g/L).
- H. Paints are available in a wide range of sheens or glosses, as measured by a gloss meter from a 60 and/or 85 degree angle from vertical, as a percentage of the amount of light that is reflected. The following terms are used to describe the gloss of our products. The list below is provided for general guidance; refer to the technical data sheet for the actual gloss/sheen level for each product.

1. Flat - Less than 5 Percent.
2. Eggshell - 5 - 20 Percent.
3. Satin - 20 - 35 Percent.
4. Semi-Gloss - 30 - 65 Percent.
5. Gloss - Over 65 Percent.

1.6 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Provide a complete list of all products to be used, with the following information for each:
 1. Manufacturer's name, product name and/or catalog number, and general product category.
 2. Cross-reference to specified paint system(s) that the product is to be used in; include description of each system.
- C. Samples: Submit three paper samples, 5 inches by 7 inches (127mm x 178mm) in size, illustrating selected colors for each color and system selected with specified coats cascaded.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years experience.
- B. Installer Qualifications: All products listed in this section are to be applied by a Painting Contractor with a minimum of five years demonstrated experience in surface preparation and field application of the same type and scope as specified.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 1. Mock-up areas designated by Architect.
 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 3. Approved mock-up areas will serve as the standard for remaining Work.
 4. Refinish mock-up area as required to produce acceptable Work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

- C. Disposal:
 - 1. Never pour leftover coating down any sink or drain. Use up material on the job or seal can and store safely for future use.
 - 2. Do not incinerate closed containers.
 - 3. For specific disposal or recycle guidelines, contact the local waste management agency or district. Recycle whenever possible.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.10 WARRANTY

- A. Inspection of all surfaces to be coated must be done by the manufacturer's representative to insure proper preparation prior to application. All thinners, fillers, primers and finish coatings shall be from the same manufacturer to support a product warranty. Products other than those submitted shall be accompanied by a letter stating its fitness for use and compatibility.
- B. At project closeout, provide to the Owner or owner's representative an executed copy of the Manufacturer's standard form outlining the terms and conditions of and any exclusions to their Limited Warranty against Manufacturing Defect.

1.11 EXTRA MATERIALS

- A. At project closeout, supply the Owner or owner's representative one gallon of each product for touch-up purposes. Cans shall be clearly marked with color name, number and type of paint.
- B. At project closeout, provide the color mixture name and code to the Owner or owner's representative for accurate future color matching.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Benjamin Moore & Co. (United States), which is located at: 101 Paragon Dr; Montvale, NJ 07645; Toll Free Tel: 866-708-9181; Email: [request info \(info@benjaminmoore.com\)](mailto:requestinfo@benjaminmoore.com); Web: <https://www.benjaminmoore.com> | <https://www.benjaminmoore.com/en-ca>
- B. Substitutions: Coronado Paint Company.
- C. Or Architect approved equal.

2.2 MATERIALS - GENERAL

- A. Volatile Organic Compound (VOC) Content:

1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D-National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
 - 1) All references to (0 g/L) are Zero VOCs according to EPA Method 24.
- B. Compatibility: Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

2.3 MIXING AND TINTING

- A. Except where specifically noted in this section, all paint shall be ready-mixed and pre-tinted. Agitate all paint prior to and during application to ensure uniform color, gloss, and consistency.
- B. Thinner addition shall not exceed manufacturer's printed recommendations. Do not use kerosene or other organic solvents to thin water-based paints.
- C. Where paint is to be sprayed, thin according to manufacturer's current guidelines.

2.4 COMMERCIAL HIGH PERFORMANCE INTERIOR PAINT SYSTEMS

- A. **CONCRETE** - Smooth (Walls and Ceilings, Poured Concrete, Precast Concrete, Unglazed Brick, Cement Board, Tilt-Up, Cast-In-Place).
 1. **Latex Systems:**
 - a. **Semi-Gloss Finish with Scuff-Resistance:**
 - 1) First Coat: Benjamin Moore, Ultra Spec Masonry Interior/Exterior 100% Acrylic Sealer 608.
 - 2) Second Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Satin 486.
 - 3) Third Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Satin 486.
 - b. **Eggshell Finish with Scuff-Resistance**
 - 1) First Coat: Benjamin Moore, Ultra Spec Masonry Interior/Exterior 100% Acrylic Sealer 608.
 - 2) Second Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Eggshell 485
 - 3) Third Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Eggshell 485
 2. **Latex-Epoxy Systems:**
 - a. **Semi-Gloss Finish:**
 - 1) First Coat: Benjamin Moore, Ultra Spec Masonry Interior/Exterior 100% Acrylic Sealer 608.
 - 2) Second Coat: Benjamin Moore, Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341.
 - 3) Third Coat: Benjamin Moore, Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341.

- b. **Eggshell Finish:**
 - 1) First Coat: Benjamin Moore, Ultra Spec Masonry Interior/Exterior 100% Acrylic Sealer 608.
 - 2) Second Coat: Benjamin Moore, Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342.
 - 3) Third Coat: Benjamin Moore, Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342.
- B. **MASONRY** - (CMU - Concrete, Split Face, Scored, Smooth, High Density, Low Density, Fluted, Stucco).
 - 1. **Latex Systems:**
 - a. **Semi-Gloss Finish with Scuff-Resistance:**
 - 1) First Coat: Benjamin Moore, Ultra Spec High Build Masonry Block Filler 571.
 - 2) Second Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Satin 486.
 - 3) Third Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Satin 486.
 - b. **Eggshell Finish with Scuff-Resistance**
 - 1) First Coat: Benjamin Moore, Ultra Spec High Build Masonry Block Filler 571.
 - 2) Second Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Eggshell 485
 - 3) Third Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Eggshell 485
 - 2. **Latex-Epoxy Systems:**
 - a. **Semi-Gloss Finish:**
 - 1) First Coat: Benjamin Moore, Ultra Spec High Build Masonry Block Filler 571.
 - 2) Second Coat: Benjamin Moore, Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341.
 - 3) Third Coat: Benjamin Moore, Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341.
 - b. **Eggshell Finish:**
 - 1) First Coat: Benjamin Moore, Ultra Spec High Build Masonry Block Filler 571.
 - 2) Second Coat: Benjamin Moore, Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342.
 - 3) Third Coat: Benjamin Moore, Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342.
- C. **NON-FERROUS METAL**- (Galvanized and Aluminum):
 - 1. **Latex Systems:**
 - a. **Gloss Finish with Scuff-Resistance:**
 - 1) First Coat: Benjamin Moore, Ultra Spec Acrylic Metal Primer HP04.
 - 2) Second Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Semi-Gloss 487.
 - 3) Third Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Semi-Gloss 487.
 - b. **Gloss Finish with Rust-Inhibition:**
 - 1) First Coat: Benjamin Moore, Ultra Spec Acrylic Metal Primer HP04
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28.

- 3) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28.
 - c. **Semi-Gloss Finish with Scuff-Resistance:**
 - 1) First Coat: Benjamin Moore, Ultra Spec Acrylic Metal Primer HP04
 - 2) Second Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Satin 486.
 - 3) Third Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Satin 486.
 - d. **Semi-Gloss Finish with Rust-Inhibition:**
 - 1) First Coat: Benjamin Moore, Ultra Spec Acrylic Metal Primer HP04
 - 2) Second Coat: Benjamin Moore, Ultra Spec HP DTM Acrylic Enamel Semi-Gloss HP29.
 - 3) Second Coat: Benjamin Moore, Ultra Spec HP DTM Acrylic Enamel Semi-Gloss HP29.
- D. **FERROUS METAL** - (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous and Ornamental Iron, Structural Iron, Ferrous Metal).
1. **Latex Systems (Alkyd Primer):**
- a. **Gloss Finish with Scuff-Resistance:**
 - 1) First Coat: Benjamin Moore, Super Spec Alkyd Metal Primer CP06.
 - 2) Second Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Semi-Gloss 487.
 - 3) Third Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Semi-Gloss 487.
 - b. **Gloss Finish with Rust-Inhibition:**
 - 1) First Coat: Benjamin Moore, Super Spec Alkyd Metal Primer CP06.
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 LEED 2009, LEED V4.
 - 3) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28.
 - c. **Semi-Gloss Finish with Scuff-Resistance:**
 - 1) First Coat: Benjamin Moore, Super Spec Alkyd Metal Primer CP06.
 - 2) Second Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Satin 486.
 - 3) Third Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Satin 486.
 - d. **Semi-Gloss Finish with Rust-Inhibition:**
 - 1) First Coat: Benjamin Moore, Super Spec Alkyd Metal Primer CP06.
 - 2) Second Coat: Benjamin Moore, Ultra Spec HP DTM Acrylic Enamel Semi-Gloss HP29.
 - 3) Second Coat: Benjamin Moore, Ultra Spec HP DTM Acrylic Enamel Semi-Gloss HP29.
- E. **WOOD** - (Doors, Trim, Partitions, Frames).
1. **Latex Systems (Alkyd Primer):**
- a. **Gloss Finish with Scuff-Resistance:**
 - 1) First Coat: Benjamin Moore, Fresh Start All-Purpose Oil-based Primer C085.
 - 2) Second Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Semi-Gloss 487.
 - 3) Third Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Semi-Gloss 487.
 - b. **Semi-Gloss Finish with Scuff-Resistance:**

- 1) First Coat: Benjamin Moore, Fresh Start All-Purpose Oil-based Primer C085.
 - 2) Second Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Satin 486.
 - 3) Third Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Satin 486.
- 2. Stain and Varnish System:**
- a. **Gloss Finish:**
 - 1) First Coat: Lenmar Waterborne Interior Wiping Stain 1WB.1300
 - 2) Second Coat: Benjamin Moore, Benwood Stays Clear Acrylic Polyurethane Gloss 422
 - 3) Third Coat: Benjamin Moore, Benwood Stays Clear Acrylic Polyurethane Gloss 422.
- F. DRYWALL - (Walls, Ceilings, Gypsum Board)**
- 1. Latex Systems:**
 - a. **Eggshell Finish Commercial-Grade:**
 - 1) First Coat: Benjamin Moore Ultra Spec 500 Interior Latex Primer N534.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Latex Eggshell T538.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Latex Eggshell T538.
 - b. **Eggshell Finish with Scuff-Resistance**
 - 1) First Coat: Benjamin Moore Ultra Spec 500 Interior Latex Primer N534.
 - 2) Second Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Eggshell 485
 - 3) Third Coat: Benjamin Moore, Ultra Spec Scuff-X Interior Eggshell 485
 - 2. Latex-Epoxy Systems:**
 - a. **Eggshell Finish:**
 - 1) First Coat: Benjamin Moore Ultra Spec 500 Interior Latex Primer N534.
 - 2) Second Coat: Benjamin Moore, Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342.
 - 3) Third Coat: Benjamin Moore, Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342.

2.5 COMMERCIAL EXTERIOR PAINT SYSTEMS

- A. CONCRETE:** (Cementitious Siding, Flexboard, Transite Board, Shingles (Non-Roof), Common Brick, Stucco, Tilt-up, Precast, and Poured-in-place Cement).
- 1. Latex Systems:**
 - a. **Satin Finish:**
 - 1) First Coat: Benjamin Moore, Ultra Spec Masonry Interior/Exterior 100% Acrylic Sealer 608.
 - 2) Second Coat: Benjamin Moore Ultra Spec EXT Satin N448.
 - 3) Third Coat: Benjamin Moore Ultra Spec EXT Satin N448.
 - b. **Low Lustre/Eggshell Finish:**
 - 1) First Coat: Benjamin Moore, Ultra Spec Masonry Interior/Exterior 100% Acrylic Sealer 608.
 - 2) Second Coat: Benjamin Moore Ultra Spec EXT Low Lustre N455.
 - 3) Third Coat: Benjamin Moore Ultra Spec EXT Low Lustre N455.
- B. MASONRY:** Concrete Masonry Units (CMU) - Cinder or Concrete Block.
- 1. Latex Systems:**

- a. **Satin Finish:**
 - 1) First Coat: Benjamin Moore, Ultra Spec High Build Masonry Block Filler 571.
 - 2) Second Coat: Benjamin Moore Ultra Spec EXT Satin N448.
 - 3) Third Coat: Benjamin Moore Ultra Spec EXT Satin N448.
 - b. **Low Lustre/Eggshell Finish:**
 - 1) First Coat: Benjamin Moore, Ultra Spec High Build Masonry Block Filler 571.
 - 2) Second Coat: Benjamin Moore Ultra Spec EXT Low Lustre N455.
 - 3) Third Coat: Benjamin Moore Ultra Spec EXT Low Lustre N455.
- C. **NON-FERROUS METAL:** Aluminum, Galvanized.
- 1. **Latex Systems:**
 - a. **Gloss Finish with Rust Inhibition:**
 - 1) First Coat: Benjamin Moore, Ultra Spec Acrylic Metal Primer HP04.
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28.
 - 3) Third Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28.
 - b. **Semi-Gloss Finish with Rust Inhibition:**
 - 1) First Coat: Benjamin Moore, Ultra Spec Acrylic Metal Primer HP04.
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Semi-Gloss Enamel HP9.
 - 3) Third Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Semi-Gloss Enamel HP29.
 - c. **Semi-Gloss Finish Commercial-Grade:**
 - 1) First Coat: Benjamin Moore, Ultra Spec Acrylic Metal Primer HP04.
 - 2) Second Coat: Benjamin Moore Ultra Spec EXT Gloss N449.
 - 3) Third Coat: Benjamin Moore Ultra Spec EXT Gloss N449.
- D. **FERROUS METAL:** Misc. Iron, Ornamental Iron, Structural Iron and Steel, Ferrous Metal.
- 1. **Latex Systems (Alkyd Primer):**
 - a. **Gloss Finish with Rust-Inhibition:**
 - 1) First Coat: Benjamin Moore, Super Spec Alkyd Metal Primer CP06.
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 LEED 2009, LEED V4.
 - 3) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28.
 - b. **Semi-Gloss Finish with Rust-Inhibition:**
 - 1) First Coat: Benjamin Moore, Super Spec Alkyd Metal Primer CP06.
 - 2) Second Coat: Benjamin Moore, Ultra Spec HP DTM Acrylic Enamel Semi-Gloss HP29.
 - 3) Second Coat: Benjamin Moore, Ultra Spec HP DTM Acrylic Enamel Semi-Gloss HP29.
 - c. **Semi-Gloss Finish Commercial Grade:**
 - 1) First Coat: Benjamin Moore, Super Spec Alkyd Metal Primer CP06.
 - 2) Second Coat: Benjamin Moore Ultra Spec EXT Gloss N449.

- 3) Third Coat: Benjamin Moore Ultra Spec EXT Gloss N449.
2. **Alkyd Systems (Alkyd Primer):**
 - a. **Gloss Finish with Rust-Inhibition:**
 - 1) First Coat: Benjamin Moore, Super Spec Alkyd Metal Primer CP06.
 - 2) Second Coat: Benjamin Moore Corotech Alkyd Urethane Gloss CV200.
 - 3) Second Coat: Benjamin Moore Corotech Alkyd Urethane Gloss CV200.
 - b. **Semi-Gloss Finish with Rust-Inhibition:**
 - 1) First Coat: Benjamin Moore, Super Spec Alkyd Metal Primer CP06.
 - 2) Second Coat: Benjamin Moore Corotech Alkyd Urethane Semi-Gloss CV201.
 - 3) Second Coat: Benjamin Moore Corotech Alkyd Urethane Semi-Gloss CV201.
- E. **WOOD:** Siding, Trim, Shutters, Sashes, Hardboard-Bare/Primed.
 1. **Latex Systems (Alkyd Primer):**
 - a. **Gloss Finish Enamel:**
 - 1) First Coat: Benjamin Moore, Fresh Start All-Purpose Oil-based Primer C085.
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 LEED 2009, LEED V4.
 - 3) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28.
 - b. **Semi-Gloss Finish Enamel:**
 - 1) First Coat: Benjamin Moore, Fresh Start All-Purpose Oil-based Primer C085.
 - 2) Second Coat: Benjamin Moore, Ultra Spec HP DTM Acrylic Enamel Semi-Gloss HP29.
 - 3) Second Coat: Benjamin Moore, Ultra Spec HP DTM Acrylic Enamel Semi-Gloss HP29.
 - c. **Semi-Gloss Finish Commercial Grade:**
 - 1) First Coat: Benjamin Moore, Fresh Start All-Purpose Oil-based Primer C085.
 - 2) Second Coat: Benjamin Moore Ultra Spec EXT Gloss N449.
 - 3) Third Coat: Benjamin Moore Ultra Spec EXT Gloss N449.

PART 3 EXECUTION

3.1 EXAMINATION

- A. The Contractor shall review the product manufacturer's special instructions for surface preparation, application, temperature, re-coat times, and product limitations.
- B. The Contractor shall review product health and safety precautions listed by the manufacturer.
- C. The Contractor shall be responsible for enforcing on site health and safety requirements associated with the Work.
- D. Do not begin installation until substrates have been properly prepared.

- E. Ensure that surfaces to receive paint are dry immediately prior to application.
- F. Ensure that moisture-retaining substrates to receive paint have moisture content within tolerances allowed by coating manufacturer. Where exceeding the following values, promptly notify Architect and obtain direction before beginning work.
 - 1. Concrete and Masonry: 3-5 percent. Allow new concrete to cure a minimum of 28 days.
 - 2. Exterior Wood: 17 percent.
 - 3. Interior Wood: 15 percent.
 - 4. Interior Finish Detail Woodwork, Including Trim, and Casework: 10 percent.
 - 5. Plaster and Gypsum: 15 percent.
 - 6. Concrete Slab-On-Grade: Perform calcium chloride test over 24 hour period or other acceptable test to manufacturer. Verify acceptable moisture transmission and pH levels.
- G. Examine surfaces to receive coatings for surface imperfections and contaminants that could impair performance or appearance of coatings, including but not limited to, loose primer, rust, scale, oil, grease, mildew, algae, or fungus, stains or marks, cracks, indentations, or abrasions.
- H. Correct conditions that could impair performance or appearance of coatings in accordance with specified surface preparation procedures before proceeding with coating application.

3.2 PREPARATION - GENERAL

- A. Clean surfaces thoroughly prior to coating application.
- B. Do not start work until surfaces to be finished are in proper condition to produce finished surfaces of uniform, satisfactory appearance.
- C. Stains and Marks: Remove completely, if possible, using materials and methods recommended by coating manufacturer; cover stains and marks which cannot be completely removed with isolating primer or sealer recommended by coating manufacturer to prevent bleed-through.
- D. Remove Mildew, Algae, and Fungus using materials and methods recommended by coating manufacturer.
- E. Remove dust and loose particulate matter from surfaces to receive coatings immediately prior to coating application.
- F. Remove or protect adjacent hardware, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items not indicated to receive coatings.
- G. Move or protect equipment and fixtures adjacent to surfaces indicated to receive coatings to allow application of coatings.
- H. Protect adjacent surfaces not indicated to receive coatings.
- I. Prepare surfaces in accordance with manufacturer's instructions for specified coatings and

indicated materials, using only methods and materials recommended by coating manufacturer.

3.3 SURFACE PREPARATION

- A. Concrete and Concrete Masonry: Clean surfaces free of loose particles, sand, efflorescence, laitance, form oil, curing compounds, and other substances which could impair coating performance or appearance.
- B. Concrete Floors: Remove contaminants which could impair coating performance or appearance. Verify moisture transmission and alkaline-acid balance recommended by coating manufacturer; mechanically abrade surface to achieve 80-100 grit medium-sandpaper texture.
- C. Existing Coatings:
 - 1. Remove surface irregularities by scraping or sanding to produce uniform substrate for coating application; apply one coat primer of type recommended by coating manufacturer for maximum coating adhesion.
 - 2. If presence of lead in existing coatings is suspected, cease surface preparation and notify Architect immediately.
- D. Gypsum Board: Repair cracks, holes and other surface defects with joint compound to produce surface flush with adjacent surfaces.
- E. Masonry Surfaces - Restored: Remove loose particles, sand, efflorescence, laitance, cleaning compounds and other substances that could impair coating performance or appearance.
- F. Metals - Aluminum, Mill-Finish: Clean and etch surfaces with a phosphoric acid-water solution or water based industrial cleaner. Flush with clean water and allow to dry, before applying primer coat.
- G. Metals - Copper: Clean surfaces with pressurized steam, pressurized water, or solvent washing.
- H. Metals - Ferrous, Unprimed: Remove rust or scale, if present, by wire brush cleaning, power tool cleaning, or sandblast cleaning; remove grease, oil, and other contaminants which could impair coating performance or appearance by solvent cleaning, with phosphoric-acid solution cleaning of welds, bolts and nuts; spot-prime repaired welds with specified primer.
- I. Metals - Ferrous, Shop-Primed: Remove loose primer and rust, if present, by scraping and sanding, feathering edges of cleaned areas to produce uniform flat surface; solvent-clean surfaces and spot-prime bare metal with specified primer, feathering edges to produce uniform flat surface.
- J. Metals - Galvanized Steel (not passivated): Clean with a water-based industrial strength cleaner, apply an adhesion promoter followed by a clean water rinse. Alternately, wipe down surfaces using clean, lint-free cloths saturated with xylene or lacquer thinner; followed by wiping the surface dry using clean, lint-free cloths.
- K. Metals - Galvanized Steel, Passivated: Clean with water-based industrial strength cleaner.

After the surface has been prepared, apply recommended primer to a small area. Allow primer to cure for 7 days, and test adhesion using the "cross-hatch adhesion tape test" method in accordance with ASTM D 3359. If the adhesion of the primer is positive, proceed with a recommended coating system for galvanized metal.

- L. Metals - Stainless Steel: Clean surfaces with pressurized steam, pressurized water, or water-based industrial cleaner.
- M. Plaster: Repair cracks, holes and other surface defects as required to maintain proper surface adhesion. Apply patching plaster or Joint compound and sand to produce surface flush with adjacent undamaged surface. Allow a full cure prior to coating application as recommended by the patching compound manufacturer's recommendations.
- N. Polyvinyl Chloride (PVC) Pipe: remove contaminants and markings with denatured alcohol scuff sand and wipe with solvent for maximum adhesion. Test adhesion before starting the job.
- O. Wood:
 - 1. Seal knots, pitch streaks, and sap areas with sealer recommended by coating manufacturer; fill nail recesses and cracks with filler recommended by coating manufacturer; sand surfaces smooth.
 - 2. Remove mill marks and ink stamped grade marks.
 - 3. Apply primer coat to back of wood trim and paneling.
- P. Wood Doors: Seal door tops and bottoms prior to finishing.
- Q. Wood Doors - Field-Glazed Frames and Sash: Prime or seal glazing channels prior to glazing.

3.4 APPLICATION - GENERAL

- A. Application of primers, paints, stains or coatings, by the Contractor, will serve as acceptance that surfaces were properly prepared in accordance with the manufacturer's recommendation.
- B. Apply each coat to uniform coating thickness in accordance with manufacturer's instructions, not exceeding manufacturer's specified maximum spread rate for indicated surface; thins, brush marks, roller marks, orange-peel, or other application imperfections are not permitted.
- C. Allow manufacturer's specified drying time, and ensure correct coating adhesion, for each coat before applying next coat.
- D. Inspect each coat before applying next coat; touch-up surface imperfections with coating material, feathering, and sanding if required; touch-up areas to achieve flat, uniform surface without surface defects visible from 5 feet.
- E. Remove dust and other foreign materials from substrate immediately prior to applying each coat.
- F. Where paint application abuts other materials or other coating color, terminate coating

with a clean sharp termination line without coating overlap.

- G. Where color changes occur between adjoining spaces, through framed openings that are of same color as adjoining surfaces, change color at outside stop corner nearest to face of closed door.
- H. Re-prepare and re-coat unsatisfactory finishes; refinish entire area to corners or other natural terminations.

3.5 CLEANING

- A. Clean excess coating materials, and coating materials deposited on surfaces not indicated to receive coatings, as construction activities of this section progress; do not allow to dry.
- B. Re-install hardware, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items that have been removed to protect from contact with coatings.
- C. Reconnect equipment adjacent to surfaces indicated to receive coatings.
- D. Relocate to original position equipment and fixtures that have been moved to allow application of coatings.
- E. Remove protective materials.

3.6 PROTECTION AND REPAIR

- A. Protect completed coating applications from damage by subsequent construction activities until completion of painting project.
- B. Touch-up coatings damaged by subsequent construction activities.

END OF SECTION

SECTION 10 11 00
VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Markerboards.
 - 2. Tackboards.
- B. Related Sections include the following:
 - 1. Division 6 Section "Finish Carpentry" for custom wood trim and chalktrays for visual display surfaces.

1.3 DEFINITIONS

- A. Tackboard: Framed or unframed tackable surface.
- B. Visual Display Boards: Markerboards, and tackboards.

1.4 SUBMITTALS

- A. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Show location of panel joints.
- B. Samples for Verification: For each type of visual display surface indicated and as follows:
 - 1. Visual Display Surface: Not less than 8-1/2 by 11 inches, mounted on substrate indicated for final Work. Include one panel for each type, color, and texture required.
 - 2. Accessories: Full-size Sample of each type of accessory.
- C. Qualification Data: For Installer.
- D. Maintenance Data: For visual display surfaces to include in maintenance manuals.

- E. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of visual display surface through one source from a single manufacturer.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of visual display surfaces and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- C. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver factory-built visual display boards completely assembled in one piece without joints, where possible. If dimensions exceed maximum manufactured panel size, provide two or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefabricate components at the factory, disassemble for delivery, and make final joints at the site.
- B. Store visual display units vertically with packing materials between each unit.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating visual display surfaces without field measurements. Coordinate wall construction to ensure that actual dimensions correspond to established dimensions.
 - 2. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

1.8 WARRANTY

- A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Surfaces lose original writing and erasing qualities.
 - b. Surfaces become slick or shiny.
 - c. Surfaces exhibit crazing, cracking, or flaking.
 - 2. Warranty Period: Life of the building.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Product: Subject to compliance with requirements, provide product specified.
 - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 MATERIALS, GENERAL

- A. Porcelain-Enamel Face Sheet: Porcelain-enamel-clad, ASTM A 463/A 463M, Type 1, stretcher-leveled aluminized steel, with 0.0236-inch uncoated thickness; with porcelain-enamel coating fused to steel at approximately 1000 deg F.
 - 1. Matte Finish: Low reflective; chalk wipes clean with dry cloth or standard eraser.
 - a. Product: Claridge CONCEPT Dry Erase Board with aluminum trim and marker tray.
- B. Fiberboard: ANSI A208.2, Grade MD.
- C. Natural Cork Sheet: Seamless, single layer, compressed fine-grain cork sheet, bulletin board quality; face sanded for natural finish.

2.3 MARKERBOARD ASSEMBLIES

- A. Porcelain-Enamel Markerboard Assembly: Balanced, high-pressure, factory-laminated markerboard assembly of 3-ply construction consisting of backing sheet, core material, and porcelain-enamel face sheet with low-gloss finish.

1. Manufacturers:
 - a. Claridge Products & Equipment, Inc.
 2. Particleboard Core: 3/8 inch thick; with 0.015-inch- thick, aluminum sheet backing.
 3. Laminating Adhesive: Manufacturer's standard moisture-resistant thermoplastic type.
- B. Markerboard Sheet Assembly: Fabricated from 0.0209-inch- thick, porcelain-enamel face sheets for direct application to wall surface.

2.4 TACK ASSEMBLIES

- A. Manufacturers:
1. Claridge Products & Equipment, Inc.
- B. Natural-Cork Tack Assembly: 1/4-inch- thick, natural cork sheet factory laminated to 1/4-inch- thick particleboard backing.

2.5 MARKERBOARD AND TACKBOARD ACCESSORIES

- A. Field-Applied Wood Trim and chalk tray: Comply with requirements specified in Division 6 Section "Finish Carpentry."

2.6 FABRICATION

- A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Examine walls and partitions for proper backing for visual display surfaces.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove dirt, scaling paint, projections, and depressions that will affect smooth, finished surfaces of visual display boards.
- B. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, and substances that will impair bond between visual display boards and surfaces.

3.3 INSTALLATION, GENERAL

- A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
- B. Field-Assembled Visual Display Units: Coordinate field-assembled units with grounds, trim, and accessories indicated. Join parts with a neat, precision fit.
 - 1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints.

3.4 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY UNITS

- A. Visual Display Boards: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display boards with fasteners at not more than 16 inches o.c. Secure both top and bottom of boards to walls.
 - 1. Field-Applied Trim: Attach trim over edges of visual display boards and conceal grounds and clips. Attach trim to boards with fasteners at not more than 24 inches o.c.
 - a. Attach chalk trays to boards with fasteners at not more than 12 inches o.c.
 - 2. Field-Applied Wood Trim: Install trim according to requirements in Division 6 Section " Finish Carpentry."

3.5 CLEANING AND PROTECTION

- A. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.
- C. Cover and protect visual display surfaces after installation and cleaning.

END OF SECTION 10 11 00

SECTION 10 21 13
SOLID PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes toilet compartments as follows:
 - 1. Type: Solid-plastic, polymer resin.
 - 2. Compartment Style: Overhead Braced.
 - 3. Screen Style: Floor anchored.
- B. Related Sections include the following:
 - 1. Division 10 "Toilet and Bath Accessories" for toilet paper holders, grab bars, purse shelves, and similar accessories.

1.3 SUBMITTALS

- A. Product Data: For each type and style of toilet compartment and screen specified. Include details of construction relative to materials, fabrication, and installation. Include details of anchors, hardware, and fastenings.
- B. Shop Drawings: For fabrication and installation of toilet compartment and screen assemblies. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Verification: Of each compartment or screen color and finish required, prepared on 6-inch- square Samples of same thickness and material indicated for Work.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions in areas of installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating units without field measurements. Coordinate supports, adjacent construction, and fixture locations to ensure actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. ASI, Global Partitions, Basis of Design.
 2. Santana Products, Inc.
 3. Comtec Industries.
 4. Knickerbocker Partition Corporation.

2.2 MATERIALS

- A. General: Provide materials that have been selected for surface flatness and smoothness. Exposed surfaces that exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are unacceptable.
- B. Solid-Plastic, Polymer Resin: High-density polyethylene (HDPE) with homogenous color throughout. Provide material not less than 1 inch thick with seamless construction and eased edges in color and pattern as follows:
 1. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range of colors and patterns.
- C. Pilaster Shoes and Sleeves (Caps): ASTM A 666, Type 302 or 304 stainless steel, not less than 0.0312 inch thick and 3 inches high, finished to match hardware.
 1. For solid-plastic, polymer-resin pilasters, in lieu of stainless-steel pilaster shoes and sleeves, manufacturer's standard plastic pilaster shoes and sleeves may be provided.
- D. Stirrup Brackets: Manufacturer's standard ear or U-brackets for attaching panels and screens to walls and pilasters of the following material:
 1. Material: Stainless steel.

- E. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories of the following material:
 - 1. Material: Stainless steel.
- F. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip in manufacturer's standard finish.
- G. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile and in manufacturer's standard finish.
- H. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

2.3 FABRICATION

- A. General: Provide standard doors, panels, screens, and pilasters fabricated for compartment system. Provide units with cutouts and drilled holes to receive compartment-mounted hardware, accessories, and grab bars, as indicated.
- B. Solid-Plastic, Polymer-Resin Compartments and Screens: Provide aluminum heat-sink strips at exposed bottom edges of HDPE units to prevent burning.
- C. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.
- D. Floor-Anchored Screens: Provide pilasters and panels of same construction and finish as toilet compartments. Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- E. Doors: Unless otherwise indicated, provide 24-inch- wide in-swinging doors for standard toilet compartments and 36-inch- wide out-swinging doors with a minimum 32-inch- wide clear opening for compartments indicated to be handicapped accessible.
 - 1. Hinges: Manufacturer's standard self-closing type that can be adjusted to hold door open at any angle up to 90 degrees.
 - 2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit with combination rubber-faced door strike and keeper designed for emergency access. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be handicapped accessible.

3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
4. Door Bumper: Manufacturer's standard rubber-tipped bumpers at out-swinging doors or entrance screen doors.
5. Door Pull: Manufacturer's standard unit that complies with accessibility requirements of authorities having jurisdiction at out-swinging doors. Provide units on both sides of doors at compartments indicated to be handicapped accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, plumb, and level. Provide clearances of not more than 1/2 inch between pilasters and panels and not more than 1 inch between panels and walls. Secure units in position with manufacturer's recommended anchoring devices.
 1. Secure panels to walls and panels with not less than 2 stirrup brackets attached near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than two fasteners. Hang doors to align tops of doors with tops of panels and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Screens: Attach with anchoring devices according to manufacturer's written instructions and to suit supporting structure. Set units level and plumb and to resist lateral impact.

3.2 ADJUSTING AND CLEANING

- A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and swing doors in entrance screens to return to fully closed position.
- B. Provide final protection and maintain conditions that ensure toilet compartments and screens are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 10 21 13

SECTION 10 28 00
TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Toilet accessories.
- B. Related Sections include the following:
 - 1. Division 10 Section "Toilet Compartments" for compartments and screens.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.
- B. Samples: For each accessory item to verify design, operation, and finish requirements.
 - 1. Approved full-size Samples will be returned and may be used in the Work.
- C. Setting Drawings: For cutouts required in other work; include templates, substrate preparation instructions, and directions for preparing cutouts and installing anchoring devices.
- D. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use designations indicated in the Toilet Accessory Schedule and room designations indicated on Drawings in product schedule.
- E. Maintenance Data: For accessories to include in maintenance manuals specified in Division 1. Provide lists of replacement parts and service recommendations.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Architect.
- B. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific products indicated in the Toilet Accessory Schedule.
 - 1. Products of other manufacturers listed in Part 2 with equal characteristics, as judged solely by Architect, may be provided.
 - 2. Do not modify aesthetic effects, as judged solely by Architect, except with Architect's approval. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering accessories that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Toilet Accessories:
 - a. A & J Washroom Accessories, Inc.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. McKinney/Parker Washroom Accessories Corp.

2.2 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch minimum nominal thickness, unless otherwise indicated.
- B. Brass: ASTM B 19, leaded and unleaded flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; ASTM B 30, castings.
- C. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.
- D. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service), nickel plus chromium electrodeposited on base metal.
- E. Baked-Enamel Finish: Factory-applied, gloss-white, baked-acrylic-enamel coating.
- F. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- G. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.3 FABRICATION

- A. General: Names or labels are not permitted on exposed faces of accessories. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.
- B. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.
- C. Recessed Toilet Accessories: Unless otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors and access panels with full-length, stainless-steel hinge. Provide anchorage that is fully concealed when unit is closed.
- D. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 TOILET ACCESSORY SCHEDULE

- A. Refer to drawings for Toilet Accessory Schedule.

END OF SECTION 10 28 00

SECTION 10 44 16
FIRE EXTINGUISHERS & FIRE BLANKET

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.
- C. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.
- D. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers:

1. Manufacturers:
 - a. J. L. Industries
 - b. Architect approved equal
2. Valves: Manufacturer's standard.
3. Handles and Levers: Manufacturer's standard.
4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Fire Extinguisher Types:

1. Type ABC 10lb: J. L. Industries Cosmic 10E or equal. Provide nine (9) units.
2. Class K Wet Chemical for Cooking Media Fires: J. L. Industries Saturn 2 ½ gallon or equal. Provide one (1) unit in each kitchen.

2.2 MOUNTING BRACKETS (if needed due to space limitations)

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
 - b. Architect approved equal.
2. Provide brackets for six (6) of the fire extinguishers including the Type K model.

2.3 CABINET

- A. Cabinet w/ Stainless Steel trim & Door and Stainless Steel tub: J. L. Industries or approved equal.
 - 1. Cabinet style: Surface Mounted or semi-recessed with rolled edge.
 - 2. Door style: Stainless Steel with full glazing
 - 3. Door glazing: Vertical Duo Laminated Safety Glass with red die-cut lettering.
 - 4. Model: J. L. Industries Cosmopolitan 1036F-17 or 1037F-17 or approved equal.
 - 5. Provide cabinets for four (4) of the Type ABC extinguisher.

2.4 Fire Blanket & Cabinet

- A. Provide fire blanket and surface mounted cabinet J. L. Industries model #9613S21 or approved equal.
 - 1. Cabinet to be 16" x 10" x 7 ½", red painted and surface mounted.
 - 2. Fire blanket to be 62" x 84" and made of processed wool.
 - 3. Provide one (1) blanket in the kitchen.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fire extinguishers, fire blankets and cabinets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 - 1. Cabinets: mounting heights as indicated or at heights to comply with NFPA 10 and with ADA requirements. Mount maximum 48" above the finish floor.
- B. Mounting Brackets: Fasten cabinets or mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 10 44 16

SECTION 11 40 00

FOODSERVICE EQUIPMENT

PART 1 – GENERAL

This document was prepared to inform of the specific information and requirements. If there is anything in this document that is in conflict with the documents provided by the Architect the architects documents shall prevail. Please review these requirements carefully.

1.1 PREPARATION & PRESENTATION OF BIDS

All bids submitted are to include item number, quantity, Item name, status, unit price and total for each item, with a separate sub-total price for buy-out and fabricated equipment combined, delivery, installation and performance bond. Any and all City, State, occupational and government taxes which are applicable to this installation shall be included and added as a separate charge to this bid. All figures shall be included in a grand total contract price.

1.2 RELATED DOCUMENTS

- A. General provisions of the contract, including General Conditions, Supplementary Conditions and General Documents, other Division I specification Documents and other Division I specification sections apply under this section.

1.3 SCOPE OF WORK

- A. Furnish all labor, materials and services necessary for the provision (furnish and install) of food service equipment to achieve the highest level of quality throughout and in strict accordance with the Contract Documents and local codes including that which is reasonably inferred. No extra charge will be allowed for that which the Food Service Equipment Contractor should have been familiar.
- B. Supervise and provide required instructions for work to be performed by other contractors in connection with requirements for all equipment under this section in order to achieve complete and operable equipment and systems to satisfy equipment manufacturer's recommendations.
- C. Check completed rough-ins for conformance to dimension rough-in plans. On projects with new construction or extensive renovation this check needs to occur before slabs are poured and walls are closed in. Submit field report to Owner identifying material variances.
- D. Be responsible for the disassembly (if required), removal, storage and protection (at contractor's expense), handling and setting in place all of those items designed in the contract documents as existing/relocate, existing/modify, and existing/relocate/modify at the appropriate time.

- E. Within the scope of this work the Foodservice Equipment Contractor needs to provide and install any and all options and/or accessories incidental to the installation of the equipment to allow it to perform its desired function and conform to the manufacturer's recommendations for the installation.

1.4 RELATED WORK SPECIFIED ELSEWHERE

- A. Floors and setting beds, quarry tile and base, masonry pads, walls and finishes, ceilings and related building work: Divisions 3 through 9.
 - 1. Quarry tile floor finish to be etched, if required, prior to setting food service equipment in place.
- B. Wall backing to support all wall mounted equipment: Division 5 and/or 9.
- C. All water, waste, indirect waste piping from sinks and ventilators, steam and gas services to the equipment including all shut-off valves, plumbing trim, traps, etc., and final connections to the equipment except as specified herein: Division 22 - Plumbing.
- D. All floor sinks and floor drains: Division 22 - Plumbing.
- E. Piping sleeves for refrigeration and drain lines through building floors: Division 22 - Plumbing.
- F. All electric services and components including wiring to and final connections to all equipment except as specified herein: Division 26 - Electrical.
- G. Grounding type receptacles for all wall mounted outlets to be used for plug-in equipment: Division 26 - Electrical.
- H. Make penetrations in building walls as required to accommodate installation of food service equipment including, among other items, routing of remote refrigeration lines: Division 4, 5 and/or 9.
- I. Removal of existing food service equipment not scheduled for reuse: Division 2.
- J. Installation of mechanical gas shut off valve(s) to shut-off gas supply to cooking equipment in the event of a fire: Division 23 - HVAC.
- K. All hood or ventilator duct work upstream from the connection position: Division 23 - HVAC.
- L. Sub-floor, water proofing, floor depressions, and related building work for cold storage rooms: Divisions 2 through 9.
- M. Concrete setting bed, 6 Mil Visqueen vapor barrier, slab urethane insulation with adequate R value rating, floor and cove base quarry tile with wire mesh and epoxy grout at depressed cold storage rooms: Division 3 through 9.

- N. Furnishing and installation of conduit at cold storage rooms in cooperation with the Food Service Equipment Contractor: Division 26 - Electrical.
 - O. Installation of light fixtures furnished loose at cold storage rooms: Division 26 - Electrical.
 - P. Connection of cold storage room temperature alarm system to the building security system: Division 26 - Electrical.
 - Q. Conduit and connections between cold storage room temperature probes and remote temperature recording devices.
 - R. Furnishing and installation of main power lines to refrigeration systems control panel and wiring for control/defrost heaters between panel and coils in accordance with factory supplied wiring diagrams and local codes: Division 26 - Electrical.
 - S. Final connection of the recirculating and city water to refrigeration rack: Division 23 - HVAC.
 - T. Installation of flexible quick disconnects for water connections to counter-top dispensing units provided "By Owner" and "By Vendor": Division 22 - Plumbing - Plumbing.
 - U. Furnish and install plugs and Neoprene Cords to Countertop Equipment Provided "By owner " and "By vendor": Division 26 – Electrical.
 - V. Furnish and install Z-bar support framing for ceiling mounted foodservice equipment units including, but not limited to, ventilators, condensate hoods, utensil/pot racks, insulated ceiling panels of cold storage rooms, Note: Foodservice Equipment contractor will furnish and install hangers from equipment to framing or other support system.
 - W. Conduit for beer/beverage lines from beer system power packs/soda systems to dispensing locations: Division 26 – Electrical.
 - X. Conduit for refrigeration piping through inaccessible areas, such as under slab on grade: Division 26 – Electrical.
 - Y. All field wiring and interconnections required between sub-assemblies for complete and operable systems: Division 26 – Electrical.
 - Z. Grease interceptors. Division 22
 - AA. Insulated indirect waste lines from ice bins, (non-walk-in) evaporator coils and cold bain maries.
- 1.5 OWNER/PURVEYOR FURNISHED EQUIPMENT
- A. Utility connections shown on CFL drawings for purveyor furnished equipment are representative of equipment necessary to support the Owner's requirements. Obtain and coordinate manufacturer, model number and utility requirements and represent utility requirements on dimensioned rough-in plans.

- B. Food Service Equipment Contractor to verify requirements and equipment sizes or other characteristics necessary to represent Owner/Operator items completely on the shop drawing submittals even though they may be listed as "NIC/Not in Contract" in the Equipment Specification sections of this document.
- C. Provide flexible disconnects for utility connections (gas, water and steam) to appropriate trades for Owner/Purveyor provided equipment items as specified.

1.6 MODIFICATIONS TO EXISTING EQUIPMENT

- A. Fire Suppression Systems
 - 1. Any modifications necessary to an existing fire suppression system as the result of changes to an exhaust hood or the replacement or rearrangement of equipment to make it comply with local codes are the responsibility of the FSE Contractor.
- B. Confirm that options & accessories specified for modifications to existing equipment units scheduled for reuse are compatible with the manufacturer/model number of the existing units prior to order placement. Notify Consultant accordingly.

1.7 REGULATIONS

- A. All work and materials shall be in accordance with the latest rules and/or regulations of agencies/ authorities having jurisdiction. All regulations, including building codes, and other codes applying to this jurisdiction should be followed. In addition all equipment shall comply with the following:
 - 1. National Electric Manufacturer's Association (N.E.M.A.).
 - 2. Underwriter's Laboratories Inc. (U.L.), must bear label.
 - 3. National Electric code, (N.E.C.).
 - 4. National Sanitation Foundation, (N.S.F.), must bear label.
 - 5. American Society of Mechanical Engineers must carry the (A.S.M.E.) stamp.
 - 6. American Gas Association (A.G.A.).
 - 7. State and Local Health Department Requirements.
- B. The Contract Documents shall govern whenever they require larger sizes or higher standards than are required by regulations.
- C. The regulations shall govern whenever the Contract Documents require something which will violate the regulations.
- D. When seismic regulations are applicable, all equipment shall be fabricated and installed

in accordance with those regulations. All seismic requirements shall be shown on all submittals. Submit requested information to the agencies and authorities having jurisdiction.

- E. No extra charge will be paid for furnishing items required by the regulations, but not specified and/or shown on the drawings.
- F. Rulings and interpretations of the enforcing agencies shall be considered a part of the regulations.
- G. The Food Service Equipment Contractor is responsible to maintain the accuracy of equipment drawings and cut books to reflect as built conditions due to equipment deletions, manufacturer and/or model number changes and unanticipated changes to site conditions. It will be the Food Service Equipment Contractor's sole responsibility to notify the Health Department having jurisdiction of all revisions until the project is issued its Certificate of Occupancy.

1.8 ALTERNATES / SUBSTITUTIONS

- A. Alternates/Substitutions must be equal in all respects to the base equipment specified. Alternate/Substitutions must state the manufacturer, model number and include illustration, specifications, capacities and operational data.
- B. All fabricated equipment shall be by one manufacturer acceptable to the Owner and Designer. If the methods specified and detailed are not in accordance with the Food Service Equipment Contractor's methods, he may quote as an alternate/substitutions, using his methods and standards. The alternate/substitutions shall include an itemization of all differences.
- C. If alternates/substitutions require different building conditions, electrical, plumbing, ventilation, etc., from those specified, a complete list of those changes for each item shall be included. If no changes are required, a statement to that effect shall be included. The costs for such changes requested after the bid due date shall be the responsibility of the Food Service Equipment Contractor.
- D. Alternates/substitutions submitted after the bid due date will not be considered. Acceptance or rejection of alternates/substitutions will be at the discretion of the Owner and/or Designer.
- E. The above requirements are waived for alternates requested in the equipment specifications. If an alternate is selected, include the alternate and the requirements for the alternate in all submittals.
- F. When alternates are listed in the item specifications and the primary manufacturer is unable to provide the item(s) specified (i.e. bankruptcy), the F.S.E. Contractor shall provide the equipment from an alternate manufacturer for the same price as originally proposed in the bid quotation.
- G. Alternates/substitution request form is to be completed for each alternate /substitution being requested. See appendix section.

1.9 REVIEW OF CONTRACT DOCUMENTS

- A. Unless expressly stipulated, and in a timely manner, no additional allowances will be made for Contractors or Manufacturers for errors, omissions or ambiguities not reported at time of bidding.
- B. Carefully review and compare the Contract Documents and at once report to Owner and/or Designer any errors, ambiguities, inconsistencies or omissions. Unless expressly stipulated, and in a timely manner, Food Service Equipment Contractor shall be liable to Owner or Designer for any damage resulting from such errors, inconsistencies or omissions in the Contract Documents. Work shall not be done without approved Drawings, Specifications and/or Modifications and without receiving prior written authorization from Owner or Designer.
- C. Where discrepancies are discovered between the drawings and the specifications, regarding quality or quantity, the higher quality or the greater quantity is to be included in the Bid Proposal.
- D. Foodservice Equipment Contractors responsible for verifying and coordinating all items provided in this Section, with the drawings, specifications, manufacturer's requirements, submittals, actual site conditions, adjacent items and associated (Sub-) Contractors; to assure that there are no discrepancies or conflicts. This is to include, but not limited to, quantities, dimensions, clearances required, direction of operation, door swings, utilities, fabrication details and methods, installation requirements, etc.
- E. All accessory items listed in the itemized specifications section are the responsibility of the foodservice equipment contractor. Careful review of these accessories are required as they may not all be provided by detail C-2-3B, Cutting Board w/ Bracket may be listed in the itemized specifications as an accessory to a Jade griddle. This item is not available from Jade. The foodservice equipment contractor will obtain this item from the appropriate source (custom fabricator) to fulfill the specification.

1.10 DRAWINGS

- A. The drawings which constitute a part of the contract indicate the arrangement and location of equipment. Should it be necessary to deviate from this arrangement in order to meet structural conditions, such deviation shall be made without expense to Owner.
- B. The data given herein on the drawings is reasonably exact but extreme accuracy is not guaranteed. Drawings are for the assistance and guidance of the Food Service Equipment Contractor and exact locations, distances and levels will be governed by the building. The Food Service Equipment Contractor shall accept his contract with this understanding.
- C. The following list of drawings as prepared by Clevenger Frable LaVallee, Inc. shall be considered as a part of the bidding documents and shall bear an issue date of June 17, 2022 KA-1,2,3,4,5 and 6.

1.11 WARRANTY

- A. All equipment, fixtures and materials furnished and installed shall be guaranteed against defect in workmanship and material. All repairs and replacements which may have become apparent and necessary by reasons of such defects, during the first year after final completion and acceptance of equipment installation, shall be made without cost and expense to the Owner. All such repairs and replacements are ultimately the responsibility of the Foodservice Equipment Contractor and are ultimately the responsibility of the Foodservice Equipment Contractor and shall be made at a time and during hours satisfactory to the Owner.
- B. For all commercially manufactured equipment that has a refrigeration system and semi-hermetic compressors, furnish an additional four (4) year warranty on all compressors.
- C. Warranty period shall commence with final acceptance of installation by Owner.
- D. Components of equipment subject to replacement prior to one years use and those items which may fail due to improper or inadequate periodic maintenance by the Owner/Operator are not intended to be included within the scope of the warranty.
- E. Provide all labor, material, refrigerant, and incidental expenses to maintain the temperatures specified on all refrigeration systems. Systems to be kept in first class working condition for a period of one (1) year from date of acceptance by Owner, or the date systems are put into operation, whichever occurs first, without additional cost to the Owner.
- F. Equipment that fails to perform will be removed and replaced with items of equal value at no expense to the Owner. Work required to replace equipment that has failed to perform will be completed at the convenience of the Owner.

1.12 DISCREPANCIES

- A. Where discrepancies are discovered between the drawings and the specifications, regarding quality or quantity, the higher quality or the greater quantity is to be included in the Bid Proposal.
- B. Contractor is responsible for verifying and coordinating all items provided in this Section, with the drawings, specifications, manufacturer's requirements, submittals, actual site conditions, adjacent items, and associated (Sub-) Contractors; to assure that there are no discrepancies or conflicts. This is to include, but not be limited to, quantities, dimensions, clearances required, direction of operation, door swings, utilities, fabrication details and methods, installation requirements, etc.
- C. Contractor to notify the Architect, in writing, of any discrepancies discovered; and await written clarification prior to proceeding with the items or areas in question.

1.13 SUBMITTALS

A. Pre-Requisite to Submittals

1. Obtain the latest Architectural plans from the Architect. F.S.E. Contractor shall review, and the shop drawings shall be prepared to reflect, the most current set of Architectural floor plans.
2. Confirm routing & distribution requirements with General Contractor /Construction Manager.
3. Confirm schedule for shop drawing submittals.

B. Submittal Content

1. Complete submission including electronic copies of cut books, rough-in drawings and fabrication shop drawings covering all food service equipment items should be submitted at one time for review and approval.
2. Individual files should be provided for each submittal: Cutsheets, Dimensioned Rough-ins, Hoods, Fabrication, etc. Do not bind all submittals into one file. Multiple submittals bound into one file will be rejected.
3. The Consultant requires only one copy of each submittal and will return one copy of marked submittals.
4. Substitutions must be approved in writing by the Architect and/or Owner prior to submittal submission. A copy of the approval must be included with any submittals by the Food Service Equipment Contractor. See Alternate / Substitution Request Form in the appendix.
5. FSE Contractor's use of any Design Team's AutoCAD contract drawings for the basis of producing their submittal drawings is with the following conditions and understanding:
 - a) FSE Contractor assumes total liability and responsibility for the accuracy, and for conformance and verification with the latest Architectural and Engineering drawings, actual field conditions and all equipment provided.
 - b) On request, CFL will provide CAD files of equipment plan & schedule only.
 - c) Dimensioned rough-in drawing submittals to be submitted on the FSE Contractor's title block.
6. All submittals to reflect "Plans & Specifications" except for substitutions approved by Owner.

C. Quality of Submittals

1. Submittals are to be of high quality, reflecting a high degree of accuracy and consistent with the specifications and drawings. **The Foodservice Equipment**

Contractor will REVIEW AND STAMP shop drawings from specified manufacturers to confirm that their drawings reflect the consultant's intent prior to submitting these for the Consultant's review. The drawings will be returned without review if the drawings are not stamped or do not reflect the Consultant's intent.

2. Drawings are to be submitted at the appropriate scale. **Shop drawings submitted that are "not to scale" will be rejected.**

D. Standard of Measurement

Submittals will conform to the standard of measurement in the country where the project is located. All submittals for projects in the U.S. will reflect U.S. measurement (feet/inches). Inches are to be represented in fractions, not decimals.

E. Incomplete/Inaccurate Submittals

1. Submittals that do not satisfy the requirements of this section will be rejected.

F. Checking:

1. Checking product data, rough-in drawings, wall backing drawings, shop drawings, and refrigeration drawings by Designer is for design concept only, and does not relieve the Food Service Equipment Contractor of responsibility for compliance with Contract Documents, verification of utilities with equipment requirements for conformity and location, verification of all dimensions of equipment and building conditions or reasonable adjustments due to deviations.
2. Drawings shall be prepared on the Food Service Equipment Contractor's sheets and by his employees. In those cases where the Food Service Equipment Contractor relies on electronic files provided by the Consultant at the request of the Owner, the Food Service Equipment Contractor is reminded of the importance of the shop drawing preparation and review phase. The availability of electronic files for purposes of expediting the submittal process is not intended to short-cut the thought process required to achieve a complete and accurate submittal.
3. Submittals require approval prior to ordering equipment or starting fabrication.

G. Mailing and Distribution:

1. After checking, distribute cutbooks and drawings as directed by the General Contractor or Construction Manager.

H. Response to Inspection List:

1. FSEC shall respond to the inspection list prepared by the Consultant within five (5) working days from receipt by either initiating corrective action to the items noted or by submitting a written report addressing the disputed items.

I. Submittal - Conformance Check

Kitchen Equipment Contractor shop drawing submittal is to conform to the following requirements

1. Product Data Sheets (Cutsheets) Checklist

After award of contract and before proceeding with the purchase of manufactured equipment, submit one (1) bound set of product data sheets. The set will consist of:

- a) Cover sheet with project name, name and contact information of KEC.
- b) Table of Contents of all items listing item names and item numbers.
- c) Submit Owner approved Alternate/ Substitution Request form for any alternates/ substitutions previously approved by the Owner.
- d) Lead sheet for all scheduled equipment items in numerical sequence by item number (1, 2, 3, 4, etc.). Including all new, existing, future and by Owner/Operator/Vendor item showing: Item number; quantity; description; manufacturer's name, address & telephone; model number; specified options & accessories & modifications; utility requirements and special notes. (See Figure 1 in appendix).
- e) Manufacturer product data sheets and/or shop drawings.
- f) Separate product data sheet submittal from other shop drawing submittals.
- g) Cutbooks must be reviewed and stamped by the KEC to indicate they conform to the submittal requirements prior to submission.

Do not cut and paste Consultants Itemized specification in the lead sheet. Cutbook submittals with incomplete or missing lead sheets will be rejected. Consultant will not review the cutbook submittal without accompanying dimensioned rough-in plans. Cutbooks submitted without dimensioned rough-in plans will be rejected.

Cutbook re-submittals must include all cutsheets including those with no comment on the previous submission. Partial cutbook re-submittals will be rejected.

Submittals that do not satisfy the requirements as outlined in Section 1.13 SUBMITTALS of the 114000 Foodservice Equipment Specification will be rejected.

2. Dimensioned Rough-in Shop Drawings Checklist:

- a) Submit 1/4" scale rough-in drawings for checking that reflect the final architectural background(s) requested and obtained from the Architect.
- b) Show dimension, ventilation requirements, floor and wall sleeves, plumbing, gas, steam, and electrical connections for food service equipment, including all equipment items supplied by the Owner, Product Suppliers, Operator, etc. on drawings.
- c) Size and locate concrete pad dimensions, depressions and special

- conditions as required for equipment.
- d) Prepare elevations and sections of special work for use of the respective trades.
- e) Represent building conditions that affect the installation or performance of food service equipment items on drawings.
- f) The following shall each be drawn on separate sheets and/or plans:
Equipment Plan; Plumbing; Electrical; Building Works & Ventilation;
Refrigeration and Beverage Systems.
- g) Tag utility connections and reference to a schedule of utility requirements using the same item number assigned by the Food Service Consultant. For example, Item 13, Mixer on the Consultant's plan becomes E-13 on the dimensioned electrical rough-in plan and P-13 on the dimensioned plumbing rough-in plan.
- h) Provide schedules on the dimensioned rough-in plans (electrical and plumbing) that define the utility characteristics of each connection and list the connections in sequence by number. That is, E-13 will appear as the 13th item in the schedule.
- i) Utilities shall be stubbed out of walls wherever possible. Except where required by code, exposed gas mains (behind the cooking battery) are not acceptable.
- j) Rough-in locations and sleeve locations to be verified in the field before floor slabs are poured and walls are closed.
- k) In the event roughing-in has been accomplished before the award of the contract, or, in the event of renovation, check the existing facility and furnish all equipment to suit building conditions and utilities. No extra charges shall be allowed for utility changes to fit equipment during installation and connection.
- l) When field dimensions cannot be verified in advance of releasing orders for food service equipment, the Food Service Equipment Contractor shall submit a Guaranteed Wall Dimension Drawing for timely approval which includes dimensions known to accommodate specified items.
- m) When conditions permit, field verifications shall occur in advance of drawing submission. In this case, drawings submitted with dimensions noted "verify" will be rejected.
- n) All utility connections shown on the Consultant's drawings are to be dimensioned on the rough-in plans including convenience receptacles, phone jacks, data ports, etc.
- o) Dimension electrical rough-in plan to locate remote recessed fire pull station(s) for fire suppression system(s) and define their mounting height in accordance with all code requirements.
- p) All area's included in the scope of work represented to be complete, legible and easy to read.
- q) Prepare all drawings "to scale".
- r) Represent duct collar sizes and locations on Building Works Plan.
- s) All wall recesses (for hose stations, control panels, etc.) sized and located consistent with the design intent shown on CFL drawings.
- t) Show remote refrigeration systems (refrigeration racks) draw to scale to represent all service, ventilation and code required clearances.
- u) Drawings must be reviewed and stamped by the KEC to indicate that they conform to the submittal requirements prior to submission.

- v) Dimension rough-ins in reference to column center lines or existing walls to remain.
- w) If using KCL catalog to create PDF's do not include hyperlinks when plotting drawings.

- x) Turn off SHX text files in Autocad prior to plotting pdf's. Pdf's received with active SHX text files will be rejected.

Submittals that do not satisfy the requirements as outlined in Section 1.13 SUBMITTALS of the 114000 Foodservice Equipment Specification will be rejected.

3. Wall Backing Shop Drawings Checklist:

- a) Verify wall construction type. Wall backing not be required on masonry wall construction.
- b) Wall backing is required for items that are wall mounted as noted on CFL standard detail C-1-2A
- c) Show location, size and dimension of all wall backing required include detail sheet C-1-2A. Any backing required will be provided and installed by the General Contractor.
- d) Building Works Plan must be submitted for checking and forwarded to the General Contractor in time for the wall backing to be installed prior to closing of the walls.

Submittals that do not satisfy the requirements as outlined in Section 1.13 SBMITTALS of the 114000 Foodservice Equipment Specification will be rejected.

4. Fabricated Shop Drawings Checklist:

- a) Submit Owner approved Alternate/ Substitution Request form for any alternates/ substitutions previously approved by the Owner.
- b) Prepare and submit shop drawings for all custom fabricated items included in this contract.
- c) The detail drawings shall be submitted at a minimum of 3/4" scale for elevations and 1-1/2" scale for sections and on minimum sheet size of 24" x 36".
- d) Drawings shall show all dimensions, all details of construction, installation, and relation to adjoining and related work.
- e) Drawings shall show all reinforcements, anchorage and other related work required for the complete installation of all fixtures.
- f) Fabrication details and section drawings shall be prepared to reflect "worst case" conditions and illustrate close tolerances.
- g) Fabricated shop drawings shall be consistent with the bidding documents. Any variances that may require changes to the building utility systems should be discussed with the Designer prior to submission.
- h) Fabrication drawings shall show manufacturer, model number and all equipment items, including those of other manufacturers, drawn to scale. For example, elevation drawings of counters with undercounter equipment shall show item number, manufacturer and model number of undercounter equipment drawn to scale.
- i) When custom stainless and or custom millwork counters for cafeteria serving areas are included in the KEC scope of work, the Foodservice Equipment Contractor is required to provide a complete set of fully

coordinated shop drawings representing all equipment and materials provided by multiple manufacturers including millwork or stainless steel counters, stone or composite counter tops and all foodservice equipment items. As part of the shop drawing submittal process, the FSE Contractor will provide a fully coordinated set of custom stainless and / or custom millwork shop drawings reflecting all items “In Contract” and related items “Not in Contract”. Those parties providing any equipment “Not in Contract” will be responsible for submitting product data/ shop drawings for specific items they are providing. The Food Service Equipment Contractor will be responsible for obtaining and reflecting those requirements in the fabricated shop drawing submittal. The drawing set should include a floor plan identifying all units and their relationship to one another, plan details for each item at a scale of $\frac{1}{2}'' = 1'-0''$, elevation drawings at $\frac{3}{4}'' = 1'-0''$ and sections/detail drawings at $1\frac{1}{2}'' = 1'-0''$ identifying:

1. Dimensions and locations of all countertop cut-outs for drop-in equipment and related equipment flanges.
2. The overall dimension that drop-in equipment units extend below the countertop.
3. The exact size and locations of all food shields. Size and locate all uprights relative to counter and adjacent equipment units.
4. Where counters contain countertop mounted units, identify the size and location of same.
5. The relationship of all items “In Contract” to items “Not in Contract”.
6. Cut-outs for remote controls, utility routing, access to drains, ventilation requirements, etc.
7. Details of food shield mounting requirements.
8. Details of food service equipment installation in stone or composite countertops, if applicable, consistent w/ the manufacturer’s recommendations including a plan view of joints proposed for stone or composite tops.

Where cafeteria service counters (referenced above) or other Millwork assemblies (including, but not limited to bar die & top, back bar, service stations, millwork buffet units, etc.) are not in the F.S.E. Contractor’s scope of work, the F.S.E. Contractor will provide product data on those “in contract” items that relate to the millwork assemblies being provided by Others sufficient to enable Others to prepare shop drawings as outlined in #5 above. Once the shop drawings are prepared by others they will be submitted to the F.S.E. Contractor for review and coordination. Fully coordinated shop drawings, satisfying the requirements outlined above, will then be submitted to the Architect for review and approval.

- j) Shop drawings submittals are to reflect all standard details specified by the Consultant. Consultant approval of shop drawings does not preclude the Foodservice Equipment Contractor from providing the details specified.
- k) For self-contained refrigeration systems located within cabinet body construction, confirm the recommended free area of ventilation with the manufacturer and coordinate the location of the ventilation louvers with the custom fabricator.

- l) All custom fabricated equipment items are to be accounted for in the drawing submittal.
- m) Confirm that all built-in utilities (plumbing and electrical) are accounted for and minimize their impact on storage and functionality.
- n) Only Approved Certified Fabricators/Installers as listed by the Solid Surface Material Manufacturer **will be accepted**.
 - o) Drawings must be reviewed and stamped by the KEC to indicate that they conform to the submittal requirements prior to submission.

Submittals that do not satisfy the requirements as outlined in Section 1.13 SUBMITTALS of the 114000 Foodservice Equipment Specification will be rejected.

5. Exhaust Hood Shop Drawings Checklist:

- a) Submit Owner approved Alternate/ Substitution Request form for any alternates/ substitutions previously approved by the Owner.
- b) Shop drawings submitted for exhaust hoods are to reflect exhaust/ make-up air data represented on the “plans and specifications” including identical duct collar quantities, size and location, CFM requirements and static pressure. Drawings submitted for approved substitutions or drawings from alternate manufacturers listed as “equal” in the item specification of this document are not excluded from this requirement.
- c) Fabrication drawings shall show manufacturer, model number and all equipment items, including those of other manufacturers, drawn to scale. For example, elevation drawings of exhaust hoods shall show manufacturer, model number and cooking appliances drawn to scale.
- d) Note that duct and fan systems will not be re-engineered to conform to shop drawings showing different exhaust/ make-up air data than those specified. See Part I – General, 1.7 Alternates, E.
- e) Account for all scheduled items.
- f) When specified, pre-piping of the fire suppression system must be shown.
- g) Provide elevations showing all equipment units below the exhaust hood.
- h) Provide wiring schematic for fire suppression system, if provided by exhaust hood manufacturer.
- i) Provide the “sequence of operation” in the event of a fire under the exhaust hood.
- j) Size and locate any remote control panels on the drawing.
- k) Drawings must be reviewed and stamped by the KEC to indicate that they conform to the submittal requirements prior to submission.

Submittals that do not satisfy the requirements as outlined in Section 1.13 SUBMITTALS of the 114000 Foodservice Equipment Specification will be rejected.

6. Food Shield Shop Drawings Checklist:

- a) Shop drawings shall show manufacturer, model number and all equipment items including those of other manufacturers drawn to scale.
- b) Submit Owner approved Alternate/ Substitution Request form for any

- alternates/ substitutions previously approved by the Owner.
- c) Account for all food shields in the submission.
- d) Drawings must be consistent with design intent regarding on/off controls for lighting and heat lamps when specified.
- e) Show all details and wiring diagrams for any transformers and related utility connections.
- f) Provide finishes, options, and accessories and mounting details.
- g) Drawings must be reviewed and stamped by the KEC to indicate that they conform to the submittal requirements prior to submission.

Submittals that do not satisfy the requirements as outlined in Section 1.13 SUBMITTALS of the 114000 Foodservice Equipment Specification will be rejected.

7. Floor Trough Shop Drawings Checklist:

- a) Specify the manufacturer and model numbers on the submittal.
- b) Submit Owner approved Alternate/ Substitution Request form for any alternates/ substitutions previously approved by the Owner.
- c) Account for all floor trough units in the submission.
- d) Specify all gauges, finishes, options, accessories and details.
- e) Confirm that the flange detail provided is consistent with the finished flooring proposed by the Architect. Drawings to represent special “sandwich” flange requirement for sheet good flooring, when specified by the Architect.
- f) Drawings must be reviewed and stamped by the KEC to indicate that they conform to the submittal requirements prior to submission.

Submittals that do not satisfy the requirements as outlined in Section 1.13 SUBMITTALS of the 114000 Foodservice Equipment Specification will be rejected.

8. Walk-In Cooler Shop Drawings Checklist:

- a) Specify the manufacturer and model numbers on the submittal.
- b) Submit Owner approved Alternate/ Substitution Request form for any alternates/ substitutions previously approved by the Owner.
- c) Confirm that the floor details shown are consistent with the specifications.
- d) Properly dimension fixtures (L x W x H)
- e) Confirm options and accessories to those specified.
- f) Confirm that the refrigeration systems submitted, if provided by the walk-in manufacturer, are consistent with the specification.
- g) Drawings must be reviewed and stamped by the KEC to indicate that they conform to the submittal requirements prior to submission.
- h) Note that no horizontal sliding doors w/ floor mounted stay wheels will be accepted.

Submittals that do not satisfy the requirements as outlined in Section 1.13 SUBMITTALS of the 114000 Foodservice Equipment Specification will be rejected.

9. Refrigeration Rack Shop Drawings Checklist:

- a) Drawings and specification sheets with refrigeration piping showing actual line sizes and system allocation, evaporators, compressors, condensers, and required valves and accessories.
- b) All items identified, including model, any required electrical characteristics and BTU load as applicable.
- c) Submit Owner approved Alternate/ Substitution Request form for any alternates/ substitutions previously approved by the Owner.
- d) Confirm that the rack accounts for all the refrigeration loads specified.
- e) Dimension the refrigeration rack (L x W x H) properly, including service and ventilation clearances.
- f) Confirm options and accessories to those specified.
- g) Confirm that the drawing properly accounts for field wiring and identifies those responsible, consistent with the specification.
- h) Confirm that emergency power is detailed properly when specified.
- i) Submit manufacturer's drawings and manufacturer's specification sheets for approval prior to commencing work.
- j) The drawings must be reviewed and stamped by the KEC to indicate that they conform to the submittal requirements prior to submission.

Submittals that do not satisfy the requirements as outlined in Section 1.13 SUBMITTALS of the 114000 Foodservice Equipment Specification will be rejected.

J. Solid Surface Materials Shop Drawings

- 1. Only Approved Certified Fabricator/Installers as listed by the Solid Surface Material Manufacturer **will be accepted**.
- 2. The Food Service Equipment Contractor must provide drawings detailing the fabrication and installation methods of the food service equipment in the solid surface material.

1.14 PARTS AND SERVICE MANUALS

- A. Furnish two (2) bound sets of parts and service manuals.
 - 1. The manual shall include a table of contents in numerical sequence referencing item number and item name.
 - 2. The manuals shall include a source directory for parts and service for all items.
 - 3. The manuals shall be submitted in time to allow review and transmittal to the Owner/Operator prior to start-up and demonstration of the equipment. Manuals must be submitted before the Owner will issue final acceptance of the installation.
- B. Furnish "As - Built" plans of foodservice areas. Note that all submittals must be revised through the course of completing the project to reflect all as built conditions.

1.15 VERIFICATION AND COORDINATION OF PROJECT/DATA

A. Range Lines:

All front manifold range lines shall be assembled and aligned at the factory before shipment, including back guards, high shelves and salamanders.

B. Pans and Inserts

Verify sizes directly w/ the Owner/Operator on the following representative items before ordering equipment relating to these items:

- a) Steam Pans
- b) Sheet Pans
- c) Trays
- d) Glass and Cup Racks
- e) Plate Sizes
- f) Cup Sizes

Include verification of tray orientation and spacing at locations of soiled tray return areas, tray make-up areas, etc.

C. Color selections "By Architect" upon contract award submit a listing of those items requiring "color selection by Architect" directly to the architect along with information from the manufacturer including color charts, detailing the choices available.

D. Quietness of Operation

Quietness of operation of all food service and refrigeration equipment is a requirement. Remove or repair any equipment producing objectionable noise.

E. Delivery and Entry

Verify all conditions at the building, particularly door openings, stairwells, elevator cab sizes and passageways prior to submitting your proposal. Foodservice Equipment Contractor proposals are to include the costs associated with delivery access to satisfy the intent of the design. The cost of manufacturing equipment in multiple sections and providing welded field joints (non-welded spline joints not acceptable), as may be required to enable delivery, are to be included in the proposal. All special equipment, handling charges, window removal, equipment substitution, etc. included in change order requests related to delivery access that should have been known to the Foodservice Equipment Contractor prior to contract award will be rejected.

Coordinate access with the General Contractor to insure delivery of equipment to the required areas. Coordination shall include, but not be limited to, early delivery, hoisting, window removal and/or delay of wall construction.

F. Connection Terminals

All equipment will be complete with standard connections as they relate to their Country of Origin. It shall be the responsibility of the Food Service Equipment Contractor to provide

any and all required adaptors to assure the proper connection to the conditions at the job site.

G. Site Verification

Notify Designer, Owner and the General Contractor in writing if, in the Food Service Equipment Contractor's opinion the job site is not adequate to insure proper installation of the equipment. Notification shall be in writing with sufficient time to effect corrective measures to meet the installation schedule.

H. Cold Storage Rooms and Refrigeration Systems

1. Coordinate the timely installation of the wearing floors inside the cold storage rooms with the General Contractor to prevent prolonged exposure of the floor insulation.
2. Confirm that the cold storage rooms are not used by any other trade for storage or work areas. Repair or replace any damaged areas of the cold storage rooms, if the damage was caused due to the cold storage rooms being used for storage or work areas.
3. Be responsible for determining the acceptability of the location of the remote refrigeration condensing units in regard to ambient temperature, noise and accessibility. If the condensing unit location is determined to be unacceptable for any reason, advise Owner and request direction in writing.

I. Millwork Coordination

1. Coordinate with the Millwork Contractor by providing the following information to the Millwork Contractor prior to the preparation of their millwork shop drawings:
 - a) Provide equipment sizing information for all foodservice equipment relating to millwork items.
 - b) Provide cut-out dimensions for all equipment units that drop-in or are built into the counter tops, counter aprons, etc.
 - c) Identify dimensions/clearances required between heated drop-in units and adjacent cabinet body millwork.
 - d) Carefully coordinate the locations of controls for ease of employee access.
 - e) For self-contained refrigeration systems located within the millwork cabinet body confirm the recommended free area of ventilation with the manufacturer and coordinate the location of the ventilation louver(s) with the Millwork Contractor.
 - f) Ship units of equipment that impact dimensions and construction of millwork to the Millwork Contractor.
 - g) Refer to 1.11, H. 5 and 6 for additional requirements.

PART 2 - PRODUCTS

2.1 COMMERCIALY MANUFACTURED EQUIPMENT

- A. All items of standard equipment shall be the latest model at time of delivery.
- B. Manufacturer's directions shall be followed in cases where the manufacturers of articles used in this contract furnish directions or prints covering points not shown on the drawings or specifications.
- C. All doors shall be hinged as shown on plans.
- D. Refrigerated Items
 - 1. All reach-in refrigerators and freezers with remote refrigeration systems shall be complete with condensate evaporator when no floor drain is available.
 - 2. When a condensate evaporator is required, it shall be complete with thermostatic expansion valves at the evaporator.
 - 3. Refrigerated drawer units are to be provided with stainless steel drawer liners and stainless steel full size pans. Food Service Equipment Contractor to furnish each drawer with two (2) 12" x 20" x 4" deep 18 ga. stainless steel pans.
 - 4. When a removable plate rail/cutting board is specified for an equipment stand, the Food Service Equipment Contractor is to coordinate cutting board support locations with work top cooking appliances to provide access for operations and service.
 - 5. The refrigerant for medium and low temperature fixtures to be CFC free and conform to the Montreal Protocol Agreement.
 - 6. All refrigerated fixtures are to be provided with a flush mounted exterior thermometer.
 - 7. All refrigeration Systems to be provided with 5 year compressor warranty and 1 year service agreement.
 - 8. Doors/drawers on refrigerated fixtures are to be provided with cylinder door locks, keyed alike to the extent possible, unless specified with a alternate locking devise.
 - 9. All glass panels provided as part of refrigerated display cases are to be made of insulated glass.
- E. Free-standing work tables and counters with flanged feet shall be secured to the floor with smooth head stainless steel fasteners or with pins concealed in all legs of the table/counter, when specified.
- F. All equipment units that "pass thru" wall openings are to have an "equal" finish on front and rear. The intent is that the equipment unit will project a finished "look" on the rear (kitchen side) as on the front (customer side).

- G. Provide water treatment units/systems (including surge tanks) for installation by the Plumbing Division suited to the application and anticipated volume for items “in contract” and those units provided “by vendor”, “by product supplier” or “by owner” as follows:

Postmix beverages:

Low to medium volume:

Coldrink Single PF EV9293-21 with 7FC EV9692-61 cartridge\

High volume:

Coldrink Twin PF EV9293-22 with two each 7FC EV9692-61 cartridges

Coffee:

Low to medium volume:

Insurice Single PF EV9293-01 w/ (1) EV9692-31 4FC-S cartridge

High volume:

Insurice Twin PF EV9293-22 w/ (2) EV9692-71 7FC-S cartridges

Ice makers:

Ice Cubers:

Less than 650#/day (except Hoshizaki): Insurice Single PF-I2000 EV9324-21

Hoshizaki up to 650#/day: Insurice Twin PF-I2000 EV9324-22

800# - 1200#/day (except Hoshizaki): Insurice Twin PF-I2000 EV9324-22

Hoshizaki 800# - 1300#/day: Insurice Triple 7FC-S EV9327-74

1300# - 1600#/day (except Hoshizaki): Insurice Triple 7FC-S EV9327-74

All cubers greater than 1600#/day (and Hoshizaki greater than 1300#/day):

Insurice Quad 7FC-S EV9327-44

Ice Flakers/Nugget:

Less than 650#/day: Insurice Single PF-I2000 EV9324-21

650# - 1000#/day: Insurice Twin PF-I2000 EV 9324-22

1200# - 2000#/day: Insurice Triple 7FC-S: EV9327-73

Combination:

Less than 3.33 gpm – High Flow CSR Twin EV 9330-42

3.33 – 7.5: High Flow CSR Triple 7FC EV9329-73

Up to 10 gpm: High Flow CSR Quad 7FC EV EV9329-74

Up to 15 gpm: Endurance Quad High Flow EV9437-32

Up to 15 gpm: Endurance Self-Clean High Flow EV9437-42

Steams (boiler only):

Countertop and floor less than 1.67 gpm: Kleensteam CT EV9797-50

Less than 2.5 gpm: Kleensteam EV9797-21

Flow rates less the 5gpm Kleensteam II Twin EV9797-22

Provide wall mounted rack per detail C-19-4 when surge tank is wall mounted.

Provide suitable sized dunnage rack for floor mounted surge tank.

Provide three sets of filters for the system provided, that's one set for the system to operate & two sets of filters for back-up/replacement.

H. Food Service Equipment Flexible Connectors

1. Gas Cooking Equipment Connections: FSE Contractor shall furnish gas cooking appliances with appropriately sized (length, diameter and BTU capacity) Dormont Safety System gas connector assemblies.
 - a. Gas appliances (movable and non- anchored stationary)
Dormont Series 16xxKITCF2S inclusive of: Gas connector, 2 Swivel Max Swivels, coiled restraining cable and hardware, and SafetyQuik combination valve/quick disconnect.
 - b. Gas appliances (Floor anchored Stationary)-
Dormont Series 16xxBP connector.
All gas connection devices shall be CSA and NSF compliant.
2. Appliances requiring water supply
 - a. Counter top Equipment
FSE Contractor shall supply countertop coffee brewing and dispensing equipment with Dormont SwirlHose retractable connectors including 2-way water quick disconnect. Sizing in diameter and length shall be sufficient to GPM requirements of appliance and length to the water source. NSF Approved. This includes equipment “in contract”, and those items “by vendor”, “by product supplier” or “by owner”.
 - b. Cooking equipment with water supply required-
FSE Contractor shall supply Dormont Series WxxBP2Q connectors inclusive of the connector and a 2 way water quick disconnect on all movable and non anchored equipment requiring a water feed. (Cold or Hot) Size shall be determined based on GPM requirements and proximity to water source. Wheeled (castered) equipment will require appropriately sized coiled restraining device. Dormont series: RDC.
 - c. Cooking appliances with steam supply required- FSE shall supply Dormont Series HxxBIP2Q connectors inclusive of the connector and a 2 way quick disconnect on all movable and non anchored equipment requiring a steam feed. Connector steam source. Wheeled (castered) equipment will require appropriately sized coiled restraining device. Dormont series: RDC
3. Remote Refrigeration, Mobile Units.
When specified, FSE Contractor shall provide and make final connection to remote refrigerated fixtures with flexible pull-out assemblies for refrigerant from Packless Industries. Units fabricated of red brass tubing with continuous helical corrugation covered by bronze braid. Standard models have an SAE male flare at one end and an SAE female flair swivel of the same size at the other end. U.L. and C.S.A. approved. Provide pull-out assemblies of diameter, length (custom, if required) and connector type as recommended by the manufacturer for each application.
4. Positioning Devices
When required by Authority having jurisdiction, mobile (wheeled) cooking equipment shall be held in position utilizing the Dormont Safety-Set device. Dormont: part # PS.

5. Division 23 to connect all quick-disconnect hoses for water and gas to equipment.

I. Buy Out Equipment

The following is a list of standards for all “buy out” equipment:

1. The intent is that exposed metal surfaces of buy-out equipment units have a Stainless steel finish except where the model number of the unit dictates aluminum. For those items where stainless fronts, tops, rears and sides are “optional” we expect that a stainless finish will be provided in those areas where the finish is exposed.
2. All range units if not provided with a rear riser as a standard component by the manufacturer are to be provided with a stub back (min.).
3. Provide any/all stacking/mounting kits as may be required per the manufacturers recommendations for stacking equipment units together (for example: ice makers positioned on top of soda/ice dispensers), built-in/drop-in units into custom fabricated fixtures, etc.
4. Accessories may be required that are not available from the manufacturer of the specified equipment. The Food Service Equipment Contractor shall provide those accessories as separate items. As an example, a Jade JGT- 2436 griddle may be specified with a cutting board and support bracket per detail C-2-3B. This support bracket specified is not available from Jade. It needs to be custom fabricated. The cost of the cutting board and support bracket needs to be included in the price of the griddle in the Food Service Equipment Contractor’s proposal to the Owner. A thorough review of all accessories specified is necessary to properly account for their cost and avoid schedule delays.
5. Size casters for proper fit of undercounter equipment units at no additional cost to the Owner.

2.2 PLUMBING WORK

- A. Provide suitable pipe slots, chases and/or do all drilling, punching and cutting of equipment required to provide access for Division 22 - Plumbing connections and/or runs. Such work performed at the job site shall be of the same quality as similar work in the shop.
- B. To insure proper clearance for cleaning, all horizontal piping lines shall be run at the highest possible elevation and not less than 6" (150 mm) above floor, through equipment wherever possible.
- C. Indirect waste piping shall be installed in accordance with the codes in effect at the job site. Piping shall run as described hereinafter, and shall discharge into floor sinks. Extend piping to a point of at least 2" (50 mm) above rim of floor sink and cut bottom on 45 degree angle. All indirect waste piping shall be installed and routed in a manner to insure proper drainage and shall conform with shelves, spaces, equipment or building conditions. Secure all indirect waste piping as required to achieve same.
 1. Indirect waste piping from ice bins, ice pans and similar items shall be insulated to prevent condensation.

- D. Water inlets shall be located above the positive water level to prevent siphoning of liquids into the water system. Wherever conditions shall require a submerged inlet, a suitable type of check valve and vacuum breaker shall be placed on the fixture to form part of same to prevent siphoning.
- E. Where exposed, piping and fittings shall be chrome plated.
- F. All valves shall be American made to insure availability of replacement parts.

G. FAUCETS

- 1. Faucets shall be furnished on all sinks, bain maries, water stations and other fixtures as specified and shall be supplied with non-splash aerator, and water saving devices where required by local codes. Unless otherwise specified, faucets shall be provided as follows, for installation by Division 22 - Plumbing: (Note: All faucets to be from the same manufacture).

Type 1: Faucet (1/2 Splash)
Fisher Model 3251 (8" Spout)*
T&S Model B—0231 with #60 x (8" Spout)

Type 2: Faucet (3/4 Splash)
Fisher Model 5414 (14" Spout)
T&S Model B-0290 (12" Spout)

Type 3: Faucet (1/2 Deck)
Fisher Model 3311 (8" Spout)*
T&S Model B-1121 (8" Spout)

Type 4: Faucet (3/4 Deck)
Fisher Model 5314 (14" Spout)
T&S Model B-0293 (12" Spout)

Type 5: Faucet (1/2 Deck)
Fisher Model 1821 (Gooseneck)*
T&S Model B-1142 (Gooseneck)

Type 5A: Faucet (1/2 Splash)
Fisher Model 1945 (Gooseneck)*
T&S Model B-0331 (Gooseneck)

Type 5B: Faucet (1/2 Deck)
Fisher Model 3525

Type 6: Faucet (1/2 Deck)
Fisher Model 3010 (INDEX HOT)
T&S Model B-207 (INDEX-HOT)

Type 7: Pre-Rinse Faucet (1/2 Splash)
Fisher Model 2210-WB
T&S Model B-0133B W/Wall Bracket

Type 7A: Pre-Rinse Faucet (1/2 Deck)
Fisher Model 2310-WB
T&S Model B-0113 W/Wall Bracket

Type 8: Fill Faucet (1/2 Wall) Double Jointed Swing Sprout
Chicago Model 515 (INDEX COLD)
T&S Model B-592

Type 9: Dipperwell & Faucet
Fisher Model 3041
Component Hardware Model K27-1010

Type 10: Water Fill Faucet & Drain Pan
Fisher Model 1400
Component Hardware Model K27-1000

Type 11: Pre-Rinse Add On Faucet
Fisher Model 2901 add-on faucet.*
T&S Model B- 155 ADD-ON-FAUCET

Type 12: Glass Rack Fill Faucet (1/2 deck- hot/cold water)
Fisher Model 1117-WB with #82104
Single Deck Dual Control Valve

Type 13: Not Assigned

Type 14: Faucet (1/2 Deck)
Fisher Model 3525 (Gooseneck)
T&S Model B-1141 (Gooseneck)

Type 14A: Faucet (1/2 Splash)
Fisher Model 1996 (Gooseneck)
T&S Model 1146 (Gooseneck)

Type 14B: Faucet (1/2 Deck) at Fabricated
Hand Sink Located in Worktop
Fisher Model 3526 (Gooseneck)
T&S Model B-1141 with #120x
Rigid Gooseneck & #B-0413 Adaptor

Type 15: Faucet (1/2 Deck) at Fabricated
Hand Sink Located Below Worktop
T&S Model -0202

Type 16: Fill Faucet (1/2 Wall) at Range Spreader
Fisher Model 3710 (INDEX COLD)
T&S Model B-0212 (INDEX COLD)

*Size spout to position water flow at center of waste connection.

H. DRAINS AND WASTES

1. Furnish all necessary drains and wastes with the equipment as follows:

Type 1: Drain (1-1/2" & 2") - Rotary handle without overflow, flat strainer. Fisher Model 28932

Type 2: Drain (1-1/2" & 2") - Basket Strainer without overflow, basket strainer. Fisher Model 28983.

Type 3: Drain (1-1/2") - Drain with standpipe. Fisher Model 6541-2400 waste socket, 6550-2100 lock nut, 6580-5000 tail piece and 6571 standpipe (length as required)

Type 4: Drain (1") - Drain with standpipe. Fisher Model 6240-2100 waste socket with 6280-5000 washer, 6250-2100 lock nut and 6271 standpipe (length as required).

Type 5: Drain (1-1/2") - Open. Fisher Model 6541-2400 waster socket, 6550-2100 lock nut, 6580-5000 washer and 6544-0000 tail piece.

Type 6: Drain (1-1/2" & 2") - Rotary handle with overflow, flat strainer. Fisher Model 28940 (verify length and height of overflow assembly with sink size).

Type 7: Drain (1-1/2" & 2") - Rotary handle with overflow and basket strainer. Fisher Model 28959 (verify length and height of overflow assembly with sink size).

2. All rotary wastes/lever wastes are to be provided with a # 14 ga. stainless steel valve bracket located a sink bowl front. Refer to Detail C-8-5 for construction.
3. Unless specified otherwise, all custom fabricated sinks (except hand sinks) are to be provided with Type 1 wastes. Custom fabricated hand sinks are to be provided with Type 2 wastes.
- I. Food Service Equipment Contractor to coordinate plumbing interconnections at field joints, completed by Division 22 - Plumbing, on equipment assembled at the job site.

J. Floor Troughs

1. When specified, floor troughs are to be properly dimensioned on the F.S.E.C.'s building works rough-in plan. Careful coordination is required so that trough grate removal is unobstructed by adjacent equipment units. Further, where troughs are specified in front of tilting units (braising pans, kettles), the equipment is to be placed so that the center of the pour path on the tilting unit aligns with the center line of the trough. Food Service Equipment Contractor to provide trough flange type best suited to accommodate finished flooring specified by Architect.

2.3 ELECTRICAL WORK

- A. For all fabricated equipment, furnish and install all outlets, switches, controls, conduit, service fittings and load centers. Load centers shall be complete with individual "visi-trip" circuit breakers for each device built into or forming an integral part of the unit. Furnish to Division 26 - Electrical a wiring schematic including circuit breaker diagram for load center.
- B. Insure that all equipment furnished under this contract shall be so wired, wound or constructed as to conform with the characteristics of electrical and other services at the premises.
- C. Appliances shall be new, of manufacturer's current production and furnished complete with motors drive mechanism, starters and controllers, including master switches, timers, cut-outs, reversing mechanism and other electrical equipment if and as applicable. Wiring and connection diagrams shall be furnished with electrically operated machines and for all fabricated equipment.
- D. Only rigid steel conduit shall be used, zinc coated where unexposed and chrome plated where exposed. All conduit wiring shall be run concealed wherever possible. Conduit shall be continuous from outlet to outlet and from outlet to load center circuit or pull boxes and shall enter and be secured in such a manner that each system shall be electrically continuous throughout. All conduits shall be thoroughly and substantially supported by accepted industry practices.
- E. Supply on each motor driven appliance or electrical heating unit, a suitable control switch or starter of proper type wherever such equipment is not provided with same.
- F. All plug-in equipment, shall have plugs and neoprene cords furnished and installed. Coordinate work with Division 26 - Electrical so that the receptacles provided will match the specific plugs installed as part of the plug-in equipment. Any changes on cords and plugs required in the field due to lack of coordination between Division 26 - Electrical and Food Service Equipment Contractor shall be the latter's responsibility.

- G. All surface mounted receptacles indicated for fabricated equipment are to have Component Hardware Group, Inc. model R58-1010 or R58-1029 or equal aluminum box complete with satin finish stainless steel cover and receptacle as indicated below:
1. 2-pole, 3-wire grounding 20 amp; 125V.
Hubbell #5352 or equal (NEMA 5-20R).
 2. 2-pole, 3-wire grounding 20 amp; 250V.
Hubbell #5461 or equal (NEMA 6-20R).
 3. 2-pole, 3-wire grounding 30 amp; 250V.
Hubbell #9330 or equal (NEMA 6-30R).
- H. All built-in receptacles indicated for fabricated equipment are to be 2" x 4" x 1-1/2" deep "Handy Box" tack welded to fixture and fitted with receptacle indicated above and satin finish stainless steel cover. Splash mounted receptacles to be horizontal with all others vertical.
1. 30 AMP, 250 V receptacles require a 2-1/8" deep "Handy Box". If splash mounted, increase splash width to 2-1/2".
- I. All switches, controls, etc., shall be conspicuously labeled as to use with phenolic plastic name plates screwed to adjacent surfaces, with white recessed lettering on black background. Submit a sample to the Designer for approval.
- J. All electrically heated, fabricated equipment shall be internally wired to a thermostatic control and an "on/off" red neon light indicator, both to be mounted in a terminal box with a removable access panel and located outside the heated area. Wiring to be nickel-plated copper, properly insulated.
- K. All cold storage room electrical components shall be provided with conduit, splice boxes, switches, fittings, etc. concealed within the insulated panels at time insulation is foamed in place. Conduit shall extend up within wall panels, through ceiling panels ready for EYS fittings and final connection by Division 26 - Electrical.
- L. Provide all incandescent bulbs and fluorescent tubes required for equipment under this section. Fluorescent tubes, for food service display equipment, to be high natural color fluorescent lamp "Color-Gard 50" as manufactured by Duro-Test Corporation 1-800-937-0900 ext 7020 (or equal).
- M. Food Service Equipment Contractor to coordinate electrical interconnections, completed by Division 26 - Electrical, at field joints on equipment assembled at the job site.
- N. All wiring within custom fabricated counters and tables to be concealed. Wiring to heat lamps and display lighting (Part of food shield assembly) to be concealed.

2.4 FOOD SERVICE EQUIPMENT (COMMERCIAL & FABRICATED)

- A. Lamps
Food Service Equipment Contractor shall furnish all lamps as recommended by the manufacturer, or as specified, required for all food service equipment light fixtures. Lamps will be installed by Division 26 - Electrical.
- B. Cutting Boards
All cutting boards provided for “buy-out” and custom fabricated equipment to be manufactured by Richlite. For custom fabricated application provided the size and thickness as indicated in the documents. For “buy-out” items provide same size and thickness as would otherwise be provided by the manufacturer of the “buy-out” item.

2.5 MOUNTING HEIGHTS FOR FOOD SERVICE EQUIPMENT

- A. Wall Shelving
Wall mounted and table mounted shelves are to be mounted at appropriate height and provide appropriate clearance to accommodate table top equipment and provide convenient access to items stored on shelf. Coordinate mounting height with owner’s representative. See Standard Details.
- B. Fire Suppression System
Fire Suppression System tank/control cabinet to be mounted tight to finished ceiling at location shown on plan.

2.6 VENTILATION WORK

- A. Provide all labor, material and services required; verify sizes and locations of duct connections; and provide all exposed duct work from hoods, ventilators, and dishwashers to 4” above finished ceiling for final connection to building duct work by division 23 - HVAC.
- B. All exposed ducts etc. to be stainless steel.
- C. Food Service Equipment Contractor to verify field conditions and provide and install matching trim and closure panels (as required) to close gaps between exhaust hoods, adjacent walls and ceilings. All trim and closure panels to be provided by ventilator manufacturer.
- D. Provide stamped and sealed drawings for exhaust hoods and fire suppression systems when required by the authority having jurisdiction.

2.7 FABRICATED EQUIPMENT

Following is a list of approved manufacturers for custom fabrication. **Bidders must provide pricing in their base bid for the specified manufacturer and any mandatory alternate manufacturer as listed in the individual item specifications for each custom fabricated item. Manufacturers not specified in the item specification section must be submitted as an alternate. See 1.7 Alternates/ Substitutions.**

All State Fabricators Corp	Cranston, RI	(401) 785-3900
Carbone Metal Fabricator	Chelsea, MA	(617) 884-0237
FSF Manufacturing, Inc.	Oviedo, FL	(407) 971-8280
Low Temp Manufacturing Co.	Jonesboro, GA	(770) 478-8803
Pro Stainless, Inc.	Keyser, WV	(304) 788-5041
South Jersey Metal (SJM)	Deptford, NJ	(856) 228-0642

No alternates to the manufacturers listed above will be accepted.

Following is a list of approved manufacturers for food shields. **Bidders must provide pricing in their base bid for the specified food shield manufacturer and any mandatory alternate manufacturer listed in the individual item specifications for each food shield item. Manufacturers not specified in the item specification section must be submitted as an alternate. See 1.7 Alternates/ Substitutions.**

BrassSmith	Denver, CO.	(800)-662-9595
Versa Gard	Norcross, GA.	(404)-248-9200
Premier	Atlanta, GA	(800)-251-5800

No alternates to the manufacturers listed above will be accepted.

NOTE: Approved Millwork Fabricators: See section 2.8

- A. Special Fabricated Equipment
All specially fabricated equipment must be by one manufacturer acceptable to Designer and the Owner.
- B. Workmanship
All work must be done in an approved workmanlike manner to the complete satisfaction of Designer and the Owner.
- C. Stainless Steel
All stainless steel shall be the U.S. standard gauge, 18-8, type 304, finish as noted in paragraph 2.05N.
- D. Galvanized Steel
All galvanized steel shall be electro-galvanized.
- E. Welding and Soldering
 - 1. All seams and joints shall be shop welded or soldered as the nature of the material may require. Welds to be ground smooth and polished to match original finish.

2. Framework of galvanized steel shall be welded construction. Where galvanizing has been burned off, the weld shall be touched up with high grade aluminum paint.

F. Sound Deadening

1. The underside of all metal top tables, counters, drainboards, sinks and dishtables shall be provided with sound deadening material similar to Component Hardware Model Q85-5225 Tacky Tape; 3/4" wide x 3/32" thick strips. Spray or painted material or exposed mastic will not be acceptable.

G. Metal Top Construction

1. All seams and joints shall be one-piece welded construction, reinforced on the underside with galvanized steel secured to top with weld studs and stainless steel or chrome plated cap nuts so tops can support heavy weight without deflection. Cross braces to be not more than 48" (120 cm) on center.
2. Tops supporting coffee urns, ice/soda dispensers, Etc...shall have additional bracing to support the heavy loads.
3. Field joints in stainless steel tops; where required due to limitation of sheet sizes, equipment sizes or installation requirements shall be welded, ground smooth and polished to blend with adjacent surfaces.
4. If inverted hat sections are used in lieu of channels, close ends.

H. Fasteners

1. Exposed bolt heads will not be permitted on fixtures.
2. Butt joints made by riveting straps under seams and then filled with solder will not be accepted.
3. Rivets of any kind, including pop-rivets, will not be accepted.
4. Exposed screw heads, when necessary, shall be one of the same material as the pieces joined and countersunk flush.
5. Exposed bolt ends not permitted. Chrome plated hexagon type cap nuts to be provided on all exposed bolt ends.

I. Rolled Edges

Rolls shall be as detailed with corners bullnosed, welded, ground and polished.

J. Corners

Dishtables, drainboards, splashbacks and turned up edges shall have 1/2" (15 mm) or larger radius bends in all horizontal and vertical corners, coved at intersections unless specified otherwise.

K. Enclosed Cabinet Bases

Bases shall be made of 18 gauge stainless steel sheets reinforced by forming the metal. Sides and partitions shall terminate at front in a 2" (50 mm) wide fully enclosed mullion and welded at intersections. Shelves are to be removable where detailed. Exposed ends, partitions and shelves are stainless steel.
FSEC to coordinate size, quantity and location of louvered openings for sufficient ventilation of food service equipment.

L. Legs and Cross Rails

1. Equipment legs and cross rails shall be 1-5/8" (40 mm) 16 gauge stainless steel tubing unless otherwise noted. All welds at cross rails shall be continuous and ground smooth. Tack welds are not acceptable. Tops of legs to be fitted with Component Hardware Model # A20-0206 16 gauge stainless steel gusset or approved equal. Gussets are to be secured as hereinafter described to fixtures.
 - a. Sinks:
Weld gussets to triangular 12 ga. stainless steel gusset plates, which are in turn welded to underside of sinks.
 - b. Tables and Dishtables:
To metal top tables and dishtables with gussets which shall be welded to reinforcing channel/hat sections 14 gauge or heavier.
 - c. Wood tops:
Welded stainless steel hat sections to support top and be held in place with stainless steel metal screws in slotted holes of flanges.
2. Bottom of legs to be fitted with Component Hardware Model # A 10-0851 with locking ring adjustable stainless steel foot or approved equal. Foot plug to be welded, ground and polished. When flanged feet are specified, use Component Hardware Model # A-10-0854 adjustable stainless steel foot or approved equal.
3. Enclosed cabinet bases mounted on 6" (150 mm) high legs are to be equipped with Component Hardware Model # A52-9907 adjustable stainless steel counter legs or approved equal.

M. Metal Gauge

Unless otherwise noted in itemized specification or details, all gauges to be manufactured to the following minimum thickness:

Stainless Steel USS Gauge	Decimal Thickness	Millimeter Thickness
12	.1094	2.78
14	.0781	1.98
16	.0625	1.59
18	.0500	1.27
20	.0375	0.95

- N. Materials
All fabricated items to be provided in gauge, metal type and finish per the following table.

Description	Gauge	Metal	Finish No.
Dishtable, Table and Counter tops	14	S.S	4
Hat Sections/Channel:			
Unexposed	14	Galvanized	4
Exposed	14	S.S	4
Counter Body:			
Framework	14	Galvanized	
Aprons, Partitions, Backs and Ends	18	S.S	4
Shelves (Intermediate)	18	S.S	4
Shelves (Base Shelf)	16	S.S	4
Refrigerators Interiors	20	S.S	2B
Doors			
Outside Faces	18	S.S	4
Inside Faces	20	S.S	2B
Drawer Pans			
General	18	S.S	2B
Plastic	Uniroyal "Royalite" Series		
Refrigerated	18	S.S	2B
Shelf			
Wall Mounted	16	S.S	4
Fixture Mounted	16	S.S	4
Table	16	S.S	4
Refrigerator		S.S Wire	
Shelf Bracket (Exposed)	14	S.S	4
Ventilators & Hoods			
Exterior Frame	14	S.S	4
Interior	18	S.S	4
Plenum	16	S.S	4
Ducts			
Unexposed	16	Galvanized	Weld
Exposed	16	S.S	4-Weld
Dishmachine	18	S.S	4-Weld
Wall Flashing	20	S.S	4

Equipment Legs & Cross

Rails	16	S.S Tubing	4
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O. Closure

Return backsplashes, when exposed to have enclosed finished rear.

Exposed backs of all fixtures, back splashes, shelves, etc., shall be closed.

Exposed backs of counter top equipment in an island configuration will be provided with a full height stainless steel enclosure to conceal utility connections.

Where the rear of a piece of equipment placed in a wall opening is exposed and unfinished, the FSEC will provide a finished rear.

P. Casters

Casters shall be Colson Caster Corp. Series 2, or equal, non-marking, ball bearing NSF approved type with greaseproof polyurethane tires, Wheels shall be 5" (130 mm) diameter.

Minimum width treads of 1-1/4" (30 mm). Minimum capacity per caster 250 lbs. (115kg). Where a set of four casters is specified, two are to be provided w/ brakes.

Q. Sinks

1. Fabricated sinks shall have corners same as for metal tops. One piece welded construction with bottom pitched to drains and double wall partitions (see standard detail C-8-5 & C-8-8). Multiple compartments shall have continuous and seamless flush front exteriors. Openings between compartments or applied panel will not be accepted.

2. Sink insets shall be 14 gauge stainless steel welded as integral part of top.

R. Drawers

All drawer pans shall have all corners coved. Pan to be mounted on fabricated 14 gauge stainless steel angle cradle frame. Frame to be supported on Component Hardware Model S-52 or approved equal full extension slides with 200 lbs. (91 kg.) capacity per pair. Pan to be easily removable without the use of tools. Drawer fronts shall be double pan type with sound deadening material. Drawer shall be self-closing.

S. Doors

1. All metal doors to be double pan type reinforced and stiffened to prevent flexing and filled with sound deadening material.

2. Sliding doors shall be mounted on large ball bearing quiet rollers in 14 gauge stainless steel overhead tracks and be removable without the use of tools. Sliding doors shall be self-closing.

3. Hinged doors shall be flush type, mounted on heavy duty, stainless steel, lift-off hinges.

4. Door catches shall be heavy duty, 4 way (mortise or surface application) with adjustable spring loaded ball tension, Model M22-2430 as manufactured by Component Hardware Inc. or equal.

T. Hardware

1. All hardware shall be of heavy duty construction and identified on shop drawings by manufacturer and model number and shall be subject to final approval by Designer.

2. All hardware shall be identified with manufacturer's name and number so that broken or worn parts may be replaced.

U. Breaker Strips

All ice pans, ice bins, refrigerated pans, hot food, Bain Marie pans and cabinets shall be provided with breaker strips where adjoining top or cabinet face materials to prevent condensation. Breaker strips shall be fastened with stainless steel, counter sunk screws. Pop rivets will not be accepted.

V. Insulation

All insulation shall be board form or foamed-in-place polyurethane. Fiberglass insulation shall not be used. Heated areas shall have minimum of 1" thick at sides and 2" thick at bottom. Cold areas shall be thickness indicated on details or drawings. Insulation shall be bonded to all surfaces.

W. Refrigerated Items

1. All reach-in refrigerators and freezers with remote refrigeration systems shall be complete with condensate evaporator when no floor drain is available.
2. When a condensate evaporator is required, it shall be complete with thermostatic expansion valves at the evaporator.
3. Fabricated compartments, refrigerated shelves, plates, etc., shall be provided with a 20 gauge steel box to house expansion valves when valve is remote from evaporator. Install in base of fixtures or in a concealed position.
4. All refrigerated compartments shall be fitted with a flush mounted exterior dial thermometer with chrome-plated bezels. Thermometers shall be adjustable and shall be calibrated after installation.
5. Refrigerator hardware for fabricated refrigerator compartments shall be heavy duty components. Hinges shall be self-closing. Latches to be magnetic edgemount type with cylinder lock, keyed alike to the extent possible, unless specified or noted.
6. Refrigerated drawer units are to be provided with stainless steel drawer liners and stainless steel full size pans. Food Service Equipment Contractor to furnish each drawer with two (2) 12" x 20" x 4" deep 18 ga. stainless steel pans. Provide drawers with cylinder lock, keyed alike to the extent possible, unless specified or noted.
7. When a removable plate rail/ cutting board is specified for an equipment stand, the Food Service Equipment Contractor is to coordinate cutting board support locations with work top cooking appliances to provide access for operations and service.
8. The refrigerant for medium and low temperature fixtures to be CFC free and conform to the Montreal Protocol Agreement.
9. All refrigeration systems to be provided with 5 year compressor warranty and 1 year service agreement.

X. Louvered Shelving

At location of three (3) compartment or pot wash sinks, wall shelving to be louvered to facilitate drainage and air drying. Construction of shelving to be the same as solid shelving as noted under 2.05M. See CFL standard detail C-1-2.

- Y. Flanged Feet Pinned to Floor
Free-standing work tables and counters with flanged feet shall be secured to the floor with smooth head stainless steel fasteners or with pins concealed in all legs of the table/counter when specified.
- AA. Backsplash “Returns”
Backsplashes on tables and counters are to be returned at the sides where adjacent wall, columns and other equipment to match the dimension of the adjacent element.
- AB. Wall Flashing
Wall flashing to include component hardware Model # J64-1450 divider bars and Model # J-63-1451 cap strips as required.
- AC. Protection of Tops/Shelves
In order to protect finishes of fabricated items, all exposed horizontal surfaces of counter, tables & shelves are to be covered with cardboard & held in place with duct tape until such time that the work of related trades is complete.
- AD. Adapter Bars
Provide adapter bars for “buy-out” equipment units where adapter bars are listed as an option/accessory by the manufacturer. Provide maximum number of adapter bars based on the smallest pan size to be used.
- AE. Remote Controls
Remote controls for equipment units built into custom fabricated assemblies shall be recess-mounted to protect the controls from damage. Surface mounted remote controls are not acceptable.
- AF. Fabricated Equipment

Surface mounted food shields to be provided with corner plates to conceal exposed screw heads. Finish of covers plates to match food shield uprights.

2.8 MILLWORK EQUIPMENT

Approved Millwork Contractors: The following is a list of Millwork Contractors that are approved as subcontractors on this project. The bidders must include pricing from one (1) of these contractors in their base bid. Pricing from an alternate millwork contractor of the Food Service Equipment Contractor's choice may be shown as a "deduct alternate" on the bid quotation form in the space provided.

American Foodservice	Savannah, TN	(800)-447-4693
Interior Creations Inc.	Philadelphia, PA	(215)-425-9390
Legere Woodworking Co.	Avon, CT	(860)-674-0392
RPI	Medford, NJ	(609)-714-2330

A. Workmanship and Fabrication:

The following general requirements shall govern the construction of millwork built fixtures, except where otherwise noted.

1. Work shall be performed by skilled craftsmens of the trade and shall be of the highest quality throughout, in such a manner as to fulfill the intent of the Contract Documents.
2. Fabrication, finishing, and installation of millwork specified in this section, shall be by one Contractor and shall not be sublet unless specifically approved by the Designer.
3. Woodwork to be 3/4" plywood throughout except at wet or moisture areas (such as sinks, beverage counters, water stations,) where 3/4" marine plywood is required.
4. Woodwork counters shall be constructed to support the full weight of operating appliances without any deflection of the counter top. Where cut-outs are required in counter tops, appropriate framing needs to be provided around the cut-out to fully support the top in level position.
5. All miter joints shall be tight with no gaps or open spaces. Filling of miter joints with crack filler prior to finishing is not acceptable. Loose joints shall be hairline, flat, in single plane, with no exposed screws, nails or other fasteners. All dimensions, reveals and joints shall be held exact.
6. All fixtures shall be assembled in single and complete units as the dimensions will permit shipment to and installation at the building. Large pieces requiring sectional construction shall have their parts accurately fitted and aligned with each other, and provided with ample screws, glue and bolt blocks, tongues, grooves and splines, dowels, mortises and tenons, screws, bolts or suitable means of concealed fastening, as required to render the work substantial, rigid and permanently secured in proper position.
7. Sufficient additional material shall be allowed to permit accurate scribing to walls, floors and related work, and due allowance made wherever possible for such shrinkage as may develop after installation. Single and sectional units shall be provided with adequate cleating, blocking, crating and other forms of protection as required to prevent damage, soiling and deterioration during transit, delivery, storage and handling.

8. Framing and blocking members shall be assembled with bolted and screwed connections and should be secured to the structural backing with cinch, expansion screws or toggle bolts, as required; spaced and installed to insure ample strength and rigidity. Rails and stiles shall be mortised and tenoned, work neatly mitered and membered, all butt joints made flush and smooth, and all permanent joints made up with water resistant glue. All fixtures shall be assembled without face screws or nails, except where it may be necessary to attach trim items. All face screws or nails which are necessary shall be countersunk and plastic wood or wood plugs used to cover head, and the plug neatly touched up. The heads of all screws used in any assembly shall be countersunk below the surface.

B. Joints

1. Mortise and tenon, spline, dowel and/or pin block and glue work to avoid use of nails wherever practical. Make butt joints with an approved device for prevention of separation of members. Blind nail and conceal.

C. Plastic Laminate (HDPL)

1. Plastic laminate shall be bonded to all exposed surfaces with contact cement fast bond #30, as manufactured by 3-M Products Company, or equal, to minimum 3/4" fir faced plywood applied under high pressure. Reject plastic laminate or plastic backing shall be used to prevent warping, unless otherwise specified. All edges shall be carefully sanded to smooth finish, removing burns, nicks and cut marks.
2. Plastic laminate joints shall be finished without wavy and unsightly joints. Joints need not be mitered except if specified. Hand sand edges to a slight chamfer.
3. Plastic Laminate products to be High Pressure Decorative Laminate as specified under AWI Standards.
4. Foodservice Equipment Contractor to confirm installation requirements with food service equipment manufacturer where equipment units penetrate the counter top. Foodservice Equipment Contractor to coordinate installation requirements suggested by the manufacturer with the Millwork Contractor.

D. Doors, Hinged

1. Hinged doors shall be fabricated of 3/4" thick plywood with plywood full perimeter edging with plastic laminate on face and self-edging on exposed sides. Door hinges, pulls and catches shall be supplied and installed as detailed and to be as manufactured by HAFELE or equal.

E. Doors, Sliding

1. Sliding doors shall be fabricated of solid core plywood with hardwood edges and constructed similar to hinged doors. Doors shall be mounted on E-Z Glides track. Doors shall be removable without the use of tools. Rubber stops shall be provided concealed in end stile or mullion.

F. Doors, Tambour Sliding

1. Tambour sliding doors shall be fabricated of individual hardwood slats, 3/8" by 3/4" round on 2 edges and glued to 20 ounce duck canvas or reject elastic vinyl plastic or equal and shall be provided with hardwood end stile with integral door pull. Track shall be lined with laminated plastic or equally smooth surface and guides at top and bottom shall be fabricated hardwood. Provide lock-pin for sliding doors.

G. Access Panels/Louver Panels/Louver Doors

1. Access Panels: Shall be fabricated of 3/4" thick plywood and shall be fabricated to be removable for access. Each access panel shall be provided with 2 (two) magnetic catches at top and 2 (two) 3/16" positioning pins at bottom (unless otherwise specified or detailed on drawings).
2. Louvered Panels: Are required in woodwork at all locations where proper ventilation is necessary for the efficient performance and operation (exhaust and/or supply) of the food service equipment compressor.
Types: (When specified)
 - a) Louvered panel constructed same as Access Panel except provided with louvers, spaced to conceal equipment yet provide adequate ventilation. Provide black color screening on rear with protective edges to prevent tearing.
 - b) Louvered panel to be extruded aluminum, Model ADL-5TC-4 W/RSM 4 Frame, spray painted to match plastic laminate of woodwork, as manufactured by Reliable Inc., Geneva, AL (205) 684-3621 or equal.
 - c) FSEC to coordinate size, quantity and location of louvered opening for sufficient ventilation of food service equipment.
3. Louvered Doors:
 - a) Must have concealed hardware to resemble access panels. Doors to have nylon roller friction type heavy duty catch and heavy duty concealed stainless steel adjustable hinge.
 - b) Plastic laminate fronts. Provide kiln dried pine shutter type slats. Wood to be free of knots with smooth grain, epoxy painted to match laminate selection. No raw wood surfaces will be acceptable. Paint or laminate as needed between slats.
 - c) Slats to be fixed, positioned to conceal equipment from sight.
 - d) Provide black color screening/mesh on rear of door with protective edges to prevent tearing.
 - e) FSEC to coordinate size, quantity and location of louvered opening for sufficient ventilation of food service equipment

H. Drawers

1. Drawers shall have dovetail construction, well glued and blocked. Fronts shall be not less than 3/4" thick plywood. Sides and back shall be 1/2" thick fabricated of Birch, Maple, or Sycamore except where extension

slides are used, in which case the sides shall be 5/8" thick. Bottom shall be milled into fronts and sides. Drawers shall be provided with suitable stops. Provide pulls as detailed or specified and to be as manufactured by HAFELE or equal.

2. The inside surfaces of all drawers shall receive one coat of Penetrating Primer and one coat of glass lacquer.

I. Painted Finishes

1. Painted finishes shall have exposed surfaces free from defects and blemishes that would show after being finished, regardless of grade specified. All surfaces specified to receive a paint or enamel finish shall receive one crosscoat of lacquer type undercoat. The undercoat shall be of appreciably different color from that of the finish coat, and of proper ground color with relation to the finish coat. After the undercoat has been thoroughly dried, surfaces shall be sanded smooth and two coats of enamel shall be applied. Back painting shall be provided for all cabinet and woodwork prior to installation.

J. Interior & Wall Shelves

1. Cabinet interiors and wall shelves shall be laminated as specified under Section 3 Plastic Laminate.

K. Corian Tops

1. Surfaces shall be Corian (methyl methacrylate binder) as manufactured by E.I. DuPont Nemours & Co., Inc. Wilmington, DE, or approved equal.
2. Color and pattern shall be selected by the Designer, and physical properties shall conform to manufacturer's standard specifications. The material shall be homogenous; not coated laminate, or of composite construction.
3. Corian sheet shall be 1/2" for counter tops, and backsplashes unless otherwise specified.
4. General installation to conform with manufacturers standard details in order to maintain product warranty, i.e. cut outs for drop in equipment.
5. Foodservice Equipment Contractor to confirm installation requirements with food service equipment manufacturer where equipment units penetrate the counter top. Foodservice Equipment Contractor to coordinate installation requirements suggested by the manufacturer with the Millwork Contractor.

L. Measurements

1. Before proceeding with fabrication of woodwork required to be fitted to other construction, obtain field measurements and certify dimensions and Shop Drawing details as required for accurate fit.

M. Pre-Cut Openings/Templates

1. Contractor to obtain templates and or accurate dimensions for sizing of cutouts required in millwork from Food Service Equipment Contractor so that cutouts can be completed in shop.

N. Wood Base Construction At Floor Drain

1. Fabricate notch in base for floor drain locations as required in employee areas (field dimensioning required).
2. In public areas, provide boxed out opening within base cabinet for floor drain locations (field dimensioning required). Provide stainless steel liner in box with top flange sealed in place.

O. Submittal

1. Shop Drawings:
 - a) Submit Shop Drawings showing location of each item, dimensioned plans and elevations, large scale details, attachment devices and other components including hardware schedule(s).
 - b) All the required cut-outs for food service equipment to be properly sized and located on Millwork Shop Drawings. Contractor to confirm locations of cut-outs with the Food Service Equipment Contractor prior to submitting Millwork Shop Drawings for approval.
 - c) The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has received written approval for the deviation.
 - d) Coordinate submittal requirement with FSE contractor. See 1.11 Submittals of Specific Conditions, K. Coordination Drawings.

P. Product, Delivery, Storage and Handling

1. Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration.

Q. Job Conditions

1. Examine site conditions affecting this Work. Report unsatisfactory conditions to the General Contractor and do not proceed until those conditions have been corrected. Commencing work implies acceptance of conditions existing at the site as satisfactory to the outcome of this Work.
2. The responsible division shall advise the General Contractor of temperature and humidity requirements for woodwork installation areas.
3. Fire Retarding:
 - a) Where required by code, all required materials are to be treated with fire retardant chemicals to achieve the required flame spreading performance rating. Retardant chemicals must be a type approved by local authorities.
 - b) Provide all fire retardant treated blocking as required for installation of Woodwork.

R. Execution

1. Inspection:

The responsible division must examine the substrates and conditions under which the work is to be installed and notify the Designer in writing of unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to The responsible division.

2. Preparation:

Prior to installation of woodwork, examine shop fabricated work for completion and complete work as required including back priming and removal of packing.

3. Installation:

- a) Install the work plumb, level, true and straight with no distortions.
- b) Shim, as required, using concealed shim and/or levelers. Install to a tolerance of 1/8" in 8'-0" for plumb and level, and with 1/32" maximum offset in flush adjoining surfaces, 1/8" maximum offsets in revealed adjoining surfaces.
- c) Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts. Scribe base as required to hard floors, such as wood and marble.

4. Wood Base/Standing and Running Trim:

Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. No joints in verticals (standing). Stagger joints in adjacent and related members. Blind fasten all joints. No exposed fasteners shall be accepted.

S. Adjustment, Cleaning, Finishing and Protection:

- 1. Repair damaged and defective woodwork wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.
- 2. Clean woodwork on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.
- 3. Contractor shall provide protection and maintain protection necessary to ensure that the work will be without damage or deterioration at the time of acceptance.

2.9 STANDARD DETAILS

CFL Standard Details (referred to as detail C-8-5, for example) included as part of specifications are to be considered guides to quality and scope of work involved.

Where shop practices dictate, alternate construction methods and component items of equal manufacturer may be substituted. It will be the responsibility of the Food Service Equipment Contractor to prove the quality of the proposed methods.

2.10 COLD STORAGE ROOMS

- A. All prefabricated cold storage rooms shall be manufactured by one manufacturer and installed by factory supervised installer.
- B. Interior finished ceiling height shall be 8'-0" unless otherwise specified.
- C. Materials
 - 1. Insulation shall be non-burning urethane, foamed in place, not frothed or rigid board-foam.
 - a) Insulation shall be CFC free 4" thick foamed -in-place.
 - b) Insulation shall have a thermal conductivity (K-factor) not to exceed (0.14 B.T.U./hour/square foot) as tested on ASTM C-177, at 75° F. (24° C.) mean temperature and an overall coefficient of heat transfer factor (U) not to exceed 0.029.
 - c) Insulation shall be rated as self extinguishing and fire retardant type. Flammability characteristics per ASTM E-84 shall be less than 25 flame spread and less than 450 smoke density, in accordance with U.B.C. Section 1717.
 - d) Classification; Class 1 Uniform Building Code, U.B.C. Part VIII, Section 4201-4203. Class A National Fire Protection Association N.F.P.A. Number 101, "Life Safety Code", FM, UL, NSF Standard #7 and approved for use in New York City.
 - 2. Aluminum sheets used as a facia for wall and ceiling panels shall be stucco aluminum not less than 0.040" thick.
 - 3. Stainless steel sheets used as a facia for wall and ceiling panels shall be 20 gauge. Other stainless steel shall be the gauge specified. All stainless steel shall be 18-8, type 304, #3 finish unless otherwise specified.
 - 4. Galvanized steel sheets and/or galvalume used as a facia for wall and ceiling panels shall be prime finish, not less than 20 gauge complying with ASTM 525 and with G90 coating.
 - 5. When specified, wall protection panels shall be Fiberglass Reinforced Polyester (FRP-X) Paneling 3/32" thick, embossed, white color or as specified with low smoke and less than 25 flame spread rating.

D. Panel Construction

- 1. Panels shall consist of precision die formed metal pans with 1/2" to 3/4" flanged perimeter, foamed in place urethane insulation between interior and exterior pans, thoroughly checked for gauge and accuracy. Panels shall be of same size wherever

possible and shall be interchangeable with panels of like size. Metal pans shall be treated on the inside with a preparation coating of bonding agent to ensure a stable adhesion with the chemical bonding capabilities of the insulation.

2. Wall and ceiling panels shall be 4" thick and contain 100% foamed in place insulation and shall not have any internal wood or metal structural members. To ensure tight fitting joints, all panel edges shall have foamed in place urethane tongues and grooves and a flexible vinyl gasket foamed in place on the interior and exterior of all edges.
3. Panels shall be rigidly coupled by a cam action hooked locking device. Locking device shall be foamed in place, maximum 48" on center. Locking device shall be accessible from the inside to facilitate installation in confined areas and shall be provided with press-fit caps to close wrench holes. Joints between panels shall be sealed at interior and exterior edges with a PVC gasket or an odorless nontoxic, synthetic polymerized sealant, to maintain continuity.
 - a) Wall panels shall have a minimum of three (3) locking devices between each panel, located in the center, lower corner and upper corner.
 - b) Ceiling panels shall have a minimum of two (2) locking devices between ceiling panel and at wall panels, located at each corner of the wall panel. Ceiling panel joints shall be offset from wall panel joints.
 - c) Pre-fabricated floor panels shall have a minimum of two (2) locking devices between each floor panel and at wall panels, located at each corner of the wall panel.
4. All interior vertical corners shall be coved with a 1/2" radius.
5. Exterior panels, interior partitions, corner panels, ceiling panels and "T" intersection panels shall be matching construction.

E. Wall/Ceiling Support System

1. Ceiling panels shall have a maximum deflection of 1/240 of the span under uniform loading of twenty (20) pounds per square foot. When the ceiling panels require a support system, the Manufacturer shall submit details and structural calculations to an engineer for approval prior to fabrication. A copy of the approved submittal shall be forwarded to Owner and Designer.
2. An indoor ceiling panel support system, when required, shall be furnished and installed using a self-supported system or with a hanger wire network attached to hanger brackets, designed to engage with the female lock pins imbedded within the roof panel foam core, spaced 4'-0" on center, per the item specification.

F. Floor Types and Conditions

1. TYPE I - Insulated depressed building floor with quarry tile finish to be as follows:
 - a) The floor shall be constructed at the job site in a depressed slab.
 - b) Cold storage room flat bottom wall panels shall extend down into the bottom of the depression. G.C. to provide two (2) 2" thick layers (or as specified) of rigid board foam urethane with staggered joints in depression over vapor barrier, installed after walls are in place. In freezers use Class I for floor insulation of not less than R-8/inch at 20°F.
 - c) On top of floor insulation G.C. to provide a protective covering of 15 pounds felt. Over lap joints 6". Flash up sides to height of wall base.
 - d) When indicated on contract documents, finished floor outside the cold storage

rooms shall ramp up 1" to the floor inside by the G.C. The finished floor between cold storage rooms shall be ramped as well when indicated.

- e) Provide coved base quarry tile (by General Contractor) at interior perimeter and at exposed exterior panel walls.

2. TYPE II - Pre-fabricated Floor Types to be as follows (per itemized specifications):

- a) The 4" floor shall be pre-fabricated NSF-approved metal-clad, foamed-in-place urethane insulated panels. Floor panel construction and insulation to match that of wall and ceiling panels. Floor panels shall be fully coved with a minimum of 3/8" radius. The exposed wearing surface will be metal-clad with a finish as indicated in the itemized specifications. Exterior bottom face of floor shall be clad with galvanized steel or galvalume.
- b) When indicated in itemized specifications, the 4" floor panels are to be heavy-duty with factory structural support that transfers the weight-bearing capacity to the building sub-floor via internally foamed-in-place supports on approximate 12" centers.
- c) The 2" floor shall be pre-fabricated NSF-approved metal-clad, foamed-in-place urethane insulated panels. Floor panel construction and insulation to match that of wall and ceiling panels. Floor panels shall be fully coved with a minimum of 3/8" radius. The exposed wearing surface will be metal-clad with a finish as indicated in the itemized specifications. Exterior bottom face of floor shall be clad with galvanized steel or galvalume.
NOTE: Heavy-duty structural floor option is not available on 2" floors.
- d) When indicated in itemized specifications, the wearing surface is to be finished with Altro Atlas 40, First Choice or Protect-All (Oscoda Plastics) seamless flooring with a 6" coved base at interior perimeter of floor.
- e) The factory provided floor is to be 5/8" foamed-in-place marine-grade plywood. The standard factory metal skin is to be eliminated so that the seamless floor can adhere directly to this plywood surface.
- f) Interior/exterior ramps with non-slip treads shall be furnished where specified and/or indicated on drawings.
- g) Provide coved base quarry tile at exposed exterior panel walls.

G. Door and Door Frames

- 1. Door sizes shall be 36" wide x 84" high or as specified, hinged as indicated on plan. Door shall be able to remain open when opened over 120°.
- 2. Door shall be infitting, flush mounted, double panned 20 gauge stainless steel interior and exterior panels or as specified with foamed-in-place urethane insulation, 4" thick minimum. Same construction as for wall panels. Corners of doors shall be Heliarc welded, ground and polished.
- 3. Furnish and install a removable threshold at each low temperature door, constructed of 16 gauge stainless steel.
- 4. Provide a heating element on the ambient side of each freezer/ food bank door frame

head, jambs and threshold. The heating element shall be a dual 120 volt, 240 watt with thermostatic control, factory prewired to a "GS" splice box located above the door on the roof exterior. Division 26 - Electrical shall make final connection.

5. Gasket shall be extruded polyvinyl chloride with vulcanized corners and continuous magnetic core at sides and top of door frame. The stainless steel jamb facing shall extend to protect the gasket.
6. Door shall be adjusted to be self-closing after installation and floor is finished.
7. Sill wipers for Type I floors shall be adjustable, extruded neoprene secured by removable stainless steel retainer strip and fasteners.
8. Each hinged door shall have:
 - a) Kick plate of 1/8" diamond plate 3'-0" high and full width of door. Mount on the interior and exterior face of each door and door section.
 - b) Hinges, three (3) each per door, shall be Kason 1253 Series, or approved equal, cam lift, zinc die cast and polished chrome plated
 - c) Latch shall be Kason 1239 Series, or approved equal, heavy duty chrome plated brass with adjustable keeper, interior safety release and provisions for padlocking. Padlock by others.
 - d) Door closer shall be Kason Model 1095 or approved equal.
 - e) Hardware shall be mounted with 12 gauge reinforced steel tapping plates and machine screws.
 - f) Heated viewport approximately 14" square (or as specified), minimum triple thermopane glass. Viewport wiring to be concealed within door and out top of door, complete with flex cable to recessed splice box within door section.
 - g) 2-1/2" dial thermometer flush mounted, to monitor the interior temperature of cold storage room, surface mounted on door panel. When specified, provide door panel with flush mounted 4-1/2" diameter dial thermometer in lieu of factory standard.
 - h) Schlage, or equal, mortise lock with recessed thumb turn on exterior door only.
9. Door section shall be self supporting constructed similar to wall panels with 4" foamed in place urethane core. No wood framing will be permitted.
10. Each sliding door opening shall have a secondary door similar to Eliason FCD-120 or equal. Door(s) to be clear PVC with top mounted gravity operated hinge sized to suit the opening per the manufacturer's recommendations.

H. Light Fixtures and Switches

1. Quantity of light fixtures shall be as indicated on the electrical plan.
2. Light fixtures;
 - a) Incandescent: Kason # 1801, light fixture with # 1804 plastic coated globe with wire guard and sized to receive one 100 watt bulb unless otherwise specified.
 - b) Fluorescent: Shall be Lithonia Commercial Model DMW 240 120 CW 48" double fluorescent light fixtures with low temp ballast designed to operate at the temperature of the Cold Storage Room(s).
3. Cold storage rooms with doors at each end shall have three way switches on the exterior.
4. Light switches shall be three way or four way, AC, pre-switch, mounted in recessed "FS" boxes with grey Hypolan, weatherproof plate and unbreakable

red plastic pilot light lens constant burning on interior and indicating on exterior.

5. Light switches shall be factory mounted on the latch side of doors and prewired with rigid conduit and wiring run within the wall panel, terminated in a vapor tight splice box mounted on the interior wall near ceiling. Manufacturer shall provide a 1-1/4" diameter hole in ceiling panel with a loose escutcheon through which Division 26 - Electrical shall make final connections.
6. F.S.E. Contractor shall furnish the required number of incandescent /fluorescent bulbs/tubes for each light fixture.

I. Audio-Visual Temperature Alarm

1. When specified, an audio visual temperature alarm shall be furnished for each cold storage room.
Unless specified otherwise, unit shall be Modularm Corporation (or equal) flush mounted with stainless steel cover plate, mounted on the exterior door section of each cold storage room, pre-wired with rigid conduit and wiring run within the wall panel using "FS" recessed box on the exterior and terminated in a "GS" splice box mounted on the interior near the ceiling. Manufacturer shall provide a 1-1/4" diameter hole in ceiling panel with loose escutcheon through which Division 26 - Electrical shall make final connection. Where there are multiple compartment cold storage rooms, alarms will be ganged into a common alarm panel.
2. Temperature alarm system shall consist of solid state audio alarm, silence button, trouble light, digital read out, indicator/failure lights, controller, time clock and stainless steel cover and battery back-up.
3. Control panel for the temperature alarm system to be located where shown on plans. F.S.E. Contractor to coordinate with appropriate trades for installation of panel.
4. Provide contacts for eventual connection to building alarm system.
5. When the door does not open into an ambient area, the temperature alarm system be factory installed, as specified above, in a remote wall panel with an ambient face that will not interfere with other equipment and functions and identified with a name plate of the room being monitored. The sensor capillary shall be extruded as required and, when necessary, run in electrical conduit. Provide escutcheon plates on each side of each partition penetrated.

J. Food Banks

1. When specified, furnish Food Banks with a Honeywell Model DR-4300-12 chart recorder or equal. Chart recorder to be 7-day record, single pen unit with probe.
2. Chart recorder to be located where shown on plans. F.S.E. Contractor to coordinate with appropriate trades for installation of panel.
3. Conduit, control wiring and interconnection between probe (at blower coil location) and chart recorder to be by Division 26 - Electrical.

K. Door Fan Switch

1. When specified, a door fan switch shall be provided for each low-temperature cold

storage room, when it opens into a non-refrigerated area, to shut off evaporator coil fan motors when the door is opened.

2. Door fan switch shall be factory mounted on the door jamb and prewired with rigid conduit and wiring within the wall panel to a splice box located on the interior near the ceiling. Manufacturer shall provide a 1-1/4" hole in ceiling panel with a loose escutcheon through which Division 26 - Electrical shall make interconnection to the evaporator coil(s) fan motors.

L. Closure Panels

1. Closure panels shall be furnished and installed to close the space between the exterior top of the cold storage room and the finished ceiling of the building.
2. Panels to match exterior panel finish. Panels to be lift out type with side turned in to form a pan. At ceilings, securely fasten a channel and at face of cold storage room, securely fasten an angle for panel to slip into. Channel and angle to match panel material.
3. When exterior finish is FRP-X, the closure panel shall be white stucco aluminum.
4. When the area does not have a finished ceiling, closure panels shall not be required, unless otherwise specified or required by the health department.

M. Trim

1. Vertical trim strips and angles to match cold storage room exterior finish. Trim to be applied with a minimum of exposed fasteners to fully seal cold storage room adjacent walls, etc.
2. The FRP-X paneling with a "J" end cap molding is to be extended past the end of the cold storage room wall to the building wall and caulked with silicone as required.

N. Ramps and Sills

Ramps and sills when required shall be prefabricated 16 gauge stainless steel ramps with 14 gauge galvanized reinforcing and urethane foamed in place insulation. Wearing surface to have Altro Atlas 40 or ProtectALL (Oscoda Plastics). See specifications and drawings for size and shape. All door sections shall be provided with minimum 14 gauge stainless steel sill plate complete with heater cable as stated under door section. Sill to be either built into ramp/pre-fabricated floors or to be part of door section on insulated depressed building floors. Sills to be removable for replacement of heater cable.

O. Utility Penetrations

1. Provide openings in ceiling and wall panels to accommodate all electrical, refrigeration and drain lines.
2. Seal all openings with silicone after lines have been run and before installation of escutcheons.

P. Escutcheons

1. Provide sufficient quantity of 5" diameter blank stainless steel escutcheons to trim all interior and exposed exterior penetrations.
2. Provide cutting of proper size hole in blanks and panel penetrations.

Q. Pressure Relief Vent

1. Pressure relief vent shall be factory installed at each low-temperature cold storage room door.
2. Pressure relief vent shall be electrically heated, 120 volt and have aluminum screen.

R. Corner Guards

1. Provide corner guards on the exterior outside corners. The corner guards shall be 4"x4"x48" 16 gauge stainless steel secured to wall panels with a full bed of contact adhesive. When FRP-X finish is specified, corner molding shall be omitted behind the corner guard.
2. Corner guards on the interior outside corners shall be 2" x 2" by height of wainscot or 48" high 16 gauge stainless steel secured to wall panels with a full bed of contact adhesive. When FRP-X is specified, outside corner molding shall be omitted behind corner guards.
3. Provide full height corner guards on exposed corners of interior door casings.

S. Divider with Gate

Divider and gate, when specified, shall be aluminum expand-x where indicated on drawings.

1. Panel mesh shall be flattened aluminum expand-x heliarc welded to aluminum frame.
2. Frame shall be 1-1/2" by 1-1/2" by 1/8" aluminum 6061-T6 angle. Frame shall

- have 3" space at bottom and 6" space at top.
- 3. Horizontal stiffeners shall be 1-1/2" x 1-1/2" x 1-1/8" aluminum angle.
- 4. Floor plates shall be 3" by 3" x 1/4" aluminum heliarc welded to angle posts.
- 5. Gate shall be of same construction as divider, 2'-10" wide with lock similar to that specified for insulated doors.

T. Rub Rails - Interior/ Exterior

When specified, rub rails shall be located where indicated on plans.

- 1. Rub rails shall be continuous lengths of 18 gauge stainless steel "U" shaped hat section secured to wall with stainless steel sheet metal screws 18" O.C. Exposed ends shall be bevel cut, capped, welded, ground and polished.

U. Strip Curtain

Strip curtain when specified, shall be Model M-200 manufactured by Curtron Industries Inc. with closed brackets, or approved equal.

V. Door Locking Bars

- 1. Door locking bars, when specified, shall be 1/8" by 2" stainless steel two piece, hinged and secured at each end with interior safety release. Bar shall swivel and where the ends meet in the center shall have a 2" long 90° "L" drilled to receive padlock, padlock by others.
- 2. When a door locking bar is specified, the latch specified in paragraph G.10.C shall be replaced with a Kason Model 577 polished chrome plated door pull, or approved equal.

W. Identification Signs

- 1. At exterior of each Cold Storage Room provide and permanently affix engraved plastic name plates with maximum 3/4" high letters and number identifying each Cold Storage Room and Refrigeration System to match "as built" diagram. Name plate to be mounted with adhesive below respective digital thermometer alarm. A similar name plate with 1/2" high letters is to be installed in a like manner on the evaporator coil(s) at all other items having a remote Refrigeration System.

2.11 REMOTE REFRIGERATION SYSTEMS

- A. All remote refrigeration systems shall be furnished and installed by one contractor, unless otherwise specified. Provide all components necessary for a complete and operable system. System to be fully capable of satisfying the refrigeration requirements for each fixture as defined by the manufacturer of each fixture.
- B. It is the responsibility of Division 11400 to follow all applicable codes and current refrigeration industry standards and practices when determining line sizes and installing and starting up remote refrigeration equipment.
- C. Compressor and Condensing Units
 - 1. Units shall be factory assemblies complete with hermetic units below 1 HP, semi-hermetic units 1 HP and larger, air or water cooled condenser, depending upon building conditions and specifications, high-low pressure controls, suction accumulator on low temperature system, sight glass, liquid line dryer, suction and discharge service valves, liquid receiver, and electric control panel. The electrical control panel shall be furnished with magnetic motor starter, defrost timer clock, and contractors in accordance with "Refrigeration Schedule". Compressor capacities shall be based on Air Conditioning and Refrigeration Institute (A.R.I) Standards.
The refrigerant for medium and low temperature fixtures to be CFC free and conform to the Montreal Protocol Agreement.
 - 2. Capacities shall be based on the following:
 - a) Compartment temperature and evaporating temperature greater than 32°F (0°C) 18 to 20 hours operations.
 - b) Compartment temperature greater than 32°F (0°C) and evaporating temperature less than 32°F (0°C) 16 hours operation.
 - c) Compartment temperature and evaporating temperature less than 32°F (0°C) 18 hours operation.
 - 3. Condensing units shall be mounted on a steel base to effect a quiet operation. All rotating parts to be carefully balanced for minimum vibration and lubricated with forced or splash oil system. Receiver shall be sized for a complete pump down of the system and shall be shell type with fusible plug.
 - 4. Compressor units to be provided with suction and discharge back setting type service valves and standard machinery finish.
 - 5. Motors shall be single speed, maximum 1750 R.P.M. compound wound ball bearings or sleeve bearing. Double squirrel cage motors with high starting torque set and low starting current to be used in a 3 phase application.
 - 6. All machines to be equipped with quick acting type high-low pressure control switches having adjustable range and differential and high pressure cut-out. Cut-out to be automatic reset type.
 - 7. For air-cooled units the condenser shall be a standard manufactured part of the equipment. Condensing temperatures shall be based upon (100°F 38°C) ambient air.
 - 8. Other components and accessories, such as suction filter and crank case heater shall be furnished when specified in the itemized specifications.

D. Motor Starters-Contactors

1. All single phase motors shall be provided with mounted and internally wired contactors, except where pre-wired units are furnished without contactors. Single phase compressors shall be provided with built-in thermal and electrical overload protection.
2. All three phase motors shall be provided with magnetic type starters with quick trip overload elements matched for motor amperage except where overload protection is built into the compressor motor and the manufacturer supplies a contactor instead of a starter. Overload heater element shall be sized according to manufacturer's recommendations. Compressor motor starters shall be definite purpose starters with manual reset.
3. Starters shall be installed upon surfaces free from excessive vibrations.
4. Where starters are required for installation in a motor control center, make and model of control center shall be verified and starters provided to match.

E. Oil Separator

1. Provide oil separators, except when Compressor Manufacturer requires otherwise, 34°F, (1°C) and below and install as near as possible to the compressor. The return line shall be connected to the top of the crank-case above the oil level. Where compressor does not have connection for oil return line from separator, connect to a tee in the suction line adjacent to the compressor. Exposed oil return line to be provided with shut-off valve of the packless stem type.

F. Compressor Racks

1. Racks shall be of the number of tiers and quantity to accommodate the number of condensing units specified for each rack assembly and allow for service clearance and ventilation. Review and confirm access into building or housing requirements to roof top locations.
2. Racks shall be fabricated with structural steel of size and quantity to properly support the equipment to be installed on the rack. In special applications where building access is limited, construct rack framing with Dexion of Unistrot material.
3. Racks shall be all welded construction with welds ground smooth.
4. After completion of fabrication the complete rack shall be cleaned, primed and painted with top quality oil base enamel.
5. Each rack shall be equipped with a pre-wired duplex outlet.
6. Racks shall be pre-wired to a circuit breaker panel and pre-plumbed to a header (when specified water cooled) requiring a single point electrical and plumbing connection.
7. Racks shall have UL or equivalent approval.
8. Special Conditions: For custom built racks for individual condensing units provide Dexion Angle Iron.

G. Coils and Cooling Units

1. Units shall be direct expansion type of size and design to effect required temperature, humidity and to suit application intent.
2. Units shall be hung from the ceiling with 1/2" nylon rods with plated steel nuts and washers. Rods shall extend through ceiling to bracing adequate for the suspended weight. Bracing shall be furnished as required, penetrations shall be sealed and trimmed with escutcheon plates.
3. Units shall be installed tight to ceiling. All installations adjacent to walls shall be set out a minimum distance conforming to manufacturer's directions, to ensure proper air circulation and performance.
4. Units with fan or blower and motor shall have thermal overload protection and be wired as indicated in "Refrigeration Schedule".
5. Defrost cycle shall be based on the following:
 - a) Coils for 32°F (0°C) and lower shall have an electric defrost controlled by a time clock mounted on the compressor rack or at evaporators locations inter-wired by Division 26 - Electrical.
 - b) Coils for 33° (0.6°C) and 34°F (1°C) shall have an air defrost controlled by a time clock mounted on the compressor rack or at evaporators locations inter-wired by Division 26 - Electrical.
 - c) Coils for temperature above 34°F (1°C) shall have an air defrost in the off cycle controlled by proper sizing of the coil and the compressor.
6. Location of coils shall be coordinated with shelving and floor sink locations.
7. All coils for fabricated refrigerators and/or freezers shall be installed for accessibility and replacement.

H. Penetration Sleeves and Plates

1. Service line penetrations of insulation to accommodate electrical conduit, refrigerant and drain lines, shall be limited to a minimum with service stubbed through insulation or locations predetermined by respective divisions.
2. Where service lines penetrate insulated walls, the opening shall be packed with caulking, before trimming with escutcheon plate.
3. Where service lines penetrate building walls outside of foodservice areas, the opening shall be packed with "Perma-Gum" and foam caulking.
4. All exposed ends of sleeves, both inside and outside of compartments, are to be trimmed with 24 gauge stainless steel escutcheon plates, furnished as blanks in which respective work divisions shall cut required line holes and install.

I. Refrigerant Piping

1. Copper tubing for refrigerant piping shall conform to ASTM standard specifications, serial designation B-88. All piping shall be type "L" ACR hard copper or cleaned and sealed soft type "L" tubing, dry seal or equal as indicated. Forged or wrought copper fitting with sweat or soldered joints shall be used.
2. Tubing shall be cut only with a tube cutter and sized with a sizing tool.
3. Piping shall be exposed to view as required by the standard safety code for mechanical refrigeration.
4. The liquid suction lines from condensing units to coil shall be sized and run as shown on the "Refrigeration Schedule" and Refrigeration Drawings.

5. Piping run within cold storage rooms shall be finished with aluminum paint.
6. For exposed areas, accessible furred ceiling spaces and in walls or excavated trench type installations, hard copper tubing shall be used. Exposed tubing shall be run in a manner to preclude damage by activities in the area; or shall be protected by conduit, furnished and installed as part of this contract. Conduit shall have water evacuated and both ends completely sealed.
7. For piping run in conduit through inaccessible areas, such as under slab on grade, continuous one piece soft copper tubing shall be used with no joints. In lieu of large piping in conduit, especially vertical runs, random lines may be used; carefully fabricated and assembled to ensure equal pressure drop. Conduit required through inaccessible areas is provided and installed by the Electrical Division. Conduit shall have water evacuated, both ends completely sealed and be watertight.
8. Ends of lines shall be capped to prevent contamination and opened only at time of final connection.
9. Suction lines shall be sized for a maximum pressure drop from evaporator to compressor 2 lbs. (0.9 kg.) for high and medium temperature systems, and of 1 lb. (0.45 kg.) for low temperature systems and shall allow gas velocities of not less than 750 FPM (3.8 M/sec.) in horizontal runs and 1500 FPM (97.6 M/sec.) in vertical risers. Liquid lines shall be sized for a maximum pressure drop of 3 lbs. (1.36 kg.) from receiver to evaporator.
10. Tubing runs shall be graded or pitched to prevent trapping of oil. Suction lines shall pitch 1/2"/10"-0" minimum.

J. Joints and Connections

1. Fittings shall be long radius wrought copper only as manufactured by Mueller Brass Company or equal.
2. Vertically run suction lines shall have one piece of manufactured oil "P" traps. Line to be sized for proper velocity for oil return to compressor(s).
3. 1/8" NPT by 1/4 fl. half union for all suction and discharge service valves with 1/4 fl. cap.
4. Reduction in piping size shall be made with a manufactured reducer coupling.
5. Flare nuts shall be short forged or frost proof.
6. All surfaces to be joined must be prepared and cleaned. When soldering stop or solenoid valves, wrap valves with moist fabric to absorb excessive heat. Stop valves shall be partly open. When soldering expansion valves or pressure regulating valves, remove power assembly, if necessary, to prevent damage by excessive heat.
7. Copper joints shall be made with Handy & Harmon "Sil-Fos" brazing alloy, "Phoson 15", "Silvaloy 15" or equal; melting point of 1185-1350°F; (640°C. - 732°C.) silver content not less than 15%.
8. Copper to brass joints shall be made with Handy & Harmon "Easy Flo 45" brazing alloy "Silvaloy 45", "Mueller 122" or equal; melting point of 1125-1145°F, (607°-618°C.) silver content not less than 45%.

K. Hangers and Supports

1. For all piping not run in conduit, provide adjustable hangers, anchors or straps as required. Hanger spacing shall not exceed 8'-0".

2. Insulated copper piping shall be provided with approved type sleeves at hanger points.
3. All insulated copper piping shall be isolated from supports by means of felt wrapping or with "Trisolater" by Semco or approved equal.
4. Vertical piping shall be supported at intervals with spring type hangers or a substantial pipe at case of the pipe. All horizontal pipe runs connected to vertical risers must be adequately supported.
5. For suspended conduit, support shall be by means of hanger permitting screw adjustments. Sufficient hangers shall be used to provide support, allow expansion and limit vibration.

L. Piping Sleeves

1. Provide sleeves through walls which allow for fully insulated lines. Extend sleeves entirely through wall and dress each end with a chromium plated wall plate neatly fitted against the wall, securely fastened and sealed in place. All sleeves through wall shall be of standard weight steel pipe.
2. Piping lines and sleeves at wall or floor penetrations shall be caulked and made vermin proof at all locations.

M. Piping Insulation

1. Suction lines run in conduit shall be insulated according to ambient and humidity conditions to prevent condensation and freezing.
2. Refrigeration suction lines outside of refrigerated compartments, not run in conduit, shall be insulated back to compressors with Armstrong Armaflex AP foamed plastic insulation or as determined by code. Thickness of material shall suit service, ambient and humidity conditions, to prevent condensation, minimum thickness 1/2" (15 mm.).
3. Cold Storage Room freezer drain lines extended through adjacent cooler compartments shall be insulated with 1/2" (15 mm) minimum thickness of Armstrong Armaflex AP foamed plastic insulation to prevent condensation. Carefully seal end of insulation tight against cooler wall surface.
4. Piping for cooling water services or refrigerant piping exposed to freezing ambient temperatures shall be insulated with 1/2" (15 mm) minimum thickness of Armstrong Armaflex AP foamed plastic insulation. Paint exterior installation with Armaflex paint.
5. Thickness of material shall suit service, ambient and humidity conditions to prevent condensation.
6. Joints shall be sealed with Armstrong 520 adhesive. Insulation shall be continuous through clamps. Provide additional insulation where suction lines must be run within 12" or less of water or underground waste lines.

N. Heat Interchangers

All blower controls, unit coolers, plate type evaporators and other evaporators where specified, are to be provided with heat interchangers, with a capacity to match the condensing unit.

O. Temperature Control

1. Temperature control of cold storage rooms shall be by line voltage thermostats operating liquid line solenoids.
2. Temperature control for remote normal temperature refrigerator shall be by low pressure switch setting.
3. Temperature in each cold storage room compartment shall be controlled by electric thermostat, Ranco No. 010-1408, located within compartment and sensing element positioned to avoid fan discharge air stream.

P. Valves and Accessories

1. All valves and controls shall be standard weight and suitable for service purpose intended, and subject to approval by the Designer.
2. Provide shut-off valves and service port for each refrigerated fixture for multiplex installations to enable service personnel to service one (1) fixture while other fixture(s) connected to the same compressor can continue to operate.
3. Each system shall include condensing unit with standard valving, refrigerant piping, refrigerant, evaporator(s), liquid and suction line isolation valves within 5'-0" (1500 mm) of evaporators, thermostatic expansion valve for evaporator, heat exchanger, filter-dryer, liquid line solenoids for Cold Storage Rooms and liquid indicator.
4. Vibration eliminators on compressor suction and discharge lines, size same as piping, as manufactured by Anaconda.
5. Refrigerant shut-off valves shall be as manufactured by Henry or Superior Valve Company. Valves shall be placed and in liquid line for each condensing unit and in each liquid line to each evaporator.
6. Expansion valves shall be Sporlan, or approved equal, furnished and installed in the liquid line at the evaporator, unless provided with manufactured equipment. External equalizer expansion valves shall be provided for coils fitted with refrigerant distributor.
7. A Sporlan, or approved equal, drier shall be provided at the compressor. Up to 3HP shall be a Catch-All series; larger than 3HP shall be angle replaceable cartridge series, or approved equal.
8. Each liquid line sight glass shall be Sporlan "See All" moisture and liquid indicator and shall be full line size, or approved equal.
9. Solenoid valves shall be Sporlan, or approved equal, line voltage, manual lift stem type, to operate at maximum of 2 lbs. (0.9kg.) pressure drop across the valve. Valves shall be full line size, using silver solder connection as applicable. A liquid line solenoid, normally closed, shall be used with temperature controller for each Cold Storage Room compartment coil on a system.
10. Include a suction line filter with access valve adjacent to compressor. Filter shall be a Superior "F" Series or equal.
11. EPR, CTR, and/or CDA valves shall be Alco or Sporlan, or approved equal.
12. Suction accumulators shall be Refrigeration Research 3700 series or Virginia VA series, or approved equal.
13. Discharge line mufflers shall be Refrigeration Research M-10 and M-15 or AC and RS S-6300 series, or approved equal.
14. Time clocks shall be Paragon, or approved equal.

Q. Drain Lines

Type "L" copper coil drain lines extended to exterior of refrigerated compartments over floor sinks (drain) with "S" traps at termination ends.

1. Provide clean out "T" and cap at each change of direction in the lines. Provide individual drain lines for each coil unless otherwise specified. Drain lines shall be run tight to refrigeration compartment walls with minimum pitch of 2" per foot.
2. Drain lines inside low temperature compartments shall be equipped with drain line heaters wired by electrical division. Drain lines in low-temperature compartments shall be extended into adjacent, medium, or high temperature compartments to reduce length of drain line heater required. (Drain line in low temp compartment to be insulated with Armaflex ½" insulation by the Foodservice Equipment Contractor).
3. Drain lines on the exterior of refrigerated compartment shall be painted with chrome tone paint.

R. Refrigerant/Compressor Oil Reclaim

1. For existing refrigeration systems which may be reused, abandoned or where site conditions warrant, the system(s) refrigerant, oil and/or other components shall be reclaimed and contained by certified personnel in conformance to Refrigerants and Hazardous Waste criterion as specified by the Environmental Protection Agency and/or Montreal Protocol Guide Lines & Requirements.

PART 3 - EXECUTION

3.1 DELIVERY AND INSTALLATION

- A. Delivery
 - 1. The equipment shall be delivered and installed on schedule. Coordinate all work with the General Contractor and other divisions as required.
 - 2. Extra charges resulting from special handling or shipment shall be paid by the Food Service Equipment Contractor if insufficient time was allowed in placing factory orders to ensure normal shipment.
- B. The work shall be accomplished so as not to delay the project construction schedule, interfere or conflict with the work being performed by other contractors. Work shall be coordinated and integrated to prevent conflict of work necessitating changes to work already completed. Should conflicts occur, notify the Owner for his coordination in its resolution.
- C. Verify all required field dimensions before fabrication.
- D. Include all alternations to walls, floors and ceiling necessary for work, except otherwise shown or specified, accomplished in a manner satisfactory to the Architect and the Designer. Holes through structural beams shall be prohibited unless written approval has been granted by the Architect.
- E. Cut holes in equipment for pipe, drains, electric outlets, etc., as required for this installation. Work shall conform to highest standards or workmanship and shall include welded sleeves, collars, ferrules or escutcheons.
- F. Repair all damage to the premises as a result of this installation.
- G. Remove daily all debris from the site related to this installation.
- H. Remove any plates, components or component covers installed at the factory before installing the FRP-X panels at cold storage rooms and reinstall them afterwards along with the items furnished loose for mounting on the exterior face of the wall panels.
- I. Space between all equipment to wall, ceiling, floors, masonry pads, and adjoining units not portable and with enclosed bodies shall be completely sealed against entrance of food particles or vermin by means of trim strips, welding, soldering or mastic. Mastic shall be General Electric Silicone Construction Sealant Series SCS1200 (NSF approved) in appropriate color.
- J. Any exposed utility services down from above on the surface of a wall servicing food service equipment items are to be covered with an appropriately sized three sided stainless steel enclosure w/ #4 finish mechanically fastened to the wall.
- K. Trademarks and names of fabricator shall not be fastened to any items without written approval of Clevenger Frable LaVallee, Inc.
- L. All items shall be installed plumb, square, level and in proper elevation, plane location and in alignment with other work.
- M. Exposed rear and sides of food service equipment to be provided with finish to match front of unit.
- N. During delivery and installation, protect all equipment from abuse with materials (cardboard, masonite, bubble wrap, foam, etc) suited to the task. To obtain final approval, equipment needs to be provided free of "dings and dents".
- O. Cold Storage Rooms
 - 1. The cold storage rooms shall be delivered and installed on schedule by factory supervised and approved installers. Coordinate the work with the General Contractor and other trades as necessary.

2. Become fully familiar with the job site and the architectural drawings and specifications. Provide the necessary job site coordination with the various trades to insure job site conditions will meet the requirements of the cold storage rooms.
3. Establish a time schedule with the General Contractor that will insure the job site coordination with the various trades to insure job site conditions will meet the requirements of the cold storage rooms.
4. All work shall be designed and manufactured to comply with field conditions and fitted with proper joints and sections.
5. During curing and cleaning of the wearing floors inside the cold storage rooms, the cold storage room doors shall be left open and the rooms well ventilated to prevent damage to the interior. "Keep Out" signs shall be posted at each open door.
6. After the installation of the cold storage rooms and prior to the installation of the wearing floor and after the wearing floor has cured, the cold storage room doors are to be closed and locked.
7. Where the floor is depressed or floorless, walls shall be anchored to the building floor with a concealed 18 gauge galvanized steel floor track with drive pins 2'-0" on center and sealed at interior and exterior edges with a bead of sealant.

P. Refrigeration Systems

1. Refrigeration systems and connecting piping shall be installed as indicated in contract documents in a manner that provides complete and operational systems and eliminates any noise and vibration being transmitted to any part of the building.
2. Piping shall be installed to permit normal inspection, service, removal of the condensing units and their components and view of sight glasses and allow expansion and contraction without damage to the system.
3. Extreme care shall be taken to keep the entire system clean and dry.
4. Nitrogen gas shall flow through piping being welded to prevent scaling. The Owner or Designer shall have the option of cutting a maximum of three (3) welded fittings to inspect for the proper use of nitrogen. Food Service Equipment Contractor shall replace fittings at his cost where scaling is present.
5. Suction and discharge line vibration eliminators shall be furnished and installed parallel to the compressor shaft and secured at outlet end as required to eliminate vibration in rigid piping.
6. All refrigeration lines shall be factory extended to one end of the compressor rack in a neat and orderly manner and shall be supported and anchored with "Unistrut" or equal clamps and channels. Ends of lines shall be capped against contamination.
7. Compressors and all accessories on the compressor rack shall be factory mounted and pre-wired to a main circuit breaker control panel with individual circuit breakers wired to a main breaker disconnect requiring a single power connection. All wiring shall be run inside a code approved raceway.
8. Condenser water supply and return header shall be factory pre-plumbed using hard copper tubing with shut-off valves for supply and return for each.
 - a) Provisions shall be provided for connection to city water for emergency use.
 - b) Verify water system pressure and provide all necessary components to insure proper operation of the water cooled system and the return of the

water to the recirculating system.

9. If, in the opinion of the Food Service Equipment Contractor, additional ventilation is required to ensure correct operating temperatures, he shall so state in a letter to Owner and/or Designer for evaluation and decision before installation.

Q. Refrigeration System Instructions and Identification

1. Food Service Equipment Contractor shall at each component of every system identify it with the letter/number shown on the Refrigeration Schedule. The identification shall be with black paint, decal, or other approved permanent method. Plastic tape labels are unacceptable. Identification shall be in an easily seen location.

R. Refrigeration Piping Testing

1. Notify Owner and/or Designer in advance when a test is being made and ready for inspection.
2. Each system shall be pressure tested for leaks. All valves shall be fully open during the test.
3. Tests are to be accomplished as follows:
 - a) Charge the systems with refrigerant through the port of liquid shut off valves of the receivers to a pressure of 10 to 20 p.s.i.
 - b) Add dry nitrogen, the supply of which shall be equipped with a pressure regulating valve to provide the specified pressure.
 - c) Carefully test all joints for leaks using either a Halide torch or an electronic Halogen leak detector.
4. The Owner or Designer shall approve all tests.
5. Precautions shall be taken to disconnect the low pressure controls for protection of the bellows during testing.

S. Refrigeration System Evacuation

1. Advise Owner and/or Designer when the evacuation of the system is to start, so the procedures can be checked.
2. Evacuation shall be with an Airserco, Stroke KC8R or Robinaire, 150021 vacuum pump with an indicating gauge registering pressure in microns. Pump shall be connected to the system with a 5/8" O.D. line or larger.
3. Evacuate both high and low sides to 500 microns. Break the vacuum with refrigerant to 0 p.s.i. evacuate the high and low sides below 500 microns; Break the vacuum with refrigerant; evacuate high and low sides to 100 microns; and then break vacuum to 0 p.s.i. with the refrigerant to be used in the system.

- T. Foodservice Equipment Contractor to confirm installation requirements with food service equipment manufacturer where equipment units penetrate the counter top [stainless steel, plastic laminate, solid surface, stone (natural & man-made)].

Foodservice equipment Contractor to coordinate installation requirements suggested by the manufacturer with the Millwork Contractor.

3.2 START-UP & DEMONSTRATION

- A. All equipment under this section shall be cleaned and ready for operation at time building is turned over to the Owner.
- B. Provide a factory authorized service representative to be present when installation is put

- into
operation. Per the manufacturer's recommendations, he shall put into proper operation per the
the
manufacturer's recommendations all equipment and instruct the Owner's employees in the proper use and maintenance of all items in this contract.
- C. Where engineered systems are specified that require specialized knowledge/skill to put equipment into operation (including, but not limited to ventless hoods, tray accumulators, combination oven steamers, utility distribution systems, water wash control panels, refrigeration rack systems, conveyor type dishmachines, single tank upright dishmachines, flight type dishmachines, pulper systems, conveyORIZED soiled dishtable assemblies, cook-chill systems and their major components, cooking suites, potwashing machines and conveyORIZED tray make-up systems, etc.) the Food Service Equipment Contractor is to provide start-up and adjustment per the manufacturer's recommendations by a factory trained service technician. The Food Service Equipment Contractor will include start-up and adjustment per the manufacturer's recommendations by a factory trained service technician and authorized by the manufacturer for starting up the equipment and putting it into operation in concert with related work performed by other divisions shall be included in their pricing proposal for all aforementioned items.
- D. At the completion of the start - up procedure, the Food Service Equipment Contractor will provide documentation to the Owner which is prepared by the service agent indicating that the equipment was put into operation per the manufacturer's recommendations.
- E. All accessory items listed in the itemized specifications section are the responsibility of the foodservice equipment contractor. Careful review of these accessories are required as they may not all be available from the manufacturer. Detail C-2-3B, Cutting Board w/Bracket may be listed in the itemized specifications as an accessory to a Jade griddle. This item is not available from Jade. The Foodservice Equipment Contractor will obtain this item from the appropriate source (custom fabricator) to fulfill the specifications
- F. Refrigeration System Start-up
1. Charge each system with the refrigerant specified in the Refrigeration Schedule.
 2. All systems and controls shall be set and checked for proper operation at temperatures specified in the Refrigeration Schedule.
 3. Check compressors for proper oil level. Refrigerant oil shall be Suniso 3G, inhibited only, delivered to job site in sealed containers. Oil shall be added to the system to maintain 1/4" to 1/2" sight glass.
 4. Check all electrical circuits by Division 26 - Electrical for compliance with the manufacturer's specifications. Division 26 - Electrical shall make corrections to his wiring as required. The Food Service Equipment Contractor shall be responsible for corrections in his wiring and/or components as required.
 5. The manufacturer's requirements for lubrication shall be checked and followed before the operation of fan and pump motors, and/or associated equipment.
 6. Furnish and install, where directed by the Owner, copies of the Refrigeration Schedule and Refrigeration Floor Plan, framed with a glass covering. The Refrigeration Floor Plan shall show the location of all EPR, CTR, and/or CDA valves, solenoid valves, and other controls for easy location and services.
 7. Provide a set of "As Built Drawings" to Owner upon completing the installation. Drawings shall include refrigeration line runs and wiring diagrams. Drawings shall be submitted in the form of reproducible sepia.
- G. Review the refrigeration systems, operation, maintenance, emergency procedures, and proper service procedures with the Owner's Engineering Staff. Provide a competent

serviceman who shall remain for a minimum of eight (8) hours during the first day of operations.

- H. Where concrete has been poured inside a low temperature cold storage room it shall be allowed to cure twenty-eight (28) days, minimum seven (7) days before starting the refrigeration system.
After the curing period the temperature shall be brought down in regulated stages. The temperature shall be brought down as follows: to 40°F. (5°C.) held twenty-four (24) hours; to 20°F. (-6°C.) held twenty-four (24) hours; and then to specified temperature.
- I. During start-up provide all required instruction for operation and maintenance of equipment, after one year guarantee period.
- J. The fire suppression system shall be tested for the authorities in the Owner's presence. Certificates shall be obtained and provided to the Owner from the authorities and from the Fire Insurance Rating Bureau.
- K. After installation and hook-up, verify air volumes at each exhaust and make-up air duct. A report shall be submitted to the Owner of all readings. All incorrect air volumes shall be rechecked after adjustment.

3.3 MAINTENANCE SCHEDULE

- A. Provide final operation warranty and service inspections thirty (30) days before warranty expiration. Any service or repair requirements shall be performed before the end of the warranty period.
- B. Copies of all warranty service calls and inspection reports shall be mailed to the Owner and building operations engineer.
- C. The Owner may call an outside company at the expense of the Food Service Equipment Contractor, if the Food Service Equipment Contractor does not arrive within four (4) hours of the time called in response to an emergency call.

PART IV - EQUIPMENT

4.1 REGULAR MANUFACTURED EQUIPMENT

- A. Provide equipment with standard finishes and accessories unless specifically deleted or superseded by the contract documents.

4.2 FABRICATED EQUIPMENT

- A. Provide arrangement and configuration as shown on plans, elevations and standard detail drawings.

4.3 BID QUOTATION SUMMARY FORM

- A. Proposals submitted for this project that do not include and itemized schedule of values consistent with the equipment schedule will be rejected.

	Total Bid Pricing with/		
	Prime Specification	Mandatory Alternates	Approved Alternates
Subtotal Equipment			
Delivery			
Installation			
Taxes			
Grand Total			
Performance Bond			

FSE Contractors to Furnish the Names of Sub Contractors:

Stainless Steel Fabricator _____
 Millwork Fabricator _____
 Refrigeration Contractor _____
 Installer _____

We Acknowledge Addendum(s) _____, Dated
 _____ the above bid is in accordance with the bid documents, except
 as noted.

The undersigned acknowledges that they have read and understand the Instruction to Bidders, General Conditions and Specific Conditions and, if the successful bidder, will fully comply with all articles and sections contained therein.

Firm

Signature

Print Name

Date

4.4 FOOD SERVICE EQUIPMENT SPECIFICATIONS

ITEM #1 WALK IN COOLER/FREEZER
Quantity: One (1)
Manufacturer: Norlake
Model: FINELINE

Unit to be a three compartment Refrigerator +35° F. and/or Freezer -10° F. of size and shape as shown on plan x 9' - 2 5/8" high. Wall and ceiling panels shall be 4" urethane, U.L. Flame Spread 25 insulation. Panels are without wooden structural members.

Thru ceiling door electrical assembly as shown on detail E-1-4.

Provide one (1) lot removable closure panels with channels, the same finish as exterior panels to ceiling. (F.S.E. Contractor to verify ceiling height). Closure to be louvered for top mounted condensing units (define)

One (1) lot of trim strip, where required to close in wall gaps, of same finish as exterior panels to finished ceiling. (F.S.E. Contractor to verify height).

Unexposed exterior finish to be galvalume.

Unit must comply with the Jan. 1, 2009 Federal Energy Regulations.

Options:

- Floorless with flat bottom wall panels in recess. (2) 2" layers of Slab urethane insulation (R-28), vapor barrier and minimum 2" mud & tile finished floor by General Contractor.
- .040 embossed aluminum white interior and exposed exterior.
- Hinged entrance door(s) w/ 14" x 14" vision panel, Kason K-1094 automatic door closer, three (3) Kason polished chrome hinges with spring assists, and Kason #27C polished chrome handle, hinged as shown on plan.
- Hinged doors to be 36" wide x 84" high.
- Factory cut door for finished floor conditions.
- Approved Kason #1810 48" LED 2-bulb, low-temp light fixtures for ceiling and Kason #1806 LED light fixture at each door installed and wired by the Electrical Division per detail E-1-4.(See electrical plan for quantity and location of lights and switches)
- Modularm 75B, recessed with thru ceiling door electrical as shown on detail E-1-4.
- IP-1 Inside panic alarm
- 2-1/2" dial thermometer flush-mounted.
- Vinyl rub rail one level on exposed exterior mounted to cap the top of the wainscot, including door and door frame kickplates.
- 1/8" aluminum diamond tread kick plate, 3'- 0" high on door exterior and up to the bottom frame of the view window on the door interior. Exterior and interior of door jambs to be 3' high. Do not use pop rivet fasteners. Use countersunk stainless steel phillips-head screws to secure treadplate.
- Wainscot on exposed exterior, 1/8" aluminum diamond plate. Provide panels 36" high and field cut to align panels with top of kickplate on door and achieve 1/8" joint w/ top of finished floor.

CLEVENGER FRABLE LAVALLEE INC. FIT & FINISH REQUIREMENT:

Fit & Finish: The top closure, side trim strips, 1/8" aluminum diamond plate wainscot, and the vinyl rub rail are all to be back-ordered by the Foodservice Equipment Contractor. Once the walk-in is constructed and the finish floor work completed, the Foodservice Equipment Contractor is required to measure accurately for these accessories per the CFL details shown on the submittal drawings. Tread plate panels are to be secured to walk-in with countersunk, stainless steel, phillips

head screws. Also, the audio-visual alarm probe wire and the dial thermometer probe wire must be uncoiled, extended and fastened neatly to the walls with the attachment clips that are provided by the manufacturer.

Per Clevenger Frable LaVallee, Inc. specification requirement, the GC is to insure and the FSEC is to confirm that the floor slab in the walk-in footprint area meets an FF50 flatness and an FL40 levelness standard as defined by the American Concrete Institute prior to the walk-in being erected. This requirement is necessary to insure proper fit of modular insulated panels and achieve level/plumb end result.

ITEM #2 CONDENSING UNIT, AIR COOLED

Quantity: One (1)

Manufacturer: Nor-Lake

Model: MSMD020MC

F.S.E.C. to provide the necessary refrigeration lines required to operate and maintain the refrigeration system for Item 1, refrigerated compartment. Unit to be part of the remote refrigeration system for Item 3, Evaporator Coil.

F.S.E.C. to coordinate with the electrical/ plumbing contractor to provide a complete and operable refrigeration system.

Provide start-up, five (5) year compressor warranty and one (1) year refrigeration service contract.

Division 26 to wire to safety disconnect switch.

- Provide outdoor ambient package.
- Unit to be located top of walk-in. See Architectural plan for location.
- Assume a 25' refrigeration line run.

ITEM #3 REFRIGERATION COIL, MED TEMP

Quantity: One (1)

Manufacturer: Nor-Lake

Model: E1MD0163A-MA

Unit to be adequately sized to operate Item 1, Refrigerator Compartment @ +35° F.

Electrical hook-up and interconnecting of system to be by the Electrical Contractor.

Indirect waste line extended to floor sink (drain) by FSE Contractor. Refer to Specific Conditions 2.10 Cold Storage Rooms, P. Drain Lines.

ITEM #4 SPARE NO.

ITEM #5 CONDENSING UNIT, AIR COOLED
Quantity: One (1)
Manufacturer: Nor-Lake
Model: MSLD020MC

F.S.E.C. to provide the necessary refrigeration lines required to operate and maintain the refrigeration system for Item 1, freezer compartment. Unit to be part of the remote refrigeration system for Item 6, Evaporator Coil.

F.S.E.C. to coordinate with the electrical/ plumbing contractor to provide a complete and operable refrigeration system.

Provide start-up, five (5) year compressor warranty and one (1) year refrigeration service contract. Division 26 to wire to safety disconnect switch.

- Provide outdoor ambient package.
- Unit to be located top of walk-in. See Architectural plan for location.
- Assume a 25' refrigeration line run.
- Loose timeclock (freezer only) installed above walk-in freezer.

ITEM #6 EVAPORATOR COIL, LOW TEMPERATURE
Quantity: One (1)
Manufacturer: Nor-Lake
Model: E1LD0088B-ME

EVAPORATOR COIL, LOW TEMPERATURE

Unit to be adequately sized to operate Item 1, Freezer Compartment @ -10° F.

Electrical hook-up and interconnecting of system to be by the Electrical Contractor.

Heat tape for low temp coil drain line furnished and set-in-place by the FSE Contractor.

Final electrical connection to heat tape by Electrical Division.

Indirect waste line extended to floor sink (drain) by FSE Contractor. Refer to Specific Conditions 2.10 Cold Storage Rooms, P. Drain Lines.

ITEM #7 WIRE SHELVING UNIT
Quantity: Twelve (12)
Manufacturer: Eagle Group
Model: E74-5 series

Shelving Unit, 5-tier, of size and shape shown on plan, wire shelves with patented QuadTruss design, (4) 74"H posts, tapered split sleeves, Eagleard Green Epoxy finish, NSF

- (4) 5" stem casters, 2 front locking.

ITEM #8 SPARE NO.

ITEM #9 EXHAUST HOOD W/UTILITY CABINET
Quantity: One (1)
Manufacturer: Captive-Aire
Model: 6024 AM-ND-2

Unit to be U.L. listed wall mounted exhaust hood of size and shape as shown on plan 2'-0" high, built in two sections and mounted at 6'-8" AFF.

One (1) lot stainless steel enclosure paneling, at all open sides, to finished ceiling (FSE Contractor to verify height). Paneling must be supplied by Exhaust Hood Manufacturer and installed by FSE Contractor. Adhere to Specific Conditions for installation of fabricated equipment

F.S.E. Contractor to supply the necessary mounting rods for hanging ventilator.

Location of cooking appliance nozzle drops are to be fully dimensioned on hood submission drawings.

Supply and/ or exhaust air requirements as shown on plans.

Options:

- Recessed LED light fixtures as indicated on electrical plan. Light fixtures shall be factory pre-wired to a single connection point. Ventilators built in multiple sections shall be furnished with coiled flex conduit for interconnecting sections.
- Pre-piping of Item 16, Fire Suppression System shall be installed by ventilator manufacturer at the factory. Pre-pipe to include UL recessed detection boxes recessed in the roof of the canopy, duct and plenum piping with nozzles, and manifold on top of hood with UL hood penetration fittings install at the factory for surface protection.
- Utility cabinet built in to accommodate installation of Item 16, Fire Suppression System.
- Demand control ventilation hood control panel.

FSE Contractor is responsible for fit of equipment. Prior to releasing hoods for fabrication, FSE Contractor needs to verify field conditions (existing &/or proposed) and to determine clearances to all structural items, obstructions, etc. The FSE Contractor will coordinate with other trades to confirm that the hood can be mounted as proposed and that the ductwork and final connection can be accommodated without conflict. Failure to perform this step may result in modifications to the exhaust hood at the FSE Contractor's expense.

See preliminary shop drawings #5429643, dated 5/25/2022.

ITEM #10 WALL FLASHING
Quantity: One (1)
Manufacturer: Low Temp Industries
Model: WALL FLASHING

Provide 20 ga. stainless steel wall flashing, approximately 21' per detail C-2-11. Stainless steel flashing to extend from floor or top of wall tile base to underside of Item 9, Exhaust Hood.

ITEM #11 RANGE, 4 OPEN BURNERS
Quantity: One (1)
Manufacturer: Jade Range
Model: JTRH-4-36

Titan Heavy Duty Range, gas, 36", (4) 35,000 BTU open burners, infinite controls, standard oven, (2) chrome plated racks, stainless steel oven liner, 6" plate shelf, front, sides, stub back & bottom, 6" adjustable legs, 175,000 BTU, CSAus, NSF

- Liquid propane gas.
- 3/4" rear connection and gas pressure regulator, standard
- Swivel casters (4) w/ front brakes.
- Stainless steel high shelf.
- Cap and cover manifold.
- Flexible gas disconnect per specific conditions (2 swivel MAX swivel).

ITEM #12 GRIDDLE, GAS, FLOOR MODEL
Quantity: One (1)
Manufacturer: Jade Range
Model: JGT-2436-F

Supreme Griddle, floor model, gas, 36", 1" thick smooth steel plate, thermostatic controls, pilot tips, spark igniter, 3" high stainless steel side & rear splash, 25" legs & undershelf, 90,000 BTU, CSAus, NSF

- Liquid propane gas.
- 3/4" rear connection and gas pressure regulator, standard
- Swivel casters (4) w/ front brakes.
- Flexible gas disconnect per specific conditions (2 swivel MAX swivel).
- Stainless steel 8" extended plate shelf

ITEM #13 TILTING SKILLET BRAISING PAN, GAS
Quantity: One (1)
Manufacturer: Cleveland Range
Model: SGL40TR

DuraPan Tilting Skillet, gas, 40-gallon capacity, modular open base, standard with hydraulic hand tilt with quick lowering feature, stainless steel construction, includes spring-assisted cover, gallon markings and electronic spark ignition, stainless steel level adjustable feet, 130,000 BTU, CE, NSF, IPX6

- LP gas
- 120v/60/1-ph, 1.8 amps NEMA 5-15P, standard
- Power Tilt, with hand tilt override
- 2" tangent draw-off valve, front mounted left side (Note: May require additional lead time, contact factory)
- Double Pantry Faucet and Bracket.
- Flexible gas and water disconnects per specific conditions (2 swivel MAX swivel).

ITEM #14 FLOOR TROUGH
Quantity: One (1)
Manufacturer: IMC/Teddy
Model: ASFT-3036-SGAS

ASFT Anti-Spill Floor Trough, 36"W x 30"D, 6" deep receptacle, (1) 4" OD tailpiece, stainless steel beehive strainer, 14/304 stainless steel, brushed satin finish, (SGAS) anti-slip subway grating, NSF, Made in USA

This item to be set and installed by General Contractor.

Quarry tile floor finish to be etched, if required, prior to setting food service equipment in place.

Provide grating sections of equal size not to exceed 20" long. Removal of grating to be unobstructed by adjacent equipment.

Provide shop drawings of size and scale outlined in specific conditions.

Coordinate structural conditions and floor penetrations with General Contractor. Fabricate trough depth and connections accordingly.

Confirm finished flooring type with Architect. Coordinate flange type w/ manufacturer.

ITEM #15 CONVECTION OVEN, DOUBLE, GAS
Quantity: Two (2)
Manufacturer: Blodgett
Model: DFG-100-ES DBL

Convection Oven, gas, double-deck, standard depth, capacity (5) 18" x 26" pans per compartment, (SSD) solid state digital controls, 2-speed fans, interior light, simultaneous operated doors with glass, stainless steel front, sides & top, flue connector, (2) 3/4 HP, 45,000 BTU each, cETL, NSF, CE, ENERGY STAR

- Liquid propane gas.
- 115v/60/1-ph, 8.0 amps, 3/4 hp, 2-wire with ground, NEMA 5-15P (per deck), standard
- Top Oven: Solid State digital with Pulse Plus® and Cook & Hold, standard
- Bottom Oven: Solid State digital with Pulse Plus® and Cook & Hold, standard
- 6" casters (set).
- Flexible gas hose w/quick disconnect & restraining device (2 swivel MAX swivel).
- Gas manifold (double section)

ITEM #16 FIRE SUPPRESSION SYSTEM
Quantity: One (1)
Manufacturer: Ansul
Model: R-102

Model R-102 Fire protection system to be provided and installed by FSE Contractor per detail C-22-6 and C-22-7. System to be Ansul R102 system, wet chemical with the following specifications:

Wet chemical suppressant.

System U.L.300 listed, installed in accordance with manufacturer's recommendations, and comply with NFPA NFPA 96 and all applicable codes.

System to be pre-piped and fusible link detection incorporated with ventilator sections by ventilator manufacturer at time of construction.

Wherever possible, system piping shall be concealed. Exposed piping, conduit and nozzles shall be smooth chrome-plated or stainless steel.

Fusible link assemblies shall be unexposed within the ventilator bodies or within enclosed boxes recessed into ventilator roof.

System shall be shipped complete with tanks, automan release, remote manual release.

Cylinders and controls shall be mounted on wall where shown on plan tight to underside of finished ceiling and not conflict with equipment below. Junction boxes for connections to Automan to be located above finished ceiling.

Mechanically activated gas shut off valve with mechanical reset is to be furnished by the FSE Contractor and installed by the Plumbing Contractor.

Coordination and cabling to valve by FSE Contractor.

Shunt trip type breaker disconnect provided and installed by the Electrical Division.

FSE Contractor to coordinate shunt trip breaker requirements with the Electrical Contractor.

System to provide plenum and duct collar protection and surface protection for equipment underneath Item 9, Exhaust Hood.

FSE Contractor will be required to obtain all permits and arrange for system inspection and testing to achieve an approved operating system.

FSE Contractor to coordinate with Electrical Division for connection to building alarm system

Operator to return mobile appliances to correct position below surface protection nozzles after cleaning.

Remote pull station:

Fire Protection System remote manual activation stations are to be recessed wall-mounted, with the cabling conduit recessed within the wall.

Remote pull stations are to be located along pathways between the protected equipment and area exits, and in accord with any governing local code requirements and/ or system manufacturer recommendations. FSE Contractor to confirm placement of remote fire pulls w/ Fire Suppression System Subcontractor and reflect code compliant placement on dimensioned rough-in plans.

FSE Contractor shall coordinate the efforts between the Fire Protection System subcontractor, any other trades, and with local code enforcement officials, as may be necessary to comply with local codes.

If the FSE contractor determines that, for any reason, the flush mounting of the remote fire pulls is not possible an appropriate and timely "Inability to Comply" statement must be furnished to Foodservice Consultant for their review and response.

ITEM #17 SPARE NO.
ITEM #18 SPARE NO.

ITEM #19 SPARE NO.
ITEM #20 SPARE NO.

ITEM #21 THREE (3) COMPARTMENT SINK
Quantity: One (1)
Manufacturer: Low Temp Industries
Model: Custom Fabrication

Unit to be of size and shape as shown on plan x 34" high to drainboard level with 10" high splash per details C-1-1A Type "D" edge, C-1-1B backsplash, C-8-1 and C-8-5. (3) sinks – wash 24", rinse 24", sanitize 24", all 14" deep with flush front construction and the following requirements:

- Undershelf below right & left drainboard sections per detail C-8-1.
- Front to back and rear crossrails.
- Two Type 2 faucet(s).

ITEM #22 SHELF, TWO-TIER, WALL MOUNTED
Quantity: One (1)
Manufacturer: Low Temp Industries
Model: Custom Fabrication

Unit to be of size and shape as shown on plan per detail C-1-2 with the following requirements:

- Louvers per detail C-1-2D - laser cut.
- Two-tier unit, first tier (lower shelf) to be 12" wide, second tier (upper) to be 15" wide.
- Confirm mounting height with Owner/ Operator.

ITEM #23 UNIVERSAL PAN RACK
Quantity: Nine (9)
Manufacturer: Channel Manufacturing
Model: AXD-UTR-12

Steam Table Pan Rack, Bun Pan / Steam Table Pan Rack, EXTRA Heavy-Duty Series, 21"W x 26"D x 70"H, Aluminum Construction, End Load, 5" Angle Spacing, (12) 18" x 26" or (24) 13" x 18" (2 per shelf) or 12" x 20" steam table pans (pan height determines capacity), 5" x 2" Heavy-Duty Swivel Plate Casters w/ Zerk Grease Fitting model # CPS25U, Made in USA, NSF.

ITEM #24 POT & PAN SHELVING RACK
Quantity: One (1)
Manufacturer: Metro
Model: PR60ES

Mobile Pot & Pan Rack, 60"W x 24"D x 68"H, (4) shelves solid embossed stainless steel (2) 5MP polyurethane swivel casters & (2) 5MPB polyurethane swivel casters with brake, NSF

ITEM #25 WIRE SHELVING UNIT
Quantity: Nine (9)
Manufacturer: Eagle Group
Model: C74-5

Shelving Unit, of size and shape shown on plan x (4) 74"H posts, wire shelves with patented QuadTruss design, tapered split sleeves, chrome finish, NSF

- (4) 5" stem casters, 2 front locking.

ITEM #26 TABLE WITH SINKS, U/CHASE, OVERSHELF
Quantity: One (1)
Manufacturer: Low Temp Industries
Model: Custom Fabrication

Unit to be of size and shape as shown on plan x 36" high per details C-1-1A Type "A" and C-7-1.

- Undershelf per C-7-1C.
- Front to back and rear crossrails at trash receptacle locations.
- Utility chase from table top to above finished ceiling per detail C-2-12. Verify ceiling height.
- 20" x 20" x 5" deep utility drawer constructed similar to details C-1-3A, C-1-3C and C-1-3D, lock hasp.
- Angle slides at bottom of drawer w/ one (1) Richlite 1/2" thick cutting board per detail C-1-3C.
- Provide single, solid overshelf of size and shape as shown on plan per detail C-7-8. Secure overshelf to s/s angle mounted to utility chase. Three (3) 24" x 24" x 12" deep sinks w/ Type 1 faucet and Type 1 waste located per plan.
- 9" x 12" x 6" deep hand sink per detail C-2-1E. Provide w/Type 14B faucet.
- Fabricator to provide an integral side splash, 6" high x 1" thick x depth of table top, to isolate hand sink from table similar to C-2-1E. Soap & towel dispenser by Owner.
- Two (2) bracket mounted convenience receptacle(s) mounted to underside of table as shown on electrical plan similar to detail C-14-1.
- Pedestal mounted convenience receptacle(s) mounted to underside of shelves as shown on electrical plan similar to detail C-14-1 serving Items 48 & 49.

ITEM #27 TRASH RECEPTACLE
Quantity: Two (2)
Manufacturer: By Owner
Model: FG263200
Status: By Owner

This item is not in contract.

The specification is for reference only.

The item is shown on the drawing for informational purposes and generally represents the size/capacity of unit to be provided by the Owner.

ITEM #28 TABLE W/SINK
Quantity: One (1)
Manufacturer: Low Temp Industries
Model: Custom Fabrication

Unit to be of size and shape as shown on plan x 36" high per details C-1-1A Type "A" and C-7-1.
Undershelf per C-7-1C.

- Utility chase from table top to above finished ceiling per detail C-2-12. Verify ceiling height.
- 20" x 20" x 5" deep utility drawer constructed similar to details C-1-3A, C-1-3C and C-1-3D, lock hasp.
- Angle slides at bottom of drawer w/ one (1) Richlite 1/2" thick cutting board per detail C-1-3C.
- Provide single, solid overshelf of size and shape as shown on plan per detail C-7-8. Secure overshelf to s/s angle mounted to utility chase.
- One (1) 24" x 24" x 12" deep sink w/ Type 1 faucet and Type 1 waste located per plan.
- Three (3) bracket mounted convenience receptacle(s) mounted to underside of table as shown on electrical plan similar to detail C-14-1.

ITEM #29 HAND SINK
Quantity: Two (2)
Manufacturer: Eagle Group
Model: HSA-10-FW

Hand Sink, wall mount, 13-1/2" wide x 9-3/4" front-to-back x 6-3/4" deep bowl, 304 stainless steel construction, splash mounted faucet with wrist handles, basket drain, inverted "V" edge, NSF

ITEM #30 TABLE, ISLAND TYPE
Quantity: Two (2)
Manufacturer: Low Temp Industries
Model: Custom Fabrication

Unit to be of size and shape as shown on plan x 36" high per details C-1-1A Type "A" edge and C-7-1C.

- Mount on set of 5" diameter polyurethane swivel casters, two (2) diagonal with brakes.
- Front to back and rear crossrails. Accommodate placement of Item 44, Dish Dolly.

ITEM #31 SPARE NO.

ITEM #32 WORK TABLE
Quantity: One (1)
Manufacturer: Low Temp Industries
Model: Custom Fabrication

Unit to be of size and shape as shown on plan x 36" high per details C-1-1A Type "A" edge, C-1-1B backsplash and C-7-1.

- Full undershelf

ITEM #33 COFFEE BREWER
Quantity: One (1)
Manufacturer: BUNN
Model: 34800.0017
Status: By Owner/Vendor furnished

This item is "Not in Contract". It is provided by the Owner.

The specification is for reference only. The item is shown on the drawing for informational purposes and generally represents the size/ capacity of unit to be provided

by the Owner to assist the Engineer in planning base building utility systems.

Following contract award, the FSE Contractor will confirm the manufacturer, model number and actual utility requirements for these items with the Owner and represent them on the dimensioned rough-in plans for use by the construction trades.

The Owner should effort to provide equipment that will function per the manufacturer's recommendations with the utilities shown on the plans or otherwise notify Designer of need for additional utility services.

The Foodservice Equipment Contractor will furnish and the Plumbing Division will install flexible quick disconnects per specific conditions for water connections to equipment as noted on the Plumbing Schedule.

- 34800.0017 SINGLE TF DBC BrewWISE ThermoFresh Coffee Single Brewer, 16.3 to 18.9 gal/hr, coffee extraction controlled with pre-infusion & pulse brew, digital temperature control, large spray head, variable bypass, stores individual recipes, funnel locks, SplashGard funnel, wireless brewer-grinder interface, stainless steel finish, holds 1-1/2 gallon ThermoFresh server (server sold separately), 120v/60/1-ph, 2200w, 18.1amps, NEMA 5-20P, UL, NSF
- 42700.0000 TF ThermoFresh Server with Digital Sight Gauge, with base, 1 gallon, portable, brew-through lid, pour spout, volume indicator display, 4-hour digital count-up timer, drip-tray, fast flow faucet, large cup clearance, soft-grip bail handle, vacuum insulated, battery operated, stainless steel finish, for use with single and dual ThermoFresh DBC brewers, NSF
- 39795.0003 TF Server Stand

ITEM #34 SERVING COUNTER

Quantity: One (1)

Manufacturer: Low Temp Industries

Model: Custom fabrication

Unit to be of size and shape as shown on plan x 34" high per detail section. Cantilevered counter construction similar to detail C-2-1.

- Accommodate Item 35, 37 and 38, drop-in equipment where shown on plan.
- Accommodate Item 36, Food Shield where shown on plan.
- Accommodate on/off switch for lights and heater, (part of Item 36, Food Shield) in counter apron.
- 1 1/4" thick Caesarstone top. Color/ grade selected by Architect.
- Set on 4" high s/s channel base sealed to finished floor.
- Bottom shelf below Item 35, Hot Food Well.
- Louvered doors per detail C-2-2 on attendant side of counter.
- Five (5) equal sized raised 1" deep x 24" high s/s panels on customer side fascia.
- Submit shop drawing for approval after having coordinated with the Foodservice Equipment Contractor on size and location of related food service equipment. See specific conditions section of specification.

ITEM #35 HOT FOOD WELL UNIT, DROP-IN, ELECTRIC

Quantity: One (1)

Manufacturer: Low Temp Industries

Model: DI-EF-4

Hot Food Well Drop-In Unit, electric, 58-1/2"W, wet or dry operation, (4) 12" x 20" sealed hot food wells, fully insulated, individual wired remote solid state controls, stainless steel top & interior liner, galvanized exterior housing, manifold drains, cULus, ANSI/NSF 4

Options:

- Hugged edge (H)

ITEM #36 HOT / COLD FOOD WELL UNIT, DROP-IN, ELECTRIC

Quantity: One (1)

Manufacturer: Low Temp Industries

Model: DI-QSCHP-4

QuickSwitch Hot/Cold/Freeze Food Well, drop-in, 64-3/4"W x 26-3/4"D x 21-16/25"H, accommodates (4) 12" x 20" pan size, wired remote, individual wired remote digital controls for hot or cold operation, manifold drain, stainless steel top & wells, galvanized exterior, cULus, ANSI/NSF 4, ANSI/NSF 7.

Options:

- Hugged edge (H)

ITEM #37 DROP-IN REFRIGERATED MERCHANDISER
Quantity: One (1)
Manufacturer: RPI Industries
Model: VICD3-27-R-SQ-SC-INS

Vienna Cold Display Case, slide-in, 44-3/8" W, self-contained refrigeration, full service, programmable digital refrigeration controller, top canopy LED light, (2) adjustable glass shelves with LED lights, squared tilt-out insulated glass front, top & side panels, stainless steel exterior, hinged rear see-thru access doors, 1/3 hp, ETL, ETL-Sanitation, NSF

- 1 year limited warranty standard
- Self-contained refrigeration, standard
- 5 year compressor warranty
- Cord and plug
- Slide-in with a base, standard

ITEM #38 FOOD SHIELD, CONVERTIBLE W/LED LIGHTS
Quantity: One (1)
Manufacturer: VersaGard
Model: VG15-SK

Convertible service/self-service food protector with shelf

21-11/16" oa height x 14-9/16" deep shelf

1" OD CNC machined solid supports

(3) Front supports (3) Rear supports

(2) Intermediate Suspended Front supports

(2) 3/8" clear tempered glass top panels

(4) 1/4" clear tempered glass front panels

(2) 1/4" clear tempered glass end panels

(2) 1/4" clear tempered glass fold-away end panels

(2) Hatco GRNH-54 food warmer over Item 35 & 38 with RMB3A remote infinite control, 120 volt, 1250 watts. (Clear anodized aluminum)

(1) 62" VGLED 12V LED light fixtures (120V, 1.04A)

(1) 68" VGLED 12V LED light fixtures (120V, 1.15A)

Includes (2) power supplies & (2) remote switches

11'-6" total cl length

Concealed-mount hardware

Brushed stainless steel finish

Ship to counter manufacturer

- (2) 1/4" clear tempered glass end panels (2) 1/4" clear tempered glass fold-away end panels
- 72-3/16" + 65-13/16" CL length
- Apron mounted controls.
- Extended span

ITEM #39 CONDENSATE HOOD
Quantity: One (1)
Manufacturer: Captive-Aire
Model: 4824AM-VHB-G-ND

Unit to be U.L. listed wall mounted exhaust hood of size and shape as shown on plan 2'-0" high, built in one section and mounted at 6'-8" AFF.

One (1) lot stainless steel enclosure paneling, at all open sides, to finished ceiling (FSE Contractor to verify height). Paneling must be supplied by Exhaust Hood Manufacturer and installed by FSE Contractor. Adhere to Specific Conditions for installation of fabricated equipment

F.S.E. Contractor to supply the necessary mounting rods for hanging ventilator.

Exhaust air requirements as shown on plans.

See preliminary shop drawings # 5429643, dated 5/25/2022.

ITEM #40 SOILED DISHTABLE W/PRE-RINSE SINK
Quantity: One (1)
Manufacturer: Low Temp Industries
Model: DISHTABLE, SOILED

Unit to be of size and shape as show on plan x 34" high to drainboard level with 10" high splash per details C-1-1A, Type "D" edge, C-1-1B backsplash and C-8-1. Provide end splashes as/if shown on plan. Provide with the following:

- Provide open base type table, no undershelf.
- Pre-rinse sink 20" x 20" x 7" deep with Type 1 waste and stainless steel rack guide per details C-8-5 and C-8-10.
- Furnish sink with Type 7 - splash mount pre-rinse faucet.
- Provide front to back crossrails
- Coordinate elevation & placement of kneewall specified by Architect.
- Provide a pass-thru window of length as shown on plan constructed similar to detail C-8-15, Section at Soiled Dishtable. Coordinate w/ placement of roll down shutter specified by Architect.
- Soiled dish drop ledge per detail C-8-3A to cantilever over kneewall.

ITEM #41 DISHWASHER, DOOR TYPE
Quantity: One (1)
Manufacturer: Champion
Model: DH-2000 (40-70)

Versa-Clean Dishwasher, door type, high temperature with built-in 40° & 70° F rise electric booster, self-draining pump, 55 racks/hour capacity, auto-fill, stainless steel construction, electric tank heat, NSF, cULus, 1hp

- Single-point electrical connection, standard
- Straight-through design application
- Drain tempering kit.
- Side panels.

ITEM #42 DISHTABLE, CLEAN
Quantity: One (1)
Manufacturer: Low Temp Industries
Model: Custom Fabrication

Unit to be of size and shape as shown on plan x 34" high to drainboard level with 10" high splash per details C-1-1A Type "D" edge, C-1-1B backsplash and C-8-1. Provide with the following:

- Undershelf.
- Provide two tier splash mounted overshelves. Construct similar to detail C-1-6.
- As part of this item provide wall mounted shelves of size and shape as shown on plan per detail C-1-2 with louvers per detail C-1-2D - laser cut. Lower shelf to be 12" wide, upper shelf to be 15" wide. Confirm mounting height with Owner/ Operator.

ITEM #43 DISH CART / DOLLY
Quantity: Four (4)
Manufacturer: Metro
Model: PCD8

Poker Chip Dish Dolly, 21-1/2"W x 21-1/2"D x 31-15/16"H, non-adjustable, (240) max dish: size 8-1/4" (4) columns (approx 60 dishes/column), 2-handed access, recessed handles, 5"Dia. swivel casters (2 with brakes) with neoprene wheels, chip-resistant polymer shell with Microban® antimicrobial protection, aesthetic blue, vinyl dust/water splash cover, NSF

ITEM #44 DISH CART / DOLLY
Quantity: Four (4)
Manufacturer: Metro
Model: PCD11

Poker Chip Dish Dolly, 26-15/16"W x 26-15/16"D x 31-15/16"H, non-adjustable, (240) maximum dish: size 11" (4) columns (approximately 60 dishes per column), two-handed access, recessed handles, 5"Dia. swivel casters (2 with brakes) with neoprene wheels, chip-resistant polymer shell with Microban® antimicrobial protection, aesthetic blue, vinyl dust/water splash cover, NSF

ITEM #45 WIRE SHELVING UNIT
Quantity: Three (3)
Manufacturer: Eagle Group
Model: VG63-4 series

Shelving Unit, 4-tier, of size and shape shown on plan, wire shelves with patented QuadTruss design, (4) 63"H posts, tapered split sleeves, Eagleard Green Epoxy finish, NSF

- (4) 5" stem casters, 2 front locking.

ITEM #46 ICE MAKER, CUBE-STYLE
Quantity: One (1)
Manufacturer: Hoshizaki
Model: KMD-860MAJ

Ice Maker, Cube-Style, 30"W, air-cooled, self-contained condenser, production capacity up to 855 lb/24 hours at 70°/50° (665 lb AHRI certified at 90°/70°), stainless steel finish, crescent cube style, R-404A refrigerant, 208-230v/60/1-ph, 9.9 amps, NSF, UL

- Ice Bin, 44"W, top-hinged front-opening door, 700-lb ice storage capacity, for top-mounted ice makers, stainless steel exterior, stainless steel legs included, protected with H-GUARD Plus Antimicrobial Agent, ETL, ETL-Sanitation
- Top Kit, 14", ABS
- Top kit extension, for KMD, KMS or FD application on B-700 bins
- Flexible disconnects per specific conditions.
- Connect to filter system
- 6" s/s leg package
- Scoop holding kit

ITEM #46A WATER FILTER
Quantity: One (1)
Manufacturer: Everpure
Model: EV932523

Insurice® Water Filtration System, Insurice® Triple PF-i4000², Triple, (1) EC210 Prefilter, (3) i4000² Micro-Pure® II Precoat primary filtration cartridge, reduces chlorine, taste & odor, inhibits scale, inlet pressure gauge, outlet pressure gauge, flushing valve, 36,000 gallons, 5.0 gpm, 0.5 micron, 3/4" inlet, 3/4" outlet, NSF 42 & 53 (EV932523)

- Connect to Items 33 and 46.

ITEM #47 MIXER, 30 QT
Quantity: One (1)
Manufacturer: Hobart
Model: HL300-4STD

200-240/50/60/1 Mixer; with bowl, beater, & "D" whip; US/EXP configuration - Legacy Planetary Mixer, 3/4 hp, 30 quart capacity, (3) fixed speeds, gear-driven transmission, 15-Minute SmartTimer™, #12 taper attachment hub, manual bowl lift, bowl guard, stainless steel bowl, "B" beater & "D" whip

ITEM #48 SLICER, ELECTRIC
Quantity: One (1)
Manufacturer: Hobart
Model: HS7-1

Heavy Duty Meat Slicer, automatic, 13" CleanCut removable knife with removal tool, burnished finish, (3) stroke lengths, & (4) stroke speeds, removable meat grip assembly, removable ring guard cover, product fence, single action top mounted sharpener with Borazon™ stones, manual lift lever, 1/2 hp motor, 5.6amps, 120v/60hz/1-ph, NSF cETLus

ITEM #49 FOOD PROCESSOR, COUNTERTOP
Quantity: One (1)
Manufacturer: Berkel
Model: M3000-7

Food Cutter, continuous gravity feed with automatic start/stop function, single speed (350 rpm), 800-950 lbs/hr capacity, removable hinged feed hopper lid with magnetic safety lock, dual feed openings with safety pusher, disk ejection system, HD motor with poly-v-belt, polished cast aluminum & stainless steel housing, 1/8" slicing plate, 1/8" shredding plate, 3/4 HP, 12.5 amps, 115v/60/1-ph, made in USA, cULus, NSF

ITEM #50 POT & PAN RACK, CEILING MOUNTED
Quantity: One (1)
Manufacturer: Low Temp Industries
Model: Custom Fabrication

Unit to be of size and shape as shown on plan, per detail C-7-4A.
Anti-sway bracing above finished ceiling by FSE Contractor.

ITEM #51 COUNTER W/SINK
Quantity: One (1)
Manufacturer: Low Temp Industries
Model: Custom Fabrication

Unit to be of size and shape as shown on plan x 34" high w/ 6" splash per detail C-1-1A Type "A" edge, C-1-1B Type "A" backsplash and C-2-1. Provide with the following:

- Splash at wall behind sink.
- Sink compartment w/undershelf and hinged door per detail C-2-2 and C-2-1E.
- 14" x 16" x 10" deep sink w/Type 3 faucet and Type 1 waste
- Bottom and fixed intermediate shelf left of sink compartment.
- Removable stainless steel kickplates
- Coordinate elevation & placement of kneewall specified by Architect.
- Provide a pass-thru window of length as shown on plan constructed similar to detail C-8-15, Section at Soiled Dishtable. Coordinate w/ placement of roll down shutter specified by Architect.
- Counter top at rear to cantilever over kneewall.

ITEM #52 MOBILE HEATED CABINET
Quantity: One (1)
Manufacturer: Winston Foodservice
Model: HOV5-14UV

CVap Holding Cabinet, mobile, full-size, insulated, convection holding, accommodates (14) 18" x 26" sheet pans or (28) 13" x 18" sheet pans or (28) 12" x 20" hotel pans, load limit 65 lbs (29.25 kg) per rack, (2) field reversible hinged solid dutch doors, magnetic door handle, C-Touch control with processor, HACCP temperature downloads, USB & audio ports, manual water fill, stainless steel interior & exterior, CE, UL EPH ANSI/NSF4, cUL, UL-Sanitation

- 120v/60/1-ph, 2292 watts, 19.1 amps, NEMA 5-20P
- Solid dutch doors, standard.
- Doors hinged on left.

ITEM #53 ROLL-IN REFRIGERATOR
Quantity: One (1)
Manufacturer: Traulsen
Model: ARI132HUT-FHS

Spec-Line Refrigerator, Roll-in, one-section, self-contained refrigeration, StayClear Condenser, stainless steel exterior, aluminum interior, standard depth cabinet, full-height doors, accepts 72" high racks (by others) with microprocessor controls, 1/3 HP, cULus, NSF

- 115v/60/1-ph, 10.6 amps, NEMA 5-15P, standard
- Door hinged on right, standard

ITEM #54 COUNTER, BEVERAGE
Quantity: Two (2)
Status: Specified by Architect

This item is "Not in Contract". It is specified by the Architect.

ITEM #55 MILK DISPENSER
Quantity: Two (2)
Manufacturer: Silver King
Model: SKMAJ3-C4

Majestic Series Milk Dispenser, refrigerated, triple spring-loaded valve, 18 gallon capacity, (accommodates 3, 5, or 6 gallon bags), includes (3) platforms & (3) crates, stainless steel interior & exterior with galvanized bottom, bottom-mounted self-contained refrigeration, 134A, 1/6 HP, 115v/60/1-ph, 1.9 amps, cord & NEMA 5-15P, cETLus, ETL-Sanitation

ITEM #56 JUICE DISPENSER
Quantity: Two (2)
Manufacturer: BUNN
Model: 37300.0004
Status: By Owner/Vendor furnished

This item is "Not in Contract". It is provided by the Owner.

The specification is for reference only. The item is shown on the drawing for informational purposes and generally represents the size/ capacity of unit to be provided by the Owner to assist the Engineer in planning base building utility systems.

Following contract award, the FSE Contractor will confirm the manufacturer, model number and actual utility requirements for these items with the Owner and represent them on the dimensioned rough-in plans for use by the construction trades.

The Owner should effort to provide equipment that will function per the manufacturer's recommendations with the utilities shown on the plans or otherwise notify Designer of need for additional utility services.

The Foodservice Equipment Contractor will furnish and the Plumbing Division will install flexible quick disconnects per specific conditions for water connections to equipment as noted on the Plumbing Schedule.

- JDF-4S Silver Series 4-Flavor Cold Beverage System, (3) 12 oz. drinks/min capacity, 2-modular dispense decks, 18 lb. ice bank, 7" cup clearance, dispense 1.0 to 1.5 ounces per second flow rate, pumps & mixes 2+1 to 11+1 concentrated beverages, 4+1 high viscosity & 5+1 juices, dispenses frozen and ambient products, High Intensity™ mixing technology, push button and portion control, LED lighted door graphics, door lock, juice display, 120v/60/1-ph, 6amps, NEMA 5-15P, NSF, ETL

ITEM #57 HOT WATER DISPENSER
Quantity: Two (2)
Manufacturer: BUNN
Model: 43600.0002
Status: By Owner/Vendor furnished

This item is "Not in Contract". It is provided by the Owner.

The specification is for reference only. The item is shown on the drawing for informational purposes and generally represents the size/ capacity of unit to be provided by the Owner to assist the Engineer in planning base building utility systems.

Following contract award, the FSE Contractor will confirm the manufacturer, model number and actual utility requirements for these items with the Owner and represent them on the dimensioned rough-in plans for use by the construction trades.

The Owner should effort to provide equipment that will function per the manufacturer's recommendations with the utilities shown on the plans or otherwise notify Designer of need for additional utility services.

The Foodservice Equipment Contractor will furnish and the Plumbing Division will install flexible quick disconnects per specific conditions for water connections to equipment as noted on the Plumbing Schedule.

- 43600.0002 H5X Element Hot Water Dispenser, 5 gallon capacity, digital thermostat, 212°F setting, LED display, programmable "Energy Saver Mode", Thinsulate tank insulation, stainless steel construction, 208v/60/1-ph, 4050w, 19.5 amps, UL, NSF

ITEM #58 SERVING COUNTER W/FOOD SHIELD, SALAD
Quantity: Four (4)
Manufacturer: Atlas Metal
Model: BLC-4-RM-BU

Buffet Style Cold Food Serving Counter, refrigeration cold pan with 3" recessed top, 4-pan size, self-contained refrigeration, 63-3/4"L x 35"H x 30-3/4"W, mobile, enclosed base, sliding doors included, stainless steel top, exterior aluminum frame, laminated front/end panels, 53-1/8" x 19-7/8" x 9" cold pan, 5" swivel casters, (2) with brakes, NSF 7

- 120v/60/1-ph, 1/3 HP, 7.8 amps, NEMA 5-15P, standard
- Condensate evaporator
- Two (2) each tray slide, drop down design, solid, 12"D, stainless steel, ribbed, rolled edge.
- Bottom Shelf, stainless steel, (BL-units)
- Model AT series food shield, double service, (2) end panels, fixed 1/4" thick tempered glass shields & 3/8" thick tempered glass top, flanged feet, stainless steel finish. With LED lighting
- Remote control located in apron.
- Labor to install special units: Versa Gard
- Stainless steel front and end panels.
- DL (door locks)
- Plumbing Division to provide flexible clear flexible tubing for indirect waste.
- Drain to bucket by Owner, Plumbing contractor to extend IW. NO floor sink

ITEM #59 ICE DISPENSER, COUNTER TOP
Quantity: Two (2)
Manufacturer: Follett Products, LLC
Model: 110CM-NI-S

Symphony Plus Ice & Water Dispenser, countertop, SensorSAFE dispense, manual load, 110 lb. storage capacity, Agion silver-based antimicrobial protection, stainless steel cabinet with accent trim, 115v/60/1-ph, NSF, cETLus

- The Foodservice Equipment Contractor will furnish and the Plumbing Division will install flexible quick disconnects per specific conditions for water connections to equipment as noted on the Plumbing Schedule.
- 115v/60/1-ph, 4.0 amps, 7' cord, NEMA 5-15P, standard

ITEM #60 BEVERAGE DISPENSER, NON-INSULATED
Quantity: Six (6)
Manufacturer: Cal-Mil
Model: 22090-3-90

Empire Beverage Dispenser, 3 gallon capacity, 8-1/2"W x 10"D x 24-3/4"H, with ice chamber, drip tray, spigot, acrylic body, steel base, black, BPA Free

ITEM #61 WATER FILTER
Quantity: Two (2)
Manufacturer: Everpure
Model: QC7I TWIN 4FC5-S

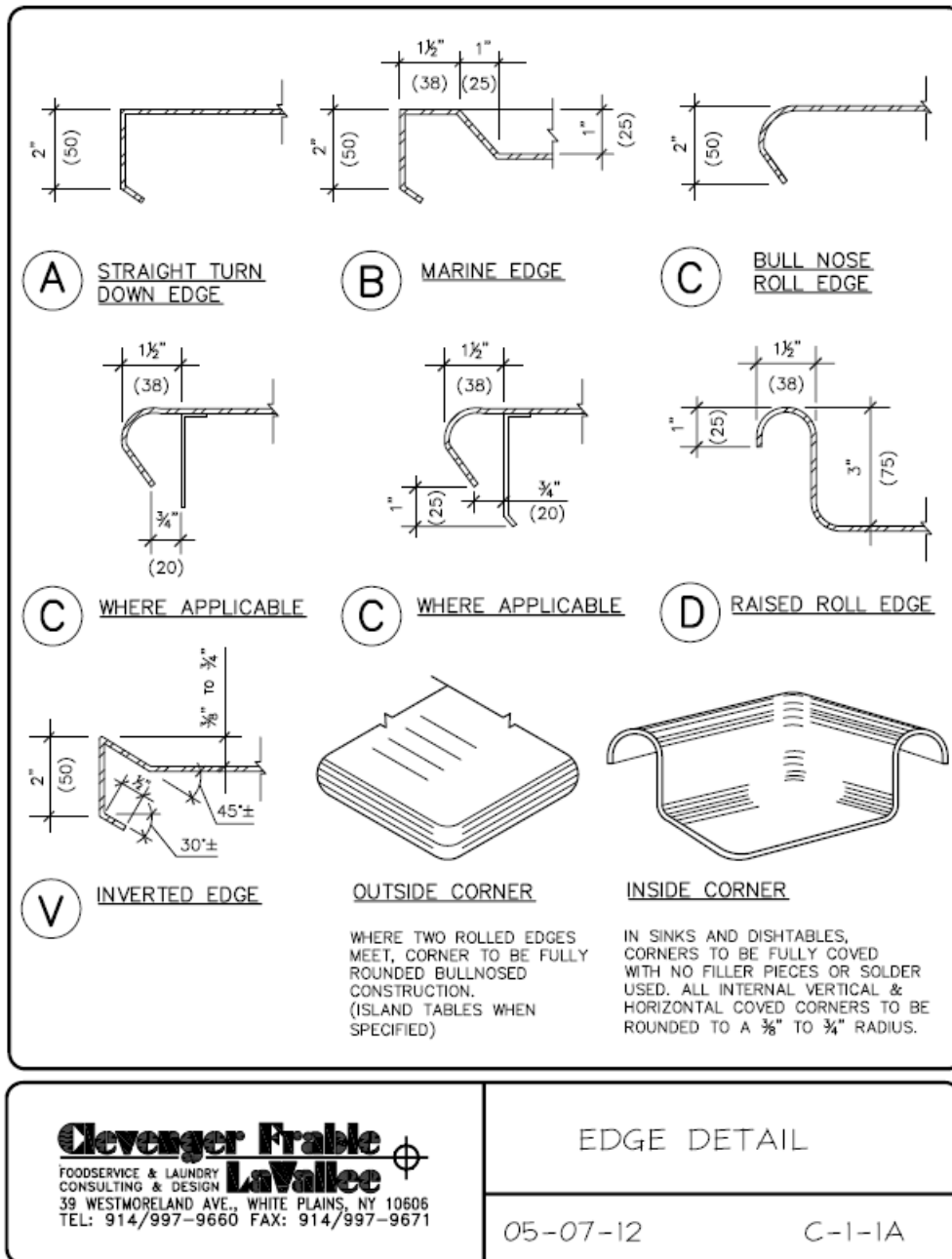
QC7I Water Filtration System, QC7I Twin 4FC5-S, (2) 4FC5-S Fibredyne carbon block cartridges, reduces sediment, chlorine, taste & odor, inhibits scale, 30,000 gallons capacity, 5.0 gpm flow rate, 5 micron, inlet water shut-off valve, outlet pressure gauge, flush valve, 3/4" inlet/outlet connections, NSF 42, (EV920262)

- Connect to Items 56, 57 & 59.

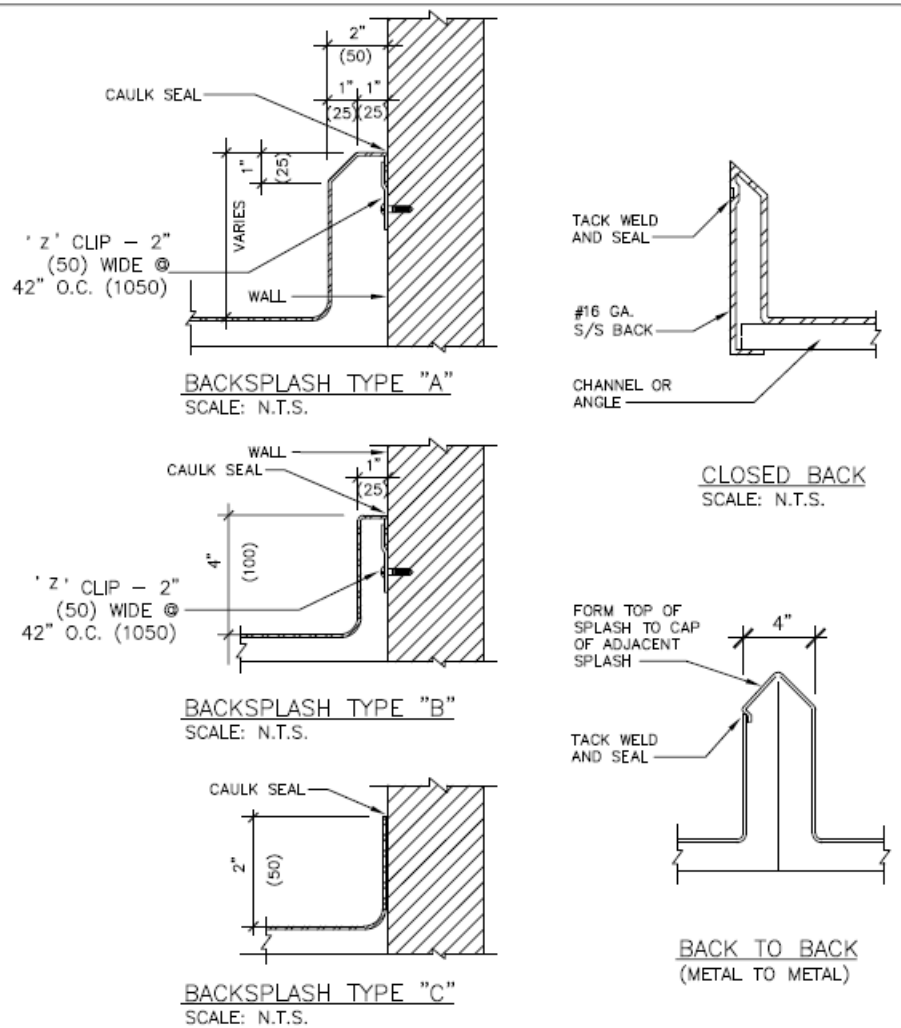
ITEM #61 SMARTCART W/ICE TOTES
Quantity: One (1)
Manufacturer: Follett Products, LLC
Model: 00112771

00112771 Smartcart 75 with 3 Totes Ice Carrier, 25 lb maximum capacity. #ABICETOTP

4.5 FABRICATION DETAILS



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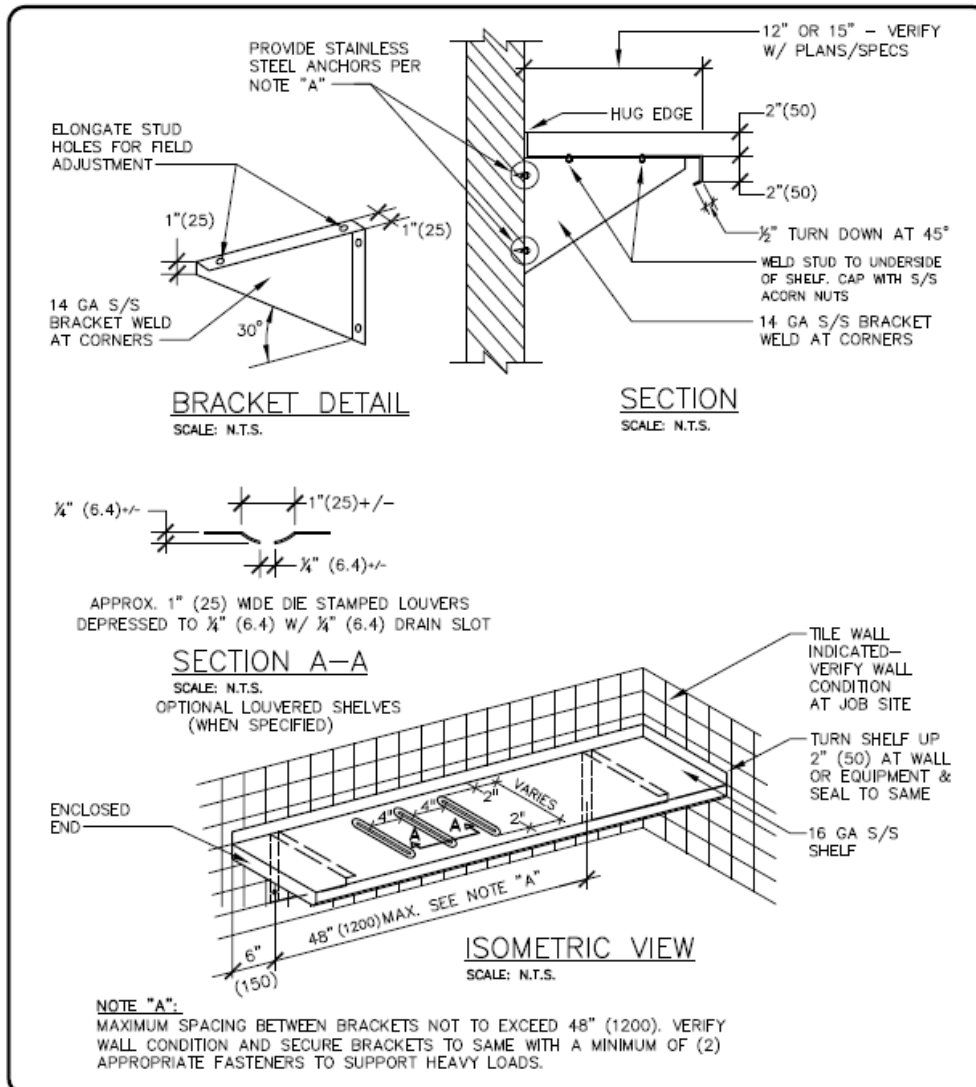
Clevenger Frable
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

BACK SPLASH DETAIL

05-08-12

C-1-1B

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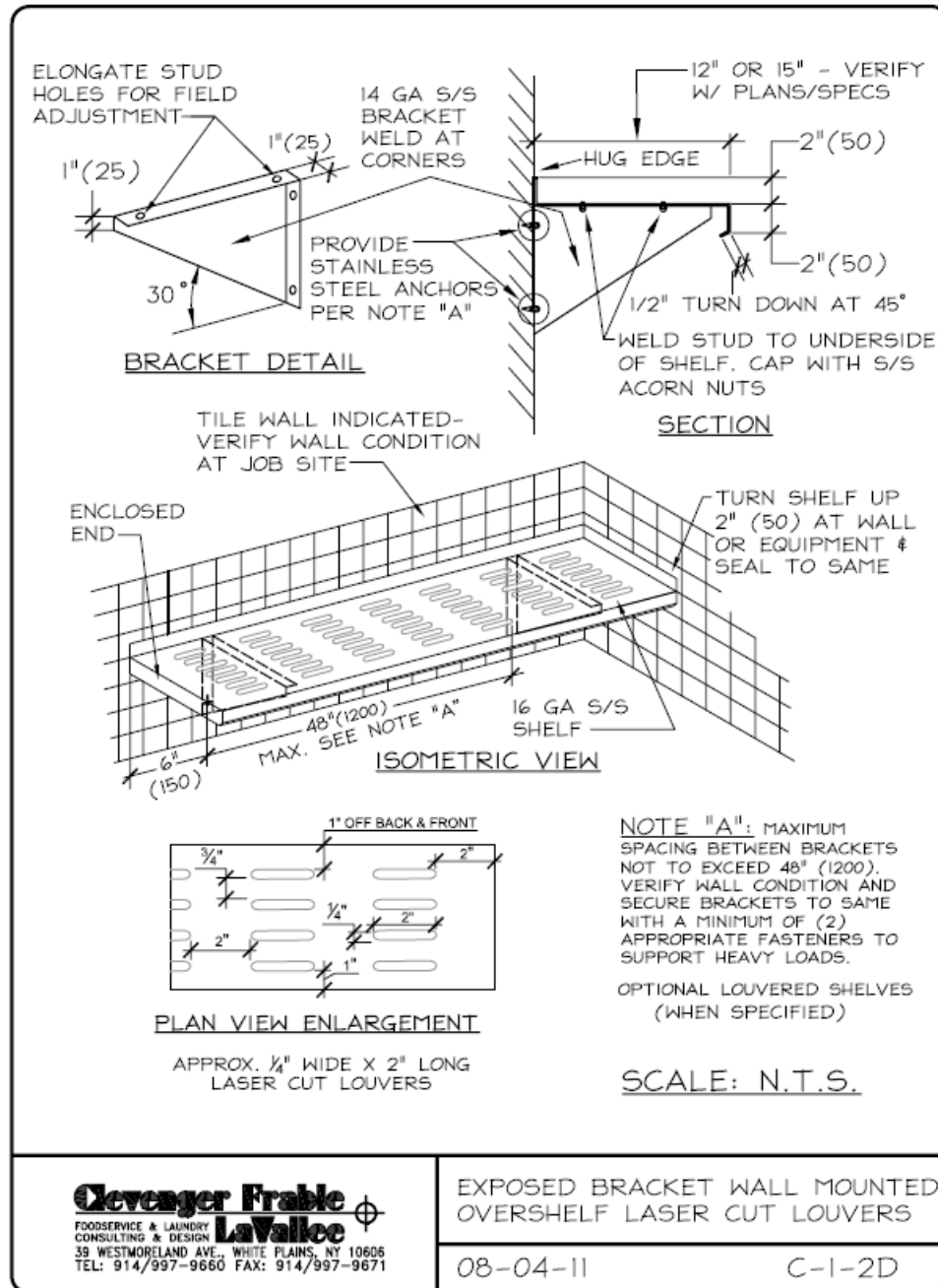
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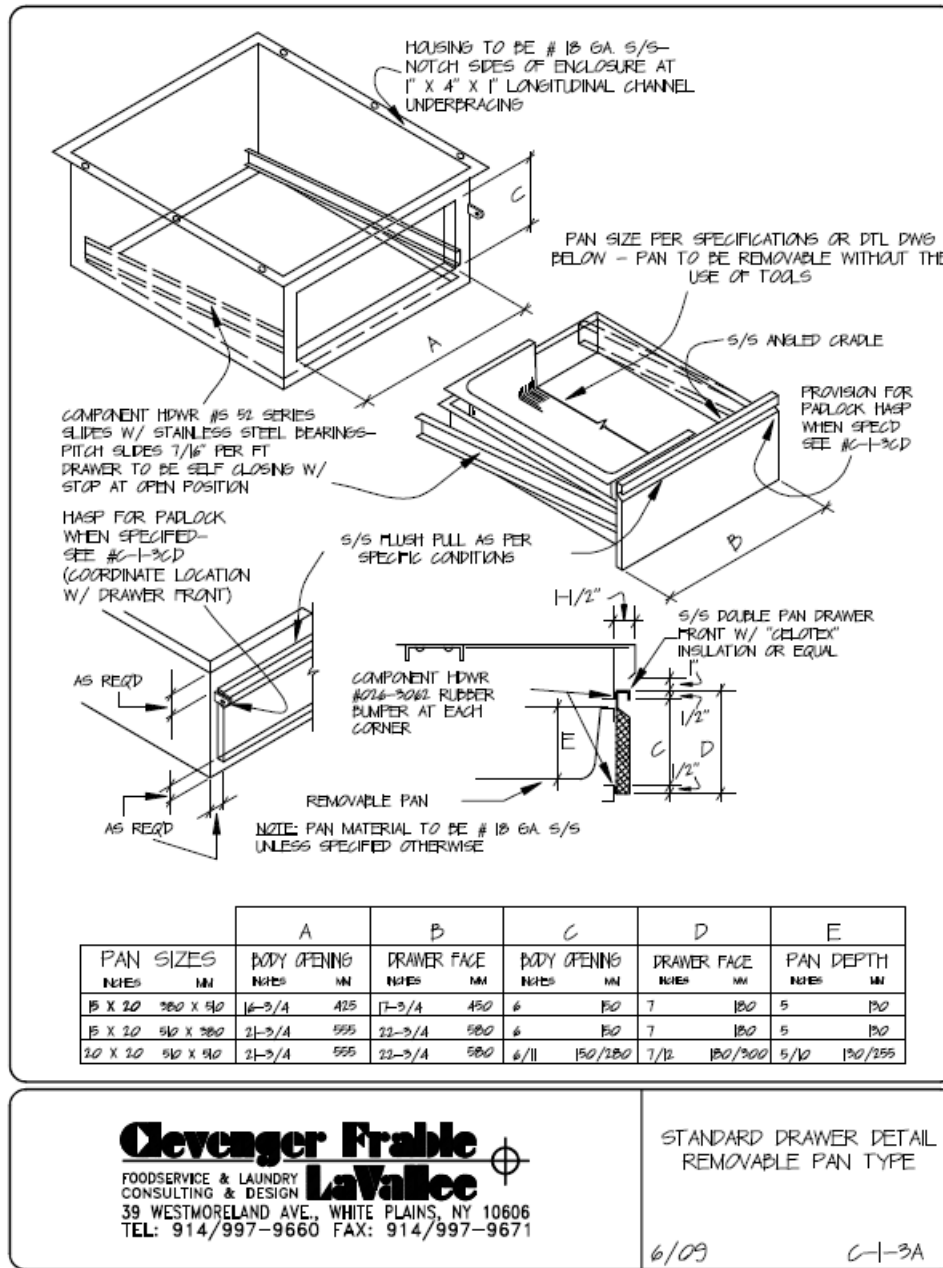
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MOUNTED OVERSHELF

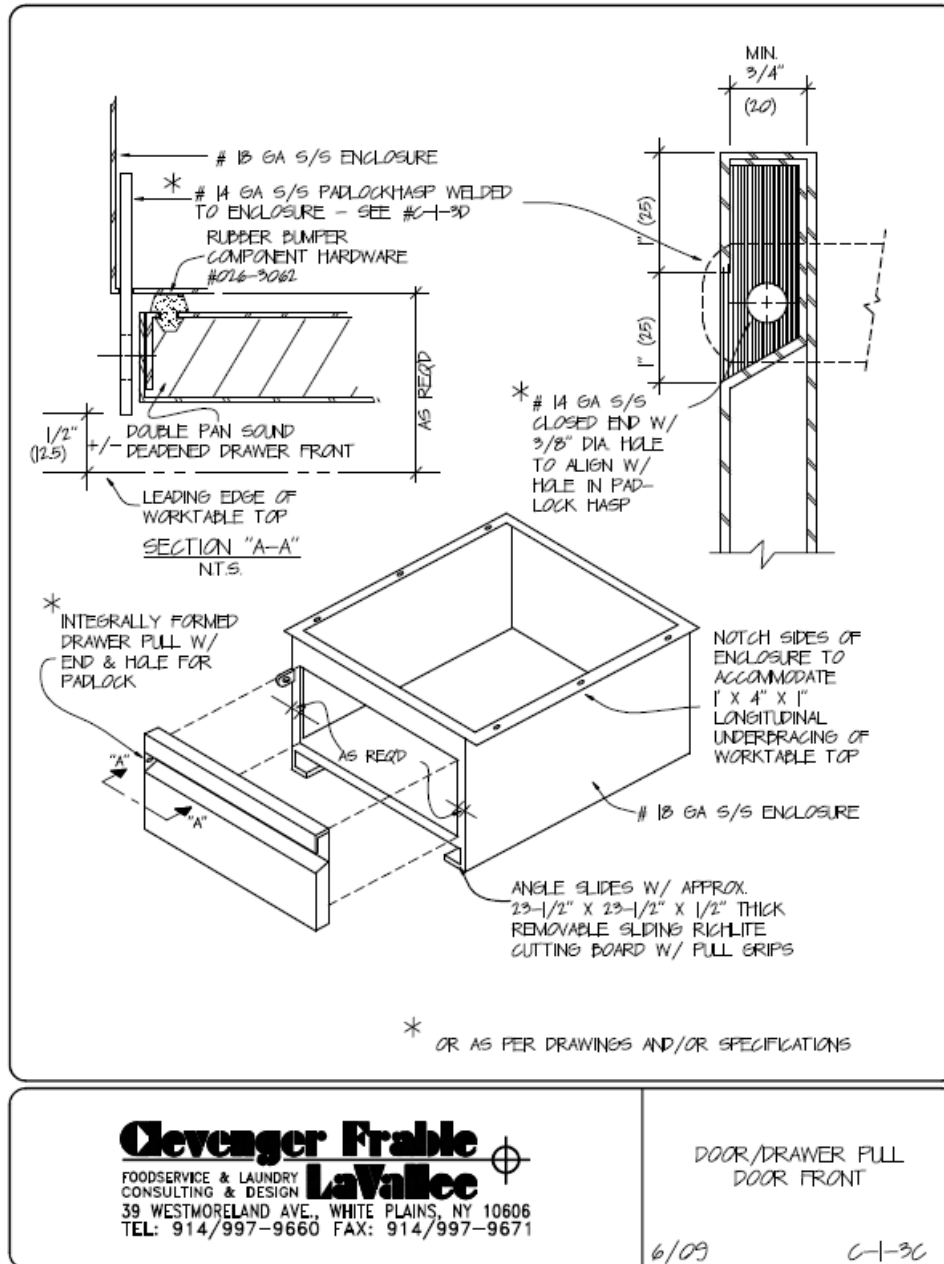
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C-1-2

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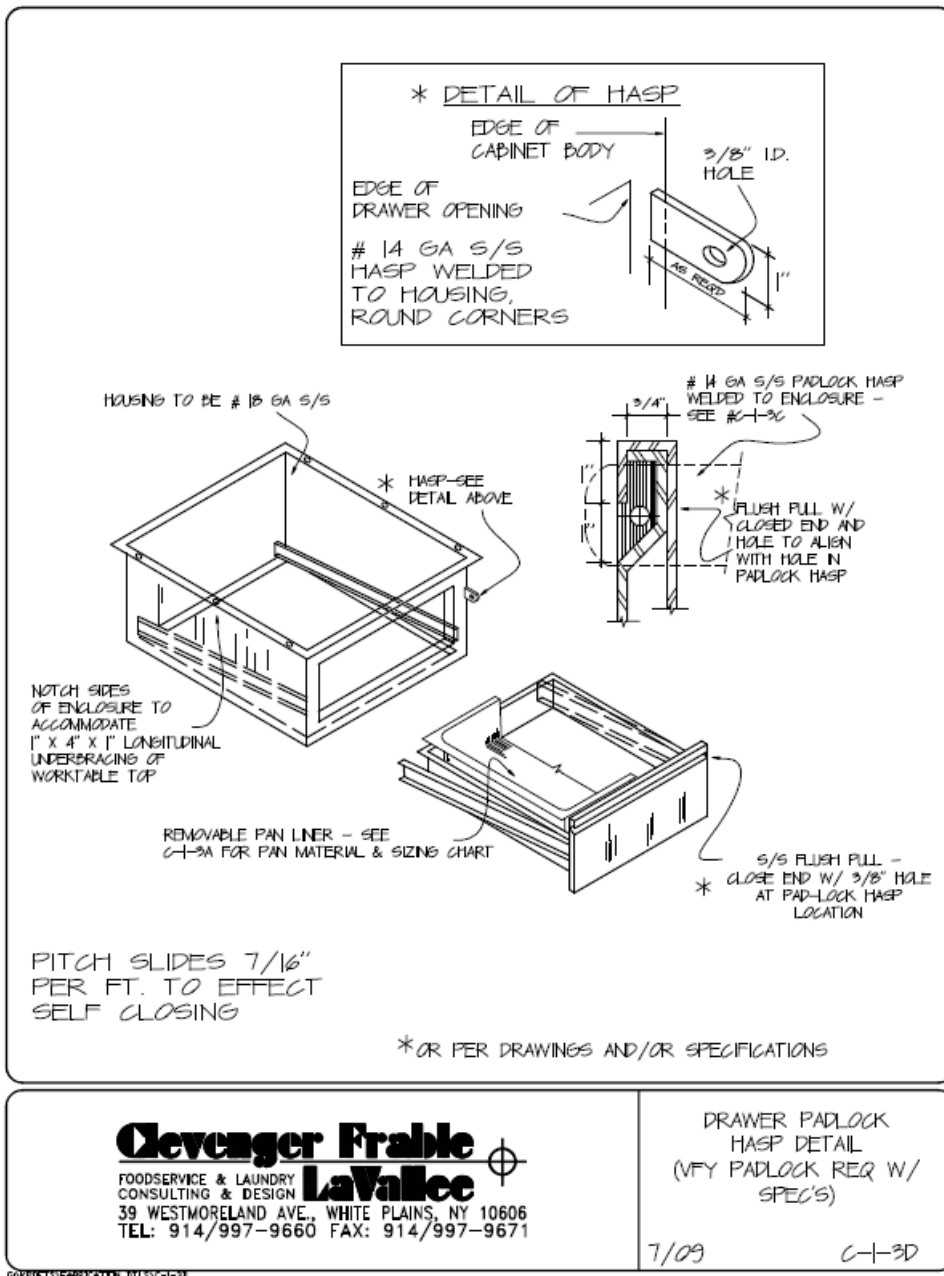
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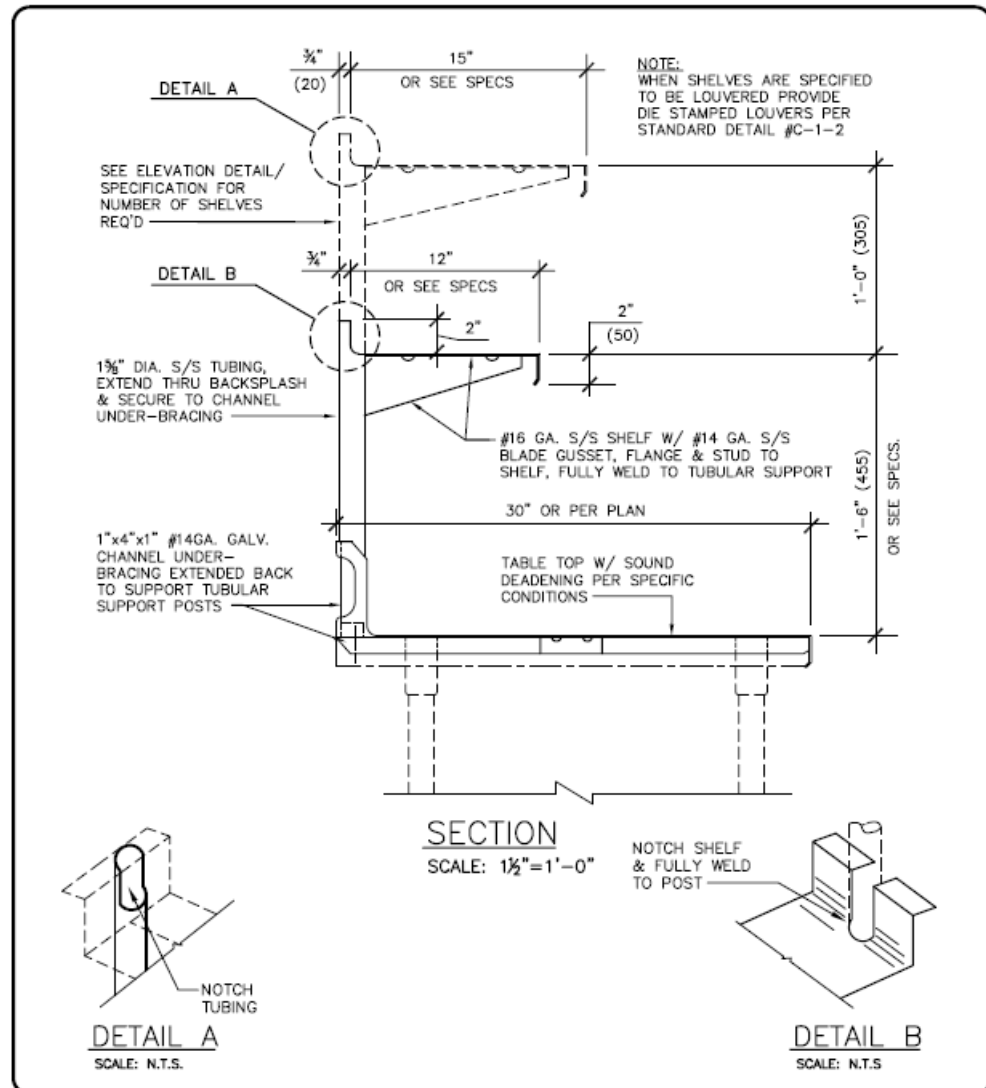
DOOR/DRAWER PULL
DOOR FRONT

6/09

C-1-30

CARPENTRY FABRICATION BY LSC-200





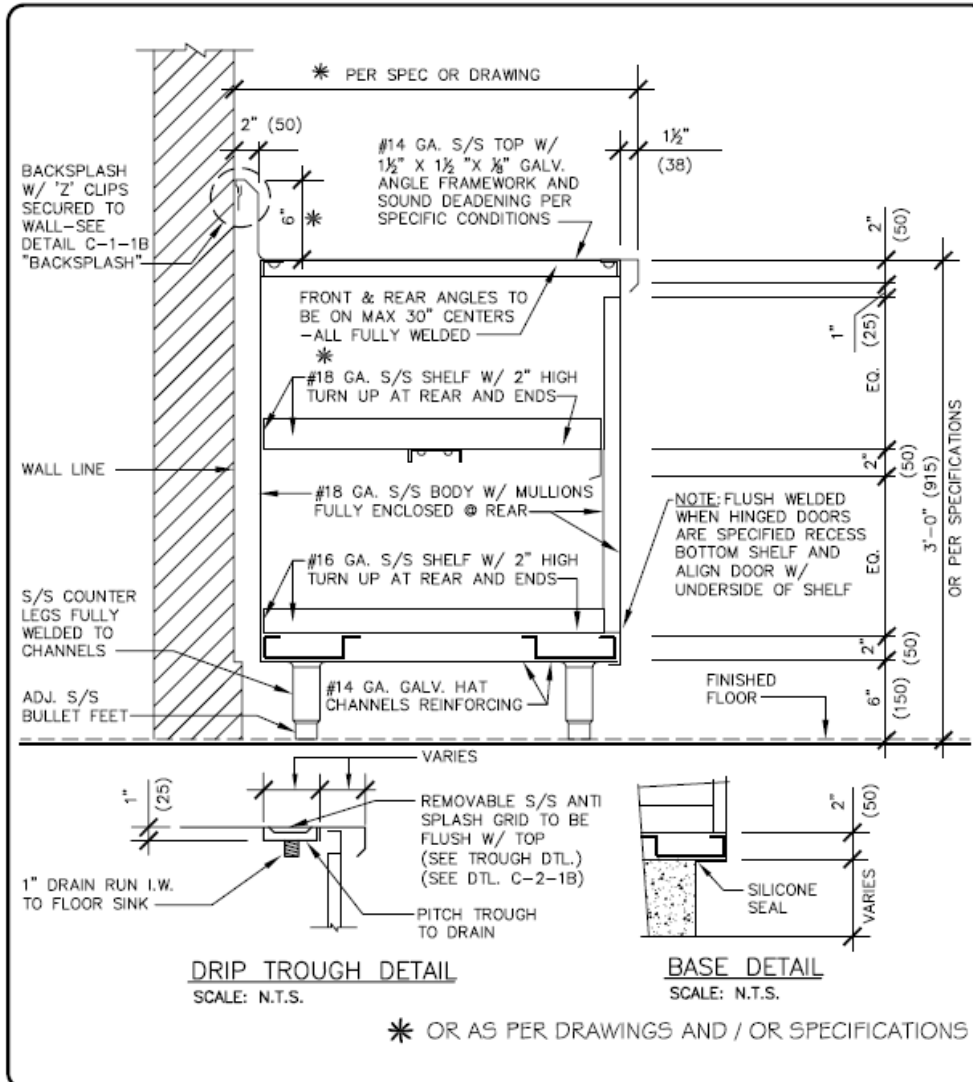
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TABLE MOUNTED OVERSHELF

05-09-12

C-1-6

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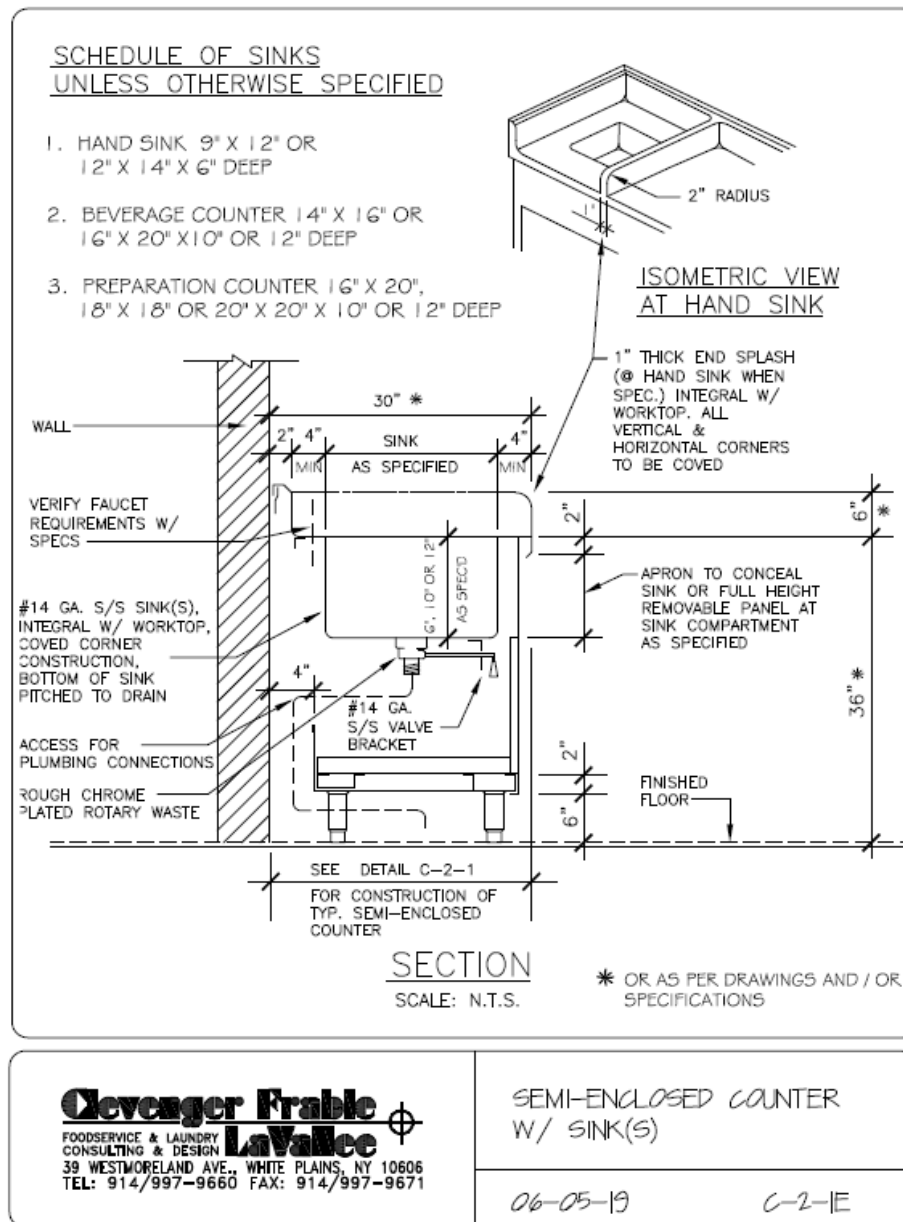
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CONSULTING & DESIGN
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SEMI-ENCLOSED COUNTER

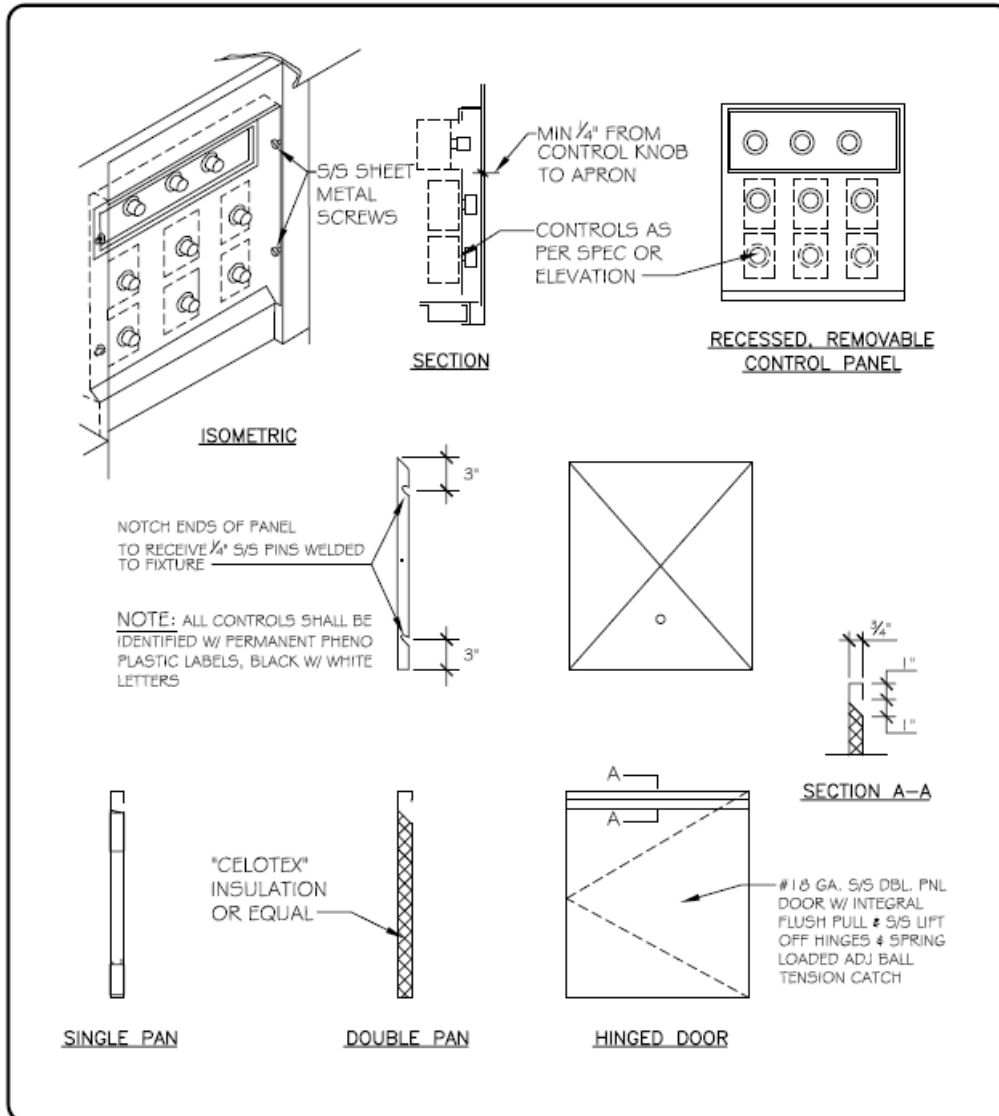
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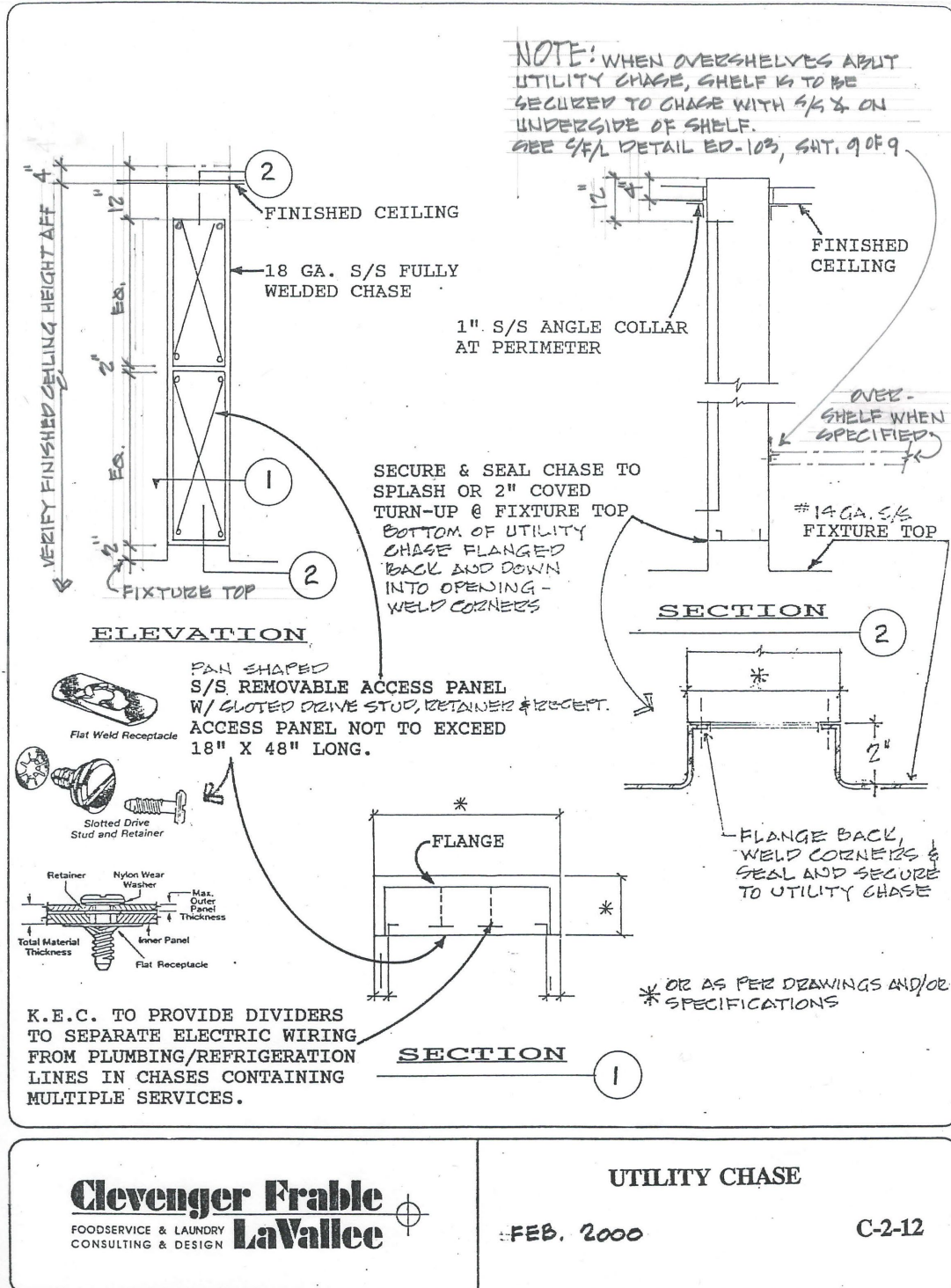
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FOODSERVICE & LAUNDRY
CONSULTING & DESIGN
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

DOOR ACCESS PANEL CONTROL
CONTROL RECESS DETAIL

12-12-11

C-2-2

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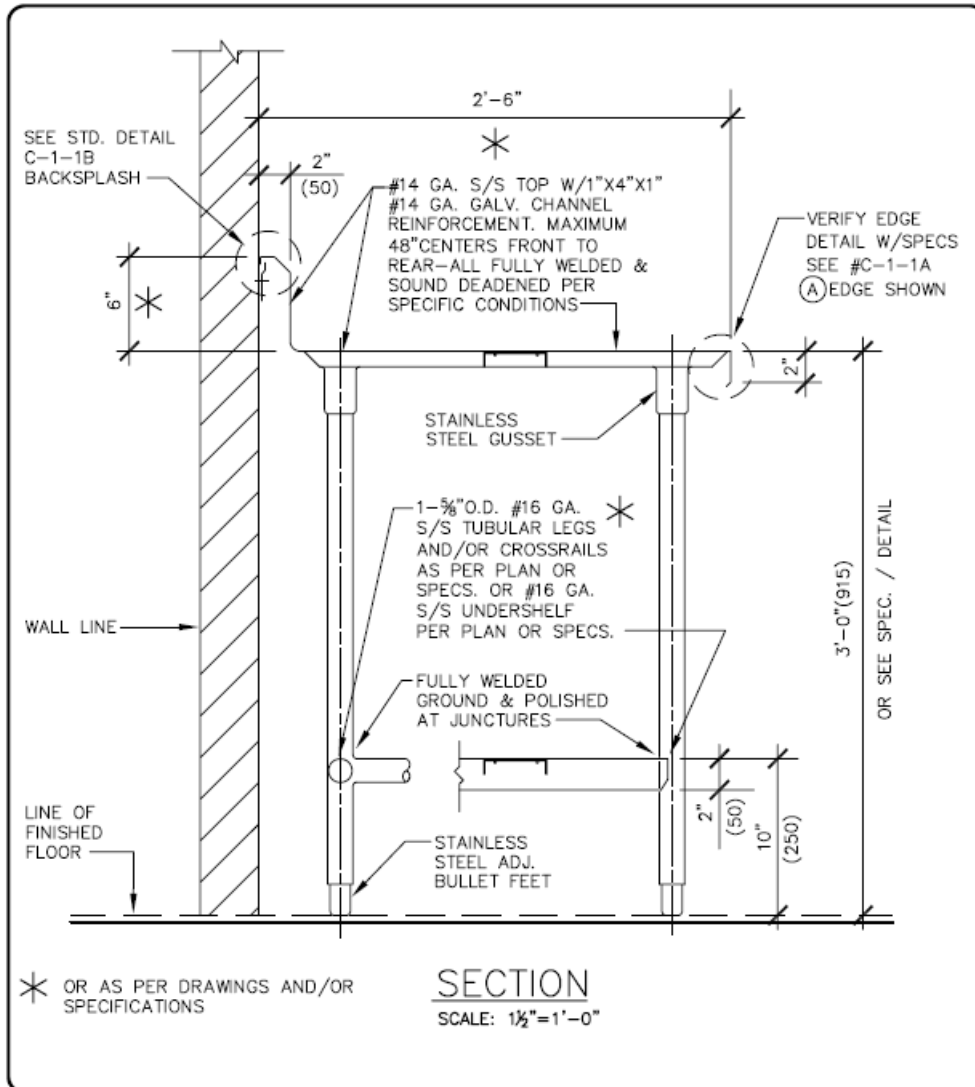
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CONSULTING & DESIGN **LaVallee**

UTILITY CHASE

FEB. 2000

C-2-12

UNITED REPROGRAPHICS



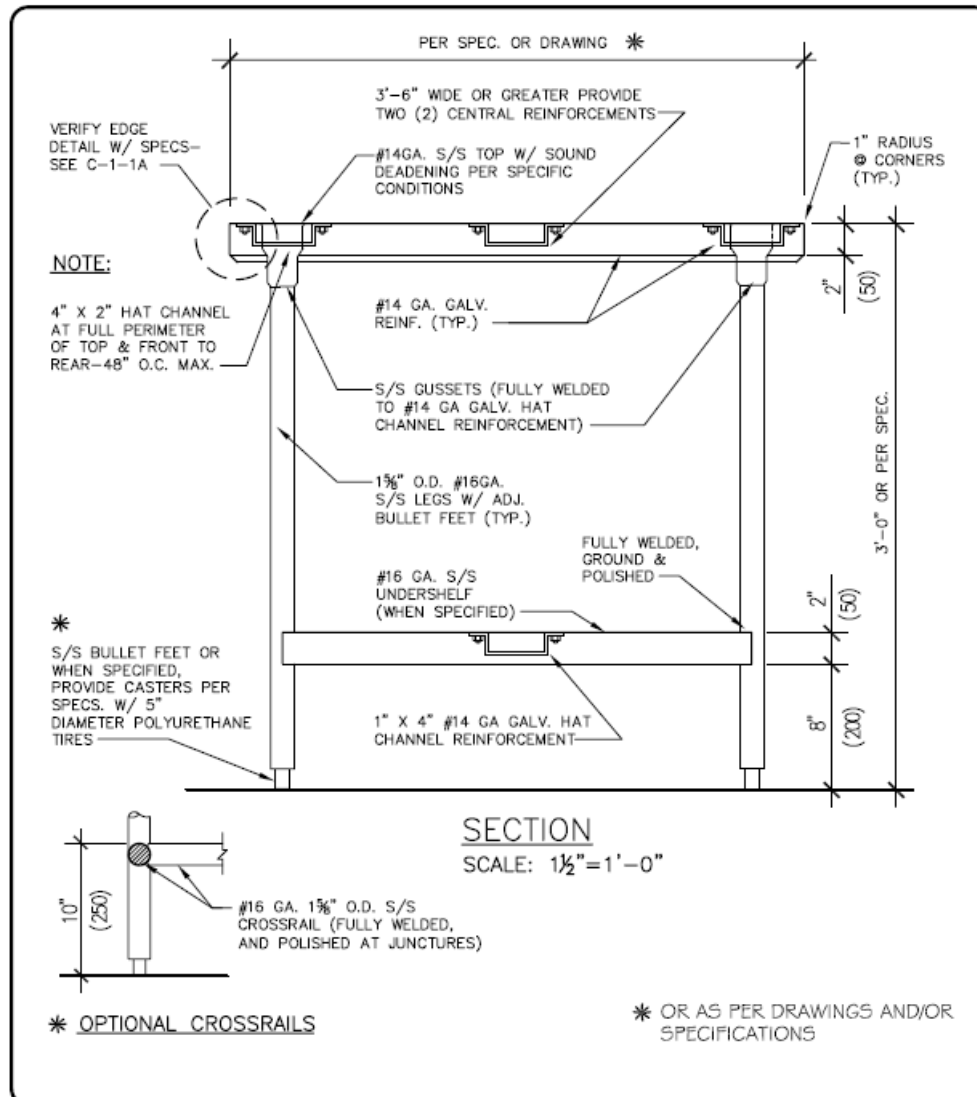
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CONSULTING & DESIGN
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

TYPICAL
WORK TABLE

08-03-12

C-7-1

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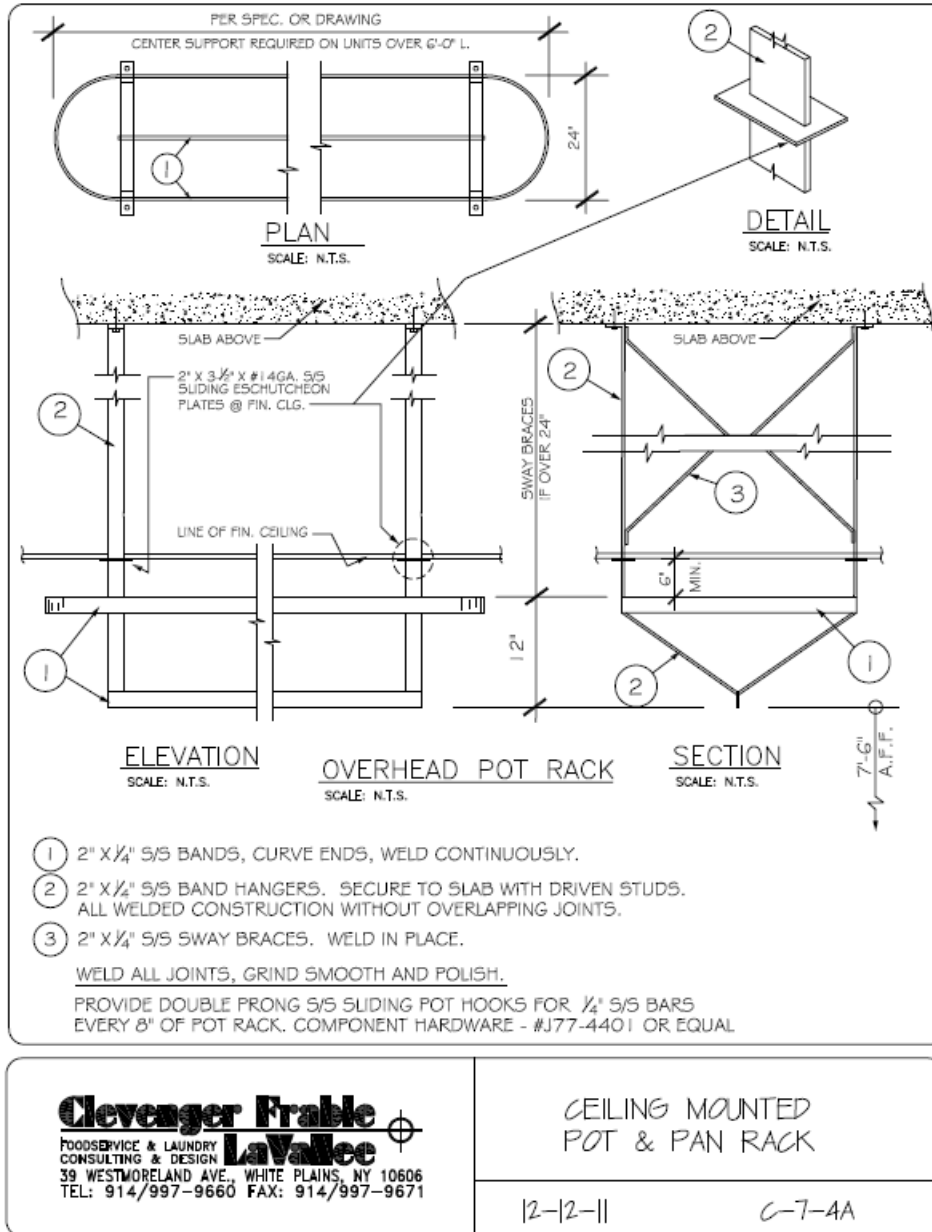
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CONSULTING & DESIGN
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

TYPICAL
ISLAND TYPE WORKTABLE

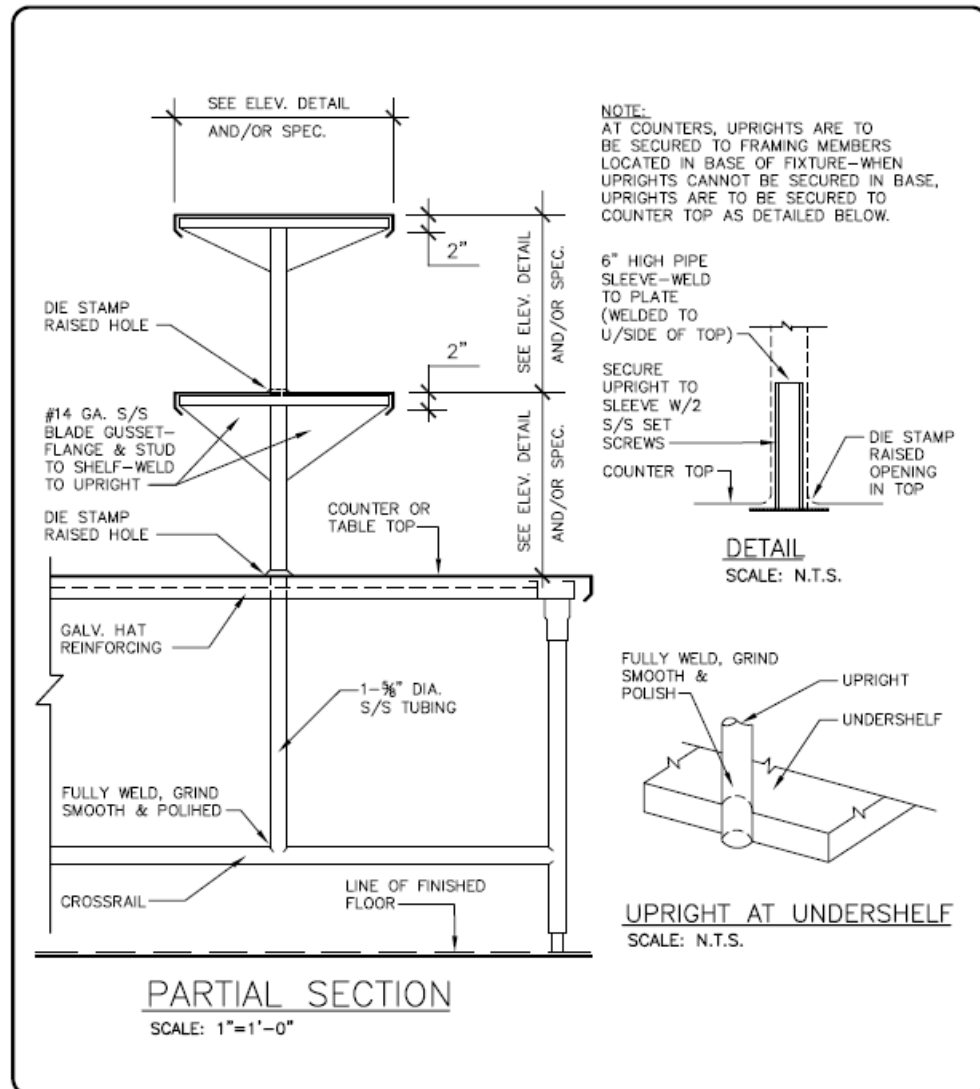
12-12-11

C-7-1C

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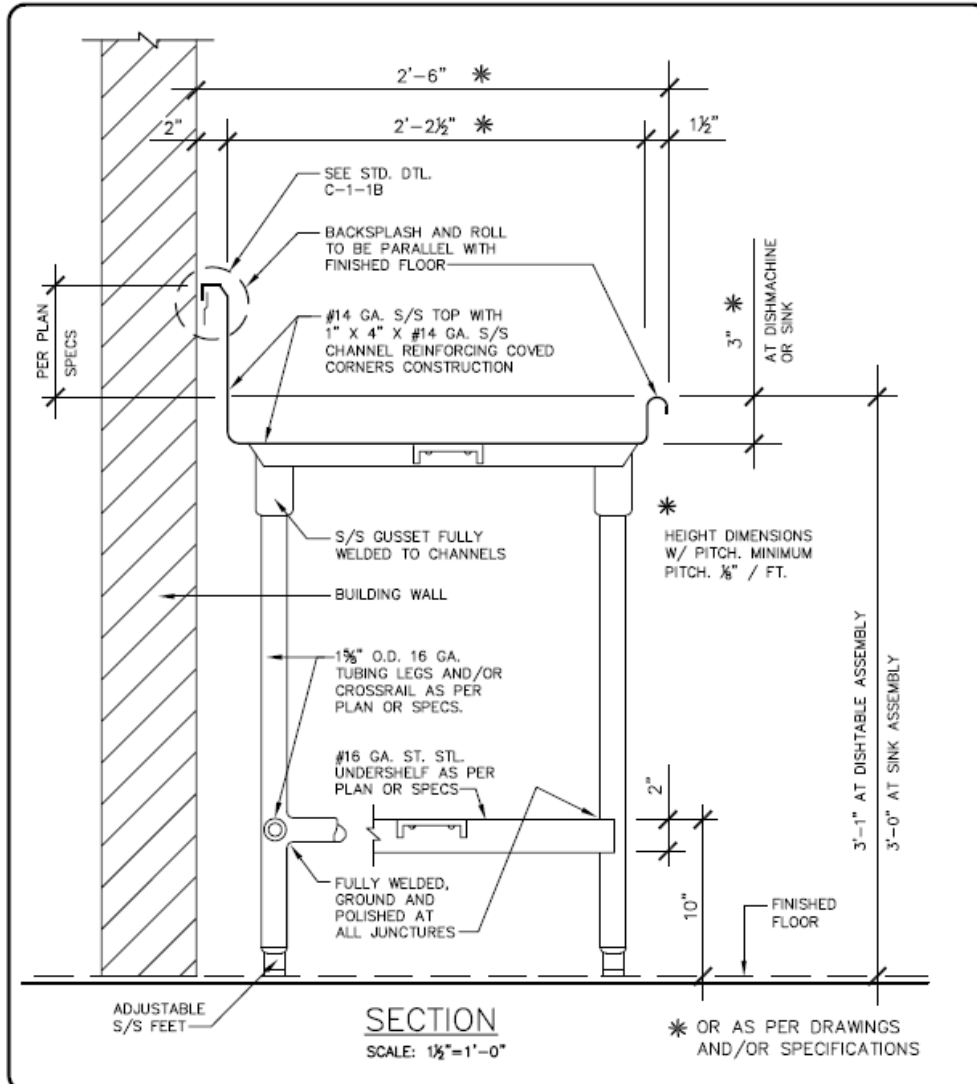
Clevenger Frable
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN **LaVallee**
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

FIXED MOUNTED
OVERSHELF(S)

06-07-12

C-7-8

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FOODSERVICE & LAUNDRY
CONSULTING & DESIGN
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

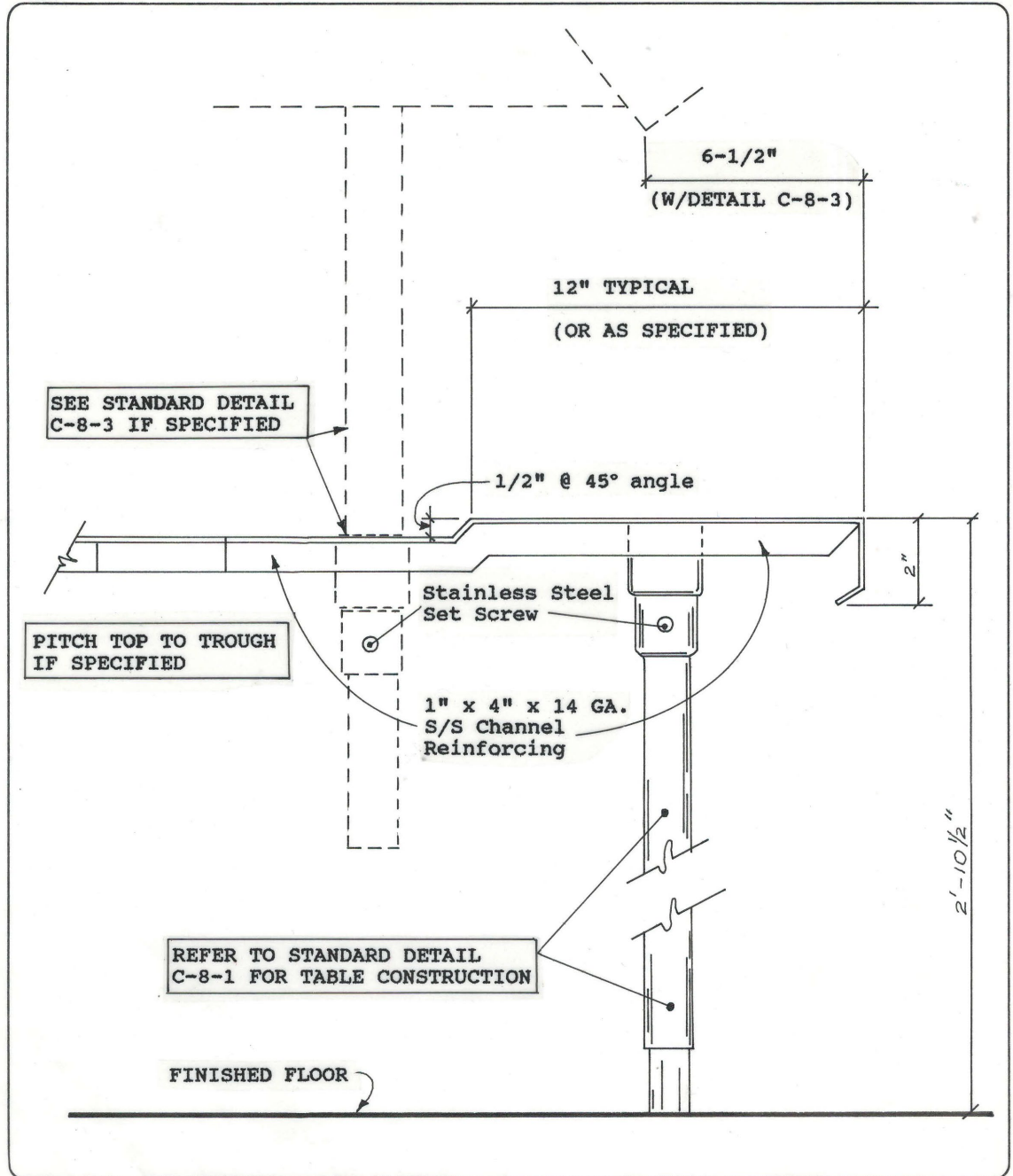
DISHTABLE-DRAINBOARD

05-16-12

C-8-1

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145265



Clevenger Frable
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN

LaVallee

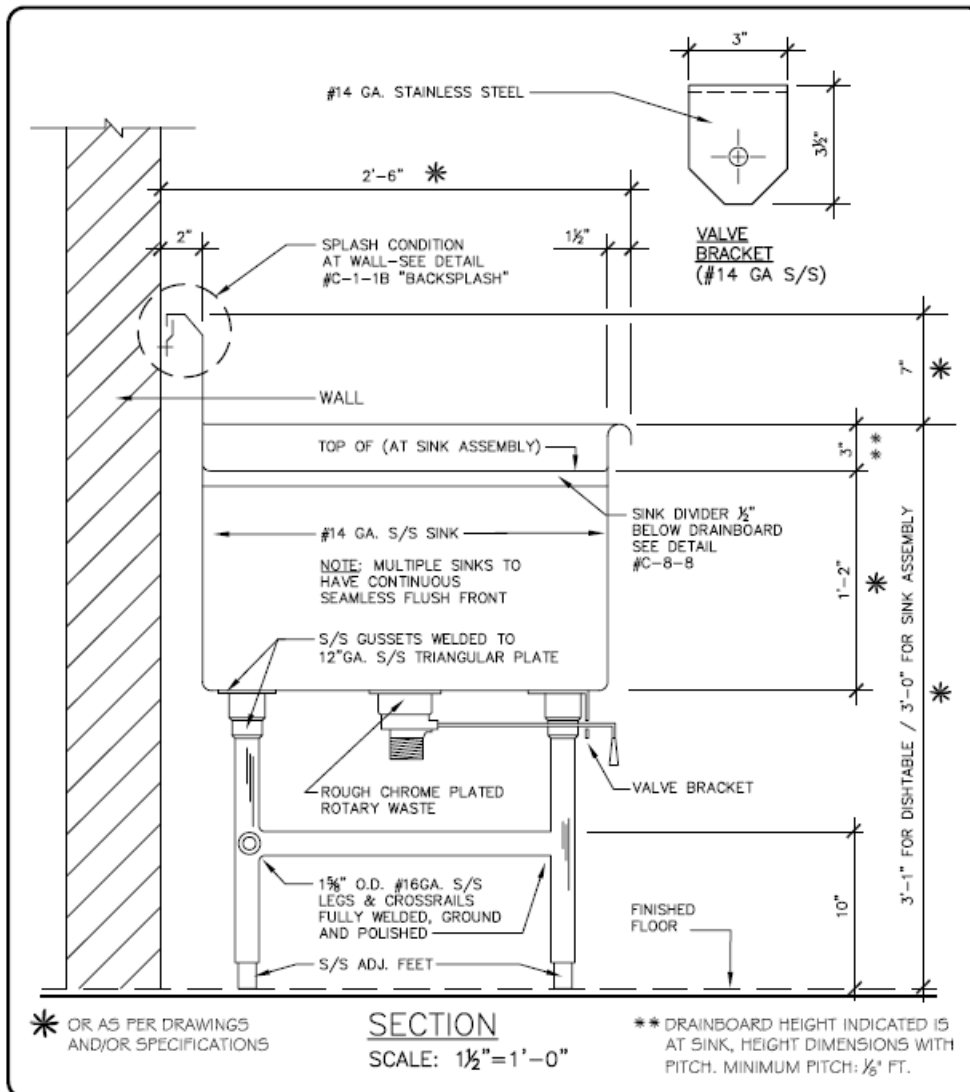
SOILED DISH DROP LEDGE

DEC 90

C -8-3A

UNITED REPROGRAPHICS

Issue for Bid
June 17, 2022



Clevenger Frable
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

SINK ASSEMBLY

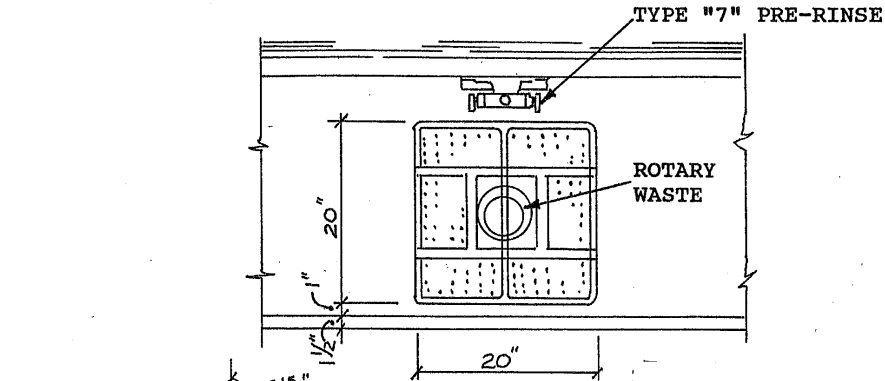
05-21-12

C-8-5

G:\KPDETS\FABRICATION DETAILS\C-8-5

145265

SCRAP BASKETS: (2) # 16 GA. STAINLESS STEEL BASKETS, COVED CORNERS, HEM TOP 1". PERFORATE SIDES AND BOTTOM WITH 1/4" HOLES 5/8 O.C. WELD 1/2 DIA. 1" HIGH S/S ROD FEET IN PLACE

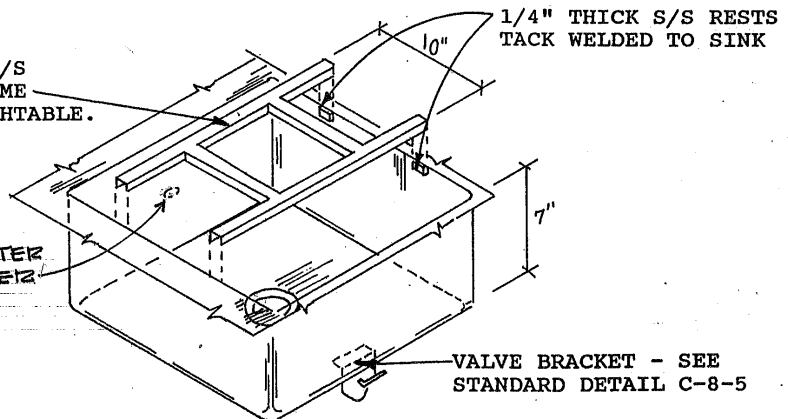


PLAN VIEW

NOTE:
FOR DISPOSER APPLICATION,
DELETE ROTARY WASTE AND
VALVE BRACKET AND SCRAP
BASKETS - WELD IN
ADAPTOR COLLAR AND
INSTALL DISPOSER AS PER
MANUFACTURER'S SPEC.

1" X 3/4" 14 GA. S/S
CHANNEL FRAME. FRAME
TO SET FLUSH W/DISHTABLE.

PROVISION FOR WATER
INLET WHEN DISPOSER
IS SPECIFIED



I S O M E T R I C

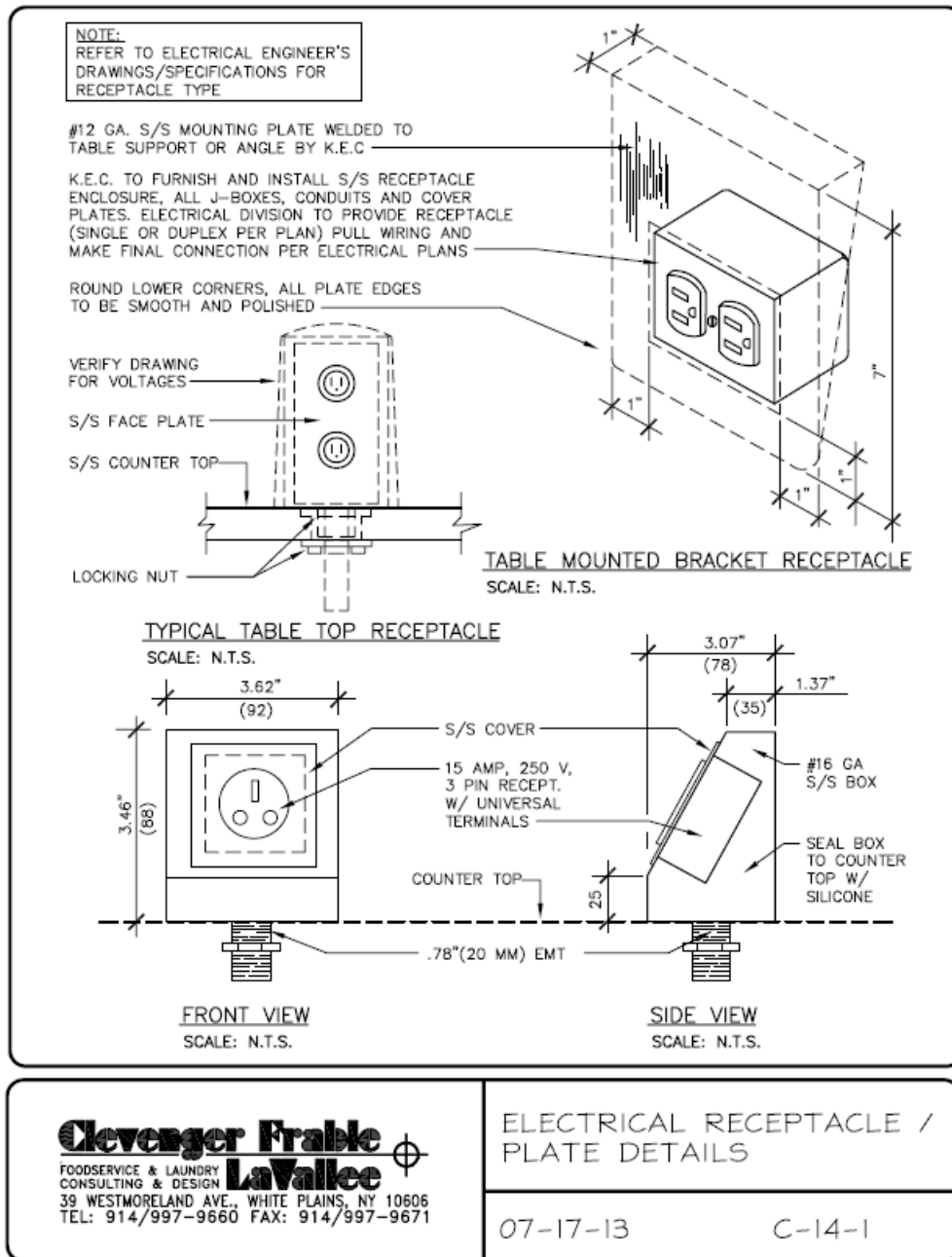
Clevenger Frable
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN **LaVallee**

**PRE-RINSE SINK & REMOVABLE
RACK GUIDE DETAIL**

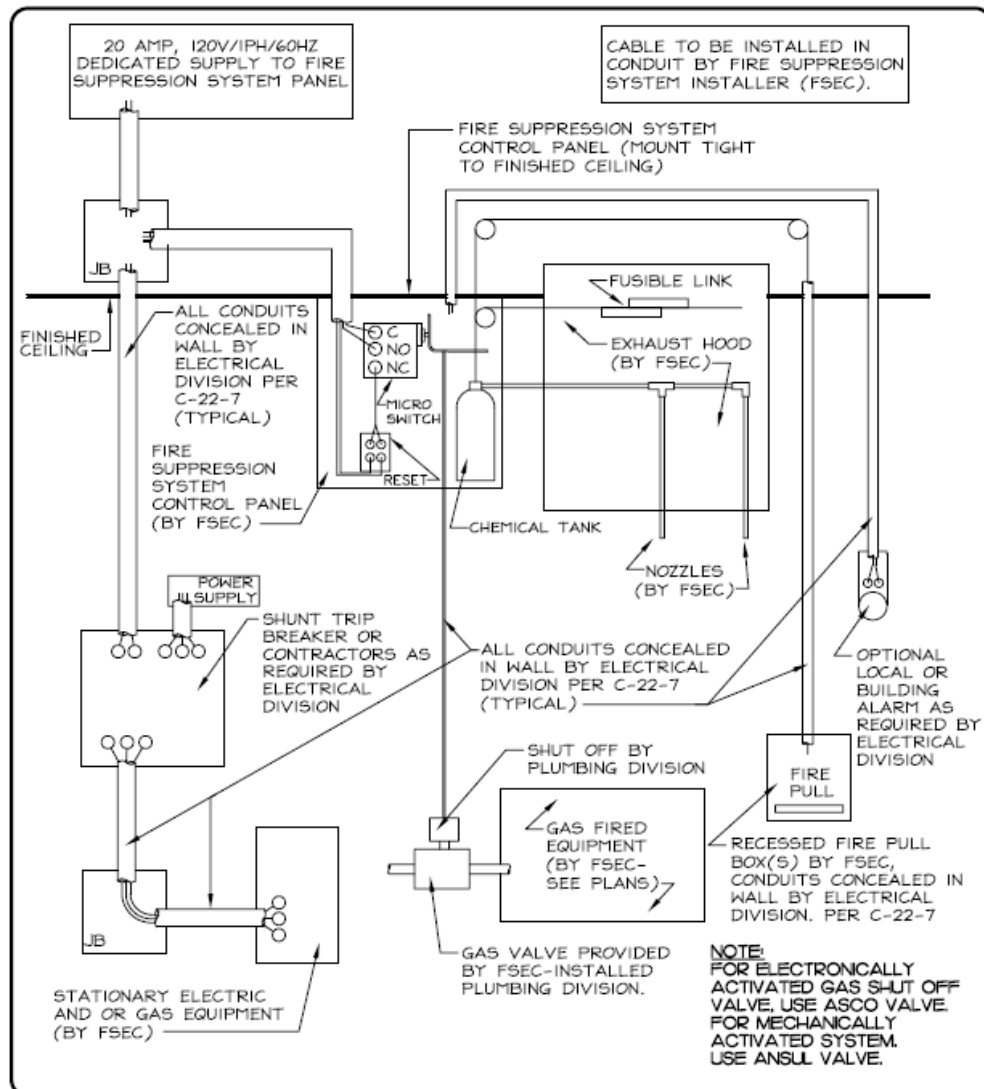
DECEMBER 2016

C-8-10

UNITED REPROGRAPHICS



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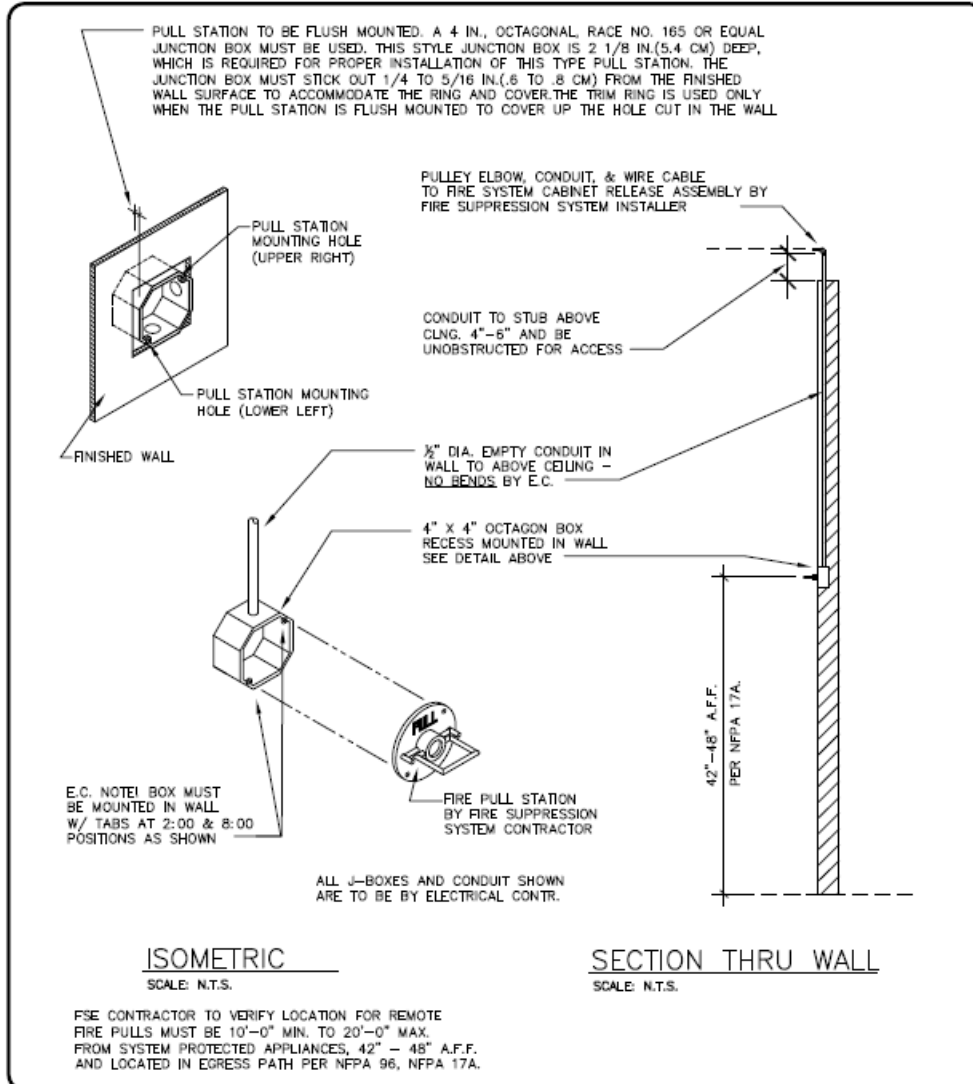
Cleaver Frable
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

TYPICAL FIRE SUPPRESSION SYSTEM

05-08-12

C-22-6

G:\KPDETS\BUILDING WORKS\C-22-6



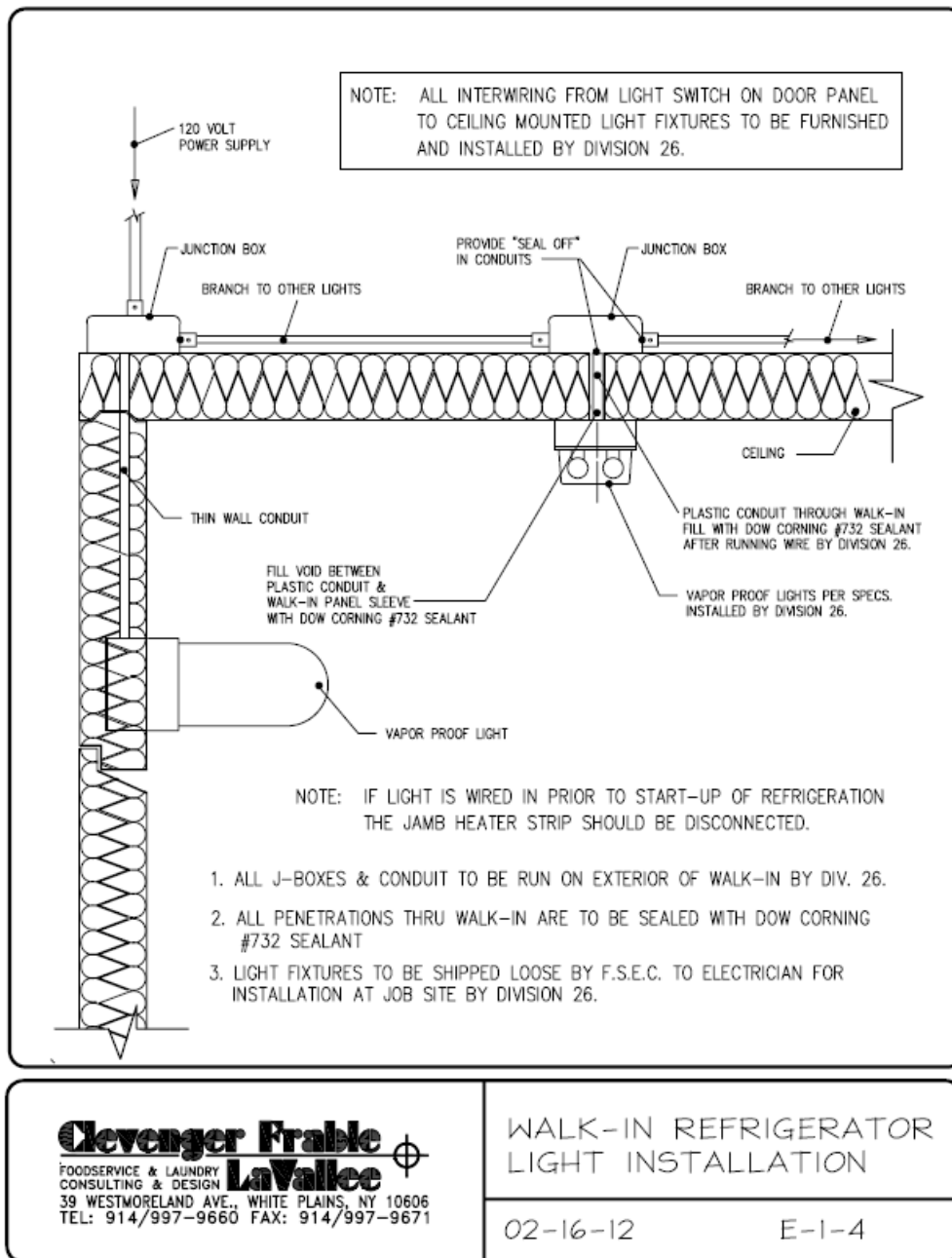
Clevenger Frable
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

FIRE SYSTEM
REMOTE PULL DETAIL
(CONDUIT CONCEALED TO ABOVE CEILING)

06-06-12

C-22-7

G:\KPDETS\BLDGWKS\C-22-7



G:/KPDETS/CSR DETAILS/CAD FILES/E-1-4

APPENDIX



Project Name _____

BROCHURE LEAD SHEET:

ITEM NO: _____ QUANTITY: _____

DESCRIPTION: _____

MANUFACTURER: _____

MODEL NUMBER: _____

DESCRIPTION: _____

UTILITIES:

ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1											

GAS

	SIZE	MBTU	KW
1			

STEAM

	INLET SIZE	RETURN SIZE	PSIG (min)	PSIG (max)
1				

WATER

	HOT SIZE	HOT AFF	HOT GPH	COLD SIZE	COLD AFF	FILTERED SIZE	FILTERED AFF	CONDENSER INLET SIZE	CONDENSER OUTLET SIZE
1									

WASTE

	INDIRECT SIZE	DIRECT SIZE
1		

ACCESSORIES, ATTACHMENTS OR REMARKS:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Appendix A



ALTERNATE/
SUBSTITUTION
REQUEST

Project: _____ Substitution Request Number: _____

From: _____
To: _____ Date: _____

CFL Project No. _____
Re: _____ Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No: _____
Installer: _____ Address: _____ Phone: _____
History: ☐ New Product ☐ 2-5 Years Old ☐ 5-10 Years Old ☐ More than 10 Years Old.
Difference between proposed substitution and specified product: _____

☐ Point-by-point comparative data attached – **REQUIRED BY CFL**

Reason for not providing specified item: _____

Similar Installation:
Project: _____ Architect: _____
Address: _____ Owner: _____

Date Installed: _____
Proposed substitution affects other parts of work: ☐ No ☐ Yes [Add] [Deduct] _____ days

Supporting Data Attached: ☐ Drawings ☐ Project Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

Appendix B

**ALTERNATE/
SUBSTITUTION
REQUEST
(Continued)**

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: Office: _____ Ext. _____ Mobil: _____

Attachments: _____

CFL'S REVIEW AND ACTION

- ☐ Substitution approves – Make submittal in accordance with 114000 Specification Section 1.13 Submittal.
- ☐ Substitution approved as notes – Make submittal in accordance with 114000 Specification Section 1.13 Submittal.
- ☐ Substitution rejected – Use specified materials.
- ☐ Substitution Request received too late – Use specified manufacturer.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ CFL ☐ _____

Appendix B



Sample Itemized Bid Proposal Form:

Item #	Description & Accessories	Qty.	Sell	Sell Total
21	Food Slicer, Electric Globe Model No. 3600N Globe Premium Slicer, 13" dia. steel alloy knife blade, manual, gear-driven knife system, start/stop touchpad controls, 2' angled drip groove on slicer table, knife ring guard with removable deflector, knife cover interlock and dual gear slice-thickness adjustment, 45° carriage angle, 12" food chute carriage, stainless steel construction, ½ HP, 115v/60/1 ph, 7.0 amps, NEMA 5-15P, cETLus, NSF/ANSI 8-2010, Made in USA	1 ea	\$3,271.00	\$3,271.00
	1 year labor warranty from date of original installation (not to exceed 18 months from factory shipment)	1 ea		
	2 year parts warranty (excludes wear/ expendable parts)	1 ea		
	15 year drive gears warranty (see Warranty sheet for complete details)	1 ea		
NOTE:	This model does not include automatic shut off. The Globe 4600N includes an automatic shut off.			

Mandatory Alternate Pricing Sheet

PROJECT NAME: _____

[illegible]

Subtotal Mandatory Alternate Equipment:	\$
Revised Subtotal All Equipment w/Mandatory Alternate Equipment in lieu of base bid items:	\$
Revised Delivery Including Mandatory Alternates: +	\$
Revised Installation Including Mandatory Alternates: +	\$
Revised Taxes Including Mandatory Alternates: +	\$
Revised Performance Bond Including Mandatory Alternates: +	\$
Grand Total with Mandatory Alternates:	\$

Mandatory Alternate
Clevenger Frable LaVallee, Inc.

Appendix D

Deduct Alternate Pricing Sheet[illegible]

	Subtotal Deduct Alternate Equipment:	
--	--------------------------------------	--

\$

Revised Subtotal All Equipment w/Deduct Alternate Equipment in lieu of base bid items:

\$

Revised Delivery Including Deduct Alternates: + \$

+

Revised Installation Including Deduct Alternates: + \$

5

Revised Taxes Including Deduct Alternates: + \$

\$

Revised Performance Bond Including Deduct Alternates: + \$

$$+ \overline{5}$$

Grand Total with Deduct Alternates: \$

\$

Appendix E

Alternate Substitution Pricing Sheet

Project Name: _____

[illegible]

* Alternate/Substitution request form required for each item.

Alternate\Substitution
Clevenger Frable LaVallee, Inc.

Appendix F

END OF SECTION 11 40 00

June 16, 2022

Girl Scouts of Greater New York
Suggested Bidder's List

We suggest soliciting proposals from the Kitchen Equipment Contractors (bidders) listed below. Before proceeding please read these notes and let us know if you have any questions:

1. The bidders listed may have interest in providing a proposal for the contract installation of the food service equipment on your project.
2. The bidders listed are qualified to provide the services outlined in our documentation. They have a minimum of five years of experience and have completed projects of similar scope that we have designed.
3. Aside from having completed successful projects with each bidder listed, we have no relationship with any of the bidders and receive no compensation from them as a result of their selection.
4. We recommend that the contract be awarded only when a minimum of three proposals from qualified contractors have been received, tabulated and leveled. Once the proposals are leveled we recommend the Owner/ Construction Manager Conduct in-person interviews with a minimum of two short-listed bidders, and select one contractor for the entire scope of work.
5. Past performance is no indication of future results. While we have had successful outcomes on similar projects with each of the bidders listed, we bear no responsibility for their performance. Project Manager assignment, project workload and other factors may impact their performance.
6. Proposals should be solicited on the basis of our final documentation (Issue for Bid) only. Distributing preliminary drawings/cut sheets for pricing is not recommended.
7. We welcome edits to the suggested bidders list based on experience of other team members. Bidders added to the list at the suggestion of others should have a minimum of 5 years of experience in the contract installation of food service equipment with projects of similar scope/ complexity and provide project references/ credentials for review.
8. Proposals submitted without an itemized schedule of values (including pricing for each item of equipment) should be rejected.
9. Use the contact information provided below to insure the right people receive the RFP. DO NOT rely on alternate contact/ email addresses.

Suggested bidders include:

Joel Kaplan
E. Friedman
4 Tammy Road
Wesley Hills, NY 10977
845-364-9779
Joel@efriedman.com

Riva Zucker
Culinary Depot
67 Route 59
Spring Valley, NY 10977
845-352-8200
Riva@culinarydepot.biz

Roy M. Oliveira
Tri-Mark United East
505 Collins St.
So. Attleboro, MA 02703
(508) 399-2373
roy.oliveira@trimarkusa.com

Ryan Peach
Fountainhead Foodservice Gp.
127 Cambridge Street
Suite 2R
Burlington, MA 01803
781-221-7276
rpeach@fountainheadfs.com

Upstate NY

Joseph Flihan
Joseph Flihan Co.
426 Broad Street
PO Box 4039
Utica NY 13504
315-735-8519
email@josephflihanco.com

Mark Olsen
Gerharz Restaurant Equipment
220 Teall Avenue
Syracuse, NY 13210
315-463-0639
Mark.O@GerharzEquipment.com

SECTION 12 36 61
SIMULATED STONE COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Quartz agglomerate countertops.

1.3 SUBMITTALS

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edges and, methods of joining, and cutouts for plumbing fixtures.
- C. Samples for Initial Selection: For each type of material exposed to view.
- D. Samples for Verification: For the following products:
 - 1. Countertop material, 6 inches square.
 - 2. One full-size quartz agglomerate countertop, with front edge, 8 by 10 inches, of construction and in configuration specified.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements before countertop fabrication is complete.

1.5 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops.

PART 2 - PRODUCTS

2.1 QUARTZ AGGLOMERATE COUNTERTOPS

- A. Configuration: Provide countertops with the following front and backsplash style:
 - 1. Front: As indicated on the drawings.
 - 2. Backsplash: None.
 - 3. Endsplash: None.
- B. Countertops: 5/4-inch- thick, quartz agglomerate.
- C. Fabrication: Fabricate tops in one piece with shop-applied edges unless otherwise indicated. Comply with quartz agglomerate manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

2.2 COUNTERTOP MATERIALS

- A. Adhesives: Do not use adhesives that contain urea formaldehyde.
- B. Adhesives: Use adhesives that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.
- C. Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with the "Physical Characteristics of Materials" Article of ANSI SS1.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. CaesarStone U.S.A., Inc.
 - 2. Colors and Patterns: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet.

- B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Pre-drill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

END OF SECTION 12 36 61

SECTION 21 00 00

FIRE PROTECTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. All work shall be in accordance with Local Fire Department, NFPA and Owners Insurance Company codes and regulations.
- C. FPC shall be a firm regularly engaged in the installation of sprinkler and fire protection systems for a period of at least five (5) years and shall have the licenses and certificates required by local, county and state regulations. License/Certificate holder shall be an officer of the firm and have a minimum of five (5) years employment with the firm.
- D. FPC shall apply for, obtain and pay for any required permits.
- E. Refer to Section 23 50 00 for Supplementary Conditions for Mechanical and Electrical Work, the requirement of which are part of the work.
- F. All materials shall be new and without blemish or defects. All equipment shall be UL or FM listed for fire protection use.
- G. Refer to Section 23 50 00 for coordination drawing requirements.
- H. FPC shall become familiar with drawings of other trades to understand work of other trades and its impact/effect on the fire protection work.
- I. FPC shall firestop openings around pipes passing through floors and walls. Refer to penetration fire stopping systems section of the specifications.
- J. The following abbreviations shall apply:
 - GC - Contractor for General Construction
 - PC - Plumbing Contractor
 - FPC - Fire Protection Contractor
 - HC - Heating (HVAC) Contractor
 - EC - Electrical Contractor
 - KEC - Kitchen Equipment Contractor

1.2 QUALITY ASSURANCE

- A. Requirements given herein may be affected by other related requirements of the project specifications. Correlation of contract requirements is the responsibility of the F.P.C.

- B. All Fire Protection work on this project shall be governed by this specification.

1.3 SCOPE OF WORK

- A. FPC shall provide all labor, material and appliances required for a complete fire protection installation as shown on Drawings and hereinafter specified, including but not limited to, the following principal items:
 - 1. Fire Hydrant
 - 2. Sprinkler Alarm Valve
 - 3. Fire Department Connection
 - 4. Sprinkler Piping
 - 5. Hangers and Supports
 - 6. Water Storage Tanks and Piping
 - 7. Fire Pump and Enclosure
 - 8. Valves and Fittings
 - 9. Pressure Gauges
 - 10. Sprinkler Heads
 - 11. Disinfection
 - 12. Electrical Work
 - 13. Testing
 - 14. Approvals
 - 15. Shop Drawings
 - 16. Hydraulic Calculations
 - 17. Guarantee

1.4 SYSTEM DESIGN

- A. The system shall provide full coverage. The system shall be designed as a wet pipe type system for all areas. The Mechanical Room, Fan Room, Kitchen and Storage areas shall be provided with ordinary hazard protection, other spaces shall be light hazard occupancy. Heads shall be provided in accord with the latest edition of NFPA 13 for system design and layout criteria. System shall also conform to Fire Department and Owner's Insurance Underwriters' requirements. In case of conflict between several authorities, the more stringent requirement shall govern.
- B. Layout of sprinkler heads and piping shall be coordinated with the Architectural Sections and Plans, structural steel, lighting, ductwork, diffuser and piping plans for location and type.
- C. Special attention shall be given to the exposed piping and heads in other areas not having a hung ceiling, to provide a neat uniform pattern of heads and piping.
- D. Heads in areas having hung ceilings shall be centered in ceiling grid and shall align with lights, diffusers and registers.
- E. Heads shall be placed to avoid obstruction to surface mounted lights and soffits.

- F. Final location, layout, quantities of heads and pipe sizes shall be as approved by the Architect, after submission and review of sprinkler system shop drawings.
- G. In addition to the heads shown, FPC shall provide an allowance of 10% additional heads along with branch piping, which may be required to suit conditions uncovered during construction.
- H. Hydraulic design shall be used for the sprinkler system. Calculations shall be submitted.

1.5 FIRE SERVICE

- A. See drawings for tanks, pump, enclosure and piping.
- B. Fire pump and enclosure shall not be ordered until hydraulic calculations for sprinkler system has been done and accepted.

1.6 FIRE HYDRANT

- A. Provide dry hydrant as shown on drawings.

1.7 SPRINKLER ALARM VALVE

- A. Provide alarm valve for wet pipe systems.

1.8 FIRE DEPARTMENT CONNECTION

- A. Fire department connection shall be Flush Siamese connection with caps and chains and “auto spkr” branding, Croker Model 6012. Thread pattern shall be as required by the Fire Department. Finish shall be as selected by Architect.

1.9 PIPING MATERIALS

- A. Sprinkler Piping- Aboveground: Standard weight schedule 40 black steel pipe with threaded standard weight cast iron sprinkler fittings for piping 2” or smaller.
- B. For sizes 2½" and larger, Schedule 10 steel tubing with rolled grooves and Victaulic fittings may be used. Care shall be taken to not over use lubricant material.
- C. Drains and Drips: Schedule 40 galvanized steel with threaded galvanized cast iron fittings, for both wet and dry pipe systems.
- D. Provide flanges at all valves and where required.

1.10 JOINTS

- A. Unless otherwise specified, joints on piping shall be made as follows:

1. On Screwed Pipe: With best quality graphite and oil, or equivalent joint compound, applied to male threads and pipe only, not on fittings.
2. Unions: For 2" diameter and smaller steel pipe, unions malleable iron unions with brass to iron seats, 150 lb. WSP, may be used in lieu of flanges.

1.11 HANGERS

- A. All lateral runs of piping shall be securely supported on hangers, rolls brackets, and in a manner to allow for proper expansion.
- B. Risers and other vertical pipe runs shall be braced and supported with split ring hangers, friction clamps or other approved means suitable for location and requirements.
- C. All horizontal pipe that is run overhead or on walls shall be supported on wrought iron clevis hangers suspended on hanger rods. Suspension type hangers shall be adjustable and supported from beam clamps or angle clips.
- D. Materials and spacing shall conform to N.F.P.A. requirements.
- E. Manufacturer: ITT Grinnell, Crane or Fee & Mason.

1.12 DRAIN AND TEST PIPES

- A. Provide drains at base of risers, on valved sections, and at other locations requiring it for complete drainage of system. Pipe drains to spill over floor drain, slop sink, or through building wall as approved. Provide test pipes at top of main riser, at end of main runs, and at other required locations. Test pipes valved and piped to discharge through proper orifice either through building wall, over floor drain, slop sink or as approved.

1.13 VALVES

- A. Provide all valves on piping, on connections to all equipment and apparatus and at all other points necessary for proper operation, control and maintenance.
- B. Valves shall be UL and/or FM listed for fire protection service, pressure rated for a minimum of 175 psig working pressure.
- C. Any valve installed that it could stop the flow to any sprinkler heads shall be provided with a sign and tamper switch.
- D. Gate Valves: Shall be wedge design. Valves of sizes up to and including 2" shall be all bronze construction, screw ends, rising stem, OS&Y type.
- E. Valves of 2-1/2" and larger shall be iron body, bronze mounted construction, flanged, rising stem, OS&Y type.
- F. Angle and Globe Valves: Sprinkler drain and test valves, and other required globe or angle valves, threaded bronze angle or globe type with composition disc.

- G. Check Valves: Underwriters approved flanged IBBM swivel type.

1.14 PRESSURE GAUGES

- A. Pressure indicating gauges shall be suitable for water service, 6" diameter dial, black iron case, and brass chrome plated ring.
- B. Connect each gauge with gauge cock and drain cock. Gauges shall be graduated 0-200 psig. Provide in service at entry into building and where required.
- C. Manufacturer: Reliable Sprinkler Co., Ashcroft, Lonergan, Mueller, Taylor, Rochester.

1.15 SPRINKLER HEADS

- A. Underwriters approved cast brass closed fusible link spray type. with 1/2. Provide heavy wire guards for heads placed where liable to be accidentally hit in normal course of events. Heads, in general, ordinary degree temperature rating. Heads subject to abnormal heating conditions shall be of sufficiently high temperature rating to prevent their accidental discharge when no fire is present.
- B. Sprinkler heads in all finished areas having hung ceilings, shall be of the automatic, adjustable, flush concealed pendant type.
- C. Heads in spaces without hung ceilings shall be cast brass upright, pendant or sidewall type.
- D. Where shown provide dry heads for adjacent areas subject to freezing.
- E. Provide shields wherever electrical equipment is present to protect equipment.
- F. Spare Sprinkler Heads and Cabinet
 - 1. Provide metal cabinet containing 6 spare sprinkler heads of concealed and upright type and 3 spare sprinkler heads of each of all other types and temperature settings used. Furnish special sprinkler head wrenches.
 - 2. Cabinet shall be all mounted, red enamel finish and marked "Automatic Sprinklers - Reserve Supply." Cabinets shall also contain instructions and other necessary information attached on inside of door. Location where directed.
- G. Manufacturer: Reliable, Viking Corp., Automatic Co. or Grinnell.

1.16 SPRINKLER PIPING

- A. Provide a complete piping system comprising supply lines, risers, headers and stringer lines for the required sprinkler heads. Sizes of all piping shall conform to the requirements determined by the hydraulic calculation. Provide check valves and automatic ball drip where required.

- B. All piping shall be installed to permit complete drainage of the system. Where required provide auxiliary drains. For dry pipe systems mains shall be pitched a minimum of 1/2" per 10 feet and branches shall be pitched a minimum of 1/4" per 10 feet.
- C. Where necessary to offset sprinkler piping to clear parts of building, piping, electrical conduits or other obstructions, offsets shall be made with 45° elbows and nipples in an approved manner.
- D. All stringer lines shall be installed as close as possible to ceiling with allowances for proper drainage and required distance between the sprinkler heads and ceilings.
- E. Piping systems shall be equipped with inspector's test connections, with suitable air vents at high points for elimination of trapped air and with suitable drain connection at all low points. Drains on sprinkler risers shall be run to floor drains, service sinks or in an approved manner to exterior grade.
- F. Where noted on plans and where required, sprinkler piping shall be run through opening in structural steel members. Coordinate exact location and sizes of openings with G.C.
- G. All piping shall be installed so that it may be drained. If possible, piping shall drain back to the main drain valve, where not possible provide auxiliary drain in accord with NFPA requirements.

1.17 INSPECTOR'S TEST CONNECTIONS

- A. Provide Inspectors' Test Connections where required.
- B. Suitable test pipes, which may also be used as drainpipes, shall be provided at such locations as will permit flowing tests to be made to ascertain whether water supplies and connections are in order. Such test pipes to be 1" in size and equipped with a shutoff valve. They shall be so installed that valve may be opened wide for a sufficient time to assure proper test without causing any water damage. Inspection Department having jurisdiction shall be consulted as to location and arrangement of test pipes.
- C. At or near such test pipe, a pressure gauge shall be installed with a connection not smaller than 1/4" made to main pipe. This gauge connection shall be equipped with a shut-off valve and with a petcock for draining. A plugged 1/4" outlet should be located between valve and gauge, for purpose of installing inspector's gauge.
- D. Required pressure gauges shall be approved type with maximum limit of not less than twice the normal working pressure at points where installed. They shall be installed so as to permit easy removal and shall be located where they will not be subject to freezing.

1.18 FLOW AND TAMPER SWITCHES

- A. Provide flow and tamper switches for each alarm valve and for each valve that is capable of shutting down the flow to any head in the system.

- B. Switches to be furnished and mounted by FPC, wiring to fire alarm system to be provided by EC.

1.19 MAINTENANCE INSPECTION

- A. Sprinkler Contractor shall make final inspection of sprinkler system after completion and acceptance of the work.

1.20 ELECTRIC WORK

- A. Except as noted, electric wiring and connections to equipment shall be provided by EC.

1.21 TESTING

- A. FPC shall, at his own expense, during progress of work or upon its completion, make such tests of his works as are herein specified. As required by Architect, State, Federal, or Municipal Bureau and/or as required by Owners Insurance authorities having jurisdiction - work to be done under their supervision.
- B. FPC shall provide apparatus, temporary work, or other requirements necessary for such tests. He shall take all the precautions to prevent damage to building or its contents as a result of such tests and he will be required to repair and make good at his own expense any damage caused.
- C. Any defects or deficiencies discovered as a result of tests shall be immediately repaired or made good. Tests shall be repeated until test requirement is properly fulfilled. Caulking of pipe joints to remedy leaks will not be approved except where lead and oakum joints are used.
- D. All water piping shall be tested to a hydraulic pressure of 200 lbs. per square inch, which pressure shall be maintained without pumping for a period of four (4) hours.

1.22 APPROVALS

- A. Plans and installation are subject to approval of the Owner's Insurance Underwriter and Local Fire Department.
- B. FPC shall submit shop drawings to the above-mentioned association and Fire Marshall, prior to submission of shop drawings to Architect. Sprinkler Contractor shall coordinate location of sprinkler heads and piping with light fixtures, ductwork, piping conduits, structural members, etc.
- C. Fire protection should be installed to conform to standards of the National Fire Protection Association and devices listed by Factory Mutual and/or Underwriters Laboratories should be used. Sprinkler work shall comply with NFPA-13.

- D. The word "approved" as used in these specifications means acceptance to the Owners Insurance Underwriter Co., and to the Fire Department.
- E. Hose thread patterns shall be approved by the local Fire Department.

1.23 FINAL REVIEW

- A. When installation is reported in writing by Sprinkler Contractor as being completed and ready for acceptance, tests and inspection shall be made by said Contractor as directed by and in the presence of Architect, Fire Marshall and Insurance Company. Underwriter representative, and Owner, to determine whether it complies with specifications and Contract. Upon failure to do so, Sprinkler Contractor shall make any additional tests that may be required, entirely at his own expense. When work is found to be satisfactory, Sprinkler Contractor shall upon request be furnished a Certificate of Completion and Acceptance.
- B. Sprinkler Contractor shall provide necessary means to protect all apparatus, fittings, etc., installed under Contract, and leave same in perfect condition. If any items or parts thereof are damaged, broken, or missing, regardless of cause, they shall be replaced with new units or restored with new parts, as required by Sprinkler Contractor.

1.24 DISINFECTION

- A. Upon completion of tests to sprinkler piping, flush lines and disinfect to Town and Health Department Standards.

1.25 PAINTING

- A. All exposed sprinkler and fire standpipe piping shall be painted with a primer and final two (2) final coats of red enamel where in unfinished spaces and in color as selected by Architect in finished spaces.
- B. Prior to painting, piping shall be cleaned of all dirt, and or grease.
- C. Heads shall NOT be painted.

1.26 SLEEVES AND ESCUTCHEONS

- A. Where pipes pass through walls, steel pipe sleeves shall be provided of ample size to contain pipe and covering when required. Whenever pipes are exposed, chrome plated escutcheons shall be used.

1.27 SIGNAGE

- A. Provide signs at Fire Department hose connection and at each valve.

- B. Signs at fire department connections shall be a minimum of 12" x 9", enamel silk-screened on heavy gauge aluminum, secured with tamper proof screws.
- C. Provide sign, attached to each valve, each sign to indicate portion of system controlled by respective valve. Also, provide all other signs relating to the work, as required.
- D. Provide signage at each alarm valve stating hydraulic design parameters.

1.28 SHOP DRAWINGS

- A. Submit shop drawings for review, for the following items:
 - 1. Water Storage Tanks
 - 2. Underground Piping
 - 3. Fire Pump and Enclosure
 - 4. Hydraulic Calculations
 - 5. Piping Layout and sizes, prepared using AutoCAD.
 - 6. Heads
 - 7. Fire Department Connection
 - 8. Alarm Valve
 - 9. Piping Materials
 - 10. Valves
 - 11. Hangers and supports
 - 12. Flow and tamper switches
 - 13. Signage
 - 14. Spare heads and cabinet
- B. Review of submission shall mean review of equipment and/or fabrication as to design and performance only. Contractor shall be responsible for scheduling quantities, physical size to suit allowable space, electrical characteristics, intended use, etc.

1.29 ADJUSTMENT AND INSTRUCTIONS

- A. All equipment shall be checked and tested for proper operation.
- B. Owner shall be instructed in operation and maintenance of all equipment furnished.
- C. Provide Owner with two (2) bound sets containing operating and maintenance literature for all equipment and systems.

1.30 GUARANTEE

- A. Refer to Section 23 50 00.

END OF SECTION 21 00 00

SECTION 22 00 00

PLUMBING WORK

PART 1 - GENERAL

1.1 GENERAL

- A. All work of this Section shall be governed by the requirements of the Conditions of the Contract and the entire Division #1, General Requirements.
- B. Due to the nature of the work and the rigid time schedule required, the utmost cooperation between Contractors must be attained.
- C. Refer to Section 23 50 00 for Supplementary Conditions for Mechanical and Electrical Work. The requirements of which are part of the work.
- D. All electrical components shall bear U.L. labels.
- E. PC shall provide concrete pads for floor mounted equipment in Mechanical Room.
- F. PC shall obtain all permits and pay all fees related to his work.
- G. All work shall be in accord with NY State Plumbing Code and Local Code requirements.
- H. Refer to Section 23 50 00 for coordination drawing requirements.
- I. PC shall be a firm regularly engaged in the installation of Plumbing systems for a period of at least five (5) years and shall have the licenses and certificates required by local, county and state regulations. License/Certificates holder shall be an officer of the firm and have a minimum of five (5) years employment with the firm.
- J. PC shall become familiar with drawings of other trades to understand work of other trades and its impact/effect on the plumbing work.
- K. PC shall provide Owner with invoices and other data required for utility and government rebates and incentives.
- L. PC shall fire-stop openings around piping passing through floors and walls. Refer to penetration fire stopping systems section of the specifications.
- M. The following abbreviations shall apply:

GC - Contractor for General Construction
PC - Plumbing Contractor
FPC - Fire Protection Contractor
HC - Heating (HVAC) Contractor
EC - Electrical Contractor
KEC - Kitchen Equipment Contractors

1.2 QUALITY ASSURANCE

- A. Requirements given herein may be affected by other related requirements of the project specifications. Correlation of contract requirements is the responsibility of the Contractor.
- B. All plumbing work on this project shall be governed by this specification.

1.3 SCOPE OF WORK INCLUDED

- A. PC shall provide all labor, material and appliances required for a complete plumbing installation as shown on drawings and hereinafter specified, including, but not limited to, the following principal items:
 - 1. Work in Connection with other Trades
 - 2. Work in Connection with Kitchen Equipment
 - 3. Identification of Equipment, Piping and Controls
 - 4. Plumbing Fixtures and Trim
 - 5. Water Heater
 - 6. Mixing Valve
 - 7. Recirculating Pump and Controls
 - 8. Drains
 - 9. Water Service
 - 10. Grease Interceptor
 - 11. Hot and Cold-Water Piping
 - 12. Fitting and Valves
 - 13. Waste Soil and Vent Lines
 - 14. Gas Supply
 - 15. Flashing (for plumbing work only)
 - 16. Wall Hydrants and Hose Bibbs
 - 17. Disinfection of Water Systems
 - 18. Drains and Interceptors
 - 19. Cleanouts and Deck Plates
 - 20. Insulation and Covering
 - 21. Hangers
 - 22. Access Doors
 - 23. Sleeves
 - 24. Escutcheons
 - 25. Shop Drawings
 - 26. Testing
 - 27. Permits
 - 28. Guarantees

1.4 WORK IN CONNECTION WITH OTHER TRADES

- A. PC shall provide proper roughing to all equipment requiring plumbing. PC shall provide shut off valves on all services to each item of equipment.
- B. Electric Wiring: PC shall furnish motor starters, controls and other electrical equipment as specified and deliver same to EC at job site for installation and wiring.

- C. PC shall be responsible for correct installation and operation of material furnished under his contract whether or not installed by him.
- D. PC shall be responsible for obtaining roughing dimensions prior to initiating work.

1.5 WORK IN CONNECTION WITH KITCHEN EQUIPMENT

- A. PC to provide all piping, valves, fittings for Kitchen equipment roughing and final connections.
- B. PC shall be responsible for handling of all plumbing fixtures and trim which may be furnished by others, from curb side loading dock to point of use, for setting of same and for final installation.
- C. Food service equipment furnished by equipment suppliers will be set in place by others. PC to have necessary roughing completed so that final connections can be made.
- D. Food service sinks, faucets, strainers, waste outlets and tailpieces will be furnished by equipment supplier unless otherwise noted on drawings.
- E. PC shall provide traps and shut-off valves.
- F. PC shall provide all roughing for equipment and make final connection, including necessary accessories for a complete installation.
- G. Prior to installation, PC shall review food service drawings and shop drawings to verify locations and sizes of plumbing connections, openings for sinks, faucets, outlets, piping space and access and advise Architect of any discrepancies.
- H. PC shall inspect materials furnished by equipment supplier and advise architect, prior to installation, of any shortages or damage to materials or non-code complying items.
- I. All piping mains shall be run concealed. Routing through cabinets or equipment shall not impair use of drawers, shelves or other equipment components.
- J. Exposed piping shall be chrome plated.

1.6 START-UP, TESTS AND ADJUSTMENTS

- A. Unless otherwise specified, all water piping systems shall be hydrostatically tested to 125 psig. Tests shall be of four (4) hour duration, during which time piping shall show no leaks and during time no sealing of leaks shall be permitted.
- B. After completion of roughing work, and before work is covered, open ends of sanitary, storm water and vent systems shall be securely closed except ends of highest openings, and entire system shall be filled to overflow point with water and subjected to a 10 feet pressure test for one (1) hour.
- C. A smoke test shall be applied to entire drainage and vent system after all fixtures have been set.

- D. Refer to gas supply for testing requirements for gas piping.
- E. PC shall furnish and pay for all labor, material and equipment require for testing.
- F. Defects disclosed by tests shall be repaired, if permitted by Architect, or replaced without extra charge so directed. PC shall furnish services of a qualified person, thoroughly familiar with the job, to operate and make all adjustments so that the systems and control equipment shall operate as intended. This man shall make adjustments including balancing of the water, gas and piping systems in cooperation with qualified representatives of mechanical equipment manufacturers and temperature control manufacturer. Architect is to be notified when this balancing is to be performed.

1.7 DISINFECTION OF WATER SYSTEM

- A. Upon completion of all tests and necessary repairs or replacements all new mains and repaired portions of, or extension to, existing water piping system shall be subjected to a disinfection procedure as herein specified. System to be disinfected shall include portions of water piping, and any systems that may be connected to the same supply sources. Disinfection shall be applied to all piping included in contract from main cutoff valve through all appurtenances connected thereto.
- B. These systems shall be thoroughly flushed with water to remove sediment. Following this flushing, they shall be disinfected in accordance with the following methods.
- C. System shall be so chlorinated that a chlorine residue of not less than 10 PPM remains in the water after 24 hours standing. Water from existing distribution system or other source or supply shall be controlled so as to flow slowly during the application of chlorine. Rate of chlorine mixture flow shall be in such proportion to the rate of water entering pipe that chlorine dose applied shall produce 10 PPM, after 24 hours standing. This may be expected with an application of 25 PPM.
- D. In the process of chlorinating the system, all valves and other appurtenances shall be operated while the pipeline is filled with the chlorinating agent.
- E. Following chlorination, all treated water shall be thoroughly flushed from the system at its extremities until the replacement water throughout its length shall upon test proved comparable in quality to the water served the public from the existing water supply system and approved by the Public Health Authority having jurisdiction. This satisfactory quality of water delivered by the new system should continue for a period of at least three (3) full days as demonstrated by laboratory examination of samples taken from a tap located and installed in such a way as to prevent outside contamination. Samples should never be taken from an unsterilized hose or from a fire hydrant because such will seldom meet bacteriological standards. After systems are drained, they shall be thoroughly flushed with fresh water, and returned to service.

1.8 PROTECTION OF MATERIAL AND WORK

- A. Openings left in floors and roofs for passage of lines of soil, drain, waste, vent and supply pipes shall be covered and protected. Set traps shall be sealed with anti-freeze solution.

Precaution shall be taken against freezing during cold weather. Pipes shall be protected with suitable coverings, as soon as set. Open ends of pipes shall be closed by proper fittings, to prevent obstruction and damage. Use of water closets and other plumbing fixtures during the progress of work is strictly prohibited.

1.9 METHODS OF FASTENING

- A. Except where otherwise specified, where fastenings are made to wood, there shall be used long screw or lag screws; to brick work, cement, stone and marble, approved long expansion bolts; to fireproof block work, approved toggle bolts and to iron work, approved bolts and nuts; to concrete slabs, approved expansion bolts. Use of wood plugs and nailing not permitted. Sundries used in connection with galvanized iron shall be galvanized, those in connection with brass or copper work shall be brass or copper, finished to match the connection work.

1.10 GENERAL INSTALLATION OF PIPE

- A. Run and arrangement of pipes shall be approximately as shown on drawings and as directed during installation, and shall be straight and direct as possible, forming right angles or parallel lines with building walls and other pipes, and be neatly spaced.
- B. No pipe shall be installed where headroom will be interfered with unless conditions are such that it is approved by Architect and unavoidable. Offsets will be permitted only where walls reduce in thickness or beams interfere with direct runs; offsets shall be made at an angle of 45° to the vertical, in no case shall the space between pipes, partitions, walls, etc., exceed 5". Risers shall be erected plumb and true, standing free from but close to walls, and other pipes and neatly spaced. Horizontal runs of piping shall be supported from floor or roof slab or other structural member above, shall be of size and arrangement noted on plans, shall be erected as closely as possible to bottom of floor slabs, ceilings, or beams as the case may be, and shall be so graded as to drain to low points at drawcocks.
- C. Roughing underground or concealed in floor or wall construction shall be properly installed and inspected before any roughing is covered up. Work covered up before being inspected shall be uncovered and recovered at expense of PC. Plugged fittings shall be installed as required and when called for.
- D. Reducer fittings shall be used in making reductions in sizes of pipes, bushings not allowed. Suitable shock arrestors shall be provided as called for in other sections. Shock arrestors to be in accord with ASSE 1010.

1.11 DRIP PANS

- A. Refer to section 23 50 00.
- B. Examine the drawings, and in cooperation with the EC, confirm the final location of all electrical equipment to be installed in the vicinity of piping. Plan arrange all overhead piping no closer than two (2) feet from a vertical line to electric motors and controllers, switchboards, panelboards or similar equipment.

- C. Where the installation of piping cannot comply with the requirements of foregoing paragraph, where feasible, the piping shall be relocated.
- D. Where piping cannot be relocated provide galvanized steel gutters as follows:
 - 1. Provide a gutter of 18-gauge galvanized steel under every pipe which is within 2'-0" of being vertically over any motor, electrical controllers, switchboards, panelboards, or the like.
 - 2. Each gutter shall be welded and made watertight, properly suspended and carefully pitched to a convenient point for draining. Provide a 1" drain to nearest floor drain or map sink, drain termination shall be visible.
 - 3. In lieu of such separate gutters, a continuous, adequately supported and braced, properly rimmed, pitched and drained, may be provided over any such motor, and extending 2'-0" in all directions beyond the motor, over which such piping has to run.
- E. In addition, gutters at electrical equipment, provide gutters under all waste piping which is installed above food preparation, service or storage areas.

1.12 IDENTIFICATION OF EQUIPMENT, PIPING AND CONTROLS

- A. All equipment shall be stenciled or labeled with Lamacoid plates screwed thereon which shall indicate system service, unit designation and area served.
- B. Motor starters shall be provided with Lamacoid plates which indicate system or equipment served.
- C. All valves shall be tagged with 2" brass plated tags and chain and a valve chart schedule framed and wall mounted shall be provided where directed.
- D. Piping Identification, Coding and Painting
 - 1. All piping in Mechanical, Boiler, Fan, Storage and Equipment Rooms and all piping above accessible ceiling shall be coded and identified as herein specified.
 - 2. Apply color-coded polyvinyl chloride pipe bands identifying pipe contents and direction of flow.
 - 3. Apply bands on 15' centers on piping in Equipment Rooms and 25' elsewhere on straight runs; at valve locations at point where piping enters and leaves a partitions, wall, floor or ceiling.
 - 4. Apply bands at exit and entrance points to each vessel, tank or piece of equipment.
 - 5. Bands widths shall be 8" for pipes up to 10" diameter and 16" wide for larger diameter piping. Letter heights stating service shall be preprinted on band, 3/4" high for 16" bands.
 - 6. For insulated pipes, apply bands after insulation and painting work has been completed.
 - 7. Provide ten (10) additional bands of each type for future use by Owner's personnel.
 - 8. Follow manufacturer's instructions for application procedures using non-combustible materials and contact adhesives.
 - 9. All piping shall be color coded in full accordance with ANSI 13.1, 1981 Standards. Pipe markers shall be as manufactured by Seton Name Plate Corp., or equivalent.

10. All piping which is not insulated, tanks and equipment shall be painted. Equipment provided with a factory finished coating shall be cleaned and touched up as necessary. Equipment provided with a factory primer shall be given two (2) coats of enamel paint after installation. Pipe, hangers, support and equipment shall be primed and given two (2) coats of enamel paint. Color for piping and tanks shall be in accordance with ANSI 13.1, 1975 Standard, color of equipment and supports shall be as directed by Architect.

1.13 WATER SERVICE

- A. Provide as shown on drawings.
- B. Piping shall be Type K copper soft temper joined with compression fitting.
- C. Backflow preventer installation shall be in accord with Health Department regulations.
- D. PC shall provide RPZ backflow preventer for the domestic service.

1.14 WATER SUPPLY

- A. Cold Water, Under slab: Shall be PEX-A tubing, with no joints below slab.
- B. Cold, Hot Water and Hot Water Recirculation Piping Above Ground: Cold, hot water and hot water recirculation lines shall be type "L" hard temper, copper. All materials shall be NSF listed for domestic water service.
- C. As an alternative NSF listed Uponor straight length PEX-A, join with Uponor Pro Pex expansion fitting may be used for mains and NFS listed Uponor PEX-A tubing joined with Pro Pex expansion fitting maybe used for branches.
- D. All piping on Mezzanine Level shall be copper.

1.15 DRAINAGE AND VENTS

- A. Below Slab: Soil, waste and vent shall be service weight cast iron, with hub and spigot joints, neoprene rings.
- B. Above Slab: Soil and waste piping, risers and horizontal runs shall be no-hub cast iron with no-hub joints.
- C. Above slab vent piping shall be schedule 40 solid wall PVC with solvent weld joints.
- D. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.
- E. Vent piping on Mezzanine level shall be no hub cast iron.
- F. All couplings for No-Hub cast iron soil pipe and fittings shall conform to CISPI 310 and be certified by NSF International.

1.16 JOINTS

- A. Exposed threads on exposed finished piping in toilet rooms and finished areas or at fixtures will not be acceptable.
- B. Joint compound for intended service shall be used on screwed joints and shall be applied to male thread only. Wicking not permitted.
- C. Joints on copper pipe, shall be made with streamline wrought copper soldering fittings and Silver-Brite lead free solder.

1.17 VALVES

- A. Provide shut-off valves to isolate each item of equipment for maintenance service and replacement, provide balancing valve or cock to adjust flow.
- B. All valves shall be constructed using lead free materials.
- C. Valves for pipe sizes of 2 ½" or less shall be Apollo 70-200 or Milwaukee Series 150, for sizes 3" and larger Milwaukee Series C, lug type butterfly valves shall be provided.
- D. Balancing valves shall be of the square head cock type. Provide custodian with at least two operators for use with balancing valves. Balancing valves shall be the same size as the adjacent piping.
- E. Check valves shall be of the horizontal swing check type with brass or bronze working parts and removable disc except where lift check valves shall be used on the discharge side of circulating pumps.
- F. Dielectric Fittings: Piping connections between dissimilar metals shall be made with dielectric fittings or insulating fittings to prevent electrolytic corrosion. Dielectric fittings shall be of the screwed union type as manufactured by EPCO.
- G. Provide drip valves at low points in various systems. Drip valves shall be lock shield and have threaded hose ends.

1.18 GAS SERVICE (LPG) AND PIPING

- A. General:
 - 1. Provide new gas service as shown on drawings in accordance with gas supplier requirements. Coordinate with gas supplier and obtain certificate for submission to Building Department.
 - 2. New gas service to be extended from the LPG storage tanks as shown on drawings.
 - 3. Meter and regulator furnished by gas supplier, installed by PC in accord with gas supplier requirements.
 - 4. Building distribution piping to be provided as shown.

- B. All work shall be in accord with New York State Fuel Gas Code, NFPA-53, Utility company and Village requirements.
- C. Pipe:
 - 1. Underground piping to be plastic coated soft tempered Type K copper.
 - 2. Above ground piping: Schedule 40 standard black pipe free from flaws or other defects and of true and uniform section. Minimum size of gas piping shall be ¾".
- D. Fittings:
 - 1. For exposed pipe 2½" and smaller – threaded heavy malleable iron beaded fittings.
 - 2. For all piping 3" and larger shall be welded using standard weight, steel joints with welding fittings.
- E. Installation of Pipe:
 - 1. All connections shall be made with fittings. Whenever gas lines are unavoidably trapped, an accessible drip shall be provided. The bottom of all risers and all equipment connections shall be provided with a capped dirt leg. Threaded joints shall be made with approved joint compound. Burrs made in cutting pipe shall be removed.
 - 2. Where piping of different sizes is joined, reducer fittings shall be used; bushings will not be permitted. All connections shall be taken from top or side of mains and not from bottom.
 - 3. Provide gas tight metal sleeve, open at each end, to enclose gas piping where it passes through corridors, halls, stairs and vestibules.
 - 4. Exterior piping at regulators and interior piping shall be cleaned, primed and painted. Color for interior piping to be yellow. Primer and paint shall be Rustoleum or equivalent.
- F. Gas Regulators and Meters:
 - 1. Provide second stage regulators at building connections.
 - 2. Install appliance regulators as shown on drawings.
- G. Gas Valves:
 - 1. General Use: Rockwell Fig. 143 or equivalent.
 - 2. Wrenches shall be supplied for all wrench operated valves.
 - 3. All regulators and reliefs shall be vented to outdoors. Vent lines shall be run full size, with vent line for each regulator or relief run separately and shall terminate in an approved vent cap.
- H. Tests of Gas Systems:
 - 1. Tests shall be paid for PC and shall be made in presence of Architect, Engineer, Owner or their representatives, gas supply company representatives and local authorities having jurisdiction of the work to be tested, and as may be directed, and at least 72 hours advance notice shall be given.

2. Shop tests shall be made of appurtenances and material before delivery to the site. These tests shall not relieve the PC of responsibility for defects discovered after appurtenances and materials are installed.
3. Source of test pressure shall be isolated before pressure tests are performed.
4. Perform all tests as herein specified and as required by the gas supplier company.

I. Gas Piping:

1. Test all new gas piping and connections to existing piping.
2. Aboveground Piping: Test with air at 50 psig for a period of not less than 2 hours without showing any drop in pressure. All joints and fittings shall be soap tested. In addition, piping system shall be tested using gas meter as outlined in NFPA-54.
3. Underground Piping: Test with air at 150 psig. All joints and fittings shall be soap tested. Prior to pressurizing line, back fill straight runs to restrain pipe.
4. After testing is successfully completed, the entire gas distribution system shall be purged, pilot lights on all equipment and appliances shall be lighted and the operation of all equipment and appliances shall be checked.
5. Defects disclosed by tests shall be repaired, if permitted by Architect, or replaced without extra charge if so directed.

1.19 SLEEVES

- A. Provide pipes passing through footings and exterior and masonry walls with steel pipe sleeves, inside diameter of which should be at least 1" greater than the outside of the pipe passing through it. Sleeves in exterior walls shall have space between pipe and sleeve caulked watertight. Sleeves shall be large enough to receive covering on insulated pipes. Sleeves shall be properly arranged to hold in position during construction.
- B. Metal sleeves for insulated pipes passing through floors, walls and partitions shall be sized to permit continuous insulation.

1.20 FLASHING

- A. Vent Terminals: Vent and other plumbing pipes through roof shall be flashed watertight. Flashing shall be 4 lb. lead extending not less than 12" on each side of the pipe, outside the barrel and terminate 1'-0" above the roof with roof fitting.
- B. Provide at top of vent stacks a 4 lb. lead vent cap.
- C. Floor Drains: Flashing shall be 4 lb. lead extending not less than 18" on all sides. Turn down into floor drain flashing clamp.

1.21 PIPE SUPPORTS, HANGERS AND INSERTS

- A. Underground Pipe: Pipes laid underground shall be firmly bedded in solid ground under body of pipe. Where suitable bearing cannot be obtained because of the ground being disturbed by excavation, or for any other reason, pipe shall be supported by concrete piers,

or by approved brackets, or holdfasts secured to the walls, or they shall be supported on ties and planks, or if below structural slab, on hangers tied into slabs.

- B. Overhead Horizontal Pipe: Horizontal drains, vents, supplies or other piping shall be supported at intervals to 12'-0" for 6" and over; 10'-0" for 4" and 5" pipe; 8'-0" for 1 1/2" to 3" pipe; 6'-0" for under 1 1/2" pipe, and where bell and spigot pipe is suspended, a hanger shall be placed ahead of each hub supported at a maximum of 5 feet intervals by adjustable wrought iron, steel or malleable iron hangers; pipe hangers, supports, etc., shall be primed with one coat of red lead and linseed oil before installation. Hangers shall be of the clevis type as manufactured by Grinnell Figure 260 or for heavier leads beyond maximum recommended loads, Grinnell Figure 212 or 216. Provide lead shields where copper tubing is utilized. Do not hang piping or equipment from other trades.
- C. Where Kindorf or Unistrut trapeze hanger systems are used, clamps shall have rubber or plastic inserts so that there is no metal-to-metal contact.
- D. Perforated Strap: Perforated strap iron and temporary wire supports are not permitted.
- E. Provide approved sheet metal shields to protect insulation at areas of contact with hangers and supports. Provide protective saddles as required, installed in approved manner. Shields to be "Insul-Shield" Insul-Coustic Corp.
- F. Hangers used to support copper or brass piping shall be copper coated or brass.

1.22 INSULATION AND PIPE COVERING

- A. General: Insulation work shall be performed under this section and work shall be done in strict accordance with manufacturer's recommendations. All hot, hot water return and cold-water piping shall be insulated.
- B. Joints shall be butted firmly together. Workmanship shall be done as to leave a smooth finish with no raveled edges.
- C. Aboveground horizontal storm piping (including 2'-0" of vertical at each end), cold water, hot water and hot water recirculating piping insulation shall be multi-purpose 4 lb. per cu. ft. density 1" thick molded glass fiber with maximum "K" factor of 0.22 at 75°F. mean temperature, as manufactured by Owens Corning, Knauf or equivalent of Johns Manville. All insulation shall have a factory applied low pressure pipe insulation flame retardant white jacket ASJ. Longitudinal lap and 4" wide flame retardant joint seal strips shall be cemented neatly in place with Insul-Coustic Sure Stik white 210 or equivalent.
- D. All insulation materials adhesives, mastics and jacket assemblies shall be UL rated and classified. Ratings shall not exceed:
 - Flame Spread 25
 - Fuel Contributed 50
 - Smoke Developed 50
- E. Fittings and Valves: Fittings and valves shall be insulated with molded fiberglass to form a smooth outer surface with adjacent insulation. Fittings insulation shall be covered with

white vapor barrier cement followed by glass tape and a finishing coat of cement or lagging adhesive, or Zeston Jackets.

- F. Roof drain sumps shall be insulated with 1" thick blanket and covered with an ASJ jacket. Blanket shall be wired on, joints overlapped, pasted and sealed.
- G. Handicap Lavatory Drain and Supplies: Where not covered with shroud provided with fixture, provide handicap lavatory P-trap and supply assemblies insulated with fully molded, TRUEBRO, Handi Lav-Guard insulation kit, Model #102 or equivalent, white in color with 3-piece interlocking trap assembly and 2-piece interlocking angle valve assemblies. Fasteners shall be nylon-type supplied with kit.

1.23 HYDRANTS AND HOSE BIBBS

- A. Exterior wall hydrants shall be Woodford Model B67 backflow protected (ASSE 1052), non-freeze automatic draining, 3/4" size, mounted 24" above grade. Construction shall be brass.
- B. Interior hose bibbs shall be Woodford Model 26, chrome plated, backflow protected (ASSE 1052) hose bibb mounted 18" above finished floor.
- C. Equivalent of J.R. Smith, Zurn, or Josam.

1.24 CLEANOUTS

- A. Cleanouts shall be provided in following locations: On traps except earthenware traps and traps of drain below slab, at ends of and at points in change of direction of drains and branch drains at offsets, at the ends of branch, soil and waste pipes, at base of stacks and leaders, at intervals of not greater than fifty (50) feet, and at other points indicated on plans. Cleanouts shall be of same nominal size as the pipes up to 6", and such cleanouts shall be at least 6" for 8" and larger pipes.
- B. Cleanouts for cast iron shall consist of tapped extra heavy cast iron ferrules, caulked into cast iron fittings with an extra heavy brass tapered screw plug with raised head; cleanouts for steel or wrought iron pipe shall consist of extra heavy brass screw plug in a drainage fitting.
- C. Cleanouts turning up through floor shall be made by means of long sweep ell or "Y" and 1/8" bend, into which shall be caulked an extra heavy cast iron ferrule with an extra brass tapered screw plug with a raised head. This shall be covered with a non-skid deck type cleanout plate brought up flush with finished floor as manufactured by J. R. Smith #4023 FCG. Cleanouts in walls shall be covered with J. R. Smith #4402. Exposed surfaces of floor cleanouts shall be nickel bronze; wall cleanouts chrome plated. Cleanouts in carpeted areas shall be J. R. Smith #4023 YFCU. Cleanouts in tiled areas shall be J. R. Smith #4208 FCU. Equivalents of Zurn or Josam.

1.25 VACUUM BREAKERS AND BACKFLOW PREVENTERS

- A. Provide where indicated and/or as required by code, vacuum breakers, which shall be installed and set at least 4" above the flood level of equipment or fixture to prevent water contamination.
- B. Provide Watts #909- 3/4" backflow preventers for heating and cooling systems and make-up water line.

1.26 WATER HEATER

- A. Provide water heaters as shown on drawings.
- B. Refer to drawing for details.

1.27 DOMESTIC HOT WATER RECIRCULATION PUMP

- A. Circulating Pump: Provide hot water circulating pump as shown. Pump shall be all bronze, bronze body and cast bronze closed type dynamically balanced impeller, carbon and stainless-steel rotary seals, rubber mounted, overload protected flexible steel spring drive coupling porous bronze stainless-steel shaft.
- B. Pump shall be Bell & Gossett Series 100-3/4" flanged 1/12 HP, 1 phase, 120 volts. Pump shall be tested and made tight at 150 psig internal pressure. Pumps shall be capable of pumping 4 GPM at 10-foot head.
- C. Domestic hot water recirculation pumps shall be controlled by a digital timeclock and Aquastat.

1.28 MIXING VALVE

- A. Provide mixing valve for domestic hot water heaters, Symmons Thermostatic Type, Temperature Control, size as shown on drawings.
- B. Mixing valve shall be automatic, adjustable, thermostatic type, of size shown on drawings.
- C. Hot and cold-water inlets shall have integral stops and checks, outlet shall have a thermometer.
- D. Mixing valve Model and installation to be as detailed on drawings.

1.29 PLUMBING FIXTURES

- A. Provide as indicated and described, set in best workmanlike manner and left in first class condition upon completion.

- B. Numbers used are taken from catalog of companies noted, unless otherwise noted all fixtures to be white.
- C. All escutcheons shall be of similar design, smooth pattern. All exposed parts chromium plated, including parts furnished for fixtures by others.
- D. All trim, stops, etc. shall be vandal resistant.
- E. Mounting heights of fixtures for normal and handicap use shall be as directed by Architect.
- F. Before installing fixtures, blow out water lines to remove any foreign matter. Fixtures shall be provided complete with traps, fittings, vents, etc., and in accordance with local plumbing codes, fixtures left complete, ready for use.
- G. Water Closet (Wall Mounted): American Standard "Afwall" 2257.101 wall mounted, elongated bowl, top spud, vitreous china. Provide with Zurn floor mounted carrier and Sloan Solis Flush Valve 8111.1.28 GPF and Church 9500C seat, mount at height as directed by Architect.
- H. Water Closet (Tank Type)-Single Stall: American Standard "Cadet Pro Right Height" 215BA.104 floor mounted, tank type, elongated bowl, vitreous china. Provide with Church 9500c seat.
- I. Lavatory (Undercounter): American Standard "Boulevard" 0610.00, under counter mount, vitreous china, front overflow. Provide with Hansgrohe Metris S Electronic faucet, 0.5 GPM, long life battery powered, Symmons thermostatic mixing valve for each lavatory, grid strainer, pair of loose key stops and cast brass trap and nipple wall flange.
- J. Lavatory (Wall Mounted): American Standard "Decorum" 9134001EC, wall mounted, vitreous china, rear overflow, concealed with arm wall hanger. Provide with Hansgrohe Metris S Electronic faucet, 0.5 GPM, long life battery powered, Symmons thermostatic mixing valve for each lavatory, grid strainer, pair of loose key stops and cast brass trap and nipple wall flange.
- K. Mop Sink: Williams HL 1800-BP, 24" x 24" x 12", high/low, precast terrazzo mop sink. Mount Faucet 36" high on wall behind. Faucet to be American Standard 8344.111 service sink fitting with screwdriver stops in shanks, level handles, vacuum breakers, threaded spout with bucket hook and top brace, 3" drain with strainer. Seal at walls with silicone sealant. Provide integral cast stainless steel cap and stainless-steel splash plates for walls.
- L. Electric Water Cooler and Bottle Filler: Elkay Model LZWS-SS8K, electric water cooler with bottle filler. All parts in contact with water to be lead free, refrigerant R-134a. Unit shall have a capacity of 8.0 GPH. Unit to be ADA compliant. Finish to be stainless steel. Mount at height as directed by Architect. Provide with Elkay filter and mounting frame.

1.30 DRAINS AND INTERCEPTORS

- A. Toilet Room Floor Drains: Zurn Z-415 with seepage pan and membrane clamp. In Toilet Rooms provide with deep seal traps and trap seals.

- B. Mechanical Room Floor Drains: Z-507S.
- C. Kitchen Floor Sink: Zurn Z-1901-KC-19-25.
- D. Kitchen Floor Drain: Zurn-Z415H
- E. Provide underground precast concrete grease interceptor. See drawings for details.

1.31 SHOP DRAWINGS

- A. All manufactured items shall be submitted for review before installation of same. Submission shall be in form of manufacturer's standard printed sheets, pamphlets or bulletins and shall be clearly indicated thereon as to size, type, etc.
- B. Review of submission shall mean review of equipment and/or fabrication as to design and performance only.
- C. Contractor shall be responsible for scheduling quantities, physical size to suit allowable space electrical characteristics, etc.
- D. Any additional costs incurred due to substitution of equipment shall be borne by PC.
- E. The following items require a submission of shop drawings:
 - 1. Plumbing fixtures, and all associated trim
 - 2. Cleanouts and Deck plates
 - 3. Backflow Preventers
 - 4. Pipe, fittings, valves and usage
 - 5. Insulation and covering
 - 6. Hangers and supports
 - 7. Drains
 - 8. Grease interceptor
 - 9. Wall hydrants and hose bibbs
 - 10. Water heater
 - 11. Mixing valve
 - 12. Hot water recirculation pumps and controls
 - 13. Pipe identification materials

1.32 GUARANTEE

- A. Refer to Sections 23 50 00.

END OF SECTION 22 00 00

SECTION 23 00 00

HEATING, VENTILATING AND AIR CONDITIONING

PART 1 – GENERAL

1.1 GENERAL

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. All work shall be in accordance with state and local codes and SED regulations.
- C. HC shall be a firm regularly engaged in the installation of heating, ventilating and air conditioning systems for a period of at least five (5) years and shall have the licenses and certificates required by local, county and state regulations. License/Certificate holder shall be an officer of the firm and have a minimum of five (5) years employment with the firm.
- D. HC shall apply for, obtain and pay for any required permits.
- E. Refer to Section 23 50 00 for Supplementary Conditions for Mechanical and Electrical Work, the requirement of which are part of the Work.
- F. All materials shall be new and without blemish or defects.
- G. Cutting and patching shall be in accord with Section 23 50 00.
- H. Refer to Section 23 50 00 for Coordination Drawing requirements.
- I. HC shall become familiar with drawings of other trades to understand work of other trades and its impact/effect on the HVAC work.
- J. All electrical components shall bear a UL label.
- K. HC shall provide Owner with invoices and other data required for utility rebates.
- L. HC shall fire-stop openings around pipes and ducts passing through floors and walls. Refer to Penetration Firestop System section of the specifications for materials and methods.
- M. The following abbreviations shall apply:

GC - Contractor for General Construction
PC - Plumbing Contractor
FPC - Fire Protection Contractor
HC - Heating (HVAC) Contractor
EC - Electrical Contractor
KEC – Kitchen Equipment Contractor

1.2 QUALITY ASSURANCE

- A. Requirements given herein may be affected by other related requirements of the project specifications. Correlation of contract re-counted is the responsibility of the Contractor.
- B. All HVAC Work on this project shall be governed by this Specification.

1.3 SCOPE OF WORK

- A. HC shall provide all labor, material and appliances required for a complete heating and ventilating installation as shown on Drawings and hereinafter specified, including but not limited to the following principal items:
 - 1. Piping, Fittings, Valves
 - 2. Miscellaneous Water Specialties
 - 3. Sheet Metal Work
 - 4. Insulation and Covering
 - 5. Foundations, Supports, Sleeves and Plates
 - 6. Shop Drawings
 - 7. Start-up, Tests and Adjustments
 - 8. Heat Pump Systems
 - 9. Condensing Boilers
 - 10. Circulating Pump
 - 11. Wall Heaters
 - 12. Unit Heater
 - 13. Exhaust Fans
 - 14. Diffusers, Registers and Grilles
 - 15. Electric Motors, Motor Controllers and Wiring
 - 16. Automatic Temperature Controls
 - 17. Alternate Building Management System (BMS)
 - 18. Guarantee

1.4 WORK IN CONNECTION WITH OTHER TRADES

- A. The following principal items of work will be done under other Sections of these Specifications.
 - 1. Electric Wiring: HC shall furnish motor starters, controls and other electrical equipment as specified and deliver same to EC at job site for installation. EC shall provide all disconnect switches, fuses and wiring. All equipment, trim and controls furnished by others required to be mounted by HC shall be furnished to him for mounting.
 - 2. Responsibility: HC shall be held responsible for correct installation and operating of all material furnished by him under this contract whether or not equipment is installed by him.

1.5 MISCELLANEOUS WATER SPECIALTIES

- A. Expansion Tank: Provide diaphragm expansion tank of size and capacity as shown on drawings. Tank to be constructed for (125 psig) working pressure and to be guaranteed leak proof by manufacturer. Tank to be stamped with "U" symbol and Form U-1 furnished denoting compliance with paragraph U-69 for Construction of Unfired Pressure Vessels Section VIII ASME.
- B. Airtrol Fittings: Provide Airtrol fittings as indicated on drawings. Fittings shall be manufactured by Bell & Gossett or equivalent.
- C. Air Vents: Provide at all high points to eliminate air binding. Use automatic air vents in Boiler Rooms and Equipment Rooms. All automatic air vents shall be approved heavy duty type equipped with tubing and pet cocks for manual venting. All other vents shall be of the manual key operated type. All vents concealed from view shall be accessible through access doors. Vents shall be by Hoffman, Anderson or Bell & Gossett, and unless otherwise noted shall be designed for 125 psig working pressure.
- D. Pressure Relief Valves: Provide pressure relief valves on all systems as shown and/or required by code. Relief valves shall be 125 lb. cast iron body with bronze trim. Drains shall be piped from valves to sump pit or floor drains in Boiler Room. Pressure relief valves shall be Bell & Gossett, Cash or Mueller.
- E. Pressure Reducing Valves: Provide pressure reducing valves on each system when connecting to service water line. Provide check valves and shut off gate valves ahead of reducing valves. Reducing valves shall be Bell & Gossett, Cash or Mueller.
- F. Pressure Gauges: Provide pressure gauges on suction and discharge sides of each pump and as required to check the operation of equipment; pressure gauges shall have 4 ½" diameter dials. Ashton, Ashcroft or approved equal.
- G. Thermometers: Provide thermometers at all locations in piping system as noted on plans and as required to check system performance. Thermometers shall be installed before and after each coil, for each air conditioning unit and on each supply, return fresh air ducts. Mueller, Taylor or Tagliabue, with 9" face 6" well, mercury filled. Provide separable sockets for all thermometers.
- H. Expansion Joints and Flexible Connections: Except as noted, flexible connections shall be provided at the suction and discharge of each circulating pump. Expansion joints shall be provided on each long run of pipe in the amount of approximately one per 40 feet of run; additional joints may be required depending upon the particular conditions to provide adequate piping support. Expansion loops may be used in lieu of joints but are subject to approval as to length and width. Joints shall be of the corrugated compensator type as manufactured by Flexonics Corporation, Maywood, Illinois or approved equal.

1.6 PIPING, FITTINGS, VALVES

- A. Piping:

1. Circulating Hot Water, and Cold-Water Make-Up Piping: Copper tubing, Type "L" hard temper for 2 ½" and smaller, soldered joints.
2. As an alternating for piping 2" and smaller Uponor straight length PEX-A joined with Uponor Pro Pex expansion fitting maybe used for mains and listed Uponor Pex-a tubing joined with Pro Pex expansion fitting may be used for branches. Piping connection to equipment to be Type A Copper except in Mezzanine.
3. Piping run under slabs shall be PEX tubing installed with Armaflex insulation. Runs shall be continuous without joints or fittings below the slab.
4. Condensate Drain Piping: Copper tubing, Type "M", hard temper with soldered joints using DWV fittings.
5. Refrigerant Piping: Type ACR copper tubing with brazed joints, up to branch box and line sets from branch box to heat pump unit. Piping to comply with ASTM B 280. All joints to be brazed.
6. Piping for VRF system to have brazed joints.
7. Line set piping to be labeled to identify unit served and neatly bundled.
8. All solder shall be Silverbrite, lead-free.

B. Fittings

1. All fittings for copper tube shall be wrought copper joined using Silverbrite lead-free solder. Unions of brass pattern shall be used as required to facilitate the removal of equipment or accessories in connection with copper tube. Flanges shall be used on connections greater than 2". Fittings to be in accordance with ASME B16.18

C. Valves

1. Provide shut-off valve to isolate each item of equipment for maintenance service and replacement, provide balancing valve or cock to adjust flow.
2. Valves for pipe sizes of 2 ½" or less shall be Apollo 70-200 or Milwaukee Series 150, for sizes 3" and larger Milwaukee Series C, lug type butterfly valves shall be provided.
3. Balancing valves shall be of Victaulic, Model 78K head cock type. Provide custodian with at least two operators use with balancing valves. Balancing valves shall be the same size as the adjacent piping.
4. Check valves shall be of the horizontal swing check type with brass or bronze working parts and removable disc except where lift check valves shall be used on the discharge side of circulating pumps.;
5. Where combination shut off and balancing valves noted on plans, provide a shut-off valve and a Bell & Gossett circuit setter.
6. Valves for chilled piping to have extended stems to permit installation of full thickness insulation.

D. Dielectric Fittings:

1. Piping connections between dissimilar metals shall be made with dielectric fittings or insulating fittings to prevent electrolytic corrosion. Dielectric fittings shall be of the screwed union type as manufactured by EPCO.

E. General Piping

1. Run, arrangement, position, connections, etc., of equipment and materials shown on the Drawings shall be taken as a close approximation to a true position and, while they shall be followed as closely as possible, right is reserved to change locations, etc., to accommodate any condition which might arise during progress of the work without additional compensation to Contractor for such changes.
2. Runs shall be straight and direct, forming right angles or parallel lines with building walls and other pipes, and be neatly and evenly spaced. Offsets will be permitted only where necessary to allow pipes to follow walls.
3. Responsibility for accurately laying out work rests with Contractor. Should interference occur, the Engineer's decision shall be final. Where so shown or required, piping shall be concealed in building walls or above ceilings.
4. Horizontal runs, except where concealed in partitions shall be kept as high as possible and close to walls. Cooperate with other trades that grouped lines will not interfere with each other.
5. Contractor shall take special care in supporting pipe to provide for expansion and venting. Pockets and traps shall be avoided but where required, shall be provided with drains. Provide air vents at all high points.

1.7 PIPING IDENTIFICATION, CODING AND PAINTING

- A. All piping in Boiler, Fan, Storage and Equipment Rooms and all piping above accessible ceiling shall be coded and identified as herein specified.
- B. Apply color-coded polyvinyl chloride pipe bands identifying pipe contents and direction of flow.
- C. Apply bands on 15' centers on piping in Equipment Rooms and 25' elsewhere on straight runs; at valve locations at point where piping enters and leaves a partition, wall, floor or ceiling.
- D. Apply bands at exit and entrance points to each vessel, tank or piece of equipment.
- E. Bands width shall be 8" for pipes up to 10" diameter and 16" wide for larger diameter piping. Letter heights stating service shall be preprinted on band, 3/4" high for 16" bands.
- F. For insulated pipes, apply bands after insulation and painting work has been completed.
- G. Provide 4 additional bands of each type for future use by Owner's personnel.
- H. Follow manufacturer's instructions for application procedures using noncombustible materials and contact adhesives.
- I. All piping shall be color coded in full accordance with ANSI 13.1, 1981 Standards. Pipe markers shall be as manufactured by Seton Name Plate Corp., or equivalent.
- J. All piping which is not insulated, tanks and equipment in Boiler Rooms shall be painted. Equipment provided with a factory finished coating shall be cleaned and touched up as necessary. Equipment provided with a factory primer shall be given two (2) coats of enamel paint after installation. Pipes, hangers, support and equipment shall be primed

and given two (2) coats of enamel paint. Color for piping and tanks shall be in accordance with ANSI 13.1, 1975 Standard, color of equipment and supports shall be as directed by Architect.

1.8 SHEET METAL WORK

- A. Provide all sheet metal work for all systems shown on Drawings, including all required register boxes, diffuser collars, balancing dampers, fire dampers, and auxiliary work necessary to make the various system complete and ready for satisfactory operations.
- B. Except as noted, all sheet metal for systems shall be fabricated of galvanized steel. Galvanized sheet metal shall be of the best grade. Ducts shall be constructed, braced and reinforced and of a gauge thickness in accordance with SMACNA Duct Manual, latest Edition.
- C. Duct sealant to be UL181 A-M B-M listed
- D. Galvanizing must not peel or crack and surfaces must be smooth and free of foreign matter.
- E. Round and flat oval ductwork shall be factory fabricated, spiral galvanized, Semco or equivalent. Thickness shall be one gauge heavier than standard. Fittings shall be factory fabricated continuous weld galvanized steel; Semco, Accuflange or equivalent, thickness to be 20 gauge minimum. Duct and fittings to include SEMCO Powder coating. Color as per Architect include matching screws and accessories. Gymnasium: single wall ductwork and fitting.
- F. Outside air ductwork shall be of aluminum construction.
- G. Boiler and water heater vent and intake to be sized and installed pursuant to manufacturer's installation instructions
- H. Any duct connections made with holes or open corners shall be opened and redone or soldered tight at the discretion of the Architect. No caulking compound shall be used to cover imperfect workmanship. Panels shall be cross-creased for stiffness and supported with braces, ties and angles to prevent buckling.
- I. All Ductwork: Provide suitable balancing dampers as shown on Drawings or as required for proper distribution and balancing of airflow.
- J. Dampers shall be of the multiblade type unless otherwise indicated, with quadrants and locking devices. Furnish and install a splitter damper or butterfly damper at each branch takeoff.
- K. Outside air and shutoff dampers shall be Class 1 motorized dampers with an air leakage rate not greater than 4 cfm/ft² of damper surface area at 1.0-inch water gauge and shall be labeled by an approved agency when tested in accordance with AMCA 500D for such purpose. Outdoor air intake and exhaust dampers shall be installed with automatic controls configured to close when the systems or spaces served are not in use or during unoccupied periods except when used for economizer cooling.

- L. Double radius turning vanes shall be provided in all square elbows.
- M. Flexible ductwork shall be insulated, UL181 listed Class 1, length of runs shall not exceed 4'-0", and runs shall not pass-through walls or partitions. Connections to rigid ductwork and diffusers shall be double banded. Thermaflex flex flow elbows shall be provided at all diffuser connections. Flexible ductwork shall not be used for return or exhaust service.
- N. Access doors shall be provided in all casings and ductwork for access to coils, and filters, dampers, fresh air intakes and all other such equipment and locations requiring maintenance or periodic inspection. Where doors are installed in insulated casings, or ducts, these doors shall be double thick steel with an insulated core. Access doors shall have continuous piano hinges and slide bar bolt locks with gasketed edges. Furnish ceilings and wall access doors for access to heating and ventilating equipment as specified.
- O. Acoustic Lining:
 - 1. Acoustic liner shall be fiber free, Armaflex sheets.
 - 2. Installation shall be in accord with manufacturer recommendations.
- P. Dishwasher exhaust duct shall be aluminum. Provide drains at low point and at fans. Extend drains to floor drain with PVC pipe and fittings.
- Q. Louvers will be provided by HC.
- R. Clothes dryer exhaust duct to be aluminum. Provide cleanouts at each side of booster fans and at changes in direction.
- S. Boiler and water heater vents and intakes to be factory fabricated stainless steel, listed system.
- T. Kitchen hood exhaust duct shall be 16 gauge black iron with all welded construction. As an alternate, UL listed double wall insulated stainless steel ducts maybe used.

1.9 UNDER FLOOR DUCTWORK

- A. Under floor ductwork shall be Blue Duct, HDPE duct as manufactured by AQC industries.
- B. Under Floor Duct System
 - 1. Complete duct system (including: plenums, round duct, run-out, diffusers boots, etc) must be from one manufacturer and be the same material, construction and connection method throughout. Field made duct components are NOT acceptable.
 - 2. Include the complete underground duct system including plenums.
 - 3. Unless otherwise noted, all duct and fittings shall be constructed per SMACNA's Duct Construction Standards (+10= w.g.).
 - 4. Provide elbows, duct, diffusers, plenum, clamp & gasket, boots, saddle registers and caulk as required for underground installation.

5. Ductwork shall be closed cell plastic material that is recyclable, does not emit volatile organic compounds, and conforms to ASTM-D2412. Ductwork shall be resistant to mildew, mold (UL 181B), and radon gas (BSS 7239-88). Ductwork shall not rust or crack under external stress or strain. Ductwork shall have integral R-10 equivalent thermal insulation value, without the use of external insulation, per NSF's P374 Protocol and verified by a NSF Thermal Testing Report.
6. All joints shall be sealed via gasket or bolts and sealant. Clamps and gasket shall be used on ductwork without flanges. Clamps shall be polyethylene with stainless steel plates and stainless steel screws. Gasket shall comprise of 1/4" thick butyl rubber sealant tape that is water and UV resistant and shall not stain. Gaskets shall comply with ASTM-E84 for flame and smoke spread.
7. Flanged joints and duct branches shall use a co-polymer adhesive caulking sealant that is water and UV resistant. Flanges shall be connected with stainless steel bolts.
8. Duct system shall be installed by an AQC Industries trained installer.
9. Duct system performance shall exceed SMACNA's Leakage Class 3 requirements at the system design static pressure.
10. Duct system shall carry a 10 year Limited Warranty.

C. Installation

1. Follow the Blue Duct Installation Instruction provided by AQC Industries. It is strongly recommended to complete installation training provided by AQC Industries prior to installation.
2. Excavate a trench evenly as per The Blue Duct Installation Instructions. No bedding is required except for cases of bedrock or clay where sand or light aggregate may be used.
3. Ducts shall be pressured tested prior to backfill.
4. Backfill material must consist of pea gravel or dry silica sand, placed and compacted in lifts of 12" or less.
5. The sealant and gasket material provided by AQC Industries must be used as directed. The use of non-approved sealant or gasket will void warranty.

D. Testing

1. The complete underground duct system shall be tested for leakage after final assembly.
2. Follow SMACNA air duct leakage test standard.
3. Allow 24 hours for The Blue Duct sealant to cure after final assembly before testing the duct system. Additional curing time may be required in high ambient conditions.

E. Cleaning

1. Remove dust and debris from ductwork prior to occupancy.

1.10 INSULATION AND COVERING

A. General:

1. Insulate all piping, ductwork and equipment as herein noted.

2. All insulation work shall be performed under this Section.
3. All joints shall be butted firmly together. All insulation shall be installed in accordance with best practice of the trade and in accordance with manufacturer's recommendations. All workmanship shall be done so as to leave a smooth finish with no raveled edges.
4. Fittings shall be insulated with preformed sections and covered with Zeston fittings.
5. Provide high density insulation inserts under pipe supports and hangers.
6. For all piping, end joint strips and overlap seams shall be adhered with a vapor barrier mastic and stapled with outward clinch staples on 4" centers.
7. High density inserts and galvanized sheet metal shield shall be provided to maintain continuous insulation valve.
8. All insulation materials, adhesives, mastics and jackets assemblies shall be UL rated and classified. Ratings shall not exceed:

Flame	25
Fuel Contributed	50
Smoke Developed	50

9. Circulating Hot Water, and Cold-Water Make-up: Insulate piping with 4 lb. per cubic feet density glass fiber with maximum "K" factor of 0.24 at 75°F. mean temperature, with factory applied ASJ vapor barrier jacket. Joints and ends of well water piping shall be vapor sealed.

Thickness:	2" for pipe sizes 1½" and larger
	1" for pipe sizes 1 1/4" and smaller

10. Condensate Drain Piping: Same as for cold water piping, thickness, ½".
11. Refrigerant Piping: 1" Armaflex, coat exterior piping with approved UV protective paint.
12. Air Separator for circulating hot water
 - a. Air separator including flanges to be wrapped with 2" thick fiberglass blanket having a foil skim vapor barrier, with all joints taped and sealed.
 - b. An ASJ cover shall be provided.

B. Ductwork:

1. Air conditioning supply, return and outside air ductwork shall be insulated as herein noted. Insulation shall be omitted from ductwork exposed in air-conditioned spaces and from underground ductwork.
2. External Insulation: Exposed to view indoors, all outdoor ductwork in fan and Mechanical Rooms; 6 lbs. density fiberglass board with reinforced ASJ jacket and corner beads. Insulation shall be wired on, impaled and all joints sealed with tape.
3. Not exposed to view (e.g., above hung ceiling) fiberglass blanket with FRJ aluminum jacket. Blanket shall be wired on, with all joints overlapped, pasted and sealed.
4. Thickness: All air conditioning ducts shall be insulated. Ductwork exposed in conditioned spaces shall not be insulated. Unless otherwise noted, thickness as follows:

Indoor Supply	2" thick
Indoor Return	2" thick
Outside Air	3" thick

1.11 KITCHEN HOOD EXHAUST DUCT

- A. Insulate with two (2) layers of 1 ½" thick listed fire wrap.
- B. Fire wrap insulation may be omitted if listed double wall, insulated duct is installed.
- C. Insulate Dishwasher exhaust duct and fan with 1" thick fiberglass blanket with all joints and seams taped.

1.12 FOUNDATIONS, SUPPORTS, SLEEVES AND PLATES

- A. Unless otherwise noted, HC shall provide all foundations, hangers, and supports for his equipment including piping, air conditioning units, fans, fin pipe radiation and covers, ductwork, etc.
- B. All ductwork, piping, wiring, and equipment shall be hung or supported from structural members only.
- C. Ductwork shall be supported in accord with SMACNA Standards.
- D. Piping:
 - 1. All pipe shall be supported from building structure in a neat and workmanlike manner wherever possible, parallel runs of horizontal piping shall be grouped together on trapeze hangers.
 - 2. Piping shall be supported by adjustable wrought iron, steel or malleable iron hangers. Pipe hangers, supports, etc., shall be primed with a coat of rust inhibitor primer. Hangers shall be of the clevis type selected to conform to the maximum recommended loads. Do not hang piping or equipment from work of other trades. Attachment to beams or joists shall be made with top beam or I-beam clamps that attach to both sides of the flange.
 - 3. Hanger rods shall be steel threaded with nuts and lock nuts, size in accordance with the following schedule:

Pipe Size	Rod Size (diam)	Spacing
Up to 1 ½"	3/8"	6'-0"
1 ½" to 3"	3/8"	8'-0"
4" to 5"	5/8"	10'-0"
6" and over	¾"	12'-0"

- 4. Hanger spacing as above, but not over 18" from each change in direction of piping.
- 5. Vertical Pipe: Vertical piping shall also be supported on every floor with riser clamps.

6. Hangers: Hangers used to hang galvanized-coated pipe shall be galvanized. Hangers used to hang ungalvanized steel, pipe shall be steel. Hangers used to hang brass or copper pipe shall be brass or copperized steel or iron. Groups of pipes may be supported on a common trapeze, but pipe shall individually be permitted freedom of motion by roller or other approved support. Trapeze shall be made of angle iron with adjustable threaded steel rod supports.
7. Spacers: Groups of risers and horizontal running lines shall be provided with temporary spacers to maintain spacing and allow for separate pipe covering and maintenance.
8. Perforated Strap: Perforated strap iron and temporary wire supports are not permitted.
9. Hangers shall support piping from building structure to maintain required grade and pitch of pipelines, prevent vibration, secure piping in place, and provide for expansion and contraction. Hangers shall be secured to inserts wherever practical. Pipe supports shall give neat appearance. Provide clad shield where copper tubing is utilized.
10. Approved bolts and inserts shall be used for connecting supports, fixtures or equipment to masonry, wood plugs shall not be used.
11. Provide approved sheet metal shields to protect insulation at areas of contact with hangers and supports. Provide protective saddles as required, installed in approved manner. Shields to be "Insul-Shield" Insul-Coustic Corp.
12. Piping on side walls shall be supported from approved roller type brackets in sizes larger than 2" and "J" type for smaller sizes or from metal channels with adjustable brackets secured to wall.
13. All supports shall be fastened to structural members or additional steel supports provided by HC. Supports shall be attached to joist panel points.
14. Where pipes pass through masonry, concrete walls, foundations, or floors, HC shall set such sleeves as are necessary for passage of pipes. These sleeves shall be of sufficient size to permit 1" of insulation to be provided around pipe passing through. HC shall be responsible for exact location of these sleeves.
15. Sleeves shall not be used in any portion of building where use of same would impair strength or construction features of the building. Insert for supporting lateral pipes and equipment shall be placed and secured to form work, and all sleeve insert locations shall be thoroughly checked with Architect so as not to conflict with other trades.
16. Where pipes pass through floor or walls, they shall be provided with chromium plated escutcheons.
17. Unless otherwise noted, auxiliary steel supports for support of piping, ducts and mechanical equipment as required for particular applications or as directed and indicated on Drawings shall be by HC. All equipment hung from overhead construction shall have weight or equipment distributed by use of angle or channel iron beams as necessary and approved or substantially fastened to beams used for building structural support.
18. All operating equipment shall be supported so as to produce the minimum amount of noise transmission.
19. Provide vibration isolation devices for equipment having moving parts.
20. Floor mounted equipment shall be installed on 6" high reinforced concrete pads, provided by HC.
21. Hydronic and refrigerant piping to be installed and supported per Section 305 of the 2015 International Mechanical Code and be supported at distances not to exceed spacing in Table 305.4 or in accordance with ANSI/MSS SP-58.

22. Vibration rails and spring pipe hangers shall be provided for base mounted circulating pump.

1.13 SHOP DRAWINGS

- A. All manufactured items shall be submitted for review before installation of same. Submission shall be in form of manufacturer's standard printed sheets, pamphlets or bulletins and shall be clearly indicated thereon as to size, type, etc.
- B. Before fabricating any work, HC shall prepare and submit drawings of all ductwork and complicated piping including coordination of lighting, ceiling grid, structural steel and connections to related equipment showing all dimensions and details of construction and installation. No work is to be fabricated until shop drawings are reviewed. Shop drawings shall be 1/4" equal to 1'-0" minimum scale.
- C. Review of submission shall mean review of equipment and/or fabrications as to design and performance only. Contractor shall be responsible for scheduling quantities, physical size to suit allowable space, electrical characteristics, etc.
- D. Any additional costs incurred due to substitution of equipment (e.g., electrical, structural, etc.) shall be borne by HC.
- E. The following items require a submission of shop drawings:
 1. Piping Material
 2. Ductwork
 3. Insulation
 4. Pipe and Equipment Identification Material
 5. Heating Hot Water
 6. Water specialties
 7. Supports and Hangers
 8. Exhaust Fans
 9. Circulating Pumps
 10. Wall Heaters
 11. Unit Heater
 12. Air Handling Units
 13. Heat Pump Systems
 14. Diffusers, Registers and Grilles
 15. Motor Controls
 16. Variable Frequency Drives
 17. Louvers
 18. Automatic Temperature Controls
 19. Building Management System (BMS)-Alternate

1.14 START-UP, TESTS AND ADJUSTMENTS

- A. Unless otherwise specified, all new water piping systems shall be hydrostatically tested to 100 psig. Test shall be four (4) hour duration, during which time piping shall show no leaks and during time no sealing of leaks will be permitted.

- B. HC shall balance out all air and water systems and submit test reports showing operational data to include the following:
 - 1. Motor power consumption for fans and pumps
 - 2. Air quantities at each outlet
 - 3. Fan RPM, air quantities, motor amperages
 - 4. Pump suction and discharge pressure and motor amperages
 - 5. Water flow quantities at all equipment, circuit setter locations and at pumps
- C. Balancing shall be done by a certified balancing firm, NEBB, AABC, TABB.
- D. An allowance of six (6) additional four (4) hour periods shall be made to rebalance air and/or waterflows, if found necessary.
- E. HC shall furnish services of a qualified person, thoroughly familiar with job, to operate and make all adjustments so that system and control equipment shall operate as intended. This person shall make adjustments including balancing of water and air systems in cooperation with qualified representative of mechanical equipment manufacturers and temperature control manufacturer. Architect is to be notified when this balancing is to be performed.
- F. When all work is in an acceptable operating condition, Owner shall be furnished with trade literature, parts lists, and operating instructions for all equipment furnished. Contractor shall furnish one glass framed set and two sets not framed of operating and maintenance instructions, control circuits, and charts with the number of all critical valves corresponding to 2" brass numbered valve discs chained to these valves to Architect.
- G. Final inspection and review shall be made only after proper completion of all of the above requirements.
- H. As part of the operating and maintenance manual HC shall provide a detailed listing (in a bound book) of the equipment installed.
- I. As a minimum the listing shall include:
 - 1. Unit type
 - 2. Unit designation
 - 3. Unit location
 - 4. Area or areas served by unit
 - 5. Starter location
 - 6. Unit manufacturer
 - 7. Model number
 - 8. Scheduled Capacity
 - 9. Electrical, Volts, Phase, Amps
 - 10. Motor HP
 - 11. Filter type, quantity and sizes
 - 12. Belt quantity and model

1.15 HEAT PUMP SYSTEMS

- A. Provide Mitsubishi Trane as specified and scheduled on drawings.
- B. Provide 10-year extended warranty.

1.16 GAS FIRED CONDENSING BOILER

- A. Provide one (1) gas-fired condensing boilers describe on drawings and specified herein.
- B. Reference standards
 - 1. American Society of Mechanical Engineers
 - ASME Boiler & Pressure Vessel Code, Section IV – Rules for construction of heating boilers
 - ASME CSD-1 – Controls and safety devices for automatically fired boilers
 - 2. American National Standards Institute
 - ANSI Z21.13/CSA 4.9 – Standard for gas-fired low-pressure steam and hot water boilers
 - 3. Air Conditioning, Heating and Refrigeration Institute
 - BTS 2000 Testing Standard – Method to determine efficiency of commercial space heating boilers
 - 4. National Fire Protection Association
 - NFPA 54- National fuel gas code
- C. Submittals:
 - 1. Product submittal sheet: Provide submittal data sheet which lists performance, features, standard equipment and optional equipment.
 - 2. Capacities and pressure drop: Provide total water capacity, expected pressure drop, gas pressure range, maximum length of vent/air intake piping and shipping weight.
 - 3. Dimensional drawings: Provide detailed dimensional drawing that shows overall length, width and height along with locations of all water, exhaust, air inlet, gas inlet and condensate drain connections.
 - 4. Manufacturer's instructions: Provide installation, operating and maintenance instruction, including detailed wiring diagrams showing all required electrical connections.
 - 5. Electrical ratings: Provide electrical supply specification including current draw of the appliance and maximum rated draw of circulating pumps.
- D. Regulatory Requirements:
 - 1. Boiler pressure vessel to be designed, constructed and tested in accordance with Section IV of the ASME boiler and pressure vessel code entitled, "Rules for construction of heating boilers"

2. ETL listed in the United States and Canada. Certified in accordance with ANSI Z21.13/CSA 4.9 by Intertek Testing Services NA Inc.
3. Each boiler shall be listed in the AHRI Certification Directory and shall bear the AHRI Certified Logo.
4. Designed to meet ASME CSD-1 requirements for Controls & Safety Devices without additional separate equipment.
5. Tested by Gas Consultants, Inc. in accordance with Rule 1146.2 Administration Certification Program for California's South Coast Air Quality Management District (SCAQMD) for NOx compliance (14 ng/J or 20 PPM corrected to 3% O₂).

E. Quality Assurance:

1. Each boiler is supplied with a manufacturers data report for Watertube boilers, Form H-3, which provides full traceability for all pressure vessel parts to their raw materials.
2. Each boiler is factory tested by the manufacturer to assure proper operation of the heating system.
 - a. The factory testing includes testing of each burner individually and both burners together at low fire and high fire.
 - b. A factory test report showing the satisfactory results of all combustion and controls tests is supplied with each boiler.

F. Warranty:

1. 10-year limited Heat Exchanger warranty.
2. 1 year parts warranty
3. 1 year labor warranty (registered providers)
4. Available extended service plans

G. Manufacturers:

1. Navien.
2. Equivalent conforming to these specifications.

H. Performance:

1. Full Load Thermal Efficiency 96% minimum as tested in accordance with BTS-2000, Method to Determine Efficiency of Commercial Space Heating Boilers by AHRI.
2. Fully Modulating boiler(s) with 10:1 input turndown ratio capability.

I. Construction:

1. Fully assembled, packaged, water tube, condensing boiler design certified for zero clearance to combustible construction and approved for installation on combustible floors.
2. Pressure vessel to be designed, constructed and tested in accordance with Section IV of the ASME Boiler and Pressure Vessel Code for a maximum allowable working pressure of 160 psig and a maximum temperature of 210°F.

3. All heat exchangers surfaces must be constructed of high-grade stainless steel to prevent corrosion due to acidic condensation.
4. The heavy gauge jacket and support structure shall be factory designed to allow stacking of identical units up to two high.
5. The boiler shall have removable jacket panels to allow access for cleaning, inspection and service.
6. The heat exchanger shall be designed with dual combustion chambers to facilitate dual combustion system.
7. Leveling legs shall be provided to assure level installation of the boiler on uneven floors allowing for proper condensate drainage.
8. The exhaust connection shall be 6" stainless steel with a factory supplied adapter to 6" PVC.
9. The air inlet connection, if required, shall be suitable 6" diameter plastic or metal pipe.
10. The water connections shall be 2" NPT supply (outlet) and return (inlet).
11. The gas inlet connection shall be 1-1/4" NPT.
12. Connection for the condensate drain shall be a 3/4" hose barb fitting.
13. Maximum dimensions: 46" high x 27" wide x 40" long.

J. Combustion System:

1. A dual, tandem, fully modulating, combustion system shall be provided to provide a maximum boiler turndown ratio of 10:1.
2. Pneumatic gas valves shall be used to provide a consistent fuel/air ratio throughout the modulation range. The valve is to be mounted on the inlet to the combustion air fan to provide a thorough fuel/air mixture.
3. Combustion air fans shall be powered by an electronically commutated brushless DC motor controlled with a pulse width modulated input with tachometer feedback to the control system.
4. Combustion air fans shall have integral venturi mixers to maximize fuel input capability with minimum electrical energy input.
5. Ported, cylindrical, premix burner heads with a metal mesh sleeve shall be used in each combustion chamber.
6. Flame supervision on each burner shall be through both the flame sensor and the ignition electrode for reliable operation.
7. Ignition of the main flame shall be achieved by a direct spark from a high energy ignition system.
8. Each combustion system shall incorporate a "flapper" valve to prevent back flow of combustion gases through an inactive burner while the other burner is operating.

K. Electrical:

1. Electrical control cabinet with removable terminal strips for easy connection of power supply wiring, circulating pumps, outdoor sensor and central heating and/or domestic hot water demand signal wires.
2. Electrical knockouts on the rear jacket support panel for all required component connections.
3. Two service switches for interrupting power to individual control circuits.

L. Control:

1. Dual integrated control systems to provide primary safety functions, temperature operating control and burner sequencing.
2. Integrated manual reset high limit and low water cutoff inputs to meet CSD-1 requirements.
3. Factory installed high and low gas pressure switches.
4. Factory installed vent temperature limit switch.
5. Plain English display interface to explain burner operation and current status of each burner.
6. Front pixel display shows status, current supply temperature, target temperature, modulation rate of each burner, outdoor temperature, boiler demand type.
7. Easy access to status of all connected boilers through the master boiler pixel display.
8. Dual temperature operation to allow one boiler reset temperature target and one setpoint target for domestic hot water input. Configurable for two fixed setpoints if required.
9. Factory equipped to allow control and sequencing of up to 16 boilers.
10. Factory equipped for connection to serial communication (Modbus) from building management systems.
11. Factory equipped with alarm contacts for remote annunciation of fault conditions.
12. Installer/Service Menu allows flame signal status, logging of flame signal during the last ignition sequence, fault history, service notification, presets for reset calculation parameters.
13. Control features for efficient operation:
 - Warm Weather Shutdown
 - Anti-Cycling Logic
 - Temperature Boost
14. Central Heating Modes: Multiple central heating modes.

M. Exhaust/Air Inlet:

1. Boiler(s) shall be suitable for direct, positive pressure exhaust operation with outside or indoor air.
2. Boiler(s) shall include a stainless-steel drain tee (shipped loose) with condensate connection to the neutralization system.
3. Boiler(s) shall be designed to allow a single vent connection from a standalone boiler and common venting from multiple boilers.
4. Boiler(s) shall incorporate a vent temperature sensor with control logic to limit the boiler input to regulate vent temperature if a problem should occur.

N. Condensate System:

1. Boiler(s) are to include built-in condensate trap with neutralization.
2. The condensate collector shall allow visual inspection of neutralizer charge.
3. Boiler(s) shall incorporate a blocked condensate switch to prevent operation condensate to back up into the combustion area.

O. Additional Components (Loose):

1. ASME Rated pressure relief valve rated for the full input of the boiler at 30 psig relief pressure.
2. Hardware required to mount ASME relief valve to supply connection.
3. Temperature/Pressure Gauge – 0-200°F & 0-75 psig, 2 ½" Diameter.
4. Outdoor Sensor
5. Auxiliary low water cut-off.

1.17 UNIT HEATERS

- A. Provide where shown on the drawing's unit heaters of the type and capacity noted, as manufactured by Sterling or equivalent.
- B. Casings: Shall be heavy gauge steel, phosphatized for rust and corrosion prevention and painted with a baked enamel. Casings shall be equipped with weld nuts for threaded hanger rods. All hardware shall be plated for rust resistance.
- C. Motors: Shall be rubber mounted to safety wire guards of solid brass. Motors shall be built to NEMA Standards and shall be selected and tested for each unit heater.
- D. Coils: Shall be constructed with steel headers, seamless copper tubes hydraulically expanded into die formed aluminum fin collars. All copper to steel joints shall be made with high temperature brazing material. Coils shall be tested at 150 psi hydrostatic pressure.
- E. Fans: Shall be constructed of aluminum and shall be factor balanced.
- F. Air Diffusers: Provide with individually adjustable four-way discharge louvers.

1.18 WALL HEATERS

- A. Provide where shown on the Drawings, wall heater as manufactured by Smiths.
- B. Units shall be designed to fit between wall studs or surface mounted.
- C. Motor shall be shaded four-pole type, two speed, 1400 and 900 RPM.
- D. Air vent and reverse acting Aquastat shall be provided with unit.

1.19 CIRULATING PUMPS-IN-LINE

- A. Pumps shall be of size and capacity indicated on plans and shall be Grundfos Magna Series 3 series or equivalent.
- B. Pumps shall be In-Line type, close-coupled, single stage design, for installation in vertical or horizontal position, and capable of being serviced without disturbing piping connections.

- C. Pumps shall be rated for minimum of 175 psi working pressure. The pump case shall have gauge tapping's at the suction and discharge nozzles and will include vent and drain ports.
- D. Motor high efficiency type and shall meet NEMA specifications and shall be the size, voltage and enclosure called for on the plans. It shall have heavy duty grease lubricated ball bearings, completely adequate for the maximum load for which the pump is designed.
- E. Each pump shall be factory tested, it shall then be thoroughly cleaned and painted with high-grade machinery enamel prior to shipment. A set of installation instructions shall be included with the pump at the time of shipment.

1.20 EXHASUT FANS

- A. Provide exhaust fans as scheduled on drawings.

1.21 LOUVERS

- A. Provide louvers as scheduled on drawings.

1.22 AIR HANDLING UNITS

- A. Provide air handling units as scheduled on drawings.

1.23 DIFFUSERS, REGISTERS AND GRILLES

- A. Provide where shown on Plans, diffusers, registers and grilles of sizes and types indicated on Drawings. Unless otherwise noted on Plans, units shall be by Price or equivalent.
- B. Catalog numbers and performance data are based on Models scheduled on Drawings. Noise levels of all air terminals shall not exceed those of units specified.
- C. Velocity of air in the breathing zone shall not exceed 40' per minute.
- D. A complete schedule of diffusers, registers and grilles shall be prepared and submitted for review.
- E. Finish and color selected by the Architect.
- F. All air terminals shall be furnished by the manufacturer with sponge rubber gaskets around the frame periphery to provide an air tight seal against the wall or ceiling into which the air terminal is set. Gaskets shall be no less than 1/4" thick and shall be securely glued to the inside surface of the frame.

1.24 ELECTRIC MOTORS

- A. High efficiently motors shall be provided with all of the equipment furnished under this section.

1.25 ELECTRIC MOTORS, MOTOR CONTROLLERS AND WIRING

- A. HC shall furnish all necessary electrical controls, motor starter, switches, etc., for proper operation of equipment furnished by him under this Contract, and as herein noted.
- B. Separate magnetic starter with phase protection and thermal overload protection shall be used for all motors 1/2 HP and over. For motors 20 HP and above, provide reduced voltage starters.
- C. Separate manual starter with thermal overload protection for all motors 1/3 HP and under.
- D. Provide non-fused disconnect switches at exhaust fans.
- E. Electric service is 120/208 volt, 3 phase, 4 wire, 60 cycle. All motors 1/2" and under 1/2 HP shall be wired for 120-volt, single phase; motors 1/2 HP and over shall be 208 volts, 3 phase, exceptions as specified.
- F. All starters shall have Hand-Off-Auto push buttons and pilot lights.
- G. Provide all auxiliary contacts and controls required for interlocks and automatic operation of HVAC equipment as noted under temperature control specifications. Control circuit voltage shall not exceed 120 volts. Provide fused control transformers where required.
- H. HC shall be responsible for the proper electrical connections which will be done by EC and shall supply said EC with all necessary wiring diagrams to complete this installation.

1.26 AUTOMATIC TEMPERATURE CONTROL

- A. Provide all labor and material for a complete electric/electronic low voltage system of temperature controls.
- B. Work shall be complete in all respects, including labor, transformers, materials and necessary services, and shall be installed by competent mechanics regularly employed by the control manufacturer.
- C. The Sub-Contractor performing this work shall be a prime manufacturer presently engaged in the manufacture of direct digital temperature control systems. Installation shall be by factory-trained personnel regularly employed by the control's manufacturer.
- D. Control manufacturer shall maintain an adequate stock of spare parts and necessary service personnel locally to maintain and service the systems being installed and/or refurbished.

- E. Service personnel shall be equipped with the control manufacturer's approved tools, testing and calibrating apparatus necessary to perform the work specified herein.
- F. Complete control drawings shall be submitted for approval before field installation is started. The drawings shall give a complete description of all control elements complete air and water flow diagrams locating instruments, valves, etc. and show all schematic piping and wiring. In addition, the submittal shall include manufacturer's data sheets on each control component and a sequence of operation.
- G. All electrical wiring, including but not limited to line voltage, low voltage and miscellaneous conduit, connections, etc., required for the installation and operation of the ATCS, is to be provided by the H.C. Wiring methods and materials to be as specified in section.
- H. Installation of Valves and Wells: Automatic temperature control valves, separable wells, duct mounted devices and other pipe mounted control devices furnished shall be installed by the H.C.
- I. Installation, Service and Adjustment:
 - 1. On completion of job, complete adjust the control system. Instruct Owner's representative on the operation of control system and supply three (3) copies of control operating and instruction and maintenance manuals. Obtain from the Owner's representative a signed receipt that he has received the instruction manuals and complete instruction of the operation of the system.
 - 2. The control manufacturer shall guarantee the system and provide full-service contract (normal and emergency) for a period of one year from the date of substantial completion, at no additional cost to the Owner.
 - 3. Full-service contract shall include emergency service with a response time of four (4) hours during the normal workday and eight (8) hours nights and weekends.
 - 4. Normal service shall include a minimum of four (4) visits to check systems, calibrate controls, replace any parts and perform preventive maintenance.
 - 5. A written report of work performed shall be provided to the Owner after each visit.
 - 6. Service contract shall include all labor, parts and material required to maintain systems in top conditions.
- J. Material Requirements:
 - 1. General: All components shall be of the latest type produced by the control manufacturer.
 - 2. Thermostats and/or sensors shall be mounted 54" above finished floor.
- K. Valves
 - 1. All valves shall be full modulating with spring return, unless otherwise specified. In addition, valves shall be quiet in operation, fail-safe, be equipped with throttling plugs and renewable composition discs, and be capable of operating at varying rates of speed to correspond with the exact dictates of the controller. Valves shall be sized by the Contract Contractor and guaranteed to meet the heating

requirements. All valves 2" and smaller shall have flanged connections. Valve body rating shall match service requirements.

2. Valves shall be suitable for hot water with pressure drop not to exceed 3 psi for water.
- L. Dampers: Control dampers shall be substantially built-in steel frames fabricated from 2" channel or equivalent. Frames shall be equipped with brass trunnions and bearings and blade end stops. All damper blades shall be galvanized steel. The maximum blade width shall be 6". For the relief air dampers with blade, shall be sized to fit in wall, 3"-4" maximum. Furnish corner braces for all damper frames exceeding a 4 square foot area. Maximum width of any section shall be 48" and the maximum section height shall be 96". Furnish horizontal stiffening for any section exceeding 48" in height. Dampers for outdoor air and exhaust air applications shall be low leakage type and provided with neoprene seals on blade edges and end stops.
- M. Damper Motors: Damper motors shall be gear train type with adjustable stroke, spring return and shall be of proper size to meet the power requirements, as determined by control manufacturer. Damper motor for relief air shall be of size able to fit in allowable space between relief louver and wall grille.
- N. Sequence of Operation
1. VRF Heat Pump Units
 - a. Units to be controlled by controller furnished with system.
 - b. Room sensor to maintain space conditions.
 - c. Central controller to be installed in Mezzanine Mechanical Room.
 - d. Provide simplified room thermostat.
 - e. Units with outside air damper to close damper during unoccupied hours.
 - f. Central controller to schedule occupied and unoccupied hours.
 2. Air Handling Units
 - a. Air handling units shall be controlled by a 7-day programmable thermostat.
 - b. Individual control shall be provided for each unit serving the Dining Hall.
 - c. Subject to the heating or cooling load, one unit shall start and if unable to reach set point, the second unit shall start.
 - d. During heating occupied cycle, unit shall run continuously, outside air damper shall open to minimal position, and first stage of heating shall be from heat pump unit, and if required, second stage of heating. Heating coil shall operate with motorized valve modulating to meet the load.
 - e. Heating Unoccupied: Similar to heating occupied cycle except outside air damper shall remain closed and unit shall be modulating.
 - f. Cooling Occupied Cycle: Unit shall run continuously. Heat pump shall be activated and operate to maintain cooling set point. Outside air damper shall open to minimal position.
 - g. Cooling Unoccupied Cycle: Air handling and heat pump unit shall be off.
 - h. Position of outside air damper shall be controlled by a CO2 sensor located in the return plenum of each unit.

- i. Economizer Cycle: Dual enthalpy sensor shall switch the units to economizer operation when outside air temperature permits. During economizer operation, heat pump and heating coil shall be inactive and outside air shall be modulated to meet load conditions.
 - j. Pressure sensor in Dining Hall shall operate to modulate opening and closing of motorized relief damper.
- 3. Lobby Heat Pump Unit
 - a. Operation shall be similar to that of the air handling units except the outside air damper shall operate at constant minimum position during occupied cycle for heating and cooling.
- 4. Kitchen Heat Pump Unit
 - a. Kitchen heat pump unit shall be controlled by 7-day programmable heating/cooling thermostat.
 - b. Occupied cooling cycle: Unit shall run continuously and outdoor heat pump shall be modulated to maintain space temperature. Outside air damper shall open to minimal position.
 - c. Unoccupied Cooling Cycle: Units and heat pump shall be off. Outside air damper shall remain closed.
 - d. Heating Occupied: Room thermostat shall cycle heat pump for first stage of heating, and modulate motorized heating coil valve for second stage, to maintain space conditions. Outside air damper shall open to minimal position.
- 5. Wall and Unit Heaters
 - a. Units shall be controlled by a single setting wall sensor which shall cycle unit fan through a 120 volt relay.
 - b. Aquastat furnished with unit shall prevent fan operation if heat is not available.
- 6. Exhaust Fans
 - a. Toilet room exhaust fan programmable timeclock shall activate fan during occupied hours and turn off during unoccupied hours.
 - b. Singular toilet room shall be controlled by room motion sensor.
 - c. Dryer exhaust fans: Pressure sensor switch shall start fan whenever dryer operates.
 - d. Dishwasher exhaust fan shall be interlocked whenever dishwasher operates.
 - e. Kitchen hood exhaust fan to operate under control of kitchen hood operating panel, which shall start fan and vary speed of fan based on conditions at the hood.

7. Boilers

- a. Boilers shall start whenever there is a call for heating from units served by the boiler.
- b. Circulating pumps shall start whenever there is a call for heating from units served by the boiler.

8. Electric Cove Heater

- a. Shall be controlled by integral thermostat furnished with heater.

1.27 BUILDING MANAGEMENT SYSTEM (ALTERNATE #2)

- A. Provide a direct digital control Building Management System (BMS). System to be by Schneider Electric EcoStruxure or equivalent. System to tie all new equipment scheduled in HVAC drawings and water heaters, mixing valve and recirculating pumps from plumbing drawings. BMS shall provide for the sequences under base bid and shall include graphics, internet access, trending, alarms and status indication for equipment.

1.28 GUARANTEE AND SERVICE

- A. Refer to Section 23 50 00.

END OF SECTION 23 00 00

SECTION 23 50 00

SUPPLEMENTARY CONDITIONS
MECHANICAL AND ELECTRICAL WORK

PART 1 – GENERAL

1.1 GENERAL

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. It is intent of Drawings and Specifications to call for finished work, tested and ready for operation. All materials, equipment and apparatus shall be new, of highest grade and quality and free from imperfections.
- C. Any apparatus, appliance, material or work not shown on Drawings, but mentioned in Specifications, or vice versa, or any incidental accessories or minor details now shown but necessary to make work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be provided by Contractor without additional cost to Owner.
- D. With submission of Bid, Contractor shall give written notice to Architect of any materials, apparatus or omissions believed to be in violation of laws, ordinances, rules or regulations or authorities having jurisdiction. In absence of such written notice, it is mutually agreed that Contractor shall include cost of providing all systems in accordance with applicable regulations without additional cost to Owner.

1.2 ABBREVIATIONS

- A. The following abbreviations shall apply:
 - GC - Contractor for General Construction
 - PC - Plumbing Contractor
 - FPC - Fire Protection Contractor
 - HC - Heating (HVAC) Contractor
 - EC - Electrical Contractor
 - KEC - Kitchen Equipment Contractor

1.3 EXAMINATION

- A. Contractor, before submitting Bid, shall examine site, building and existing facilities, Drawings and Specifications, inform himself as to State and local codes and laws having jurisdiction, allow for licenses and fees to be paid as directed under his Contract and/or as required by law.

- B. Claims made for extra payment for the following reasons will not be allowed:
Unfamiliarity with work to be performed by other trades, existing conditions at job site, local or State laws and codes and minor alterations due to field conditions.

1.4 CONTRACT DRAWINGS

- A. Drawings and Specifications: Drawings accompanying these Specifications are intended to show general arrangement and extent of work to be done. Work in all its details is subject to approval of Architect, whose decision on all points of difference shall be final and binding on Contractor. Any work or materials, which are rejected, must be immediately replaced by Contractor.
- B. Drawings and Specifications together mutually explain each other and indicate work to be done, and anything appearing in one and not in other shall be as if appearing in both. In case of disagreement between Drawings and Specifications or within either document itself as to better quality, greater quantity or more costly work shall be included in contract price and matter referred to Engineer's attention for decision or adjustment.

1.5 EQUIPMENT LOCATIONS

- A. Location of equipment, outlets, etc., as indicated on Drawings shall be considered as reasonably correct, but it shall be understood that they are subject to modifications as may be found necessary or desirable at time of installation in order to meet any unforeseen or design conditions. Such changes shall be made by Contractor without additional cost to Owner.
- B. Location of devices, fixtures, diffusers, registers, panels, sprinkler heads, equipment, etc., which are exposed in finished spaces, shall be coordinated and aligned with Architectural elements. Where on exposed masonry, they shall be coordinated with block or brick courses.
- C. Locations of pipes, ducts, electrical raceways, switches, panels, equipment, fixtures, etc., shall be adjusted to accommodate the work to interferences anticipated and encountered. The Contractor shall determine the exact route location of each pipe, duct and electrical raceway prior to fabrication.
- D. Offsets, transitions and changes in direction in pipes, ducts and electrical raceways shall be made as required to maintain proper headroom and pitch of sloping lines, whether or not indicated on the Drawings. The Contractor shall provide for all trades, air vents, pull boxes, etc. as required to effect these offsets, transitions and changes in direction.
- E. Architect reserves right to relocate any outlet or equipment to a distance of five feet in either direction from that indicated or described; said changes, if any, will be requested prior to installation and shall be made without additional cost to Owner.

1.6 COOPERATION

- A. The Contractor shall compare the mechanical and electrical Drawings and Specifications with those for other trades and shall report any discrepancies between them to the Engineer and shall obtain from him written instructions for changes necessary in the mechanical and electrical work. The mechanical and electrical work shall be installed in cooperation with other trades installing interrelated work. Before installation, the Contractor shall make proper provision to avoid interference in a manner approved by the Architect. All changes required in the work of the Contractor caused by his neglect to do so shall be made by him at his own expense.
- B. Every effort shall be made not to damage, soil or scratch the work of other Contractors.
- C. In case of damage to work or materials of other Contractors, he shall be required to pay for such damage as may be incurred. Architect shall be sole arbitrator in this matter.

1.7 SPACE CONDITIONS

- A. Work shall be confined to space allowed for it. If space is not sufficient, Architect shall be notified. More space shall not be used unless authorized by Architect.

1.8 ACCESSIBILITY

- A. Contractor shall install all work so that all parts required are readily accessible for inspection, operation, maintenance and repair. Minor deviations from Drawings may be made to accomplish this, but changes of magnitude shall not be made without prior written approval from Architect.
- B. The Contractor shall install all mechanical and electrical work to permit removal (without damage to other parts) of coils, heat exchanger bundles, fan shafts and wheel, draw-out circuit breakers, filters, belt guards, sheaves and drives and all other parts requiring periodic replacement or maintenance. The Contractor shall arrange pipes, ducts, raceways, traps, starters, motors, control components to clear the openings of swinging doors and of access panels.

1.9 ACCESS DOORS

- A. Location: Access doors in building construction through which a man must pass to repair or operate valves and other apparatus will be provided by others. All other required access doors, panels, cabinets, etc. shall be furnished by Contractor requiring same, for access to equipment provided under his Contract. Access doors shall be provided for valves, cleanouts, air vents, dampers, and for adjustments of apparatus where necessary and required. Access doors shall be installed by Contract No. 2. Doors must be made at job site so as not to cause delay to other trades.
- B. Type: Access doors shall have angle frame, cold rolled steel, shaped to provide a rabbet on all sides to house door and confine wall. Frames shall be 16-gauge steel, doors 14 gauge to 29" dimension vertical or horizontal and 12 gauge for larger sizes.

Hinges shall be concealed type permitting a door swing of 175°. Panels shall have prime coat of gray rust inhibitive paint. Access panels shall be similar to "Milcor" as manufactured by Inland Steel Products Company, Style "K" for plastered surfaces and Style "M" for masonry and tile surfaces. Panels must be available at job site, not to cause delay to other trades.

- C. Size: Access door shall be of adequate size to permit ready servicing of intended equipment. Unless otherwise noted, the minimum size shall be 12" x 12".

1.10 DRIP PANS

- A. Examine the drawings, and in cooperation with the Electrical Trade, confirm the final location of all electrical equipment to be installed in the vicinity of piping. Plan and arrange all overhead piping no closer than 2 feet from a vertical line to electric motors and controllers, switchboards, panelboards or similar equipment.
- B. Where the installation of piping does not comply with the requirements of foregoing paragraph, where feasible, the piping shall be relocated.
- C. Furnish galvanized steel gutters as follows:
 - 1. Provide and erect a gutter of 18 gauge galvanized steel under every pipe which is within 2'-0" of being vertically over any motor, electrical controllers, switchboards, panelboards, or the like.
 - 2. Each gutter shall be welded and made watertight, properly suspended and carefully pitched to a convenient point for draining. Provide a 3/4" drain, with valve as directed, to nearest floor drain or slop sink.
 - 3. In lieu of such separate gutters, a continuous, adequately supported and braced, properly rimmed, pitched and drained, may be provided over any such motor, and extending 2'-0" in all directions beyond the motor, over which such piping has to run.

1.11 DAMAGE

- A. Each Contractor shall protect and leave in perfect condition materials, apparatus, fittings, fixtures and trim in scope of his Contract. Should any items be damaged or broken or workmanship molested, no matter by whom such damage is caused, work must be corrected and damaged items replaced with new units by Contractor at no additional cost to Owner. Work, which needs redoing because of damage, shall be done by skilled trade which originally performed such work.
- B. Any adjustments between Contractors relative to damage to work or materials shall not be responsibility of Owner, Architect or their representatives.

1.12 LAW, ORDINANCES, PERMITS AND FEES

- A. The Contractor shall give all necessary notices, obtain all permits, pay all governmental taxes, fees and other costs in connection with his work, file for necessary approvals with the Town or Village and all other State governmental departments having jurisdiction, obtain all required certificates of inspection for his work and deliver same to the Architect before request for acceptance and final payment for the work.

1.13 CODES AND STANDARDS

- A. Contractor shall include in his Contract any labor, materials, services, apparatus, Drawings (in addition to Contract Documents), necessary to comply with all applicable codes, specifications, local ordinances, industry standards and utility company regulations.
- B. In case of difference between building codes, specifications, State laws, local ordinances, industry standards and utility company regulations and Contract Documents, most stringent shall govern. Contractor shall promptly notify Engineer in writing of any such difference.
- C. Noncompliance: Should Contractor perform any work that does not comply with requirements of applicable building codes, State local ordinances, industry standards and utility company regulations, he shall bear all costs arising in correcting deficiencies.
- D. Applicable codes and standards for material furnished and work installed shall include all State laws, local ordinances, utility company regulations, special requirements of Owner's insurance underwriters, requirements of governmental agencies having jurisdiction, and applicable requirements of following nationally accepted codes and standards:
- E. Codes:
1. International Building Code.
 2. International Plumbing Code.
 3. International Fuel Gas Code.
 4. International Fire Code.
 5. International Energy Conservation and Construction Code.
 6. National Electrical Code.
- F. Industry Standards, Codes and Specifications:
1. AIEE American Institute of Electrical Engineers
 2. ANSI American National Standards Institute
 3. ASHRAE American Society of Heating, Refrigeration & Air Conditioning Engineers
 4. ASME American Society of Mechanical Engineers
 5. ASTM American Society of Testing Materials
 6. AWWA American Water Works Association
 7. IPCEA Insulated Power Cable Engineers Association
 8. NBS National Bureau of Standards

9.	NEMA	National Electrical Manufacturers Association
10.	NFPA	National Fire Protection Association
11.	NEC	National Electrical Code
12.	UL	Underwriters' Laboratories
13.	AGA	American Gas Association

1.14 DEFINITIONS

- A. The term "Contractor" or "this Contractor" shall be interpreted to mean individual, partnership, or corporation to whom Contract has been awarded.
- B. Whenever the terms "provide" or "provided" are used in the specifications, they shall mean "furnish & install" or "furnished & Installed," "connect" or "connected", "apply" or "applied", "erect" or "erected," "construct" or "constructed," or similar terms, unless otherwise indicated in the specifications.
- C. Words in the singular shall also mean and include the plural wherever the context so indicates, and words in the plural mean the singular wherever the context so indicates.
- D. Wherever the terms "shown on drawings" are used in the specifications, they shall mean, "noted", "indicated," "scheduled," "detailed," or any other diagrammatic or written reference made on the drawings.
- E. Wherever the terms "material" or "materials" are used in the specifications, they shall mean any "product," "equipment," "device," "assembly" or "item" required under the contract, as indicated by trade or brand name, manufacturer's name, standard specification reference or other description.
- F. The terms "approved" or "approval" shall mean the written approval of the Engineer.
- G. The terms "specification" or "specifications" shall mean all information contained in the bound or unbound volume, including all "Contract Documents" defined therein, except for the drawings.
- H. The terms "directed," "required," "permitted," "ordered," "designated," "prescribed" and similar words shall mean the direction, requirement, permission, order, designation or prescription of the Engineer; the terms "approved," "acceptable," "satisfactory" and similar words shall mean approved by, acceptable or satisfactory to the Engineer; the terms "necessary," "reasonable," "proper," "correct" and similar words shall mean necessary, reasonable, proper or correct in the judgment of the Engineer.
- I. "Piping" includes, in addition to pipe or tubing, all fittings, flanges, unions, valves, strainers, drains, hangers and other accessories relative to such piping.
- J. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceiling, embedded in construction or in crawl spaces.
- K. "Exposed" means not installed underground or "concealed" as defined above.
- L. "Invert Elevations" means the inside bottom of pipe.

- M. "Wiring" includes, in addition to wire, all conductors, raceways, boxes, devices, supports, hangers and other accessories relative to such wiring.
- N. Trade Contractors for this project shall be the PC, FPC, HC and the EC.

1.15 REMOVALS AND RELOCATIONS

- A. Removal and/or relocate all existing equipment, fixtures, wiring, piping and ductwork not being incorporated into the new design or as required to accommodate Architectural changes. Removals shall be carefully phased so that existing portions of the building continue to be served while the first phase of the new construction take place. All existing equipment, fixtures, piping, ductwork, wiring not being reused in the new design shall be removed. Protect existing equipment, fixtures piping, ductwork, and wiring which is to remain. Existing equipment which is reused shall be checked for proper operation and cleaned.
- B. Extreme care shall be taken during removal of Mechanical/Electrical facilities so as not to damage architectural facilities.
- C. Where light fixtures are removed, lighting controls and switches not being reused shall also be removed.
- D. Coordinate removals work with that of other trades. Any existing equipment fixtures, piping, ductwork, etc., which is to be reused, shall be identified to the other Contractors. Should it be damaged or removed, it shall be repaired or replaced. Responsibility for protecting, identifying, storing, repairing and replacing shall e by the Contractor who would normally provide the item.
- E. Removals shall be complete and include all trim, supports and accessories.
- F. Where raceways, piping or ductwork cannot be removed, cap and make safe behind finished construction.
- G. No disruption of existing service will be permitted without prior approval of the Owner.
- H. Wiring and piping for equipment which is to be relocated shall be disconnected, relocated and reconnected.
- I. During the course of removing existing and installation of all new service, equipment, fixtures, piping, ductwork and wiring, no interruption of existing facilities will be permitted without the consent of the Owner. All new wiring, piping, ductwork and equipment shall be installed, connected and made ready for final connections to existing systems before disrupting services. These final connections shall be made with such force as may be required to minimize time of shutdown or discontinuance of existing services. Prior to making final connections to existing services, schedule with Owner exact time and duration of discontinuance of service. A minimum of one (1) week notice shall be given to the Owner and other Contractors of any shutdown of services.

- J. Provide all piping, ductwork, wiring, raceways, equipment, appliances and labor required for temporary connections and bypasses necessary to permit continuous operating with minimum interruption of service.
- K. Disposition on equipment and fixtures being removed shall be reviewed with Owner. Equipment or fixtures which the Owner wishes to retain shall be carefully removed and set aside at a location designated by Owner. All other equipment, fixtures and trim shall be removed from site and properly disposed of.

1.16 CUTTING AND PATCHING

- A. Contractor must lay out the work in advance to minimize unnecessary cutting and patching.
- B. Cutting and patching of holes in walls, partitions, ceilings and floors and building in of chases, recesses or other openings that may be required shall be done by Contractor requiring same. All such patching and chases shall be finished to match existing adjacent finishes. Provide all new acoustic tile ceilings in areas where such ceilings are disturbed. All final patching shall be done by Contractor normally employed for such work at expense of Contractor requiring same.
- C. Drilling and patching for expansion bolts, hangers and other supports shall be done by Contractor requiring same, subject to review by Architect.
- D. Pavements, sidewalks, roads and curbs, planted areas, fences and all other site structures shall be cut, patched, repaired and/or replaced as required to permit installation of work of various trades and such cutting, patching, repairing and replacing shall be responsibility of, and paid for by, Contractor under Section of Specifications for trade requiring work. Work shall be done by Contractor normally employed for such work at expense of Contractor requiring same.
- E. Each Contractor shall bear expense of all cutting, patching, repairing or replacing of work of other trades required because of negligence or tardiness or because of any damage caused by him.

1.17 USE OF PREMISES

- A. Each Contractor shall perform all work necessary to deliver, store, and protect his material and equipment and shall provide a locker for safe and orderly storing of materials and tools. Location of such locker shall be with approval of Architect. Contractor shall change location thereof when so directed by Architect.
- B. The Contractor shall confine his apparatus, storage of materials and construction operations to the limits indicated by ordinances or permits or as may be directed by the Architect. He shall not unreasonably encumber the premises with his materials.
- C. In the utilization of ground area, the protection of pavement, curbs, walks, structures, and other permanent improvements shall be installed and maintained.

- D. In storing materials within any structure, or when using structure as a shop, the Contractor shall consult with the Architect and shall restrict his storage to spaces designated for such purposes. The Contractor will be held responsible for repairs, patching or cleaning arising from such use.
- E. Ground storage shall be similarly restricted.
- F. The Contractor shall not trespass or enter upon areas that are noted as being restricted.
- G. Plumbing fixtures shall not be used for emptying water from buckets, pails or other containers. Notwithstanding any approvals or instructions which must be obtained by the Contractor from the Owner in connection with use of premises, the responsibility for the safe working conditions at the site shall be the Contractor's and the or Owner shall not be deemed to have any responsibility or liability in connection therewith.

1.18 CLEANING

- A. Each Contractor shall, while engaged in work, maintain everything used in conjunction therewith in an orderly and clean condition and shall periodically during progress of work, or when directed by Architect, clean up and remove from building rubbish accumulated from his work.
- B. Work areas shall be cleaned on a daily basis. Areas occupied by Owner shall be kept clean at all times.
- C. Before reporting for final inspection, preceding acceptance by Architect, Contractor shall thoroughly clean fixtures, and apparatus of dust, stains, grease, oil, etc., and touch up with enamel or paint any scratched or marred surfaces. Finish of all trim and equipment shall be in perfect condition.

1.19 MANUFACTURER'S REPRESENTATIVE

- A. Each Trade Contractor shall provide, at appropriate time or as directed by Architect, the services of a competent factory-trained Engineer of particular manufacturer of equipment or item involved so as to inspect, adjust, and place in proper operating condition any and all items of manufacturer. No additional compensation will be allowed Contractor for such services.

1.20 SUPERVISION AND LAYOUT

- A. The work called for under this Contract shall be carried on simultaneously with the work of other trades in a manner such as not to delay the overall progress of the work. Be prepared to furnish promptly to other trades involved at the project all information and measurements relating to the work which they may require. Cooperate with them in order to secure the harmony necessary in the interest of the project as a whole.

- B. Keep a competent Superintendent in charge of the work. Such Superintendent shall be replaced if unsatisfactory to the Owner or Architect. Dealings at the site will be made only with this person.
- C. Maintain a complete file of Contract shop drawings at the site available for inspection by Owner's representatives. Installation and equipment shop drawings shall be initialed and dated upon installation.
- D. Every facility shall be provided to permit inspection of the work by Owner's representative during the course of construction.
- E. Be responsible for work until its completion and final acceptance; replace any of the same, which may be damaged, lost or stolen, without additional cost to the Owner.
- F. Contractor shall not employ on job unfit persons or anyone not skilled in work assigned nor anyone considered detrimental to best interests of job.
- G. Contractor to provide supervision, layout the work, do necessary leveling and measuring or employ a competent person satisfactory to Architect.
- H. All work shall be executed at and from as many different points at such times and with such force as to meet completion schedules and/or as may be deemed necessary by Architect.

1.21 COORDINATION OF THE WORK

- A. Each Trade Contractor shall coordinate their work with that of the Contractor for General Construction's and with the other Trade Contractors. Work of the respective trades shall be scheduled in accordance with the Contractor for General Construction's schedule so that all of the work will be installed at the proper time without delaying completion of the project.
- B. Contractor shall check the Contract Drawings and Specifications for all of the other trades so as to become familiar with the various items of apparatus and equipment, which will be furnished or set under the different Contractors, that require connections or other coordination.
- C. Trade Contractor shall furnish to the Contractor for General Construction, detailed advance information regarding all the requirements related to work under other Divisions and/or Sections. Each Contractor shall furnish sizes, accurate data, and location of any and all pads, chases, sleeves, and slots through floor slabs, walls, foundations, ceilings, roof, and other special openings required.
- D. Trade Contractor shall carefully check space requirements with other Contractors to ensure that the equipment, fixtures, piping, conduits, ducts, etc. can be installed in the spaces allotted for same.
- E. Wherever the work of the various Trade Contractors interconnects each Contractor shall provide all information, as required for the equipment, to the connecting Contractor so that the connecting Contractor will be able to properly furnish and install all water and

drain connections, gas connections, electrical connections or general construction provisions.

- F. Each Contractor shall check the Architectural Drawings for all ceiling height requirements.
- G. The HC shall provide reproducible drawings or electronic drawing files for trade coordination. These drawings shall show the duct layout and major piping layout for the HVAC work. This coordination drawing shall be circulated in timely fashion to the other contractors for them to add their work to provide a fully coordinated drawing for the work of all trade. Coordination meetings shall be held in locations and at frequencies as required to develop full coordinated drawings. All coordinating Contractors shall “sign-off” the coordination drawings when coordination is complete.
- H. Final coordination drawing in electronic file format shall be provided to the Construction Manager, the Architect and the Engineer.

1.22 MATERIALS AND WORKMANSHIP - GENERAL REQUIREMENTS

- A. Guarantees of Performance: Contractor shall be held to have carefully examined and checked Drawings and Specifications before acceptance of Contract, starting any work, or purchasing any materials. Contractor shall inform Engineer of any changes or additions necessary to make possible fulfillment of any guarantees called for by this Specification, failing which, he shall be deemed to have accepted such guarantees and be bound thereby.
- B. Wherever hereinafter guarantees of durability, operating capacity, proper functioning or like are called for, or whenever it is specified that manufacturer shall furnish detail drawings, test certificates or performance curves, supervise installation of his apparatus, test or adjust it after installation, keep it in repair for a stated period, or render other similar services,
- C. Contractor will be held responsible for thorough performance or specific services under actual conditions of installation. Same shall apply in cases where special adjustment or other services are necessary to insure proper and efficient functioning of apparatus, even though not specifically called for. It is intended that entire plant be ready for satisfactory operation, and Contractor is hereby made responsible for this result.
- D. In every case where Contractor's own employees cannot adequately perform above described services, he shall stipulate such performance in his Contract with sub-contractors, manufacturers, etc., or else subsequently pay them any additional fees required therefor so that a satisfactory and ready plant will be secured without additional cost to Owner.

1.23 JURISDICTIONAL DISPUTES

- A. Contractor shall assume responsibility for resolving jurisdictional disputes and resolving all claims arising from factory vs. field installation, etc.

- B. Wherever factory mounting, piping or wiring of controls and accessories, etc., are called for, Contractor shall ascertain at time of Bid that all work is in accord with local jurisdiction and shall allow for all costs to comply with same. Extras arising out of jurisdictional disputes will not be permitted.

1.24 FOUNDATIONS AND SUPPORTS

- A. All piers, supports, shelving, foundations, anchor bolts, hangers, auxiliary steel, etc., unless specified under other Sections, required by Mechanical or Electrical Contractors for support or hanging of their equipment shall be provided by Contractor requiring same. All such work shall be done by Contractor requiring same. All such work shall be done in a manner approved by Architect.
- B. The anchoring of all equipment to the structure shall comply with all applicable requirements of the local governing codes.
- C. Support and fastening of all mechanical and electrical equipment shall be by the Trade Contractors. All equipment hung from overhead construction shall have weight of equipment distributed by use of structural iron supports, as necessary and approved, substantially fastened to structural support system. Any wall-mounted equipment, which cannot be supported from architectural or structural materials shall have its own independent support system furnished by the Contractor. Proposed installation method shall be reviewed by the Architect.
- D. Refer to trade sections of the specification for equipment requirements.

1.25 ESCUTCHEONS

- A. Contractor shall provide escutcheons on pipes wherever they pass through floors, ceilings, walls or partitions.
- B. Escutcheons for pipes passing through outside walls shall be Ritter Pattern and Casting Company No. 1 solid, cast brass, flat type, secured to pipe with a set screw.
- C. Escutcheons for pipes passing through floors shall be Ritter Pattern and Casting Company No. 3A split-hinged, cast brass chromium plated type. Piping passing through exterior walls, floors below grade, etc., shall be made watertight with caulking compound and pipe sleeves with wall collar located at the center of the wall extending 8" all around the pipe. Collar to be 1/8" thick steel welded to sleeve.

1.26 PAINTING

- A. Painting and touching up shall be responsibility of Contractor installing equipment and/or materials as hereinafter described, including but not limited to following principal items:
 - 1. Prime Coat: Suitable rust inhibiting metal primer.
 - 2. Final Coat: Enamel of colors to be selected by Architect.

3. Galvanized and Copper Pipe: Uncovered piping shall be cleaned and left unpainted.
 4. Materials Not Accessible: Hangers, metal supports, pipe, conduit and miscellaneous equipment, except copper and galvanized, which is above hung ceilings, in chases or areas not accessible when job is completed shall be given a prime coat of paint to prevent rusting or corroding of material.
 5. Exposed Material: Hangers, metal supports, pipe and conduit, air handling units, tanks, electric fixture stems and canopies, and all material with exposed metal surfaces shall be finished as described above with prime and final coats of paint.
 6. Equipment, which has factory enamel finished surfaces, and which has been slightly scratched or chipped shall be carefully cleaned and at discretion of the Architect, shall be touched up with factory paint. Equipment, which is more than slightly rusted, scratched or chipped, shall at discretion of the Architect be repainted in its entirety with a factory finish.
 7. Natatorium and Pool Equipment Room: Any painting or touch equipment in these spaces shall be done with an epoxy coating suitable for a chlorine environment.
- B. Underground metallic conduit shall be coated with Asphaltum.
- C. Finish painting of patched architectural finishes will be provided by others.

1.27 MANUFACTURER'S IDENTIFICATION

- A. Manufacturer's nameplate, name or trademark shall be permanently affixed to all equipment and material furnished under this Specification. Nameplates of a contractor or distributor will not be acceptable.

1.28 NAMEPLATES

- A. Contractor shall provide for each item of equipment, including controls, a permanently attached nameplate made of black surface, white core, laminated bakelite with incised. Nameplates shall be a minimum of 3" long by 1-1/2" wide and shall bear equipment names and item numbers as designated in equipment schedule.

1.29 TAGS AND CHARTS

- A. Charts and diagrams listed below shall be provided by Contractor, mounted in separate glazed hardwood frames.
1. Valve Charts: Furnish to Owner's representative three (3) complete framed plastic laminated valve tag schedules. Schedule shall indicate tag number, valve location by floor, and nearest column number, valve size and service control. Include reproducible Mylar copy with as-built drawings.
- B. Valves

1. Attach a 2" round brass tag stamped with designating numbers 1" high filled in with black enamel to each valve.
2. Securely fasten valve tag to valve spindle or handle with a brass chain.
3. Appropriate ceiling tile markers, in areas where removable ceilings occur to indicate location of valves or other devices, shall be provided under the general construction division of these Specifications.

1.30 EXCAVATION AND BACKFILL

- A. Work for interior will be provided by Contractor requiring same.
- B. Excavation and Backfil shall be provided by Contractor as noted on drawing.
- C. Trade Contractors shall layout routing and confirm depths with respective Utility Companies.
- D. Trade Contractors shall be present during backfilling to assure that no damage is done to their material by improper backfill operations.
- E. Trade contractors shall furnish all special backfill materials, sand, pea gravel or concrete as specified under Trade Sections or called for on the drawings.
- F. Trade contractors shall provide marker tapes to be incorporated into the backfill.
- G. Refer to applicable specification sections for site work, further requirements.

1.31 TEMPORARY OPENINGS

- A. Contractor shall ascertain from his examination of existing facilities and Drawings whether any special temporary openings in building will be required for admission of apparatus provided under his Contract, and he shall notify Engineer accordingly. In event of Contractor to give sufficient notice to Architect in time to arrange for these openings during construction, Contractor shall assume all costs of providing such openings thereafter.

1.32 WORK IN CONNECTION WITH BUILDING SERVICES

- A. Mechanical and Electrical Contractors shall include in Bid all work, labor, material, fees and costs, including charges imposed and work charged by any utility company or governmental agency, for introduction of building services from street terminal to building, unless another terminal location is specifically noted. Work shall be complete and in accordance with intent of Drawings and Specifications. Contractor shall take special note to contact all agencies and utility company to account for and include in his Bid ALL charges.

1.33 EQUIPMENT START-UP AND TESTING

- A. Each Contractor shall furnish services of qualified person thoroughly familiar with job and installed work to operate and make adjustments so that equipment and work furnished under this Contract operates as required.
- B. Contractor shall instruct Owner's operating personnel during start up and separate operating tests of each major item of equipment. During operating tests, Contractor shall prove operation of each item of equipment to satisfaction of Architect.
- C. At least seven (7) days' note of equipment start-up and operating tests shall be given to Architect. See technical sections of these specifications for additional field tests, factory tests and certifications required.

1.34 INSTRUCTIONS AND LITERATURE

- A. Contractor is to thoroughly instruct building custodian or person/persons designated by Owner in proper care and operation of work furnished and installed by him. Contractor shall prepare for use by Owner a detailed brochure of instructions in non-technical terms describing maintenance and operation of all apparatus, valves, controls, switches, fixtures, etc. provided.
- B. A preliminary copy shall be submitted for review, after which four (4) bound copies of corrected material along with an electronic copy shall be delivered to the Owner.
- C. Furnish required number of manuals in bound form containing data covering capacities, maintenance of operation of all equipment and apparatus. Operating instructions shall cover all phases of control and include the following:
 - 1. Performance Curves: For pumps, and similar equipment at the operating conditions.
 - 2. Lubrication Schedule: Indicating type and frequency of lubrication required.
 - 3. List of Spare Parts: Recommended for normal service requirements.
 - 4. Parts List: For identifying the various parts of the equipment for repair and replacement purposes.
 - 5. Instruction Books: May be standard booklets but shall be clearly marked to indicate applicable equipment.
 - 6. Wiring Diagrams: Generalize diagrams are not acceptable, submittal shall be specifically prepared for this project.
 - 7. Automatic Controls: Diagrams and functional descriptions.
 - 8. List of Equipment: Furnish list including manufacturer's representative, address, phone number and e-mail for future use in obtaining replacement parts.
- D. Where applicable, one set of operating and maintenance instructions shall be neatly framed behind glass and hung adjacent to the equipment concerned.

- E. Tools: All special tools as are required for proper operation and maintenance of the equipment provided under this Specification shall be delivered to the Owner's representative and a receipt obtained as evidence of delivery.
- F. In addition to above, and to various other instructions called for under individual Specifications, Contractor shall make arrangements for formal "classroom" lecture type instruction seminar where Owner's maintenance and administrative personnel will receive detailed verbal and written instructions from Contractor and the various subcontractors and material and equipment suppliers and when instruction brochures will be turned over to the Owner. A video of these instruction sessions shall be provided to the Owner.
- G. At completion of instruction period, when Contractor and Owner are satisfied of Owner's knowledge to operate equipment, Contractor shall obtain in writing Owner's acceptance of instructions.

1.35 RECORD DRAWINGS

- A. Each Trade Contractor shall prepare a set of drawings on which shall be recorded any changes made so that at completion of work a complete record will be shown thereon of actual installation. At completion of work all of the information added to these drawings shall be transferred to the AutoCAD files which will be furnished to the Contractors. Drawings shall be certified to be complete and accurate. Contractor shall furnish two print copies and discs of this AutoCad files.

1.36 SHOP DRAWINGS

- A. See individual Sections for items requiring submission of shop drawings. Contractor shall submit the shop drawings electronically.
- B. Ductwork, piping, wiring diagrams and other drawings prepared for this project shall be prepared using AutoCad.
- C. The name of the manufacturer, model, accessories, size, etc. shall be clearly noted.
- D. Contractor shall review shop drawings prior to submission and all shop drawings shall be stamped by the Contractor. Any deviations or changes to Contract Documents shall be clearly noted.
- E. Review of shop drawings by the Architect/Engineer shall not relieve the Contractor of the responsibility of furnishing materials in accordance with the Contract Documents.
- F. Contractor shall be responsible for quantities, physical sizes, electrical characteristics, etc. Any additional costs incurred due to the substitution of equipment (e.g. electrical, structural, etc.) shall be borne by the Contractor.
- G. Project specific drawings for Ductwork piping, Fire Protection, Electrical Feeders, etc. shall be prepared using AutoCad.

1.37 GUARANTEE AND SERVICE

- A. Guarantee and service the entire installation for a period of one year from the date of final completion.
- B. The final acceptance will be made after Contractor has adjusted his equipment, balanced the various systems, demonstrated that it fulfills the requirement of the drawings and specifications, and has furnished all the required certificates of inspection, drawings, instructions and approvals.
- C. Contractor shall, during the period of the guarantee, replace or repair at his/her own expense any piece of equipment and/or material which is found to be defective. The replacement or repair shall be performed the same day of notification in an emergency fashion when notified by the Owner or authorized representative. Contractor shall also repair all damage to surrounding work caused by the failure, repair or replacement of defective equipment.
- D. During guarantee period, Contractor shall provide full service and maintenance for all equipment and systems, including all necessary inspections, cleaning, servicing, lubrication, adjustments, belts, filters, refrigerant, replacements and cleaning necessary to maintain equipment and systems in top working efficiency. Service shall include preventive, normal and emergency.
- E. Response time for emergency service shall be four (4) hours during business hours and six (6) hours on nights, weekends or holidays, and two (2) days for routine servicing.
- F. Refer to technical sections for additional guarantee and servicing requirements for specific equipment and systems.

END OF SECTION 23 50 00

SECTION 26 00 00

ELECTRICAL WORK

PART 1 - GENERAL

1.1 GENERAL

- A. All work of this section shall be governed by the requirements of the Conditions of the Contract, and the entire Division #1, General Requirements.
- B. Due to the nature of the work and the rigid time schedule required, the utmost cooperation between Contractors must be maintained.
- C. Refer to Section 23 50 00 Supplementary Conditions for Mechanical and Electrical Work, the requirements of which are part of this work.
- D. All work shall be in accord with state and local codes.
- E. EC shall visit site to ascertain existing conditions, access available and to take measurements for items related to the work.
- F. EC shall provide concrete pads for electrical equipment.
- G. EC shall be a firm regularly engaged in the installation of electrical systems for a period of at least five (5) years and shall have the licenses and certificates required by local regulations. License/certificate holder shall be an Owner or Officer in the firm and have a minimum of five (5) years employment.
- H. EC shall become familiar with drawings of other trades to understand work of other trades and its impact/effect on the electrical work.
- I. Refer to Section 23 50 00 for coordination drawing requirements.
- J. All work shall be in strict accord with the National Electric Code (NEC) and the Electrical Contractor shall furnish the Owner with Underwriters Electrical Certification upon completion of work.
- K. The Electrical Contractor shall obtain all permits and pay all fees.
- L. All components shall bear U.L. labels.
- M. EC shall provide Owner with invoices and other data required for utility and government rebates and incentives.
- N. EC shall fire-stop openings around conduits passing through floors and walls. Refer to penetration fire stopping section of the specifications.

O. The following abbreviations shall apply:

GC - Contractor for General Construction.
PC - Plumbing Contractor
FPC - Fire Protection Contractor
HC - Heating (HVAC) Contractor
EC - Electrical Contractor
KEC - Kitchen Equipment Contractor

1.2 QUALITY ASSURANCE

- A. Requirements given herein may be affected by other related requirements of the project specifications. Correlation of contract requirements is the responsibility of the Contractor.
- B. All Electrical Work on this project shall be governed by this specification.

1.3 SCOPE OF WORK

- A. EC shall provide all labor, material and appliances required for a complete electrical installation as shown on drawings and hereinafter specified, including but not limited to the following principal items:
 - 1. Grounding
 - 2. Hangers and Supports
 - 3. Wiring in Connection with Other Trades
 - 4. Motor Protection Wiring
 - 5. Kitchen Equipment Roughing
 - 6. Testing
 - 7. Service
 - 8. Main Service Board
 - 9. Panels
 - 10. Raceways and Pull Boxes and Outlet Boxes
 - 11. Overcurrent Devices
 - 12. Wires and Cables
 - 13. Devices
 - 14. Disconnect Switch
 - 15. Lighting Fixtures, Exit and Emergency Lights
 - 16. Lighting Control System
 - 17. Lighting Inverter System
 - 18. TVSS Units
 - 19. Telephone, Data, Raceways and Boxes
 - 20. Fire Alarm System
 - 21. Temporary Light and Power
 - 22. Shop Drawings
 - 23. Guarantees

1.4 WORK NOT INCLUDED

- A. The following work is not included unless otherwise specified hereinafter:

Issue for Bid
June 24, 2022

1. Furnishing of motors, motor controllers, temperature controls.
2. Painting: Finished painting of exposed conduits, apparatus, etc.

1.5 GROUNDING

- A. Grounding as required by governing codes and/or indicated for grounding distribution systems, conduits, panels, motors, wiring devices, and non-current carrying metal parts.
- B. Ground and bond building structural steel in accord with NEC Article 250.
- C. Use grounding type bushings on feeder conduits. At receptacles the ground terminal is connected with #14 copper wire to screw lug or "jiffy" terminal on outlet box.
- D. Inaccessible and permanent connections made by Exothermic Process grounding terminal fastened to equipment brazed with the metal being thoroughly cleaned, and bolted connections silver plated.
- E. At panelboard cabinets and switchboards connect the grounding bushings to ground lug with copper conduct or, sized per NEC based on current carrying capacity of largest conductor or feeder entering panelboard. Minimum size #12 AWG.
- F. Wire all raceways, conduit, cabinets, outlets, etc. so that they are mechanically jointed into continuous electrical conductor. At service board, raceway shall be bonded with a bare copper wire to service equipment enclosure. At boxes, fittings and enclosures, lock nuts and bushing shall be used to provide mechanically secure connections.
- G. Only threaded fittings shall be used on rigid conduit; compression fittings on EMT.
- H. Equipment grounding shall be in accordance with NEC.
- I. Equipment Grounding: Equipment grounding conductors commonly described as a "green wire" shall be provided for feeders and branch circuits protected by over current devices rated 30A and over and all motors, and also in raceways buried in earth or using flexible conduit regardless of size of overcurrent protection. Equipment ground will consist of metallic connection to ground of non-current carrying metal parts of wiring system or apparatus connected to system, including metal raceways, busways, outlet boxes, cabinets, switch boxes, motor frames, transformer cases and metallic enclosures for electrical equipment. The primary objective of equipment grounding is greater safety and assurance of clearing a fault.
- J. Metallic conductor shall be enclosed in same raceway as phase conductors and shall be insulated. Where multiple raceway are required, separate grounding conductor shall be provided for each raceway.
- K. Provide all equipment and circuitry required for an isolated ground system as noted on the plans.

1.6 HANGERS AND SUPPORTS

- A. Support conduits on "Kindorf" wall bracket or ceiling trapeze hangers with "Kindorf" #C105 straps secured by toggle bolts on hollow masonry units. "Kindorf" concrete inserts or A & J shields to suit conditions in concrete or brick, machine screws on metal and wood screws on wood.
- B. Nails will not be permitted. Support suspended conduits by "Kindorf" lay in type hangers when run singly and "Kindorf" trapeze hangers in groups. Grouped runs, symmetrical where bends occur, nest to a uniform radius. Support lateral runs of piping securely on hangers, brackets, etc., and in manner to allow for expansion and elimination of vibration.
- C. Brace and support risers and other vertical pipe runs with split ring hangers having threaded rods and wall plates, friction clamps or other approved means suitable for location and requirements. Do not support conduit from another conduit of piping or mechanical system. Spacing of supports shall be according to the NEC. Space limitations in hung ceiling spaces and conditions in other locations may require use of other type of hangers than those specified above. Provide suitable and approved hangers for such job condition.
- D. In areas of the buildings where wood beams were employed, hanger rods shall be supported from side beam brackets bolted through the beam similar to ITT Grinnell Figure 202.
- E. As required, where rods can be supported to steel beams use a beam clamp.
- F. Inserts for small work - Ackerman - Johnson, for large work, expansion shields. Wooden plugs not permitted.
- G. Equipment hung from Overhead Construction: Have weight of equipment distributed by use of angle and channel iron to beams used for building structural support.
- H. Hanger Rods: Steel, threaded with nuts and lock nuts, sizes in accordance with the following schedule:

Conduit Size	Rod Size
3/4" to 2" inclusive	3/8"
2-1/2" to 3-1/2" inclusive	1/2"
4" to 5"	5/8"

- I. Where the hanger rod supports more than a single run of conduit, use the following:

Rod Size - inches	3/8	1/2	5/8
Loading Rate - pounds	800	1512	2424

- J. Manufacturer: Kindorf, ITT Grinnell, Unistrut, or Globe.

1.7 WIRING IN CONNECTION WITH OTHER TRADES

- A. Provide conduit, wiring, appurtenances and make all connections to motors, etc., to make systems operate as intended in accordance with the requirements of the specifications and

as hereinafter specified. GC, HC, FPC and PC will furnish (after review) detailed wiring diagrams, shop drawings, instructions and equipment for installation. EC shall provide wiring and raceway for Theater consultant per Theater (TH) drawings.

- B. Provide wiring and conduits to all equipment furnished under other contracts and provide a complete system. Do all wiring and make all connections.
- C. Refer to shop drawings of all equipment furnished by others for proper equipment sizes, voltage, phase characteristics, space requirements, etc., and verify with requirements on drawings.
- D. Notify Architect in writing of any discrepancies before roughing for equipment. Provide receptacles and connections to each and every piece of equipment and replace cords with new of proper type and size, with plugs to suit receptacles provided.
- E. GC, HC, FPC and PC to furnish all electrical equipment for completion of their contracts to include all combination motor starters, relays, limit controls, transformers, etc. All electrical equipment attached to piping or ductwork shall be installed by HC/PC.
- F. Line and low voltage wiring for BMS will be provided by HC.
- G. Motor Controls will be furnished by others. Installation and all wiring shall be included in work by EC
- H. Operational faults found in inter-connecting of mechanical and electrical equipment shall be corrected and shall be the responsibility of the Contractor responsible for same. In the event of dispute, the Architect will make final decision as to responsibility for correction.
- I. EC to provide all wiring, outlets, panels, devices etc. as shown on drawings, for Theatrical Lighting and sound system. Including but not limited to scope shown on Theater drawings.
- J. EC shall be responsible for handling of all electrical equipment which may be finished by others, from curb side loading dock to point of use, for setting and wiring of same and for final installation.
- K. Prior to installation, EC shall review equipment shop drawing and roughing to verify locations, devices, outlets, and advise Architect of any discrepancies.
- L. EC shall inspect materials furnished by Theatrical Equipment Suppliers and advise Architect, prior to installation of any shortages of, or damage to, materials or non-code complying items.

1.8 KITCHEN EQUIPMENT ROUGHING

- A. EC shall be responsible for bringing electric service to Kitchen equipment; for providing disconnects and for connections to equipment.
- B. All 120 volt receptacles shall have individual ground fault circuit interrupt (GFCI) protection.

- C. Disconnect switches shall be NEMA 4X construction.
- D. Exposed conduit shall be rigid aluminum.
- E. Prior to installation, EC shall review food service and equipment shop drawings and roughing to verify locations, devices, loads, outlets, cutout openings for outlets, wiring space and access and advise Architect of any discrepancies.
- F. All wiring to be run concealed, wiring from roughing outlets, to and/or through equipment shall be run in seal tight conduit. Routing through cabinets or equipment shall not impair use of drawers, shelves or other equipment components.
- G. EC shall inspect materials furnished by equipment suppliers and advise Architect, prior to installation, of any shortages of or damage to materials or non-code complying items.

1.9 MOTOR PROTECTION AND WIRING

- A. EC shall mount and wire motor starters, starter/disconnect, VFD units and other motor controls furnished by other contractors.
- B. EC shall be responsible for the installation of proper size thermal overload, fuse and circuit breaker protection of motor (3 overloads to be provided for 3-phase equipment).
- C. Upon completion of connections to any motor and when all mechanical features permit operation of motor, operate said motor and determine that its direction of rotation and method of operation is correct. Take ammeter readings on all motor leads to determine starting current and steady state full load operating current, record these readings, and determine the following:
 - 1. Proper value of heaters for thermal overload protection.
 - 2. Proper value of time-delay fuses to provide safe motor operation without unnecessary blowing on starting currents but sized as close as possible to the steady state running current.
 - 3. The proper setting of circuit breakers for motor protection as in above.
- D. Insert proper heaters, proper fuses and make proper settings on circuit breakers. Furnish to the Architect a record of the following for each motor:
 - 1. Starting current of motor
 - 2. Full load steady state running current
 - 3. Size of heater in thermal protective device
 - 4. Size of fuses
 - 5. Trip rating of circuit breakers
- E. Make motor connections with short length (18" minimum) flexible metallic conduit (neoprene jacketed) to allow free movement of motor vibration.

1.10 TESTING

- A. Upon completion of new and existing portions of electrical systems changed by EC, systems shall be tested for short circuits and grounds.

1.11 ELECTRIC SERVICE

- A. Intercept power at existing dining hall to be used for temporary power. Remove temporary service when new service is being installed.
- B. Provide conduit and conductor and connect to existing pad mounted transformer.
- C. Provide switchgear as shown and scheduled on drawings.

1.12 MAIN DISTRIBUTION PANEL

- A. Provide main distribution panel as scheduled on drawings.

1.13 BRANCH CIRCUIT PANELS

- A. General: UL labeled and rated for voltage supplied, with bolt-on circuit breakers as scheduled; dead front construction with mains of ampere rating not less than frame size of circuit breakers feeding same.
- B. Style Surface or flush mounted as indicated. Panels to conform to physical requirements listed in balance of this Section.
- C. Internal Mounting and Bussing: Back pan flanged entire length of angle iron, securely fastened for rigidity; screws, bolts, and lock washers only for copper connections, copper bus bars securely fastened to base independent of breakers for support. Main and branch circuit connections of copper cross-section based upon NEMA standards; main busses and back pan arranged so branch circuits may be changed without machining, drilling or tapping.
- D. Cabinets and Boxes: NEC gauge steel, completed galvanized or bonderized with gutter size prescribed by code as minimum. Back boxes construction with welded or riveted lapped corners. Provide NEMA 4x where indicated.
- E. Cabinet exterior finished in gray enamel over rust inhibiting primer. Interior finished with one coat rust inhibiting primer.
- F. Provide ground lug welded or brazed to panelboard box for connection of ground wire from ground bushing.
- G. Trim and Doors: NEC gauge steel, finished as described in previous paragraph with fronts having adjustable indicating trim clamps, welded trim rest plate, accurately typed circuit directory index under glass or heavy clear plastic in frame behind door, flush catch and lock with 2 keys per panel. Keys for all panels on project to be alike.

- H. Spaces indicated on panelboards are for future installation of circuit breakers with busses, drilled and tapped so that single pole, double pole or three pole circuit breakers can be installed.
- I. Provide wire markers over wiring for phase and neutral wires indicating associated circuit breakers pole number.
- J. Provide printed tags around wiring where circuit exits cabinet to indicate circuit breaker pole number and termination point of wiring.
- K. Provide type written directory for each panel. Install one copy in panel and second copy in maintenance manual.
- L. Manufacturer: GE, Square D, Cutler Hammer, Westinghouse, ITE.

1.14 BUS BAR RATINGS

- A. Copper used in distribution centers, panelboards, (both light and power) or whatever purpose to meet NEMA standard for purity. Capacity ratings to equal or exceed the following:

Copper– 1 square inch for each 1000 amps

1.15 RACEWAYS AND PULL BOXES

- A. General: Raceway system shall be continuous, concealed or exposed as indicated, for feeders, branch circuits, systems of all voltages, etc., to afford complete removability of all conductors and accessibility of junction boxes in accordance with codes. Manufacturer's name and UL label to appear on each length of conduit (3/4" minimum unless otherwise noted)
- B. Type of raceways shall be as follows for all feeders, distribution, branch light and power circuits and all low-tension systems:

Application	Type of Conduit
Buried in Concrete	Galvanized rigid steel or schedule 80 PVC
Buried in masonry	Galvanized rigid steel or schedule 80 PVC
In hallow partitions or hung ceilings	EMT, galvanized rigid steel, Greenfield or MC cable, where permitted by code
Exposed in unfinished areas	EMT, Galvanized rigid steel, Rigid aluminum conduit
In or below floor slabs	PVC with metallic elbows where turned up.
Conduit for ground conductors	Rigid galvanized conduit

Underground for service	HDPE
Exposed to weather	Rigid standard weight aluminum conduit with all boxes, plates, hardware and fasteners aluminum or stainless steel.
Exposed in finished spaces	Only where specifically indicated wire mold surface raceway, with extent and routing reviewed with Architect prior to installation.

C. Low voltage Raceways provided for low voltage data cable pathways shall comply with all the requirements of this spec section plus all the requirements of the following:

1. Applicable Standards (26 00 00)
 - a. NFPA/NEC70
 - b. TIA (Telecommunication Industry Association)-569B
 - c. NECA (National Electrical Contractors Association) 568
 - d. BICSI TDMM (Building Industry Consulting Service International, Telecommunications Distribution Methods Manual).
2. Raceways for signal utilities entering shall terminate within 50' of entering the building per:
 - a. NEC 770.48 Unlisted Cables Entering Buildings (Optical)
 - b. NEC 800.48 Unlisted Cables Entering Buildings (Communications)
 - c. NEC 820.48 Unlisted Cables Entering Buildings (Coaxial)
3. Provide a pull box in each signal raceway for every two (2) 90 degree (or equivalent) turns to comply with TIA 569B.
4. Provide separation between communications cables or raceways and power cables or raceways to comply with TIA 569B.
 - a. 6 inches separation between power circuitry in metallic raceways and data cables.
 - b. 12 inches separation between grounded enclosure with power circuitry and data cables.
 - c. 24 inches separation between exposed power circuitry, power equipment and data cables.
5. Provide conduit supports every 5' minimum to comply with TIA 569B
6. Provide EMT conduit stub ups and backboxes for each location of indicated data jacks. Provide 1-inch EMT conduit with drag line to nearest accessible ceiling.

D. Run conduit or Wiremold and install outlets carefully and coordinate with other trades to avoid piping, ducts and other mechanical equipment. Where possible Wiremold shall be run up against molding strips. Do not cross pipe shafts or ventilation duct openings. Exact location of wall and floor outlets are to be determined from architectural drawings of other

trades having work in the area. In no case will any extras be allowed due to failure or neglect to determine exact locations before installation.

- E. All conduits shall be reamed, burrs removed, and conduits cleaned for the proper introduction of wire. All conduit ends shall be capped and plugged with standard conduit accessories as soon as same have been permanently installed in place.
- F. Conduit to be bent as required without flattening or scarring conduit finish. Conduit distorted and/or scarred will be rejected and replaced at no expense to Owner.
- G. No conduit to run either directly above or below heating pipes or directly under water pipes. Maintain at least 3" between raceway and parallel pipe covering and at least 1" at right angle crossing.
- H. Avoid traps conducive to collection of moisture. Insert sealed fittings where conduits leave building interior above ground or enter refrigerated or hazardous areas.
- I. Underground conduits to slope away from building. Conduits entering or leaving building above or below grade shall be sealed with duct seal.
- J. No chasing of exposed block walls permitted. Conduits to run in voids of blocks.
- K. Where conduits occur in groups in slabs or partitions, care must be taken not to weaken the structure. Where such a condition occurs, consult Architect before work progresses.
- L. Where metallic raceways pass thru expansion joints, provide "OZ" type AX or DX expansion fitting, within raceways system per manufacturer approved installation method.
- M. No wiring is to be installed before conduits and outlets are permanently secured in place; in concrete pours before concrete is poured and set; in concealed conduits located in plastered rooms before brown scratch has been applied to walls and ceilings.
- N. Provide insulating bushings and double locknuts on all conduits.
- O. Compression raintight connections shall be used on EMT.
- P. No set screw type connectors allowed in any conduit work. Use threaded joints and paint all underground conduits two (2) coats of asphaltum paint.
- Q. Install all sleeves and box openings in walls and floors required for installation.
- R. Provide "OZ" type CB metal closing caps on empty conduits that remain empty after final inspection and approval.
- S. Provide minimum #12 AWG drag wire in empty conduits.
- T. Flexible conduit shall be used when running in voids of structural planking and in making up short flexible connections to rotating or vibrating machinery or equipment, or as otherwise indicated on drawings.

- U. Mechanically join together all wire raceways, conduit, etc., into a continuous electrical conductor. At sub distribution panel, raceways must be bonded with bare copper wire to service equipment enclosures. Provide grounding bushings on all conduits entering the panelboards, distribution panels, switchboards, etc.
- V. Install Wiremold and conduit runs parallel with or at right angles to walls and ceilings. Run along molding and trim where possible.
- W. Test all conduits installed and left empty for clear bore and correct installation with ball mandrel, brushes and snake, before installation will be accepted. Ball mandrel to be approximately 85% of internal diameter of raceway to be tested. Mandrel assembly to include two short brushes. Snaking of raceways to be done in presence of representative of Architect. Any conduit which rejects the mandrel must be cleared at once. All work such as chopping concrete, etc., replacing defective conduit and restoring surface to original condition is to be done at no expense to Owner.
- X. Raceway Manufacturer: Anaconda, Wiremold, Robroy Industries (Pittsburgh), Republic, Triangle, Walker or equivalent.
- Y. Pull Boxes: Wherever required by code or by method of running raceways, provide and install pull boxes of NEC required size and construction for conduit and/or wires contained. Pull boxes to be accessible but concealed. Include access doors where required for box accessibility. Support boxes independently of conduit. In all pull boxes where cables are in the clear 3'-0" and over, cable supports are to be installed.
- Z. Manufacturers: Appleton, Steel City, Raco, Wiremold.

1.16 INSTALLATION RACEWAY AND PULL BOX SYSTEM

- A. In general, follow the layout on plans. However, layout is diagrammatical only and where changes are necessary due to structural, architectural, mechanical conditions, other apparatus or other causes, make changes without additional cost to Owner.

1.17 OUTLET BOXES

- A. General: Plans show conditions as accurately as possible to indicate them in scale, but do not necessarily show all the fittings, etc. necessary to suit building conditions. Locations of outlets, appliances, etc. are approximate. Responsibility remains with the EC for proper locations in order to make them fit with architectural details and instructions from Architect's representative at job site. Before installation of conduit for switches, receptacles, ceiling lights, or motors, the Architect and Engineer reserve the right to move each outlet location to better adapt them for usage prior to installation, within a distance of 5'-0" as presently indicated, at no additional cost to Owner.
- B. Type: Hot dipped galvanized of size to accommodate devices and wiring installed, provide with covers to suit function. Wherever boxes are located in exposed masonry walls, use only straight composition type with hub conduit entries and gaskets. Boxes and covers for exposed work, cast aluminum with suitable cover plate. All floor box outlet locations must be verified by Architect prior to installation. Surface Wiremold raceway

system shall contain proper Wiremold fittings and boxes as required for a complete installation.

- C. Location: Heights are indicated above finished floor to center of devices and are for estimating purposes only. Exact locations shall be as noted on drawings.

Receptacles	General 18", where at counters, 6" above counter.
Lighting Switches	48"
Panels	Not higher than 6'-0" to top breaker or switch.
Fire Alarm Pull Stations	48"
Fire Alarm Signals	80" or 1'-0" below ceiling

- D. Where height of wall outlets is not given locate as best suited for extension to equipment supplied and as directed. Where special conditions exist, locate outlets as directed.
- E. In center outlets, allow for overhead pipes, ducts, etc. and variations in arrangement and thickness of fireproofing and plastering also window trim, paneling, etc. Any inaccuracy resulting from failure to do this must be corrected without expense to Owner.
- F. Coordinate location of electrical equipment with work of other trades. Verify all door swings before roughing for switches, etc. Outlets set in exposed block wall to be set vertically and line up with joints in coursing.
- G. Installation: Securely fasten outlet boxes. Use hangers to support outlets in hung ceilings. Use galvanized bar irons attached through openings inside of the outlet box for outlets in hung ceilings. Outlets to be accessible by removal of fixtures or access panel. Equip outlets with fixture stud. Fixture outlet boxes must be set so the edge of outlet box comes flush with finished surfaces except where cast in slab, outlet boxes may then be set flush with slab. Erect wall and switch outlets in advance of furring and fireproofing and firmly secure to steel work with metal straps. Make necessary adjustment to work so outlets are properly centered after interior finish is erected. Set outlets to line up with joints in ceiling tile or in center of one tile block.
- H. For terminating conduit at all boxes, fittings, and enclosures, use Thomas & Betts #3870 series insulated grounding and bonding bushings, or equivalent. Always use double locknuts.
- I. Exterior boxes to be cast aluminum, weatherproof with all required gaskets.
- J. Manufacturer: Crouse-Hinds, Raco, Steel City, Hubbell, Wiremold.

1.18 WIRES AND CABLES

- A. General: Conductors #8 and larger - copper stranded, #10 and smaller, solid copper, 600V insulation. Insulation to be as follows: lighting fixtures - AF or THHN, all others - THHN above ground or XHHW underground, except where otherwise specified on plans.

- B. Flexible cord (minimum #14) type S, SO or SJ as required. Power and light wiring - #12 minimum size. Where home runs exceed 100ft. wire size to be increased to limit voltage drop. Voltage drop shall be limited to a 2% max. The size of conductors shown on drawings is for copper conductors, and only copper conductors shall be used.
- C. Where permitted MC armored cable with THHN conductors may be used for branch circuit wiring.
- D. Maintain consistent phase identification throughout utilizing colored insulation or braids; colors used for identification shall match existing.
- E. Colored tapes, paints, or tags will not be acceptable.
- F. Control Wiring: Terminal strips marked in black on a white background, and wires consistently color coded to avoid confusion and permit easy identification of conductors. Use IPECA color code wherever possible, no two wires in the same raceway to be the same color. Control wiring - #14 minimum installed in conduit.
- G. Installation: Interior of raceway into which wire or cable is installed shall be cleaned of all burrs, dirt and obstructions before wire is pulled. Use lubricant designed for pulling wires.
- H. Connect stranded copper conductors with solderless connecting lugs drilled the full diameter of the conductor, or Thomas & Betts compression type. Lugs for cables larger than #2/0 to have to bolts mounting with heavy copper washers for copper lugs. No splices on feeders will be permitted, except by special permission.
- I. Taps in stranded conductor where permitted "OZ" type PT cable tape with type PTC bakelite covers. Splices in branch circuits to occur only where such circuits divide. No screw caps or wire nuts will be permitted.
- J. Connect branch circuits to panels in such a manner that load balance is within 10% with all circuits in operation.
- K. Circuit numbers indicated on drawings are shown as a guide only and should not be followed when connecting branch circuits to panel.
- L. Tagging of Wires and Cables: Identify all wiring in pull boxes, panels, cabinets, wiring troughs and other enclosures, and at all terminal points, with laminated tags. Clearly tag each wire to indicate origin and circuit number of pieces of equipment or circuit it feeds.
- M. Manufacturers: Hatfield, General Cable, Anaconda, Circle, Crescent, Okonite, Triangle.
- N. For low voltage wiring, plenum rate cables shall be used throughout building.

1.19 WIRE SPLICING AND TERMINATING OF 600 VOLT CONDUCTORS

- A. Splices of wires up to 3 #8 conductors shall be made with pressure type connectors. Wire nuts or screw caps will not be permitted. Splices above this size shall be made with approved mechanical connectors, Scotchfill and Scotch #88 vinyl tape.

- B. Splices in cables #6 gauge and larger shall be made with cast sleeve type connectors with set screws, Scotchfill and Scotch #88 vinyl tape.
- C. Copper conductor terminations shall be made with mechanical set screw, pressed copper lugs. Two bolt lugs shall be used if necessary to obtain sufficient contact surface of 200 amperes per square inch, or to maintain rigidity in terminating large cable.
- D. Small wire splices shall be made with Thomas & Betts, Sta-Kon or equivalent pressure connectors.
- E. Large wire splices shall be made with OZ type XW and OX type XTP or equivalent connectors.
- F. Terminal lugs shall be pressed copper screw lugs as made by MAC or equivalent.
- G. Splices in manholes, handholes, and other damp or wet locations shall be made with suitable kits to form a watertight and waterproof splice. Splice kits shall be Anaconda, Buchanan, Line Materials, Minnesota Mining and Manufacturing or Thomas & Betts.

1.20 DEVICES AND PLATES

- A. Provide at every indicated outlet, the proper devices and plates as specified in electric legend. Where more than one device is indicated in one location, gang together in one box and under one plate as required.
- B. Receptacles accessible to campers to be tamper resistant.
- C. All devices to be Specification grade, color as selected by Architect.
- D. Receptacles where installed outside, exposed to weather or in places subject to spray or unusual conditions to be equipped with weatherproof type covers, gaskets, and must have ground fault type protection. Provide Isolated Ground (IG) where indicated.
- E. Plates – Heavy gauge nylon, color selected by Architect. For exposed work cast aluminum suitable for cast box utilized. On tile or block walls use rubber gaskets between wall and plate.
- F. Manufacturer: Hubbell, Bryant, Arrow Hart, Salter and G.E.

1.21 DISCONNECT SWITCHES

- A. Where required by code and/or noted on drawings, provide safety switch (fused or unfused as required up to 60A size or enclosed circuit breaker with trip as indicated for 100A and over) to disconnect all circuit to motors or appliances.
- B. Style: Totally enclosed type with cover interlocked with operating mechanism to prevent opening by unauthorized personnel when switch is closed. Include provisions for locking switch in "off" position with a means provided for defeat of this feature. Mechanism to be

quick make-quick break. All copper surfaces to be tin plated. Line terminals to be provided with insulating shield to protect against accidental contact.

- C. Fused switches to be provided with cartridge fuse and pole for each ungrounded leg. Neutrals to be solid unless otherwise specified or required. Do not fuse switches in excess of 80% of rated capacity.
- D. Switches in equipment spaces shall be H.D. Heavy Duty enclosure type. Switches exposed to the weather or within 10'-0" of sinks, etc. shall be in NEMA 4 enclosure. Provide NEMA 4X in Natatorium and Pool Equipment Room.
- E. Motor Disconnect Switches: Where not indicated to be provided in other sections of specifications and where required by code, provide disconnect switches as described.

1.22 MOTOR CONTROLLERS

- A. Furnished under respective trade sections.
- B. Obtain all required information for equipment being supplied from Contractor supplying same and install controller and all wiring and make all connections as required for proper operation.

1.23 LIGHTING FIXTURES

- A. General: Provide fixtures as indicated and further specified. Fixtures to bear label of Underwriters' Laboratories and to be installed true and plumb, left clear and free from grease and fingerprints. Damage to ceilings or walls to be repaired/replaced at no cost to Owner. Lighting fixtures to be complete with all necessary mounting hardware, lamps, ballasts, starters, and other necessary equipment. Provide lighting fixtures for each indicated light outlet of type required. Where fixture type is not noted, furnish the same type noted in similar areas. Mount individually or continuous as indicated. Where fixtures are mounted in continuous rows, 8' fixture bodies are allowed, lamps to remain 4'.
- B. Use of catalog numbers describing types of fixtures does not necessarily include all the required accessories for a complete installation. All accessories for a complete installation must be provided. Install pendant type fixtures in the same room at a uniform height from the floor and hang plumb. Make adjustment of height during installation. In cases where conditions make this impractical, refer to the Architect for a decision.
- C. Recessed fixtures shall be provided with frame, Flange and Trim to suit the ceiling type.
- D. Firmly and independently fasten fixtures to building structure and not from or by the suspended ceiling system. In areas with no finished ceiling, suspend fixtures from construction by approved brackets or chains. Fixtures shown on drawings are to designate quantities only. Install fixtures, conduit and boxes after all duct work, piping, etc. have been installed and locate as directed by Architect's representative in field.
- E. All plastic diffusers and lens shall be 100% virgin acrylic, and shall meet the following flame and smoke rating when tested in accordance with ASTM test criteria:

Flame Spread (ASTM E-84)	25 Maximum
Smoke Developed (ASTM E-84)	450 Maximum
Burning Test (ASTM D-635)	1.5 in/min. Maximum

- F. EC shall consult the lighting fixture schedule for fixture types shown on the drawings and shall be furnished from the list of manufacturers noted thereon. EC shall be responsible for the proper fixture for the type ceiling which will be used on the job. Coordinate with dimming requirements.
- G. Provide for each exposed fluorescent lamp in fixtures that have no light diffuser, clear plastic lamp guards and safety clips over sockets as manufactured by Laduby Company or McGill Company.
- H. For fluorescent fixtures ballasts shall be electronic type with high power factor and low harmonic distortion.
- I. Exit signs- Exit signs shall have 8" text with integral battery backup and illuminated test switch. Exit sign shall comply with UL 929 for battery storage and other applicable standard: Battery shall provide power for illumination of at least 90 minutes after loss of number power. Stand by power space activate within 10 second of loss of normal power.
- J. Voltage for fixture supply shall be as scheduled.
- K. Color temperature shall be as scheduled.
- L. LED fixtures shall comply with the following:
 - 1. UL Standard 8750 "Light Emitting Diode Equipment for Use in Lighting Products", IES Standard LM-79 "Electrical and Photometric Measurements of Solid-State Lighting Products", IES Standard LM-80 "Measuring Lumen Maintenance of LED Light Sources", and IES Standard TM-21 "Projecting Long Term Lumen Maintenance of LED Light Sources".
 - 2. ANSI C78.377 "Specifications for the Chromaticity of Solid-State Lighting Products" with LEDs binned within a maximum three-step MacAdam Ellipse to ensure color consistency amongst luminaires of the same type.
 - 3. LM-70 listed for 50,000-hour minimum life.
 - 4. Fixtures, lamps, drivers, and components, provide a complete warranty for parts and labor for a minimum of five years from the date of Substantial Completion.
 - 5. Fixtures shall be modular and allow for separate replacement of LED lamps and drivers. User serviceable LED lamps and drivers shall be replaceable from the room side.
 - 6. Dimmable LED fixtures shall have either a 0-10 volt, or 3-wire dimming driver, line voltage, as shown on the drawings. 10% dimming for daylight only. 1% dimming for manual dimming.
 - 7. Retrofit LED lamps shall comply with NEMA SSL 4 "SSL Retrofit Lamps: Suggested Minimum Performance Requirements". Provide base to match designated fixture.
 - 8. Drivers shall be electronic-type, labeled as compliant with radio frequency interference (RFI) requirements of FCC Title 47 Part 15, and comply with NEMA SSL 1 "Electronic Drivers for LED Devices, Arrays, or Systems". LED drivers

shall have a sound rating of "A", have a minimum efficiency of 85%, and be rated for a THD of less than 20 percent at all input voltages.

9. Dimmable LED drivers shall be capable of dimming without LED strobing or flicker across their full dimming range.

M. Allowances and Spare Parts: In addition to the work shown on the drawings, provide the following items to be wired to nearest circuit with spare capacity at locations as selected by the Architect. If some units are not required to be installed, they shall be turned over to the Owner for spare parts.

1. Provide four (4) exit signs, four (4) utility fixtures, and four (4) two-head EM battery packs.

1.24 DISTRIBUTED LIGHTING CONTROL SYSTEM

A. General

1. System Description
 - a. Refer to drawings for lighting control system.

1.25 CENTRAL LIGHTING INVERTER

A. General

1. Specification - This specification defines the electrical and mechanical characteristics and requirements for a stand-by, three-phase, solid-state uninterruptible power supply, hereafter referred to as the CIS (Central Inverter System). The CIS shall provide high quality, computer grade AC power for lighting loads (power factor corrected and self-ballast fluorescent, incandescent, halogen, and LED) during emergency backup. The CIS shall incorporate a high frequency pulse width modulated (PWM) inverter utilizing IGBT technology, a microprocessor-controlled inverter and a temperature compensating battery charger, a user-friendly control panel with audible and visual alarms.
2. Specification is based on Myers Inverters. Alternate manufactures meeting these requirements may be submitted.
3. Acceptable manufacturers are: Dual-Life, Chloride, Myers.

B. Design Standard

1. The CIS shall be designed in accordance with the applicable sections of the current revision of the following documents. Where a conflict arises between these documents and statements made herein, the statements in this specification shall supersede.
 - a. UL 924 Standard for Emergency Lighting and Power Equipment
 - b. ANSI C62.41 (IEEE 587)
 - c. ANSI C62.42.45 (Cat. A & B)
 - d. National Electrical Code NFPA-70
 - e. Life Safety Code NFPA-101

f. OSHA

C. System Description

1. Design Requirements - Electronics Module
2. Nominal Input/Output Voltage

The input and output voltage of the CIS shall be pre-configured to match the user specified input and load requirements. Available voltages are 120/208 VAC.

Input: 120 V, 1-phase, 3-wire-plus-ground

Output: 120 VAC, 1-phase, 3-wire-plus-ground

3. Output Load Capacity

The output load capacity of the CIS shall be rated in kVA at unity power factor. The CIS shall be able to supply the rated kW from .5 lagging to .5 leading.
Rating: 2 kVA

4. Design Requirement - Battery System
 - a. Battery Cells- The CIS shall be provided with sealed, valve regulated lead acid batteries.
 - b. Reserve Time- The battery system shall be sized to provide the necessary reserve time to feed the inverter in case of a mains failure.
Battery reserve time: 90 minutes.
 - c. Recharge Time- The battery charger shall recharge the fully discharged batteries within a 24-hour period. The charger shall be an integrated 3-step with equalize, microprocessor controlled and temperature compensating.

D. Modes of Operation

1. The CIS shall be designed to operate with less than a 2-millisecond (no break) transfer time:
2. Normal- The CIS Inverter is normally off and the commercial AC power continuously supplies the critical load. The input converter (bi-directional transformer) derives power from the commercial AC power source and supplies to the inverter while simultaneously providing floating charge to the batteries.
3. Emergency- Upon failure of the commercial AC power the inverter instantaneously, with a maximum of a 2-millisecond break, switches its power supply from the input converter to the battery system. There shall be no loss of power to the critical load upon failure or restoration of the utility source.
4. Recharge- Upon restoration of commercial AC power after a power outage, the input converter shall automatically restart and start charging the batteries. The critical loads are powered by the commercial AC power again.
5. Performance Requirements
AC Input to CIS
 - a. Voltage Configuration for Standard Units: 3-phase, 4-wire-plus-ground.
 - b. Voltage Range: (+10%, -15%)

- c. Frequency: 60 Hz (+/- 3HZ)
- d. Power Factor: .5 leading/lagging
- e. Inrush Current: 1.25 times nominal input current, 10 times 1 line cycle for incandescent loads
- f. Current Limit: 125% of nominal input current
- g. Current Distortion: Less than 3% THD maximum from 50% to full load
- h. Surge Protection: Sustains input surges without damage per standards set in UL924

6. AC Output, CIS Inverter

- a. Voltage Configuration for Standard Units: 3-phase, 3 or 4-wire-plus-ground
- b. Static Voltage Stability: Load current changes +/- 2%
- c. Dynamic Voltage Stability: +/- 2% (25% step load), +/- 3% (50% step load)
- d. Dynamic Recovery Time to within 1% of nominal: 3Hz (0-100% load step)
- e. Output Harmonic Distortion: < 3% (with linear load)
- f. Frequency: 60 Hz (+/- .05Hz during emergency mode)
- g. Load Power Factor Range: 0.5 lagging to 0.5 leading
- h. Output Power Rating: kVA = kW
- i. Overload Capability: to 100% continuous rating
to 115% for 5 minutes
to 125% for 12-line cycles
- j. Crest Factor: <= 2.8

E. Environmental Conditions

The CIS shall be capable to operate within the specified design and performance criteria provided that the following environmental conditions are met:

- 1. Storage/Transport Temperature:
-4° to 158°F (-20° to 70°C) without batteries
0° to 104°F (-18° to 40°C) with batteries
NOTE: Maximum recommended storage temperature for batteries is 25°C for up to six months. Storage at up to 40°C is acceptable for a maximum of three months.
- 2. Relative Humidity: 0 to 95% non-condensing
- 3. Altitude: Operating: to 10,000 ft. (3,000 m) above sea level
De-rated 5% per km above 3 km
Storage/Transport: to 40,000 ft. (12.2 km) above sea level
- 4. Audible Noise: 45 dBA @ 1 meter from surface of the CIS on emergency

F. Submittals

1. Proposal Submittals

Submittals with the proposal shall include the following:

- a. System configuration with single-line diagrams
- b. Functional relationship of equipment including weights dimensions and heat dissipation

- c. Descriptions of equipment to be furnished, including deviations from these specifications
 - d. Size and weight of units to be handled by installing contractor
 - e. Detailed layouts of customer power and control connections
 - f. Detailed installation drawings including all terminal locations
2. Central Inverter System Delivery Submittals
Submittals upon CIS delivery shall include:
 - a. A complete set of submittal drawings
 - b. One set of instruction manuals. Manuals shall include a functional description of the equipment, installation, safety precautions, instructions, step-by-step operating procedures and routine maintenance guidelines, including illustrations.

G. Warranty

1. Central Inverter Module - The inverter manufacturer shall warrant the CIS module against defects in materials and workmanship for 12 months after initial start-up or 18 months after ship date, whichever occurs first.
2. Battery - The battery manufacturer's standard warranty shall be passed through to the end user. Sealed Lead Calcium VRLA, 10-year life expectancy one-year full replacement warranty plus an additional nine years pro-rata.

H. Quality Assurance

1. Manufacturer Qualifications - A minimum of 10 years' experience in the design, manufacture, and testing of emergency power systems is required.
2. Factory Testing - Before shipment, the manufacturer shall fully and completely test the system to assure compliance with the specification.

I. Product

1. Fabrication
 - a. All materials of the CIS shall be new, of current manufacture, high grade, free from all defects and shall not have been in prior service except as required during factory testing.
 - b. The CIS module shall be housed in a single freestanding NEMA type 1 enclosure. Battery cabinets are designed to allow stacking to minimize the overall system's footprint. Front access only shall be required for installation, adjustments and expedient servicing (MTTR: < 15 minutes). All components shall have a modular design and quick disconnect means to facilitate field service.

The CIS shall be painted with a powder coat finish in the manufacturer's standard color. The inverter shall be constructed of replaceable subassemblies. Like assemblies and like components shall be interchangeable.

Cooling of the CIS shall be forced-air in emergency mode with internally mounted fans. Fans shall not operate in the battery charge / standby mode. Fan power shall be provided by the inverter. Maximum acoustical noise on emergency at one meter from the cabinet surface shall be no greater than 50 dBA.

2. Components

- a. The CIS shall be comprised of the following components:
- CIS Module - The inverter module shall contain an inverter, an AC distribution panel with an input circuit breaker, backfeed relay, control, and monitoring subsystems.
 - Battery Module - The battery module shall contain the battery plant required to produce the reserve energy to supply the inverter during abnormal AC mains conditions. The battery module may be contained in an external cabinet(s) depending on the system VA.

3. Battery Charger

- a. General - In the standard configuration the charger converts AC voltage to DC voltage. With commercial power present, the inverter power transformer is powered and the IGBT modules are microprocessor controlled to recharge the batteries. The temperature compensated battery charger circuit supplies constant voltage and constant current to the batteries. Once the batteries have received a full recharge, a constant trickle charge maintains batteries at maximum level. Recharge time is 24 hours maximum at nominal AC input voltage. The AC ripple current of the DC output meets the battery manufacturer specification, thus ensuring the maximum battery lifetime.
- b. AC Input Current - The charger unit is provided with an AC input current limiting circuit whereby the maximum input current shall not exceed 125% of the output full current rating.
- c. Automatic Restart - Upon restoration of utility AC power, after a utility AC power outage and after a full CIS automatic end-of-discharge shutdown, the CIS will automatically restart, performing the normal CIS start up.
- d. DC Filter - The charger shall have an output filter to minimize AC ripple voltage into the battery. Under no conditions shall ripple voltage into the battery exceed 2% RMS.
- e. Battery Recharge - The charger is capable of producing battery-charging current sufficient enough to recharge the fully discharged battery bank within a 24-hour period. After the battery is recharged, the charger shall maintain full battery charge until the next emergency operation.
- f. Over-voltage Protection - The charger is equipped with a DC over-voltage protection circuit so that if the DC voltage rises above the pre-set limit, the charger is to shut down automatically and initiate an alarm condition.

4. Inverter

- a. General - The inverter converts DC voltage supplied by the battery to AC voltage of a precisely stabilized amplitude and frequency that is suitable for powering most sophisticated electrical equipment. The inverter output

voltage is generated by sinusoidal pulse width modulation (PWM). The use of a high carrier frequency for PWM and a dedicated AC filter circuit consisting of a transformer and capacitors, ensure a very low distortion of the output voltage (THD<3% on linear loads).

- b. Overload Capability - The inverter during emergency modes shall be capable of supplying current and voltage for overloads exceeding 100% and up to 125% of full load current for 12-line cycles, 115% for 5 minutes and 110% for 10 minutes.
- c. Output Power Transformer - A dry type power transformer provides the inverter AC output. The transformer is built with copper wiring exclusively. The hottest winding temperature of the transformer shall not exceed the temperature limit of the transformer insulation class of material at ambient temperature.

5. Displays and Control

- a. Monitoring and Control - The CIS system provides operation monitoring and control, audible alarms, LED indicators, and diagnostics. The front-mounted control panel includes a 2-line 20-character LCD display, a keypad to control and monitor the internal operation of the system. This allows the operator to easily “watch” system functions as they occur and check on virtually any aspect of the system's operation. Monitoring and control are microprocessor-based for accuracy and reliability. To ensure only authorized personnel can operate the unit, the system is multi-level password protected for all control functions and parameter changes.
- b. Metering - Scrolling through the meter functions can monitor the following measurements:
 - Utility input voltage
 - System output voltage
 - Battery voltage
 - Battery current
 - System output current
 - System output VA
 - Inverter wattage
 - System temperature
 - Date & time

6. LED Indication

- a. The front panel with integrated LEDs, allows a quick check of the CIS operating status.
 - AC Present (Green)
 - System Ready (Green)
 - Battery Charging (Yellow)
 - Battery Power (Yellow)
 - Fault (Red)

7. Audible Alarm

- a. Audible alarm will activate with any of the following conditions and automatically store the 50 most recent events.
 - High battery charger voltage
 - Low battery charger voltage
 - High AC input voltage
 - Low AC input voltage
 - Near low battery voltage
 - Low battery voltage
 - Load reduction fault
 - High Ambient temperature
 - Inverter fault
 - Output fault
 - Output overload
- b. Interface - The system shall be equipped with an RS-232 serial port (DB9) for remote communications.
- c. Manual and Programmable Testing - The system shall incorporate a manual test function and two automatic test modes. The system will perform a programmable, self-diagnostic monthly test for 5 minutes. The monthly test is preset for the 15th of every month and the user can program the event time of day. The yearly self-diagnostic test is for 90 minutes and the user can program the time of the day the event is to take place. The microprocessor automatically records the last 75 test events in its own separate test result log.
- d. Battery Assembly - The batteries are sealed, lead-acid valve regulated battery cells with a ten-year prorated warranty. Precut cable wires are included to provide easy installation. A means of disconnect shall be included for isolation of battery assembly from the CIS module.

J. Options

- 1. The central inverter system shall include the following options:
 - Summary Form C Contacts
- 2. Ordering Number

The system shall be Myers Emergency Power Systems, LLC

K. Execution

- 1. Wiring - All wiring shall be installed in conduit. Input and output wiring shall enter the cabinet in separate conduits.

- L. Unit Start-up and Site Testing - Site start-up and testing shall be provided by the manufacturer's field service representative during normal working hours (Mon. - Friday, 8 a.m. - 5 p.m.). Individual scheduling requirements can usually be met with 7 working days advance notice. Site testing shall consist of a complete test of the CIS and accessories by the inverter manufacturer in accordance with manufacturer's standards. Manufacturer's

approved service representative must perform commissioning for two-year warranty to apply.

- M. Replacement Parts - Parts shall be available through Field Service Centers throughout the country and directly from the factory. Recommended spare parts shall be fully stocked by local field service personnel with back up available from manufacturing location.
- N. Maintenance Contracts - A complete offering of preventive and full-service maintenance contracts for both the inverter system and batteries shall be available. An extended warranty and preventive maintenance package shall be available. Factory-trained service personnel shall perform warranty and preventive maintenance service. A five-year maintenance contract option will include a unit start-up and site testing.

1.26 TELEPHONE, DATA FACILITIES

- A. Conduit System: Complete system to include mounting, board, empty conduit from terminal pole, empty raceways to terminal panel and outlet boxes as indicated. All wiring will be furnished and installed by the Owner's vendor. Provide cables where indicated.
- B. Conduit to have no more than two (2) right angle bends. Minimum 6" radius bends and all bends shall have a radius equivalent to at least 8 times the nominal size of the conduit.
- C. Provide a nylon drag rope of #12 gauge drag wire in empty conduits to facilitate the installation of wiring.
- D. Outlet boxes to be single gang 4" square 2-1/2" deep unless noted otherwise on plans, with satin finished stainless steel single hold bushed plates.
- E. Provide 4' x 4', 3/4" painted fire proof plywood backboard at terminal board locations.

1.27 FIRE ALARM SYSTEM

- A. General:
 - 1. Provide Siemens fire alarm control panel and devices per plans. See Plans for more information.
 - 2. All equipment shall be UL listed and shall meet or exceed the requirements of NFPA 72 NEC Article 760 and State and Local Fire Marshalls.
 - 3. Items of the fire alarm system shall be listed as a product of a single fire alarm system manufacturer under the appropriate category by the Underwriters' Laboratories, Inc., U.L. and shall bear the U.L. label. Control equipment shall be listed under U.L. category UOJZ as a single control unit. Partial listings shall NOT be acceptable.
 - 4. Provide new devices, circuitry and programming.
- B. System Description:
 - 1. System shall be electronically operated, addressable type with annunciation, and shall include: control equipment, battery back-up, remote station tie via telephone

line, stations, smoke and heat, combination smoke/carbon monoxide detectors, detectors, signals, speaker/strobes and strobes remote annunciation, exterior speaker/strobe, fan shutdown, remote annunciation with trouble station, and Knox box with tamper switch.

2. The system shall be provided with standby battery and charger. The battery shall be Gel sealed cell type capable of operating the system under supervisory condition for seventy-two (72) hours and alarm for fifteen (15) minutes. System shall automatically transfer to the standby batteries upon power failure. Battery charging and recharging operations shall be automatic. Batteries, once discharged, shall recharge at a rate to provide a minimum of 70% capacity in 12 hours.
3. Circuits requiring system-operating power shall be 24V DC and shall be individually fused at the control panel.

C. Fire Alarm Control Equipment:

1. All modules shall be factory assembled into an operating control panel, prior to shipment.
2. The control equipment shall be factory tested and approved complete with appropriate UL label.
3. Control panel shall include module for pre-recorded voice evacuation.

D. The quantity of modules shall be determined by the circuit requirements of the job. All modules shall be mounted in a surface cabinet with hinged, locked trim. Trim shall have a plastic window, which will show all zone lights, system reset and alarm silence switch, and alarm supervision trouble and power on lights.

E. All addressable initiating devices shall be individually annunciated via the 80-character minimum LCD display, at the fire alarm control panel and the remote LCD annunciator. The initiating devices will also be annunciated per zone, as described by the Engineer, on an LED annunciator located at the fire alarm panel and main entrance to the Village police station. All signals to sound continuously, all visual alarm devices to flash, all ventilating fans connected to stop and all magnetic door holders to release. A module for City connection via lease telephone line shall be activated. All of the above functions shall remain "on" until initiating device is restored to normal and the system is reset.

F. Should trouble occur on the system, an internal trouble buzzer shall sound. Each addressable Initiating device shall have a trouble indication via the 80-character (minimum) LCD so an interruption in that circuit can be identified quickly.

G. All addressable devices are to have the capability of being disabled or enabled individually. Up to 127 addressable devices may be multi-dropped from a single pair of wires.

H. The communication format must be a poll/response protocol to allow T-tapping of the wire of addressable devices and be completely digital.

I. Standby Power

1. The standby power supply shall be Gel type battery, with charger, calculated to provide 60 hours of supervisory power, followed by 15 minutes of continuous alarm.

2. A surface mounted, locked cabinet shall be provided to house the standby power supply.
3. All doors normally held open by door control devices, shall release upon AC failure.
4. Submit battery sizing calculations as part of system shop drawings.

J. Communication with Addressable Devices:

1. The system shall provide communication with initiating and control devices individually. All of these devices will be individually annunciated at the control panel. Annunciation shall include the following conditions for each point:
 - Alarm
 - Trouble
 - Open
 - Short
 - Device missing/failed
2. Addressable devices shall have the capability of being disabled or enabled individually.

K. Operation:

1. Activation of manual or automatic initiating device after verification shall provide following operation throughout system:
 - a. Device in alarm shall be indicated at the fire alarm control panel. Once acknowledged, the indication light will remain latched ON until the system has been reset. A subsequent alarm will flash the appropriate indication on the control panel.
 - b. Pulsing alarm tone shall occur within control panel.
 - c. Alarm signaling devices shall sound and flash.
 - d. Air handling units shall shutdown.
 - e. Address description shall be at annunciator.
 - f. Signal shall be sent to Fire Department via telephone.

L. Supervision

1. Control circuits plus the external alarm indicating and alarm initiating circuits shall be electrically supervised. Any open or ground fault, or loss of circuit power shall cause the panel trouble signal to sound. Trouble signal operating power shall be provided by a separate power circuit feed.
2. System shall provide independently supervised initiation circuits so that fault in any one loop or address shall not affect any other loop or address. Alarm activation of any initiation loop address or circuit shall not prevent subsequent alarm operation of any other initiation circuit.
3. Auxiliary manual controls shall be supervised so that switches must be returned to normal automatic position to clear system trouble.
4. Each independently supervised circuit shall include discrete amber "Trouble" LED to indicate disarrangement conditions per circuit.

5. Control panel batteries shall be supervised so that disconnection of battery shall be audibly and visually indicated at control panel and annunciator.

M. Directory

1. Provide adjacent to the fire alarm control panel, a surface mounted directory, plastic laminated, in an aluminum frame, containing a graphic plan of the building with each device and address clearly indicated. Furnish two (2) additional unframed laminated directories to Owner.

N. Wiring

1. Number and size of conductors shall be in strict accord with manufacturer's wiring diagram as required for proper operation. Manufacturer's wiring prepared diagrams for this system shall be submitted for review prior to installation.
2. Each initiating zone shall be on a Class A, two-wire circuit. Wire size shall be #14.
3. Each signal circuit shall be Class A, 4-wire circuit, wire size shall be #12.
4. Smoke detectors shall require two (2) wires #14, except smoke detectors with sounding bases shall require (2) pairs of #14 wire.
5. Annunciator shall require one (1) #14 for power plus one (1) #18 twisted shielded pair between the annunciator and the control panel.
6. Where required due to length of run, the size of conductors shall be increased in accord with manufacturer's recommendations.
7. Provide wiring from tamper switch in Knox Boxes to control panel.
8. Wiring shall be fire rated Teflon, copper THHN, solid.
9. Raceways shall be provided for wiring run in Mechanical Rooms, Attics crawl spaces and where run exposed.
10. All outlet boxes and covers for fire alarm system shall be painted red and all new or accessible existing raceways shall be banded with red paint at 10'-0" intervals and each side of partitions.
11. Conductors not having connections within a box shall pass through without interruption.

O. Peripheral Devices

1. General: The system control panel, must be capable of communicating with the addressable devices. Addressable devices shall be located as shown on the drawings. The location of addressable devices shall be selected along with conventional devices to optimize the system layout in order to provide the level of protection, address or zone identification and control as shown on the drawings.
2. Signals: Signals shall be audio/visual type with speaker and strobe conforming to ADA requirements. Where noted, provide visual only signals. Provide white devices to match system.
3. Addressable Detector Bases: All addressable smoke and heat detector heads shall be plugged into their bases. The base shall contain electronics that communicate the detector status (normal, alarm, trouble) to the control panel over two wires. The same two wires shall also provide power to the base and detector. Different detector heads (smoke or heat) shall be interchangeable. Upon removal of the heat, a trouble signal shall be transmitted to the control panel. Provide sounding bases for Dormitory Rooms.

P. PhotoElectric Detector Head:

1. The photoelectric type detector shall be a plug-in unit, which mounts to a twist-lock base, and shall be UL approved.
2. The detectors shall be of the solid-state photoelectric type and shall contain no radioactive material. They will use a pulsed infrared LED light source and be sealed against rear airflow entry.
3. The detector shall fit into a base that is common with both the heat detector and ionization type detector and shall be compatible with other addressable detectors, addressable manual stations, and addressable zone adapter modules on the same circuit. The detector shall also fit into a non-addressable base that is capable of being monitored by an addressable zone adapter module.
4. Duct type smoke detectors shall have an air sampling tube extending across the duct. Locate in representative duct, approximately 6 duct widths from potential source of turbulence.
5. There shall be no limit to the number of detectors or zone adapter modules, which may be activated, or "in alarm" simultaneously.

Q. Thermal Detector Head:

1. Thermal detector heads shall be UL listed. They shall be a combination rate-of-use and fixed temperature (135°F) type, automatically restorable.
2. Provide addressable heat detectors in all spaces except Natatorium.

R. Provide combined smoke and carbon detectors where shown on drawings.

S. Pull Stations:

1. Addressable pull stations shall contain electronics that communicate the station's status (alarm and normal) to the transponder over two wires, which also provide power to the pull station. The address shall be set on the station. They shall be manufactured from high impact red Lexan. Station shall mechanically latch upon operation and remain so until manually reset by opening with a key common to all system locks. Pull stations shall be (double action).
2. The front of the station shall be hinged to a backplate assembly and must be opened with a key to reset the station. The key shall be common with the control panels. Stations, which use Allen wrenches or special tools to reset, will not be accepted. The station shall consist of high impact Lexan plastic, red in color.
3. The addressable manual station shall be capable of field programming of its "address" location on an addressable initiating circuit. The manual station shall be fitted with screw terminals for field wire attachment.
4. There shall be no limit to the number of stations, detectors or zone adapter modules, which may be activated or "in alarm" simultaneously.
5. Provide remote annunciator with mic station.
6. The addressable manual station shall be Underwriters' Laboratories, Inc.
7. Provide stopper II clear cover for pull stations.

T. Fire Alarm speaker/strobes and strobes.

1. Provide code required candela and db levels.
2. Adjust dB and candela levels as required per code.

- U. Equipment submission include as a minimum the following:
1. Complete descriptive data indicating U.L. listing for all system components.
 2. Complete sequence of operations for this project system.
 3. Complete system wiring diagram specific to this project.
 4. Interconnection diagrams indicating specific wiring connections required, including specific terminal designations for this project.
 5. Final determination of compliance with these specifications shall rest with the Architect and Engineer, who at their discretion, may require proof of performance.
- V. Addressable Device Supervision:
1. All devices shall be supervised for trouble conditions. The system control panel shall be capable of displaying the type of trouble condition (open, short, device missing/failed).
 2. Should a device fail, it shall not hinder the operation of other system devices.
 3. Testing and Instruction: Manufacturer's authorized agent shall perform a quality inspection of final installation, and in the presence of the EC., Owner, Architect and Engineer, program the addressable system, and perform a complete functional test of the system. Test shall include activating of each device. A written system certification verifying the type, location and individual testing of all system components, as supplied by manufacturer, shall be required prior to acceptance. Manufacturer's authorized agent shall instruct Owner in the operation and maintenance of the system.
- W. Fan Shutdown: Provide signal to each air mover noted on plans for fan shutdown. Signal shall activate a fan shutdown relay with manual reset, provided by EC, wired into the unit controls per HC's approved wiring diagram or provide signal to shunt trip circuit breakers.
- X. Sprinkler System Flow, Tamper and Low-Pressure Switches: Shall be connected to the Fire Alarm System and to be wired to:
1. Initiate an alarm and annunciate point address upon activation of any flow switch.
 2. Initiate a trouble signal in the main panel and remote annunciator upon activation of any tamper or low-pressure switch.
 3. Switches will be furnished and mounted by FPC, wiring and connection shall be provided by EC. Provide all necessary control panel and addressable network modules.
 4. Provide double contact detectors in Boiler Room, wire to sound alarm and shutdown boilers. Provide relays to connect to existing boiler controls.
- Y. System Test: Manufacturer's authorized agent shall perform a quality inspection of final installation, and in the presence of the EC, Fire Marshall, Owner, Architect, and Engineer, perform a complete functional test of the system. Tests shall verify operation and zoning of all initiation devices, operation of all signals, fan shutdown, elevator operation and remote tie. A written system certification verifying the type, location and individual testing of all new and existing system components, as supplied by manufacturer, shall be required prior to acceptance. Manufacturer's authorized agent shall instruct Owner in the operation and maintenance of the system.
- Z. Adjustment:

1. Provide for two (2) 4-hour visits to adjust programming and settings. Visits shall be made upon request of Owner within 24-hours of contact.
2. Included shall be change out of devices causing nuisance alarms.

AA. Service:

1. Provide a one (1) year complete service contract for the entire (new, altered and existing components) fire alarm system. Service contract shall provide for all maintenance, testing, cleaning and adjustments necessary to maintain system in top operating condition. Included shall be a minimum of four (4) scheduled service visits to check normal system operation and emergency service, which shall be available 24 hours of every day. Response time for emergency service shall be four (4) hours or less. Work under this Service Contract shall be performed by Manufacturer's factory trained service personnel. Provide the telephone numbers for regular and emergency service to the Owner and post on Fire Alarm panel. The one-year service period shall start on date of Certificate of Completion.
2. Included in the one-year full-service contract, shall be any necessary change out of detectors causing nuisance alarms. This shall include labor and materials required for reprogramming and to change smoke detector type or change to heat detector.
3. Each of four scheduled service visits shall include testing of every component, and ringing out all stations. Each device and outcome of test shall be recorded. This shall be done during non-building use hours at a time approved by the Owner in advance.
4. Scheduled service testing shall be documented by a full report indicating each test done, results, repairs, or adjustment accomplished, name of service personnel, date and time of testing, and any other pertinent information.
5. Reports shall be reviewed with the Maintenance Supervisor before leaving the building and shall be submitted in writing to the Owner within three (3) days of the inspection.

BB. Allowances and Spare Parts:

1. In addition to the devices shown on the drawings, provide the following items to be wired and connected to adjacent zones at locations as selected by the Architect. If some units are not required to be installed, they shall be turned over to the Owner as spare parts.
2. The Contractor shall provide devices, wiring, and programming as follows, two (2) audio/visual signal units, two (2) speaker/strobes, two (2) pull stations, two (2) duct smoke detectors, two (2) photoelectric ceiling smoke detectors, two (2) fixed temperature heat detectors.

1.28 TEMPORARY LIGHT AND POWER

- A. EC shall provide, maintain and remove upon completion a temporary lighting and power system as outlined below.

- B. Provide a 120/208 volt, 3 phase temporary service for the project. Intercept existing feeder from existing dining hall and extend to vicinity of new building. Locate as specified by GC.
1. A weather proof plywood mounting board with meter and NEMA-3R trough shall be provided at the base.
 2. NEMA-3R disconnect switches shall be provided for:
 - Temporary power and lighting within the building
 - General Contractor's trailer
 3. Extend feeders to the loads listed below and make connections.
 - Temporary power and lighting throughout the building (200 Amp, 3Ø)
 - General Contractor's trailer (as required)
 - Extend feeder for the loads and make connections
- C. Temporary system shall provide outlets spaced so that all parts of building may be reached with one-hundred-foot extension.
- D. Where building is roofed, provide temporary lighting throughout building consisting of #12 wire strung in areas with rubber covered pigtail sockets and LED lamps spaced a maximum of 20 feet apart. Provide lighting outlets as request in all areas of construction.
- E. A minimum light level of 15-foot candles shall be provided throughout the building.
- F. Any Contractor requiring service for equipment of 208 volts or more than 15 amperes at 115 volts shall have separate feeder installed from temporary panels, all such installation to be made by EC and paid for by Contractor requiring service.
- G. No space heating equipment using electricity as a heat source shall be allowed.
- H. Upon completion of work, all temporary tie-ins, feeders, wiring, outlets, panels and supports shall be removed in their entirety.
- I. Ground fault protection shall be provided for temporary light and power in accord with the National Electrical Code.
- J. Energy charges will be paid for by Owner.
- K. EC shall coordinate shutdown for service changes to permanent with other Contractors. A minimum of three (3) days' notice shall be given for any disruption of temporary light and power.

1.29 SHOP DRAWINGS

- A. All manufactured items shall be submitted for review before installation of same. Submission shall be in form of manufacturer's standard printed sheets, pamphlets or bulletins and shall be clearly indicated thereon as to size, type, etc.

- B. Review of submission shall mean review of equipment and/or fabrication as to design and performance only. Contractor shall be responsible for scheduling quantities, physical size to suit allowable space, electrical characteristics, etc.
- C. Any additional costs incurred due to substitution of equipment shall be borne by E.C.
- D. The following items require a submission of shop drawings:
 - 1. Main Distribution Panel
 - 2. Branch Panels
 - 3. Lighting fixtures
 - 4. Lighting Control System, Including Wiring Diagrams
 - 5. Lighting Inverter System
 - 6. Disconnect switches
 - 7. Devices and plates
 - 8. Fire alarm system including wiring diagrams
 - 9. TVSS Units

1.30 GUARANTEE

- A. Refer to Sections 23 50 00.

END OF SECTION 26 00 00

SECTION 31 00 00

SITE WORK

PART 1 - GENERAL

1.00 QUALITY ASSURANCE

- A. Comply with all applicable local, state and federal requirements regarding materials, methods of work and disposal of excess and waste materials.
- B. Obtain and pay for all required inspections, permits and fees. Provide notices required by governmental authorities.

1.01 DEMOLITION, REMOVAL, CUTTING AND PATCHING

- A. Provide materials, labor, equipment and services necessary to perform work as shown on the drawings, as specified herein or as required by job conditions; scheduling work as required by Contract Documents.

1.02 PROJECT CONDITIONS

- A. Locate and identify existing underground and overhead services and utilities within contract limit work areas. Provide adequate means for protection of utilities and services designated to remain. Repair utilities damaged during site work operations at Contractor's expense.
- B. Arrange for disconnection, disconnect and seal or cap all utilities and services designated to be removed before start of site work operations. Perform all work in accordance with the requirements of the applicable utility company or agency involved.
- C. When uncharted or incorrectly charted underground piping or other utilities and services are encountered during site work operations, notify the applicable utility company immediately to obtain procedure directions. Cooperate with the applicable utility company in maintaining active services in operation.
- D. Locate, protect and maintain bench marks, monuments, control points and project engineering reference points. Re-establish disturbed or destroyed items at Contractor's expense.
- E. Perform site work operations and the removal of debris and waste materials to assure minimum interference with streets, walks and other adjacent facilities.
- F. Obtain governing authorities written permission when required to close off obstruct street, walks and adjacent facilities. Provide alternate routes around closed or obstructed traffic ways when required by governing authorities.
- G. Control dust caused by the work. Dampen surfaces as required. Comply with pollution control regulations of governing authorities.

- H. Protect existing buildings, paving and other services or facilities on site and adjacent to the site from damage caused by site work operation. Cost of repair and restoration of damaged items at Contractor's expense.
- I. Protect and maintain street lights, utility poles and services, traffic signal control boxes, curb boxes, valves and other services, except items designated for removal. Remove or coordinate the removal of traffic signs, parking meters and postal mail boxes with the applicable governmental agency. Provide for temporary relocation when required to maintain facilities and services in operation during construction work. Provide for temporary street lighting during construction, as necessary.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment: As selected by Contractor, except as indicated.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Examine the areas and conditions under which site work is performed. Do not proceed with the work until unsatisfactory conditions are corrected.
- B. Consult the records and drawings of adjacent work and of existing services and utilities which may affect site work operations.

END OF SECTION

SECTION 31 10 00

SITE DEMOLITION, CLEARING AND PREPARATION

PART 1 - GENERAL

1.00 DESCRIPTION

- A. Work under this Section shall consist of providing all labor, plant material and equipment for preparing the site for construction in accordance with the Contract Documents.
- B. Work shall include, but not be limited
 - 1. Removal of site structures, obstructions and utilities.
 - 2. Disconnecting, capping, or sealing and removing or abandoning utilities.
 - 3. Protection of Existing structures and utilities to remain.
 - 4. Protection of existing trees, landscaping and natural features to remain.
 - 5. Maintenance and protection of traffic.
 - 6. Clean-up and restoration.
 - 7. Removing designated site improvements.
 - 8. Reusing designated site improvements.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.03 SUBMITTALS

- A. Provide submittals as listed and/or enumerated in division 1 of these specifications.

1.04 QUALITY ASSURANCE

- A. Comply with Section 31 00 00 requirements.

1.05 PROJECT CONDITIONS

- A. General:
 - 1. Locations shown on Drawings not Guaranteed:
The structures, obstruction, utilities, trees and shrubs shown on the drawings are those known to exist, but their location is not guaranteed to be exact, nor is it

guaranteed that all structures, obstructions, utilities, trees and shrubs are shown. The contractor shall, however, be responsible for the protection of all structures, obstructions, utilities, trees and shrubs, whether shown on the drawings or not.

2. **Safeguards and Protections:**
The Contractor shall provide all necessary safeguards including the installation of protective fencing and barriers, etc., as may be required to prevent damage to adjacent property or injury to persons. All work shall be done in accordance with the requirements of the local building codes and the rules, regulations and ordinances of all other governing bodies having jurisdiction. The Contractor will be held responsible for any claim arising from his failure to provide proper safeguards or for his failure to conduct his operation in a manner consistent with the rules, regulations and ordinances of those governing bodies having jurisdiction.
3. **Replacement of Disturbed Ground Surfaces:**
The Contractor shall at his own expense, repair or replace all ground surfaces which are to remain, and which may become disturbed or damaged due to his operations. Said repair or replacement shall be satisfactory to the Architect and in accordance with the requirements of the governing body having jurisdiction.
4. **Damage:**
The contractor, at his own expense, shall make good, repair and/or replace all damage occurring as a direct or indirect result of his operations.
5. **Notification of Utility Owners:**
Under Industrial Code Rule 53, the Contractor will be required to notify all operators of utilities prior to the start of his work and to call the Underground Call Center so that all the various underground utility operators will be able to locate and mark the locations of their own utilities. Notification of operators of utilities must be made at least forty-eight (48) hours prior to the start of any construction. No work by the Contractor shall commence until the operators have notified the Contractor that their utilities have been located.

The Contractor will be held responsible for any claims arising from his failure to make such notification, or for his failure to do the work in accordance with the rules and regulations of the governing authorities and owners of the utilities involved.
6. **Locate and identify existing underground and overhead services and utilities within contract limit work areas. Provide adequate means of protection of utilities and services designated to remain. Repair utilities damaged during site work operations at Contractor's expense.**
7. **When uncharted or incorrectly charted underground piping or other utilities and services are encountered during site work operations, notify the applicable utility company immediately to obtain procedure directions. Cooperate with the applicable utility company in maintaining active services in operation.**
8. **Locate, protect and maintain bench marks, monuments, control points and project engineering reference points.**
9. **Control dust caused by work. Dampen surfaces as required, comply with pollution control regulations of governing authorities.**

1.06 REMOVAL OF STRUCTURE, UTILITIES AND OBSTRUCTIONS

A. General Requirements:

The contractor shall remove and dispose of those existing structures, utilities and obstructions which interfere with the proposed construction as shown on the drawings, and as determined in the field by the Owner's Field Representative or Architect. This shall include, but not necessarily be limited to: retaining walls, poles, pole bases, catch basins, inlets, manholes, vaults, tanks, conduit, pipes and appurtenances, pavements, sidewalks, curbs, signs and sign supporting structures.

The Contractor shall remove only those items and structures that he has been authorized to remove, either by specific directions given on the drawings or by written instructions given before or during the progress of the work by the Owner's Field Representative or Architect.

The Contractor will be held responsible for any claim arising from his removal of any existing item or structure without the required authorization specified herein.

B. Discontinuance of Utilities:

Before any structure or building with utilities thereon is disposed of, the utilities shall be disconnected and removed. The Contractor shall perform the work of discontinuing the utilities in accordance with the requirements and directions of the authorities having jurisdiction over the utilities involved.

C. Removal Within Proposed Building Areas:

In the proposed building areas as shown on the Drawings, existing foundations, floor slabs, pipe, utility structures and other obstructions shall be removed completely. Backfilling required by the removal of these obstructions shall be performed in accordance with the appropriate Section of these specifications.

D. Portions of Pavements, Curbs, Etc., to Remain:

In removing portions of pavements, curbs, sidewalks, driveways and similar items where the balance of such items is to remain, removal shall be to an existing joint. Where this is not practical, as determined by the Owner's Field Representative or Architect, removal shall be to a reasonably true line with vertical face, which shall be cut with a power-driven concrete saw or by other approved mechanical line cutting methods.

E. Existing Services to be Maintained:

In removing storm drain structures or sanitary sewer structures, all existing live storm drains or sanitary sewers connected to the structures shall be rebuilt and properly reconnected, and service shall be maintained during such construction operations.

F. Disposal of Material:

All waste material obtained from the removal of structures and obstructions, including, but not limited to, concrete matted together by reinforcing, pipe, plaster, wood, paper, asphalt shingles, tanks, metal and miscellaneous debris, shall be properly disposed of off-site. Broken concrete (but not including broken concrete matted together by reinforcing), broken pavements, brick and concrete block not exceeding a maximum dimension of twelve (12) inches, may be deposited in the deep on-site fill areas outside of the building areas, where and as directed by the Owner's Field Representative or Architect and/or Soils Engineer. Location of on-site deposit areas and method of handling and placing such material shall be in strict accordance with the directions of the Owner's Field Representative or Architect and/or Soils Engineer.

1.07 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

A. General Requirements:

1. The Contractor shall be responsible throughout the course of work for protecting from injury or damage all existing structures and utilities which are to remain.
2. All existing gas and water lines, telephone and electric poles, wires, conduits, sewers, drains, culverts, fire hydrants and other utilities which are to remain shall be carefully supported, maintained in operation and protected from injury or damage by the Contractor.
3. The Contractor shall sling, support, shore up and secure in place all pipe or conduits, without damage thereto. The Contractor shall provide for and maintain, by means of suitable temporary channels or pipe, the flow of drainage and watercourses, whether on the surface or under-ground which may be interrupted during and by progress of the work. All works of drainage intercepted or disconnected shall be restored and made good or taken down and rebuilt to the extent made necessary by the new work, and all temporary material required for such construction shall immediately be removed from there when no longer required.

B. Dead-End Pipe and/or Conduit to be Sealed:

When pipe, conduits, sewers or drains are removed from trenches, leaving dead-end in the ground, the Contractor shall carefully plug or bulkhead such ends in a manner satisfactory to the Owner's Field Representative or Architect and the utility owner.

1.08 PROTECTION OF EXISTING TREES, LANDSCAPE AND NATURAL FEATURES

A. General Requirements:

The Contractor shall protect, throughout the course of construction, all such trees as are shown on the drawings or marked by the Architect as "to remain". The Contractor shall also protect throughout the course of construction all landscaping, vegetation and natural features on public and private property. The contractor shall use every precaution to prevent injury, damage, pollution, erosion or destruction of existing landscaping, vegetation and natural features including swamps, woods and field.

B. Protective Fencing Around Trees:

The Contractor shall install and maintain a four (4) foot high snow fence properly supported around each such tree or grouping of trees that is to be saved. Minimum clearance shall be ten (10) feet around each tree depending on tree size or as required by the Architect. All protective fencing shall be subject to the approval of the Architect.

C. Grading and/or Filling Around Trees:

Grading and/or filling operations within the protective fencing shall be carried on with extreme care only under the direct supervision of the Architect. If the soil over the root area of the trees has been compacted, it shall be restored by proper cultivation to permit entrance of water and proper aeration of roots.

D. Cutting of Tree Roots and Limbs:

Roots and limbs of trees are not to be cut unless authorized by the Architect. Should it become necessary to do so, the Contractor shall treat the remaining exposed portion of roots and/or limbs to prevent damage, loss or injury to the tree. This treatment shall be done in accordance with accepted horticulture practice and by personnel experienced in that field of work.

1.09 MAINTENANCE AND PROTECTION OF TRAFFIC

A. General Requirements:

The Contractor shall maintain traffic as required during the course of construction in such a manner satisfactory to the Architect and authorities having jurisdiction. The contractor shall comply with all rules and regulations of those governing bodies having jurisdiction on the adjacent roadways, and shall obtain required permits and pay all fees, deposits and charges in connection with same.

B. Conduct of Work:

The Contractor shall furnish, install and maintain construction signs, barricades, lights, steel plates, and/or all other protective devices necessary and required to adequately maintain vehicular traffic during construction. He shall provide all personnel necessary for properly directing and controlling traffic. Traffic entering and exiting the site shall be regulated and maintained so as not to disrupt the normal flow of traffic. Emergency personnel and equipment shall have safe and adequate access at all times to the site.

1.10 CONSTRUCTION AND MAINTENANCE OF ACCESS ROAD

A. General Requirements:

The Contractor shall construct and maintain a suitable gravel or hard surfaced access road from the existing highway pavement at the proposed driveway to the site to the building and staging areas. This road shall be constructed when and where directed by the Owner's Field Representative or Architect and shall be kept in such condition that the vehicles of all other contractors, subcontractors and suppliers can traverse it at all times without difficulty.

B. Stabilized Construction Entrance as per civil drawings.

C. Maintenance:

The Contractor shall be responsible for the installation and maintenance of temporary facilities such as steel plates, ramps, etc., to insure safe, adequate and uninterrupted means of traffic flow over this access road. Work shall also include dust control and snow removal.

PART 2 - MATERIALS

2.01 8' HIGH CONSTRUCTION FENCE

A. Furnished by Owner.

2.02 MATERIALS FOR PIPE ABANDONMENT

- A. A cement-based grout shall be used to fill the void of the existing pipe. The grouting material must have a minimum strength of 100 PSI and shall have flow characteristics appropriate for filling an existing pipe. The grout mix design and method of installation shall be approved by the Engineer prior to the start of operations.
Non-shrink mortar grout shall conform to the requirements of ASTM C 1107 and shall be a cement-based, flowable, non-shrink grout that develops extremely high compressive strength in a short period of time.

PART 3 - EXECUTION

3.01 TREE PROTECTION

- A. Protect existing trees scheduled to remain against injury or damage, including cutting, breaking, or skinning of roots, trunks or branches; smothering by stockpiled construction materials, excavated materials or vehicular traffic within branch spread.
 - 1. Protect designated trees with temporary wood snow fence enclosure. Provide a minimum 8'-0" radius from center of tree trunk. Increase enclosure size as directed for large trees.
 - 2. Erect temporary fencing before commencing site preparation work. Maintain fencing during full construction period. Remove temporary fencing when no longer needed or when acceptable to Landscape Architect.
 - 3. Contractor to employ the services of a licensed arborist to "air spade" and perform root pruning around outer edge of designated tree protection zones
 - 4. Interfering branches of trees scheduled to remain may be removed when acceptable to the Landscape Architect.
 - 5. Repair trees scheduled to remain and damaged by construction operations in a manner acceptable to the Landscape Architect.
Repair damaged trees promptly to prevent progressive deterioration caused by damage.
 - 6. Replace trees scheduled to remain and damaged beyond repair by construction operations, as determined by the Landscape Architect, with trees of similar size and species. Cost for tree replacement shall be determined in accordance with the Tree Evaluation Formula as described in "A Guide to the Professional Evaluation of Landscape Trees, Specimen Shrubs, and Evergreens", published by the International Society of Arboriculture.
 - 7. Repair and replacement of trees scheduled to remain and damaged by construction operations or lack of adequate protection during construction operations shall be at Contractor's Expense.

3.02 CONSTRUCTION FENCE

- A. Furnished by Owner.
- B. The Contractor shall maintain the chain link construction fence with screen and gates during the life of this contract and shall repair or replace all members that are disturbed or damaged as result of the Contractor's operations at no cost to the Owner. Contractor is

responsible for construction fence relocation as required by the construction sequence and operations.

3.03 PIPE ABANDONMENT

- A. Twelve (12) inch and larger pipes to be abandoned shall be plugged and filled with a cement-based grout slurry mixture.
- B. Filling of the pipe with the cement slurry grout shall be accomplished by pumping or gravity and will be checked by comparing the volume of the pipe with the volume of slurry material used. If the volume is more than ten (10) percent greater than the actual volume of slurry used, the Contractor shall excavate two or more exploratory holes where directed by the Engineer and shall do all work necessary to satisfactorily fill any voids encountered. The abandonment method shall provide for the release of air. When intermediate points are required for the abandonment of the system, they shall be a part of the abandonment process.
- C. Ten-inch (10") and smaller pipes to be abandoned shall be plugged at both ends with a non-shrink mortar not less than 2'-0" thick.
- D. The abandonment method shall adequately provide for the removal and legal disposal of all existing pipe materials, of whatever nature, removed from the system.

3.04 SITE IMPROVEMENTS

- A. Remove existing site improvements within contract limits as indicated. Include the following:
 - 1. As shown on Drawing L-100.
 - 2. Light Bases - coordinate with Electrical Contractor.
- B. Existing utilities:
 - 1. Information on the drawings relating to existing utility lines and services is from the best sources presently available. All such information is furnished only for information and is not guaranteed. Excavate test pits as required to determine exact locations of existing utilities.
 - 2. Perform work and provide necessary materials to disconnect or relocate existing utilities as indicated. Record existing utility termination points before disconnecting.
 - 3. Coordinate utility work with electrical work performed under Division 16, Electrical.
- C. Remove existing sidewalks, curbs, and paving, including all base material, as required to accommodate new construction.

3.05 STOCKPILING OF EXISTING SOIL AND DEBRIS AND/OR OBSTRUCTION MATERIALS

- A. Stockpiling of unsuitable existing soil, debris and/or obstruction materials within the contract limits of the job site is restricted to no more than the needs of what can be off loaded in a 24-hour period. Under no circumstances shall on-site stored material exceed a total of 50 cubic yards. Stockpiles should be no more than 6 feet in height.
- B. Stockpiling of existing soil materials and debris and/or obstructions for longer than 24 hours and/or exceeding 50 cubic yards may be removed by the Construction Manager and back charged to the Contractor with no additional cost to the Contract.
- C. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.06 DISPOSAL

- A. Disposal: Remove all unsuitable existing soil materials, debris and/or obstructions, demolished materials, waste materials, including trash, and legally dispose of them off of the Owner's property.
- B. Remove materials resulting from construction operations as the work progresses, and in compliance with stockpiling requirements of this Section, and/or at the direction of the Construction Manager.

3.07 CLEANING

- A. Upon completion of site preparation work, clean areas within contract limits, remove tools, and equipment. Provide site clear, clean and free of materials and debris and suitable for site work operations.

3.08 SALVAGED MATERIALS

- A. Remove, store, protect and reinstall as per Architect.
- B. Materials, items and equipment not scheduled for reinstallation or salvaged for the Owner's use are the property of the Contractor. Remove cleared materials from the site as the work progresses. Storage and sale of Contractor's salvage items on site is not permitted.

3.09 CLEAN-UP AND RESTORATION

- A. Clean-up:
The Contractor shall clean up and remove all refuse, rubbish, scrap materials, unsuitable materials and debris caused by his operations so that at all times the site of the work shall present a neat, orderly and workmanlike appearance. Materials from the Contractor's operations shall not be allowed to accumulate and cause hazardous or unsightly conditions.
- B. Restoration:
 - 1. Where and as directed by the Architect the Contractor shall replace all surfaces disturbed and shall restore paving, curbing, sidewalks, driveways, gutters,

shrubbery, fences, lawns and other surfaces disturbed to a condition equal to or better than that which existed before the work began, furnishing all labor, material, and equipment necessary thereto. Restore to original grades and conditions, areas adjacent to site disturbed or damaged as a result of site preparation work.

2. The Contractor shall, at said contractor's own expense and to the satisfaction of the Architect, clean-up and correct unsightliness, inconvenience, hazard or damage caused by water, mud, stones, dust rubbish, construction debris, traffic, workmen or the general operations. Wheel tracks, paths, puddles, damaged growth, ragged edges, undesirable spoil from excavation and rough slopes are to be removed, obliterated, corrected, graded, leveled, patched or smoothed. All adjacent areas that have been damaged or that require regrading shall be smoothed and worked to make the project area blend into existing conditions.
3. Unsightliness extending onto adjacent private or public property shall be corrected to the satisfaction of both the Owner of the adjacent property and the Architect, and no private agreements allowing a waiver of clean up will be recognized.

END OF SECTION

SECTION 31 20 00
EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
1. Earthwork by each prime contractor in conducting unclassified excavation in bulk and in trenches/pits, backfilling, filling, compacting, and rough grading.
 2. Testing of off-site borrow soil materials for approved use in earthwork operations.
 3. Furnish materials from approved off-site sources for approved use in earthwork operations.
 4. Bulk Excavation
 - a. Placement of fill and mounding materials in both compacted and uncompacted conditions depending upon contract requirements and anticipated subsequent construction.
 5. Earthwork shall occur primarily in landscaped areas and around building areas and for site conditions as required to provide foundation elements, appurtenant structures, sub bases, site landscaping and improvements, utility lines, and other miscellaneous elements of each separate contractor's respective work: Earthwork shall further include:
 - a. Excavation in bulk and in pits and trenches for foundations and substructure utilities including but not limited to mechanical, electrical, site water, storm and sanity drainage, irrigation, site security, telephone, etc. including pits for buried utility structures.
 - b. Protection of excavations, adjacent conditions, and previously installed work of the project.
 - c. Designing, furnishing, installing and removing temporary excavation supports and other temporary protection including erosion control required for earthwork.
 - d. Dewatering of excavations incidental to performing, maintaining, and protecting excavation work of this Section.
 - e. Soil erosion controls in addition to those controls specified in Division 1, Section "Temporary Facilities & Controls".
 - f. Placing fill materials at and around foundation areas of structures including from footing levels to slab on grade level and at site areas to design grades related to other systems and fills (Horticultural soil mixes) to be installed as required to complete work.
 - 1) Rough grading of site and backfilled areas to design grades with allowance for design thicknesses of mixed planting soils, paving systems, and the like, and allowing for even flow of grade transitions to adjacent site areas.
 - 2) Obtaining imported (borrow) material from off-site sources to extent required and of materials specified.
 6. Disposal of excess and unsuitable materials resulting from earthwork operations.

- 7. Field survey work including staking out lines and grades, topographic surveys, verification of job site elevations, and other identification of site work locations. Refer also to Section "Execution Requirements" for final survey requirements.
 - 8. Preservation and protection of existing site work, structures, curbs, decorative pavements; and utilities to remain.
 - 9. Coordinating this work between contracts and with related work; including sequencing and scheduling of construction operations and use.
- B. Related Sections include the following:
- 1. Division 31 Section "Site Demolition, Clearing and Preparation".
 - 2. Division 31 Section "Excavation, Support and Protection".
 - 3. Division 33 Section "Storm Utility Drainage Piping".
 - 4. Division 31 Section "Planting, Seeding and Topsoil".
 - 5. Division 3 Section "Site Concrete".
 - 6. Division 22, 23 and 26 Sections for excavating and backfilling buried mechanical and electrical utilities and buried utility structures.

1.3 UNIT PRICES

- A. Excavation Measurement: Volume of material in cubic yards removed and properly disposed off, measured to the lines of excavation.
- B. Controlled Fill Measurement: Volume of Controlled Fill, furnished and installed, measured in place in a fully compacted position.
- C. Crushed Stone Measurement: Volume of Crushed Stone furnished and installed, measured in place in a fully compacted position.
- D. Sand Measurement: Volume of sand material, furnished and installed, measured in place in a fully compacted position.
- E. Soil Separation Fabric Measurement: Square yards of soil separation fabric, furnished and installed, measured in place.

1.4 DEFINITIONS

- A. Excavation: Removal of material encountered above subgrade elevations.
 - 1. Additional Excavation: Excavation below subgrade elevations as directed by the Construction Manager. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by the Construction Manager. Unauthorized excavation, as well as remedial work directed by the Construction Manager, shall be without additional compensation.
- B. Bulk Excavation: Excavation of soils and unclassified materials in any areas not defined as trench or

pit excavation.

- C. Design Bearing Grades or Elevations: The design vertical levels of the bottoms of foundations indicated on the Drawings.
- D. Excavation Grades or Elevations: The design vertical levels specified or indicated in the Contract Documents (or revised during construction by the Construction Manager to accommodate field conditions) to which excavation shall be conducted.
- E. Pit Excavation: Small, local excavations, such as for column footings where the plan dimensions do not exceed 10 feet in either length or width.
- F. Suitable Fill Materials: Classified as specified for each type and condition of use such as described as "Controlled Fill", Article 2.1 herein.
- G. Trench Excavation: Excavations where the required depth is greater than twice the width such as required for installation of utilities and pipes.
- H. Unclassified Excavation: Removal of materials encountered within the required excavations between the existing ground surface and design excavation grade to the top of suitable sub-grade material, whichever is deeper, regardless of the nature of the materials encountered, their geologic definitions, the water contents thereof, and the means of excavation required. Resultant Unclassified Excavation material will be further classified as "Suitable Fill Material" or "Unsuitable Fill Material". Classification of unsuitable material shall be made exclusively by the Construction Manager.
- I. Unsuitable Fill Material(s): Whenever the words "Unsuitable Fill Material" or words of similar meaning are used, they are taken to include combustible, organic and frozen materials, vegetation, debris and/or obstructions, trash, snow, ice and/or fill materials previously placed on the site in an uncontrolled manner or with uncontrolled material, material with excessive water content, material with an inability to obtain necessary compaction, and material which is not in conformance with approved test results of fill materials as per this Section. The classification of unsuitable material(s) shall be made exclusively by the Construction Manager.
- J. Rock: Limestone, sandstone, shale, granite, and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 13.0 cu ft. Concrete building foundations and concrete slabs, not indicated, with a volume greater than 13.0 cu ft. shall be classified as rock.
 - 1. Limestone, sandstone, shale, granite, and similar material in a broken or weathered condition which can be removed with an excavator or backhoe equipped with a bucket with ripping teeth or any other style bucket shall be classified as earth excavation.
 - 2. Masonry building foundations, whether indicated or not, shall be classified as earth excavation.
- K. Debris and/or Obstructions: See Division 2, Section "Site Demolition Clearing and Preparation".
- L. Backfill: Soil materials used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- M. Structures: See Division 2, Section "Site Demolition Clearing and Preparation".

- N. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase.
- O. Utilities: Existing and proposed utilities including on-site underground pipes, conduits, ducts, and cables, wiring as well as underground services within buildings

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Each type of plastic warning tape.
 - 2. Drainage filter fabric.
 - 3. Separation fabric.
- B. Samples: For the following:
 - 1. 30-lb (14-kg) samples, sealed in airtight containers, of each proposed soil material from on-site or borrow sources.
 - 2. 12-by-12-inch (300-by-300-mm) sample of drainage fabric.
 - 3. 12-by-12-inch (300-by-300-mm) sample of separation fabric.
 - 4. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 5. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
 - 6. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.
- C. Seismic survey agency report, for record purposes.

1.2 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

1.3 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Owner and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than three days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.
 - 3. Contact utility-locator service for area where Project is located before excavating.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: All materials utilized for this Project shall be obtained from a source that has been licensed or permitted for such use by local and state authorities. The CONTRACTOR shall be required to submit evidence of such if so requested.
1. Suitable materials: Suitable soil materials are defined as those complying with ASTM D2487 soil classification groups GW, SM, SW, and SP.
 2. Unsuitable materials: Materials containing excessive amounts of water, plastic clay, vegetation, organic matter, debris, pavement, stones or boulders over 3" inches in greatest dimension, frozen material, and material which, in the opinion of the ENGINEER, will not provide a suitable foundation or subgrade.
 3. Existing On-Site Fill Material: Any suitable material 3" or less in greatest dimension, "Well Graded" taken from on-site excavation.
 4. Inspection: The ENGINEER may inspect off-site sources of materials and order tests of these materials to verify compliance with these Specifications.
 5. All materials for use as backfill and fill material shall be tested by the laboratory and approved by the ENGINEER.
 6. If existing on-site fill material is unsuitable as determined by the ENGINEER, select backfill or approved imported off-site fill shall be used.
 7. Site Stripped topsoil may be used as fill in landscape areas. It may not be used under footings, slabs, drives and parking areas.
 8. Imported soil or fill materials to the site shall be analyzed for the following chemical parameters using EPA methods: Volatiles, Semi-Volatiles, TAL Metals, Pesticides/Herbicides, PCBs. Concentrations shall be compared to the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, Appendix 5 – Allowable Constituent Leveling for Imported Fill or Soil and approved by ENGINEER. Samples shall be taken at a frequency of 1 per 5,000 cubic yards if originating from a natural borrow source and 1 per 1,000 cubic yards if manufactured or recycled.
- B. General Backfill and Fill Materials:
1. Provide approved soil materials for backfill and fill that are uniformly mixed, free of clay, rock or gravel larger than 3-inches in any dimension, Well Graded, free of debris, waste, frozen materials, vegetation and other organic matter and other deleterious materials. Previously excavated materials meeting these requirements may be used for backfill but not under, above or around utilities.
 2. All materials for use as described above shall be tested by the laboratory and approved by the ENGINEER.
- C. Select Granular Fill: Well graded hard, clean, durable particles free from wood, organic matter, roots, debris, vegetation, sod and other deleterious material. Sieve analysis by weight:

<u>Sieve Size</u>	<u>Max % Passing by Weight</u>
3"	100
No. 40	70
No. 200	10

- D. Crushed Stone:
1. Crushed Stone shall consist of hard, durable crushed rock consisting of angular fragments obtained by breaking and crushing solid or shattered natural rock. Material shall be free (one percent maximum) from a detrimental quantity of flat, elongated (where average width exceeds 4 times the average thickness) pieces, or other objectionable pieces.
 2. Crushed Stone shall have the following gradation as determined by ASTM Designation D-422, Particle Size Analysis of Soils:

<u>Sieve Size</u>	<u>Max. % Passing by Weight</u>
1 inch	100
1/2 inch	45 to 85
1/4 inch	30 to 65
No.10	15 to 45
No.200	0 to 5

3. Provide processed crushed stone material obtained from off-site sources.
- E. Sand:
1. Sand shall consist of natural mineral soils or processed mineral materials free of combustible, organic and frozen materials, roots, topsoil, loam, trash, snow, ice, wood and other objectionable materials which may be compressible or cannot be compacted as specified.
 2. Gradation of sand shall conform to ASTM C-33 for fine aggregate.
 3. Sand shall be supplied from off-site suppliers.
- F. 3/4" Drainage Stone Fill: See Section 33 49 00 – Storm Drainage System.
- G. Bedding Material: Generally, bedding material for utilities and the like shall be the same as Crushed Stone as specified herein except use Sand as specified, where Sand is indicated for specific condition of use.
- H. Subsurface Drainage Mat: Shall be extruded HDPE: High Density Polyethylene Polymer Drainage Panel with non-woven needle punched polypropylene fabric.
1. Compressive strength: 15,000 psi, As per ASTM D-162I.
 2. Fabric shall be UV stabilized such as J-Drain 420 Series; as manufactured by JDR Enterprises, Inc., or approved equivalent
- I. Soil Separation Fabric: Woven geotextile, specifically manufactured for use as a separation geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
1. Grab Tensile Strength: 325 lbf; ASTM D 4632.
 2. Tear Strength: (333 N) 90 lbf, ASTM D 4533.
 3. Puncture Resistance: (400 N) 115 lbf, ASTM D 4833.
 4. Water Flow Rate: 145 gpm per sq. ft. (2.7 L/s per sq. m); ASTM D 4491.
 5. Apparent Opening Size: No. 40 (0.425); ASTM D 4751.
- Soil Separation Fabric shall be Mirafi 500X Woven Geotextile as manufactured by TC Mirafi www.tcmirafi.com, or approved equal.
- J. Erosion Control Materials:
1. Erosion Control Netting: Provide as specified in Section 31 21 30: Erosion & Sediment Control.

2. Other, as approved by the Construction Manager to suit conditions of use.
- K. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
 1. Yellow: Electric.
 2. Red: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXCAVATION, GENERAL

- A. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- B. Classified Excavation: Excavation to subgrade elevations classified as earth and rock.

- 1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.

3.4 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm) except for footing volumes which will be within 4" of the bottom of the footing as per Section 03 30 00. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch (25 mm). Do not disturb bottom of excavations intended for bearing surface.

3.5 EXCAVATION FOR TRENCHES

- A. Excavation for Trenches: Excavate to widths shown on the Drawings and depths indicated or required to establish indicated slope and invert elevations.

Produce an evenly graded, flat trench bottom at the subgrade elevation required for installation of pipe and bedding material. Place backfill material directly into trench or excavation. Do not stockpile material to be used as backfill along edges of trenches. Load excavated material directly into trucks, unless otherwise permitted by the ENGINEER.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.7 APPROVAL OF SUBGRADE

- A. Notify Engineer when excavations have reached required subgrade.
- B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
 - 1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer.

3.8 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Engineer.
 - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

3.9 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Inspecting and testing underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- C. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- D. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use Suitable Fill Material.
 - 2. Under walks and pavements, use Suitable Fill Material.
 - 3. Under steps and ramps, use Suitable Fill Material.
 - 4. Under building slabs and foundations, use Suitable Fill Material approved by Geotechnical Engineer.
 - 5. Under footings and foundations, use Suitable Fill Material.

3.11 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 3 percent of optimum moisture content.

1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 3 percent and is too wet to compact to specified dry unit weight.

3.12 COMPACTION OF BACKFILLS AND FILLS

- A. Place backfill and fill materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches (150 mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill material at 95 percent.
 2. Under walkways, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 95 percent.
 3. Under lawn or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 90 percent.

3.13 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 1. Lawn or Unpaved Areas: +/- 1 inch (25 mm).
 2. Walks: +/- 1 inch (25 mm).
 3. Pavements: +/- 1/2 inch (13 mm).
 4. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

3.14 SUBSURFACE DRAINAGE

- A. Subsurface Drain: Place a layer of drainage fabric around perimeter of drainage trench as indicated. Place a 6-inch (150-mm) course of filter material on drainage fabric to support drainage pipe. Encase drainage pipe in a minimum of 12 inches (300 mm) of filter material and wrap in drainage fabric, overlapping sides and ends at least 6 inches (150 mm).

1. Compact each course of filter material to 92 percent of maximum dry unit weight according to ASTM D 1557.
- B. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches (300 mm) of final subgrade. Overlay drainage backfill with one layer of drainage fabric, overlapping sides and ends at least 6 inches (150 mm).
 1. Compact each course of filter material to 92 percent of maximum dry density according to ASTM D 1557.
 2. Place and compact impervious fill material over drainage backfill to final subgrade.

3.15 SUBBASE AND BASE COURSES

- A. If specified on plans, install separation fabric on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
- B. Under pavements and walks, place subbase course on prepared subgrade and as follows:
 1. Place base course material over subbase.
 2. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
 3. Shape subbase and base to required crown elevations and cross-slope grades.
 4. When thickness of compacted subbase or base course is 6 inches (150 mm) or less, place materials in a single layer.
 5. When thickness of compacted subbase or base course exceeds 6 inches (150 mm), place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.
- C. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches (300 mm) wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.16 DRAINAGE COURSE

- A. If specified on plans, under slabs-on-grade, install drainage fabric on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends. Place drainage course on drainage fabric and as follows:
- B. Under slabs-on-grade, place drainage course on prepared subgrade and as follows:
 1. Compact drainage course to required cross sections and thickness to not less than 92 percent of maximum dry unit weight according to ASTM D 1557.
 2. When compacted thickness of drainage course is 6 inches (150 mm) or less, place materials in a single layer.
 3. When compacted thickness of drainage course exceeds 6 inches (150 mm), place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.

3.17 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Engineer.
- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. (186 sq. m) or less of paved area or building slab, but in no case fewer than three tests.
 - 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet (30 m) or less of wall length, but no fewer than two tests.
 - 3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet (46 m) or less of trench length, but no fewer than two tests.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.
- F. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- G. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.
- H. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION

SECTION 31 23 16
ROCK REMOVAL

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section shall be governed by the Contract Documents. Provide materials, labor, equipment, and services necessary to furnish, deliver and install all work of this Section as shown on the drawings, as specified and as required by job conditions.
- B. The work shall include but not be limited to the following:
 - 1. Carefully loosen, break up and excavate existing rock required for proper completion of the work shown on the plans, including trenching.
 - 2. Break up and dispose of the excavated material in accordance with the plans, specifications and directions of the engineer.

1.02 RELATED SECTIONS

- A. Applicable provisions of the General conditions
- B. Section 31 20 00 - Earthwork
- C. Section 31 23 33 - Trenching and Backfilling
- D. The Geotechnical Report for test pit locations and findings of subsurface materials and conditions is given as reference information only (Appendix A). The contractor is to verify all subsurface conditions in the field.

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Determine all environmental effects associated with the proposed work and safeguard those concerns as regulated by law and all others by reasonable and practical methods.

1.04 JOB CONDITIONS

- A. The payment of rock excavation (or trench rock excavation) shall be based on the unit price specified in the bid proposal multiplied by the actual quantity measured in the field.
- B. Rock Excavation will be paid for as a Unit Price as established in the base bid. Any discrepancy with plans and specifications regarding amount, type and depth of rock to be removed shall immediately be brought to the attention of the Architect, Owner and the Geotechnical Engineer. A revised removal plan and schedule shall subsequently be provided and followed by the Contractor.

- C. Rock excavation shall include only excavation of boulders of more than thirteen (13) cubic feet in volume and ledge rock which is determined by the Engineer to be so hard that it is necessary to loosen and handle with a power shovel, special rock breaking equipment.
- D. Excess material and material not suited for backfill shall be removed from the site and disposed of by the Contractor. No additional payment will be made for material removed from the site, but the cost thereof shall be deemed included in the price bid for this item.

1.05 QUALIFICATIONS

- A. Prior to the start of any rock removal under this Contract, the Contractor shall indicate his capability of performing this type of work by submitting qualifications of personnel or firms who will be executing the rock excavation work. In order to prove capability and qualifications, the Contractor must include, but not be limited to the following:
 - 1. Meeting and complying with all applicable local, state, and federal standards set forth in regulations covering the work.
 - 2. General qualifications and evidence of experience sufficient to be "accepted" by the Owner's Representatives. Furnish evidence of successfully completing projects of this type and sensitivity within the last ten years.
 - 3. The Contractor shall obtain permits for performing the work from all necessary local, state, and federal agencies governing the site and shall present evidence of obtaining all of the proper permits prior to rock removal.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 GENERAL

- A. General Requirements:
 - 1. If rock is encountered, the Contractor shall excavate, remove and dispose of rock within the limits specified and in accordance with the Drawings and Specifications and as approved by the Owner's Representatives. The Contractor may excavate the rock by any method which is satisfactory to the Engineer and which will prevent damage to existing surfaces and structures adjacent to the work. The approval of the method of excavation shall not be construed as relieving the Contractor of any of his responsibilities or liabilities for damages.

2. It is the Contractor's responsibility to protect the surrounding area including but not limited to all utilities, concrete and facilities, etc. Any damage shall be repaired at the Contractor's expense.
3. Unless otherwise specified or directed rock excavation shall be carried to a depth to allow for future site improvement as indicated by the drawings. Work that is excavated to a greater extent than required by the drawings and which is within the bearing area of walls, footings
4. Where rock occurs and footings or walls rest on same, the rock shall be leveled to a clean, even hard surface.
5. Slope Preservation: Where rock cuts requiring drilling will be exposed after the Project is completed, all necessary precautions shall be exercised to preserve the rock in the finished slope in a natural undamaged condition, with the surface remaining reasonably straight and clean. Where rock excavation requires drilling holes shall be drilled at the inclination of slope along the line of the proposed finished slope. The Contractor shall adjust his operations to obtain the required slope conditions, as called for on the Drawings and as specified herein.

END OF SECTION

SECTION 31 23 33
TRENCHING AND BACKFILLING

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the Trenching and Backfilling as shown on the drawings and specified herein, including, but not limited to, the following:
1. All necessary backfill and compaction, including furnishing additional suitable backfill material as required for trench backfilling.
 2. Sheet piling, shoring and bracing.
 3. Dewatering of trenches.

1.03 RELATED WORK

- A. Division 31 Earthwork
- B. Division 31 Soil Erosion and Sediment Control

1.04 QUALITY ASSURANCE

- A. Quality Assurances indicated in Section 31 20 00 of these Project Specifications shall apply to this Section.

1.05 REFERENCES

ASTM C136	Sieve Analysis of Fine and Course Aggregates
ASTM D1556	Density of Soil in Place by Sand-Cone Method
ASTM D1557	Laboratory Compaction of Soil Using Modified Effort
ASTM D2922	Density of Soil in Place by Nuclear Methods
ASTM D3017	Water Content of Soil in Place by Nuclear Methods
OSHA	Occupational Safety and Health Administration

1.06 SUBMITTALS

- A. Submit copies of material gradation for the aggregate bedding material for review and approval prior to any materials being delivered to the site.

PART 2.00 - PRODUCTS

2.01 MATERIALS DEFINITIONS

- A. Standard Backfill - Onsite material approved by the Geotechnical Engineer. Should there be a deficiency of proper onsite material for backfilling, the Contractor shall furnish additional proper backfill material, at no additional cost to the Owner.
- B. Select Granular Backfill - Soil material which meets the requirements of Section 203-2.02.C of the NYSDOT Specifications.
- C. All backfill material shall be free from large stones (3 inches or larger), clods, topsoil, sod, frozen earth, wood or any other objectionable material.
- D. Unless otherwise specified, Standard Backfill shall be used.

2.02 BORROW:

- A. Obtain borrow materials from sources outside the project site, at the Contractor's option. Materials shall conform to the requirements for fill and backfill. Fill supplied by the Contractor from an offsite source shall be granular fill, free of organic or other deleterious material with a maximum particle size of 3 inches, with less than 15% passing the No. 200 sieve.
- B. This borrow material shall meet with the approval of the Owner and/or Geotechnical Engineer and shall generally be consistent with onsite material approved for fill areas.

PART 3.00 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions where Trench Excavation and Backfill operations are to be performed and notify the Owner's Field Representative of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Owner's Field Representative.

3.02 INSTALLATION

- A. General Construction Details
 - 1. Trench excavation shall be performed by the Contractor to conform with the line and grade of the various utilities and the bottom of the foundations and/or footings for subsurface structures as shown on the Drawings and as specified herein.

2. All excavations shall be kept free from water, snow and ice during construction.
3. The Contractor shall be responsible at all times for conducting all operations in a safe and prudent manner so that all workmen and the public will be protected from hazard. The Contractor shall observe all applicable local, State and/or Federal requirements, and he shall obtain all necessary permits and pay all fees, deposits and charges in connection with the acquiring of said permits.
4. All fills shall be constructed to a minimum of two (2) feet above the outside top of the pipe or conduit prior to beginning the Trench Excavation.

B. Trench Excavation

1. General Requirements

- (a) The Contractor shall be responsible for the excavation of all materials encountered. There shall be no extra compensation for any excavation regardless of the character or type of subsoils.

2. Method of Trenching

- (a) Trenching shall be performed with excavating equipment except in such places where Work performed in this manner will injure trees, buildings, existing utilities or structures, or where the use of equipment is specifically forbidden, in which case hand methods shall be employed.

3. Preparation of Bottom of Trench

- (a) The bottom of the trenches shall be prepared to conform to the grade of the pipe and the bottom of the foundation of structures. The bottom of trenches shall be shaped as shown on the Details of the Drawings and recessed for pipe bells. Special precautions shall be exercised to ensure that pipes, when installed, will not rest on rock, masonry or any other materials which would present a nonuniform foundation. Where two or more pipes are to be laid in the same trench, the Contractor will excavate the trench so that all pipes are laid on undisturbed material.

4. Unsuitable Material at Bottom of Trench

- (a) When the material at the bottom of a trench is unsuitable, as determined by the Owner's Field Representative and/or Geotechnical Engineer, it shall be removed to such depth as the Owner's Field Representative and/or Geotechnical Engineer may direct and backfilled with suitable granular material obtained from the project excavation, or from borrow excavation if it is not available within the project. Payment for removal and replacement of this unsuitable material shall be made in accordance with the Contract Documents, as hereinafter defined.

5. Excavation Below Required Grade

- (a) Excavation carried below the required level without authorization by Geotechnical Engineer and/or Owner's Field Representative shall be backfilled at the Contractor's expense with granular material as approved by the Owner's Field Representative. Compaction of backfill material shall be as specified elsewhere herein.

6. Excavation in Paved Areas

- (a) When excavations are to be made in paved surfaces, the paved surfaces shall be line-cut one (1) foot beyond each side of the trench and ahead of the excavation by means of pneumatic tools, saw cutting or other approved tools to provide a clean, uniform edge, with minimum disturbance of remaining pavements. The pavements so removed shall not be used for trench backfill but shall be disposed of as approved by the Owner's Field Representative.

7. Surplus Excavated Material

- (a) Excavated material not required for fill or backfill shall be disposed of by the Contractor as approved by the Owner's Field Representative. In general, suitable surplus excavated material may be used as embankment. Unsuitable surplus material shall be disposed of in accordance with the approval of the Owner's Field Representative and/or the Geotechnical Engineer.

C. Additional Trench Excavation

1. Authorized Changes and/or Alterations

- (a) The Site Engineer and/or Owner's Field representative may, as a result of unforeseen conditions arising during the progress of the work, order the grade or location of any pipe or other structure, changed from that established on the Drawings or previously designated in the field, or may order the removal of unsuitable material from the bottom of any trench.

2. Additional Payment to Contractor

- (a) Should such changes or alterations result in an addition to the quantity of earth trench excavation, this additional earth excavation shall be considered as "Extra Work" and payment for same shall be made to the Contractor in accordance with the Contract Documents.

3. Credit to Owner

- (a) Should such changes or alterations result in a reduction in the quantity of earth excavation, then a credit to the Owner for the reduction in the amount of earth trench excavation occasioned by such change shall be made in accordance with the Contract Documents.

4. Method of Measurement

- (a) The quantity of additional earth excavation in trench measured for payment to the Contractor or reduction of earth excavation in trench measured for credit to the Owner shall be determined by plotting the profile of the bottom of the trench as indicated on the Drawings and the final location of pipe and/or structure(s). The amount of earth excavation computed as payment or credit shall be the volume measured between these limits using a constant width of trench equal to the outside pipe diameter, plus two (2) feet for pipe and one (1) foot outside of walls for structure(s). The depth of the excavation shall be limited to the lesser of the subgrade elevation or two (2) feet above the outside top of pipe in embankments, as shown on the Details of the Drawings.

D. Backfilling

1. General Requirements

- (a) Approval by the Engineer upon completion of proper inspection and tests, shall be given to the Contractor prior backfilling of pipes and/or structures.
- (b) Excavations shall be backfilled using the backfill material as defined in Section 2.01A of this Project Specification.

2. Placement and Compaction

- (a) Backfill for pipe and ducts shall be placed evenly and carefully around and over the pipe in six (6) inch maximum layers. Each layer shall be thoroughly and carefully rammed until one (1) foot of cover exists over the pipe. The remainder of the backfill shall then be placed and compacted in maximum one (1) foot layers. Each layer shall be compacted by approved mechanical tamping machines to a density equal to that of adjacent original material, but not less than 95% of the maximum dry density as defined by ASTM D-1557, latest issue for that soil.
- (b) Backfill shall proceed to the lines and grades as shown on the Drawings and/or as approved by the Owner's Field Representative. Backfill areas which settle shall be corrected to the satisfaction of the Owner's Field Representative at the Contractor's expense.

3. Plastic pipe

- (a) Pipe shall be supported on a minimum of four (4) inches of compacted screened gravel, or as directed by the Owner's Field Representative. No pipe or fitting shall be permanently supported on saddles, blocking, or stones. Screened gravel shall be well graded in size from 3/8 inch to 3/4 inch or such other sized as may be approved. The gravel shall consist of clean, hard, and durable particles or fragments, free from dirt, vegetation, or other objectionable matter and free from an excess of soft, thin elongated, laminated or disintegrated pieces. The screened gravel shall be spread in layers of uniform thickness and

shall be compacted to a minimum density of ninety-five (95) percent of the maximum density of the soil as determined by the Standard Proctor Test (AASHTO Designation T-99).

- (b) After each pipe has been properly bedded, enough screened gravel shall be placed between the pipe and the sides of the trench, and thoroughly compacted, to hold the pipe in correct alignment. Bell holes, provided for jointing, shall be filled with screened gravel and compacted, and then screened gravel shall be placed and compacted to a minimum of six (6) inches over the top of the pipe to complete the pipe bedding.

4. Removal of Sheeting

- (a) During backfill operations, sheeting which is to be removed shall at no time extend into the backfill which is being compacted. The sheeting shall be withdrawn so as to always be above the backfill.

5. Protection

- (a) The Contractor shall be responsible for safeguarding all pipes and structures being backfilled, as any damage occurring to same either during the backfilling operations or after the backfilling operations have been completed shall be corrected to the satisfaction of the Owner's Field Representative at the Contractor's expense.
- (b) The Contractor shall place six (6) inch wide red plastic tape above all underground utility lines where accidental rupture would be potentially hazardous. The tape shall be buried six to eight inches below grade directly above the utility line surface.

E. Sheeting, Shoring and Bracing

1. General Requirements

- (a) At his own expense, the Contractor shall furnish, install and maintain such sheeting, shoring, bracing and cofferdamming, etc., as may be needed to support the sides and roofs of excavations and to prevent any earth or rock movements which might in any way diminish or affect the necessary width of the excavation, endanger the safety of persons, injure or delay the work, or jeopardize the safety of adjacent pavements, property, buildings or other structures. The Work of sheeting, shoring and bracing shall, at all times, be in accordance with the requirements of all authorities having jurisdiction.

2. Contractor to be Solely Responsible

- (a) The Contractor shall be entirely and solely responsible for the adequacy and sufficiency of all supports and of all sheeting, bracing, shoring cofferdamming, etc. The Contractor shall assume entire and sole liability for damages on account of injury to persons, adjacent pavements, and public and private

property including, but not limited to, the Work under construction, buildings and other structures, which injury shall result directly or indirectly from Contractor's failure to install or to leave in place adequate and sufficient supports, sheeting, bracing, shoring, cofferdamming, etc.

F. Disposal of Water

1. General Requirements

- (a) The Contractor shall remove, by pumping or other means approved by the Owner's Field Representative, any surface or groundwater which may accumulate in excavations, and shall at all times keep excavations free from water while Work is being performed. If the bearing soils are disturbed by water seepage, the Contractor shall use a predrainage system (wells or wellpoints) to lower the water table.

2. Method of Disposal

- (a) The water from the excavations shall be disposed of in such a manner as will not cause injury to the public health, degrade the water quality of nearby streams or rivers, or damage the work contemplated or in progress, surfaces of the streets, nor cause any interference with the use of the same. The disposal of this water shall be performed in a manner satisfactory to the Owner's Field Representative and authorities having jurisdiction.

3. Erosion Control

- (a) The Contractor is advised that all operations must conform to Section 31 21 30 of these Project Specifications dealing with Soil Erosion and Sediment Controls.

4. Protection of Masonry

- (a) Newly laid masonry shall be protected from damage resulting from dewatering operations by the use of canvas or other methods as may be approved. No water shall be allowed to pass through masonry or pipes without the approval of the Owner's Field Representative.

END OF SECTION

SECTION 31 25 00
EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.
- B. New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activity Permit No. GP-0-20-001.

1.2 SUMMARY

- A. This section includes furnishing, installing, maintaining, and removing temporary erosion and sediment control measures as shown on the contract documents or as ordered by the Engineer throughout the life of the contract to control soil erosion, sediment and water pollution through the use of temporary swales, check dams, bales, sediment traps, and silt fences.
- B. Related Sections include other Division 2 Sections.

1.3 REFERENCES

- A. Materials installation, maintenance, inspection and removal shall be in accordance with the *New York Standards and Specifications for Erosion and Sediment Control*.

1.4 SUBMITTALS

- A. Submittals shall be submitted in accordance with the provisions set forth in the General Specifications.
- B. Submittal shall contain source and supplier of material showing its compliance with specifications and associated standards.
 - 1. Samples of any kind shall be submitted upon Engineer's request.
- C. The Contractor shall submit schedules for the accomplishment of temporary sediment control work.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Products shall be as specified on the contract drawings and as stated in *New York Standards and Specifications for Erosion and Sediment Control*.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. In the event of conflict between these specification requirements and pollution control laws, rules or regulations by other federal, state or local government agencies, the more restrictive rules and regulations shall apply.
- B. Temporary erosion and sediment control measures shall be inspected by the Contractor and maintained during the life of the project, and such maintenance and inspection shall continue until permanent stabilization measures are in place and the temporary control measures are ordered to be removed by the Engineer, and the disturbed area returned to its intended stabilized condition.
- C. The Engineer has the authority to limit the surface area of erodible earth material exposed by excavation, borrow and fill operations and to direct the Contractor to provide immediate permanent or temporary erosion and sediment control measures to minimize damage to adjacent property.
- D. The Contractor shall submit schedules for the accomplishment of temporary and permanent erosion and sediment control work to the Engineer for acceptance. All work done under this section shall be included as part of the construction schedule submitted by the Contractor.
- E. Maintenance shall be performed as directed by the Engineer. All sediment deposits shall be considered unsuitable material and properly disposed of.
- F. The Contractor shall immediately repair or replace defective or damaged portions of the erosion and sediment control facilities.
- G. Erosion and sediment control measures shall be installed where necessary and shall remain in place until the area is permanently stabilized or the Engineer directs that it be removed. Upon removal, the Contractor shall remove and dispose of any sediment accumulations and restore the area as directed by the Engineer. The removed facilities and materials shall become the property of the Contractor and be removed from the site.

END OF SECTION 31 25 00

SECTION 31 50 00
EXCAVATION SUPPORT & PROTECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes, but is not limited to:
 - 1. Temporary sheeting whenever an excavation exceeds five (5'-0") feet in depth and the side slopes are not laid back to a safe gradient as set forth in Title 29 Code of Federal Regulations, Part 1926, Safety and Health Regulation for Construction (OSHA).
- B. Related Sections include the following:
 - 1. Division 31, Section "Earthwork."
 - 2. Division 31, Section "Trenching and Backfilling."

1.3 PERFORMANCE REQUIREMENTS

- A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalks and of resisting soil and hydrostatic pressure and superimposed and construction loads when an excavation exceeds five (5'-0") feet in depth and on the side slopes are not laid back to a safe gradient as set forth in Title 29 Code of Federal Regulations, Part 1926, Safety and Health Regulation for Construction (OSHA).
 - 1. Provide professional engineering services needed to assume engineering responsibility, including preparation of Shop Drawings and a comprehensive engineering analysis by a qualified professional engineer.
 - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 3. Install excavation support and protection systems without damaging existing buildings, pavements, and other improvements adjacent to excavation.

1.4 SUBMITTALS

- A. Shop Drawings for Information: Prepared by or under the supervision of a qualified professional engineer for excavation support and protection systems.
 - 1. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Qualification Data: For Installer and professional engineer.
- C. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by the absence of, or the performance of excavation support and protection systems.

1.5 PROJECT CONDITIONS

- A. Acquaintance with Existing Site Conditions
 - 1. See Sections 02 31 00 and 31 20 00.
- B. Subsurface Conditions
 - 1. See Sections 02 41 10 and 31 10 00.
- C. Existing Utilities and Services
 - 1. See Sections 02 31 00 and 31 20 00.
- D. Survey adjacent structures and improvements, employing a qualified professional engineer or land surveyor; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
 - 1. During installation of excavation support and protection systems, regularly reserve benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Construction Manager if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that are either new or in serviceable condition.
 - 1. Timber sheeting shall consist of structurally sound hardwood at least two inches by six inches in size or of lumber of equivalent strength. The actual thickness of such timber sheeting shall be consistent with the size of the supporting timbers and the depth of the excavation.

2. Metal, steel aluminum or combinations of steel, aluminum and timber bracing systems of equivalent strength and capacity may be used in place of timber bracing systems.
3. Cast-In-Place Concrete: ACI 301, of comprehensive strength required for application.

PART 3 EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
 1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces is not impeded.
- D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 GENERAL

- A. Inspect site, examine existing conditions and make all necessary preparations for the safe and proper sequence of work.
- B. Properly guard and protect excavations so as to prevent them from becoming dangerous to person or property.
- C. Properly slope sides of excavation or provide shoring, sheeting and bracing to prevent caving, erosion, or gullyng of sides of excavations.
- D. Brace, shore, and protect existing structures when excavations are made adjacent to the existing structures or within a distance that they will be affected by the excavation.

Underpin adjacent structures when excavations are carried to a depth that will require it by the applicable Building Code or when indicated on Contract Drawings.

- E. Maintain sides and slope of excavation in safe condition until backfilling or other work is complete. Maintain shoring and bracing in place until the completion of work.

3.3 INSPECTION AND CODE REQUIREMENTS

- A. Sheet piling, shoring, and underpinning for protection of excavations and protection of adjacent structures and the public is the responsibility of the Contractor and shall comply with the requirements of the applicable Building Code.
- B. The most stringent requirements of the Building Code, Contract Drawings, Specifications, or any authorities having jurisdiction shall govern this Work.
- C. Coordinate Work of this Section with Work of all other Divisions so as to properly, and completely, install all Work as drawn or specified.
- D. Engage a Professional Engineer licensed in the State of New York to prepare details of underpinning, cofferdams, caissons, bracing, and other construction required for protection of excavations and support of adjacent properties or buildings. These drawings shall be submitted to the Owner's Representative for general review, which does not relieve the Contractor's Engineer of responsibility for the adequacy of the design.
- E. At the conclusion of the work all temporary sheet piling and support systems shall be removed by the Contractor.

3.4 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
 - 1. Remove excavation support and protection systems to a minimum depth of 48 inches (1200mm) below overlying construction and abandon remainder.
 - 2. Repair or replace, as approved by Construction Manager, adjacent work damaged or displaced by removing excavation support and protection systems.

END OF SECTION

SECTION 32 12 16

ASPHALT

PART 1 - GENERAL

1.0 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.01 GENERAL REQUIREMENTS

- A. Work of this section shall be governed by the contract documents. Provide materials, labor, equipment, and services necessary to furnish, deliver and install all work of this section as shown on the drawings, as specified herein, and/or as required by job conditions.
- B. Work shall include, but not be limited to:
 - 1. Installation of all pavements consisting of base, bituminous concrete intermediate and surface courses, and including all associated items and operations necessary and required to complete the pavement installation.
 - 2. Preparation of sub-grade to include fine grading, compaction and proof-rolling.
 - 3. All necessary and required line cutting of existing pavements.
 - 4. All formwork, finishing, curing and testing necessary and required for the installation of pavements, including:
 - a. Parking Lots
 - b. Paths

1.03 DESCRIPTION

- A. Related Work Specified Elsewhere:
 - 1. Division 31: Site Demolition, Clearing and Preparation
 - 2. Division 31: Earthwork
 - 3. Division 31: Trenching and Backfilling
- B. Description of the Asphalt Paving (depth of the different courses shall conform with the drawings).
 - 1. Compacted sub-grade.
 - 2. Bituminous bond base course.
 - 3. Tack coat.

4. Asphaltic wearing course.
5. Sealer.
6. Painted lines and symbols.
7. Asphalt curbs.
8. Repair and saw cutting of existing paving.

1.04 SUBMITTALS

- A. Submit three (3) each of the following to Architect for review prior to delivery and installation.
 1. Notarized certificates of materials.
 2. Submit complete materials list of items proposed for the work. Identify materials source.

1.05 QUALITY ASSURANCE

- A. Materials and methods of construction shall comply with the following standards:
 1. American Society for Testing and Materials, (ASTM).
 2. American Association of State and Highway and Transportation Officials, (AASHTO).
 3. Asphalt Institute, (AI).
 4. National Crushed Stone Association, (NCSA).
- B. Provide material furnished by a bulk asphaltic concrete producer regularly engaged in the production of hot-mix, hot-laid asphaltic concrete paving materials.
- C. Tolerances:
 1. In-place compacted thickness:
 - a. Base course: Maximum 1/2" plus, minus 0".
 - b. Surface course: Maximum 1/4" plus, minus 0".
 2. Finished surface smoothness:
 - a. Base course: Maximum 3/8" in 10'-0".
 - b. Surface course: Maximum 1/4" in 10'-0", any direction.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Delivery manufactured products in manufacturer's original, unopened, and undamaged containers with labels intact and legible.
- B. Store and handle manufactured products to prevent damage and deterioration.
- C. Shipments of material shall be made in tight vehicles previously cleaned of all foreign material and delivered to the work so that it will not become contaminated in any way.

1.07 PROJECT CONDITIONS

A. Weather limitations:

1. Do not install base course materials over wet or frozen subgrade surfaces.
2. Do not apply prime and tack coat materials when temperature is 50 degrees F. or below. Do not apply to wet base surfaces.
3. Install asphalt surface materials only when base is dry and air temperature is 40 degrees F. or above.

B. Grade control: Match and maintain the existing lines and grades, including crown, inverted crown and cross-slopes, for each course during paving operations.

C. Painting: All contact surfaces manholes, etc., shall before the surface mixture is laid be painted with hot asphaltic cement.

D. Placing: Except where the mixture is spread and finished by approved mechanical equipment the mixture, upon arrival at the site shall be dumped on steel dump boards, and spread and screened to leave the required amount of material so that after compression the course will be of the thickness shown on the plans.

Mixture shall be laid only where the surface to be covered is free from loose or foreign material, dry and only when weather conditions are suitable. (Asphaltic pavement shall not be applied when temperature is 40 degrees Fahrenheit or below.)

The contractor shall provide suitable means for keeping all small tools clean and free from bituminous accumulation. The contractor shall provide and have ready for use at all times sufficient tarpaulins or covers as may be directed by the Architect for use in any emergency such as rain, chilling winds, or unavoidable delay, for the purpose of covering or protecting any material that may be dumped but not spread.

E. Provide temporary barricades and warning lights as required for protection of project work and public safety.

F. Protect adjacent work from damage, soiling and staining during paving operations.

PART 2 - PRODUCTS

2.01 BASE COURSE

A. A gravel base course to be NYSDOT Item 304.05, Type 4.

2.02 ASPHALTIC CONCRETE

A. The asphalt pavement shall consist of a binder course and a top course to the dimensions as shown on the plans and details. The binder course for all asphalt surfaces shall be asphalt concrete, Type 3 as defined herein and by the N.Y.S. D.O.T. Standard Specifications.

The top course(s) for all pedestrian pathways and/or play surfaces shall be Type 7F as defined herein and by the N.Y.S. D.O.T. Standard Specifications and Type 6F as defined herein by the N.Y.S. D.O.T. Standard Specifications for all roadway and vehicular parking surfaces.

- B. The following requirements shall apply for both Binder Course and Top Course:
1. Asphalt Cement shall be 100% soluble in Trichloroethylene. The mixing and placing temperature shall be 250 degrees to 325 degrees F. The viscosity of the asphalt shall be AC 20.
 2. The mix shall have a minimum Marshall Stability of 500 lbs, flow of 8 to 16, and percent of air voids 3 to 5 percent. For full depth asphalt pavement (top and base courses) and the base course (only) for tennis courts, the asphalt mix may contain a maximum of 15% by weight of Recycled Asphalt Pavement (R.A.P.) material. The R.A.P. shall be certified by the inspection service before use and shall be free of dirt, debris, garbage, metal, glass and any other deleterious material. R.A.P. shall be tested by an approved laboratory for (%) percent asphalt cement before mixing. R.A.P. shall be screened prior to mixing so that final mix meets the specification delineated below. The City reserves the right to reject the R.A.P. asphalt mix if in the determination of the Engineer, the mix is contaminated with dirt, debris, garbage, metal, or glass. R.A.P. is not acceptable for the top courses of asphalt pavement for tennis courts. R.A.P. shall comply with N.Y.S. D.O.T. Section 703-09 "Reclaimed Asphalt".
- C. Binder Course: The material for the binder course shall meet the requirements of the latest edition of the N.Y.S. Department of Transportation Standard Specification Section 400 "Bituminous Pavements". Composition of the asphalt concrete binder shall be Type 3 as indicated in the following table:

<u>COMPOSITION OF BINDER TYPE 3</u>		
<u>SCREEN SIZE</u>	<u>GENERAL LIMITS % PASSING</u>	<u>JOB MIX TOL. %</u>
1 1/2"	100	---
1"	95-100	---
1/2"	70-90	+/-6
1/4"	48-74	+/-7
1/8"	32-62	+/-7
No. 20	15-39	+/-7
No. 40	8-27	+/-7
No. 80	4-16	+/-4
No. 200	2-8	+/-2
Asphalt Content, %	4.5-6.5	+/-0.4

- D. Top Course: The material for the top course shall be a fine asphaltic concrete mixture and shall meet the requirements of the latest edition of the NYS DOT Standard Specifications Section 400 "Bituminous Pavements".
1. Asphaltic cement shall be of one grade and of the penetration specified.

2. Asphaltic cement shall be either fluxed natural asphalt or residual asphalt derived from the distillation of asphaltic petroleum.
3. Asphaltic cement shall be homogeneous and free from water, shall not foam when heated to 347 degrees F., and shall comply with the following requirements.
4. If the asphaltic cement contains natural mineral matter, the penetration limits as indicated above for 77 degrees F. shall be reduced at the rate of 5 for each 15 per cent of such mineral matter present.
5. Loss on heating - at 325 degrees F. in 5 hours - 1.0 percent maximum penetration of residue at 77 degrees F. - not less than 75 percent of original penetration.
6. Composition of the asphalt concrete top course shall be Type 7F or 6F as indicated in the following tables:

COMPOSITION OF TOP COURSE- TYPE 6F

<u>SCREEN SIZE</u>	<u>GENERAL LIMITS</u>	
	<u>% PASSING</u>	<u>JOB MIX TOL %</u>
1"	100	-
1/2"	95-100	-
1/4"	65-85	+/-7
1/8"	36-65	+/-7
No. 20	15-39	+/-7
No. 40	8-27	+/-7
No. 80	4-16	+/-4
No. 200	2-6	+/-2
Asphalt Content %	5.8-7.0 (+/- .4)	

COMPOSITION OF TOP COURSE- TYPE 7F

<u>SCREEN SIZE</u>	<u>GENERAL LIMITS</u>	
	<u>% PASSING</u>	<u>JOB MIX TOL %</u>
1/2"	100	-
1/4"	90-100	-
1/8"	45-70	+/-6
No. 20	15-40	+/-7
No. 40	8-27	+/-7
No. 80	4-16	+/-4
No. 200	2-6	+/-2
Asphalt Content %	6.0-8.0 (+/- .4)	

- E. Sand: Sand shall be natural sand, consisting of hard durable, angular, rough-surfaced material particles passing the following sieve analysis:

Total Passing - Percent by Weight

<u>Sieve Number</u>	<u>Sand</u>
3/8 inch	
No. 4	100
No. 8	85-100
No. 16	45-85
No. 50	10-30
No. 100	2-10

- F. Aggregate: Aggregate shall be broken stone or gravel moderately resistant to abrasion, and shall comply with the following sieve analysis. Aggregate shall comply with N.Y.S.D.O.T. standards, see Section 304.1.
- G. Mineral Dust: Mineral dust shall be limestone or other approved dust. It shall be thoroughly dry when delivered and shall contain not more than 50% free silicon dioxide and conform to the following requirements:

Dust shall have a record of satisfactory performance in pavements for not less than three (3) years.

It shall be uniform in quality, satisfactorily reduce voids, produce density, stability and durability in the pavement according to tests as described in Asphalt Institute Research Bulletin No. 1, and any other tests approved by the municipal engineer. The use of dusts of a siliceous nature shall conform with the requirements of Industrial Bulletin No. 33 of the New York State Department of Labor, Board of Standards and Appeals.

Mineral dust shall comply with the following sieve analysis:

Passing No. 30 sieve	100%
Passing No. 200 sieve	70% - 100%

2.03 SEALER AND PAINT

- A. Sealer Coat: "Pavement Sealer" conforming to Fed. Spec. R-P-355d.
- B. Paint for parking space lines shall be a white paint for regular parking spaces, yellow for fire lane and blue for handicapped parking spaces. All paint shall be acrylic base paint formulated especially for this purpose.

2.04 EQUIPMENT

- A. Paving equipment: spreading, self-propelled asphalt paving machines capable of maintaining line, grade and thickness shown.
- B. Compacting equipment: self-propelled rollers, minimum 10 ton weight.
- C. Hand tools: rakes, shovels, tampers and other miscellaneous equipment required to complete the work.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Inspect surfaces of compacted sub-grades prior to installation of materials to assure that these surfaces have been properly prepared to receive asphalt paving.
- B. Verify finished elevations, and perimeter conditions. Where concrete or other vertical material is not present at the paving edges, provide other means to contain the asphaltic paving to the limits indicated.
- C. Check on catch basins, drains, and other surface items, and be sure they are fixed and properly located.
- D. Remove debris and rubbish completely from the compacted sub-grade prior to installation.
- E. Start of the work of this section shall imply that the contract surfaces have been inspected and have been found adequate, or corrective measures have made them adequate, for the asphaltic paving specified herein.

3.02 PREPARATION

- A. Field verify extent and location of paving scheduled. The work includes:
 - 1. Paving of access road, parking lot and pedestrian paths.
- B. The Contractor shall install all on-site pavements as specified in the locations and to the grades as shown on the drawings and/or as directed by the Architect. Materials, methods of construction and type and thickness of pavement courses shall be as shown on the drawings and as specified herein.
- C. The Contractor will be responsible for laying out and installing all pavements to the proper cross sections and in accordance with the lines and grades as specified herein and, on the drawings, and/or in accordance with the directions of the Architect and/or site engineer. Pavements which are not constructed to the proper section, grade and alignment shall be corrected by repair and/or replacement by the Contractor in accordance with the Architect and/or Site Engineer's directions and at no additional cost to the Owner.
- D. Thoroughly clean and prepare the base course prior to application of the wearing surfaces.
- E. Do required cutting out of soft spots and repair as required to provide a satisfactory installation.
- F. Obtain and pay for required approvals and permits.
- G. All materials plant mixed ready for use at site.
- H. Formulate asphaltic paving materials in strict accordance with the recommendations and procedures of the Asphalt Institute Applicable Specification and Manual Series publications (latest editions) are hereby made a part of this specification, and Construction Leaflet No. CL-12.
- I. Execute the work using skilled workmen and the proper equipment as recommended by the Asphalt Institute.

- J. Mix asphaltic materials and formulate in a plant specifically designed for that purpose. Materials, plant-mixed and delivered to the job site ready for installation.
- K. Coordinate junction of new and existing pavement. Saw cut existing pavement to provide a uniform straight-line transition. Meet existing surface levels and maintain drainage slopes. Feathering of transitions is not acceptable.

L. Asphalt Replacement

All saw cutting shall be done to accurate, neat and straight lines. Pavements and curbs shall be marked before cutting, with approved power saws specifically designed and manufactured for such purpose. Workmen shall wear necessary safety clothing and eye protection while operating saw cutting equipment and shall be thoroughly familiar in the safe operation of the equipment.

3.03 PREPARATION OF SUBGRADE

- A. General Requirements - Prior to the start of paving operations, the subgrade surface shall be prepared by filling in wheel ruts, erosions and all other ground disturbances regardless of cause, and the ground surface shall be fine graded so that after compaction the subgrade surface will be at the proper elevation (+ or - .05') to accommodate the pavement structure.
- B. Fine Grading - Fine grading of the subgrade shall be performed in section, working the equipment perpendicular to the contours and constructing the respective valleys and ridges in accordance with the drawings. Particular care shall be exercised with the grades of the valleys which lead to the catch basins. Fine grading shall not be done when the ground is excessively wet or frozen.
- C. Compaction - Fine grading of the subgrade shall be accompanied by proper compaction to the extent that the upper twelve (12) inches of subgrade shall have a density not less than that as specified under the Section 31 20 00. Compaction shall be done by means of a roller weighing not less than ten (10) tons or other compaction equipment satisfactory to the Soils Engineer and/or the Architect.
- D. Proof-rolling - Immediately prior to the start of paving operations, the contractor shall proof-roll the subgrade in the presence of the Architect and/or Owner's Field Representative. If, in their opinion the subgrade is not suitable for support of the pavement structure, measures shall be taken by the Contractor to correct the subgrade deficiencies to the satisfaction of the Architect and/or Owner's Field Representative at no cost to the Owner.
- E. Subgrade Approval - The Architect and/or Owner's Field Representative must approve the subgrade prior to placement of the initial pavement course. Installation of all or any portion of the pavement without subgrade approval by the Architect and/or Owner's Field Representative is done at the Contractor's risk.
- F. Protection of Approved Subgrade - Approval of the subgrade by the Architect and/or Owner's Representative shall not relieve the Contractor of his responsibility to protect the subgrade from damage caused from excessive moisture, rutting from trucks or heavy equipment or from any other cause, and any damage occurring to the subgrade either before or during the paving operations shall be corrected to the satisfaction of the Architect and/or the Owner's Field Representative at the Contractor's expense.

3.04 INSTALLATION: GENERAL

- A. Comply with Asphalt Institute (AI) MS-3 Asphalt Plant Manual for material storage, control and mixing, and for plant equipment and operation.
- B. Transport asphaltic concrete mixtures from the mixing plant to the project site in trucks with tight, clean compartments.
- C. Thoroughly clean existing pavement surfaces by air blowing, brooming or vacuuming before starting repair or resurfacing operations.
- D. Place engineered fill in layers not to exceed 12" in loose thickness with each layer compacted to 95% of the maximum dry density in accordance with ASTM D698 Standard Proctor Method or as specified by the Soils Engineer.
- E. Install base material as specified herein.
- F. Install prime coat or tack coat as applicable and specified herein.
- G. Install leveling and surface courses as specified herein.

3.05 INSTALLATION: BASE MATERIALS

- A. Install gravel base course (NYSDOT Item 304.5, Type 4) over properly prepared subgrade. Compacted thickness to be as shown on the drawings. The base course material shall be compacted by rolling with a powered steel tandem roller weighing not less than eight (8) not more than ten (10) ton or by other approved equipment producing an equivalent density.

3.06 INSTALLATION: SURFACE MATERIALS

- A. Remove loose and foreign material from compacted base immediately before application of surface materials. Do not start surface work until all other work which may damage the finish surface is completed.
- B. Apply prime coat uniformly to aggregate base at the rate of 0.15 to 0.25 gal. per sq. yd. Allow to dry and cure as required.
- C. Install asphalt surface materials in two courses, leveling course and surface course, total compacted depth as scheduled.
- D. Place, spread and strike off the asphalt concrete mixture on a properly prepared and conditioned surface. Inaccessible and small areas may be placed by hand. Place each course to the required grade, cross-section and scheduled compacted thickness.
- E. Apply tack coat to contact surfaces of existing pavement, curbs and structures abutting pavement.
- F. Begin rolling operations when the asphalt concrete mixture will bear the weight of the roller without excessive displacement. Compact areas inaccessible to rollers with vibrating plate compactors.

- G. Perform breakdown, second and finish rolling until the asphalt concrete mixture has been compacted to the required surface density and smoothness. Continue rolling until all roller marks are eliminated. Provide a smooth compacted surface true to thickness and elevations required.
- H. After final rolling, do not permit vehicular traffic on the pavement until it has cooled and hardened, and in no case sooner than 8 hours.
- I. Protect newly placed material from traffic by barricades or other suitable methods acceptable to the Landscape Architect.

3.07 INSTALLATION: PAVING RESURFACING

- A. Obtain inspection and approval of surfaces by the Architect prior to installing paving.
- B. Install sealer as described for asphaltic paving, filling all cracks.
- C. Level all voids and low spots.
- D. Install prime coat or tack coat as applicable and as described for asphaltic paving.
- E. Install leveling and surface courses as described for asphaltic paving.

3.08 PAINTED LINES

- A. Paint pavement lines and numbers on the finished pavement to mark off each parking space.
- B. The paint, a well ground, uniform mixture of good brushing consistency which shall thoroughly dry and free from tackiness within one hour after application.
- C. Traffic marking paint: a fast-drying medium oil alkyd series B46 manufactured by Sherwin-Williams or an equal approved by the Architect in white or yellow plus handicapped markings.
- D. The surface of pavement, thoroughly clean and perfectly dry at the time the paint is applied. The lines, uniform and applied by hand and/or machine. Use templates to define width when the stripes are painted by hand. The stripes shall be 4" wide. Numbers as selected by Owner 6" high x 1" wide.
- E. Erect suitable barriers to prevent tracking of the paint until it has thoroughly dried. Before the final acceptance of the work, retouch or repaint markings which have become discolored or worn out, due to defective materials or construction traffic.

3.09 PROTECTION

- A. Protect paving from damage due to construction and vehicular traffic until final acceptance.

3.10 CLEANING

- A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess material, debris and equipment. Repair damage resulting from paving operations.
- B. Sweep pavement and wash free of stains, discoloration, dirt and other foreign material immediately prior to final acceptance.

3.11 GUARANTEE AND MAINTENANCE

- A. The Contractor shall guarantee all pavement installation, including materials and workmanship for a period of one year from the date of acceptance.

END OF SECTION

SECTION 32 13 73
SITE WORK JOINT SEALANTS

PART 1 GENERAL

1.0 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.1 SUMMARY

- A. This Section includes, but is not limited to:
 - 1. Expansion and contraction joints within curbs, stairs, paving, granite bands and walls.
- B. Related Sections include the following:
 - 1. Division 3, Section "Site Concrete".
 - 2. Division 32, Section "Unit Pavers".

1.2 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Approval: For each type and color of joint sealant required. Install joint-sealant samples in 1/2-inch- (13-mm-) wide joints formed between two 6-inch-(150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.
- D. LEED Submittals: provide submittals as listed and/or enumerated in division 1 of these specifications.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
 - 2. When joint substrates are wet.
- B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than that allowed by joint sealant manufacturer for application indicated.
- C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2 PRODUCTS

2.0 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: Match approved samples.

2.1 COLD-APPLIED JOINT SEALANTS

- A. Products: Multicomponent Jet-Fuel-Resistant Sealant for Concrete.
- B. Subject to compliance with requirements, provide one of the following:
 - 1. Sikaflex-2CNS: Sika Corporation, Lyndhurst, NJ
 - 2. Sonolastic SL2 (slope grade); Sonneborn Building Products Div., ChemRex, Inc.

2.2 JOINT-SEALANT BACKER MATERIALS

- A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint sealant manufacturer based on field experience and laboratory testing.
- B. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depths, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.3 PRIMERS

- A. Primers: Product recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Refer to Division 3 Section "03 30 50 Site Concrete" for construction and expansion joint installation.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint sealant manufacturer. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's written installation instructions applicable to products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

- C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of backer materials.
 - 2. Do not stretch, twist, puncture, or tear backer materials.
 - 3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.
- D. Install sealants by proven techniques to comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses provided for each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealants from surfaces adjacent to joint.
 - 2. Use tooling agents that are approved in writing by joint sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint sealant manufacturer's written instructions, unless otherwise indicated.
- G. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.4 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged

or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

END OF SECTION

SECTION 32 14 00
UNIT PAVERS

PART 1 GENERAL

1.0 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.1 SUMMARY

- A. This Section includes but is not necessarily limited to the following:
 - 1. Bluestone pavement set in mortar setting bed.
 - 2. Precast concrete pavers set in mortar setting bed.
- A. Related Sections include the following:
 - 1. Division 31, Section "Earthwork."
 - 2. Division 32, Section "Site Work Joint Sealants."
 - 3. Division 3, Section "Site Concrete."

1.2 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: ASTM C 1028, values as follows:
 - 1. Level Surfaces: A minimum of 0.6.

1.3 SUBMITTALS

- A. Product Data: For each variety of unit pavers and accessory and other manufactured products specified. For unit pavers varieties proposed for use on Project, include data on physical properties required by referenced ASTM standards.
- B. Shop Drawings: Show details of fabrication and installation of unit pavers, including dimensions and profiles of stone units; arrangement and details of jointing; and details showing relationship with, attachment to, and reception of related work.
- C. Samples: Sets for each color, grade, finish and variety of paver required; not less than 12 inches (300mm) square for large unit pavers. Include a minimum of three (3) samples in each set for approval showing the full range of variations in appearance characteristics expected in completed Work.
- D. Grout Samples: For each color required, provide cured samples showing the full range of exposed color and texture expected in completed Work.
- E. Joint Sealant: For each color required, provide cured samples showing the full range of exposed color and texture expected in completed Work.

- F. Provide submittals as listed and/or enumerated in division 1 of these specifications.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an installer who has a minimum of 5 years experience similar in material, design and extent to that indicated for Project that has resulted in construction with a record of successful in-service performance.
- B. Fabricator Qualifications: Engage a firm experienced in producing unit pavers similar to that indicated for this Project and with a record of 5 years of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work.
- C. Source Limitation for Stone: Obtain each variety of unit paver, regardless of finish, from a single quarry or fabricator with resources to provide materials of consistent quality in appearance and physical properties and to cut and finish material without delaying the Work.
- D. Mockups:
 - 1. Material Mockups of Sample Selections: Construct mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and variations in appearance characteristics expected in completed work.
 - 2. Construction Mockups: After acceptance of material mockups of sample selections and prior to installation of unit pavers, construct mockups including mortar joints to demonstrate quality, execution and jointing representative of the completed work of this section. Build mockups to comply with the following requirements, using materials indicated for completed work.
 - a. Locate mockups in the location indicated or, if not indicated, as directed by the Owner's Representative.
 - b. Build mockups as follows:
 - 1. Approximately 96 inches (2400mm) square with joints grouted and cured.
 - c. Notify Owner's Representative 7 days in advance of the dates and times when mockups will be constructed.
 - d. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 1. Approval of mockups does not constitute approval of deviations from Contract Documents contained in mockups, unless such deviations are specifically approved by Owner's Representative in writing.
 - 2. When directed, demolish and remove mockups from Project site.
- E. Approved mockups may become part of the completed work if undisturbed at time of substantial completion.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to Project site in undamaged condition.

- B. Store and handle unit pavers and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping, or other causes.
 - 1. Store unit pavers on wood skids or pallets with non-staining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to stone. Ventilate under covers to prevent condensation.
 - 2. Store cementitious materials off ground, under cover and in tightly closed container.
 - 3. Store aggregate materials covered and in dry location.

1.6 PROJECT CONDITIONS

- A. Do not set pavers when air or material temperatures is below 50 deg F (10 deg C).
- B. Maintain minimum ambient temperatures of 50 deg F (10 deg C) during installation of stone paving and for 7 days after completion, unless higher temperatures are required by fabricator's or supplier's instructions.
- C. Weather Limitations for Unit Pavers: Comply with the following requirements:
 - 1. Cold-Weather Requirements: Protect stone paving against freezing when atmospheric temperature is 40 deg F (4 deg C) and failing. Heat materials to provide mortar and grout temperatures is between 40 and 120 deg F (4 and 49 deg C). Provide the following protection for completed portions of work for 24 hours after installation when the mean dialing air temperature ins as indicated: below 25 deg F (minus 4 deg C), cover with insulating blankets; below 20 deg F (minus 7 deg C), provide enclosure and temporary heat to maintain temperature above 32 deg F (0 deg C).

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Precast Concrete Pavers: Prest Paver Matrix #2374 Square Edge by Hanover Architectural products (800) 426-4242 or approved equal.
 - 2. Bluestone Band: "North River Blue" with thermal finish by American Bluestone (607) 369-2235 or approved equal.

2.2 COLORS AND TEXTURES

- A. Provide materials and products that result in colors and textures of exposed unit paver surfaces and joints complying with the following requirements:
 - 1. Match approved samples.
- B. Provide stone that is free of cracks, seams and starts impairing structural integrity or function. Provide stone from a single quarry for each variety required.

2.3 CONCRETE UNIT PAVERS

- A. Characteristics and Quality:

1. Manufacturer's standard solid paving units made from normal-weight aggregates in sizes and shapes indicated.
 2. Size, color and finish shall be as shown on the Contract Drawings
- B. All Concrete Unit Pavers shall conform to the following specifications:
1. Cement: ASTM C-150 Portland cement Type III Aggregates – ASTM C-33 (washed, graded sand and natural aggregates.
 2. Compressive Strength: The average compressive strength of the test samples shall be not less than 8500 PSI.
 3. Water Absorption: The average absorption of the test samples shall not be greater than 5% when tested in accordance with ASTM C-140-75 testing procedure.
 4. Finish: as indicated.
- C. Steel Edge Restraint: Painted commercial steel edging with #3 galvanized rebars welded at 12 inches O.C. Size of edging as follows:
1. 3/16-inch-thick 5 inches high, C1010 cold rolled ASTM 29.

2.4 SPACERS

- A. Provide pavers manufacturer supplied spacers as required were design calls for joints width larger than 1/16 inch. This may occur were paving pattern to be based or aligned with building module or pattern.

2.5 BASE AND SUBBASE MATERIALS

- A. Base: Base shall be reinforced concrete slab to the thickness shown and as specified in Division 3, Section "Site Concrete."
- B. Graded Aggregate for Base: Well graded washed gravel or washed crushed stone complying with ASTM D 448 for Size No. 8 coarse aggregate to the thickness shown.
- C. Graded Aggregate for Subbase: Shall be gravel or crushed stone as specified in Division 31, Section "31 20 00 Earthwork".

2.6 PORTLAND CEMENT MORTAR SETTING BED MATERIALS

- A. Portland Cement: ASTM C150, Type I or II.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Aggregate: ASTM C144.
- D. Mortar Admix: Styrene-butadiene-rubber or acrylic resin water emulsion serving as replacement for water specifically recommended by manufacturer for use with job-mixed Portland cement and aggregate.
1. Mortar Admix shall be 3701 by Laticrete International Inc.

2.7 JOINT FILLER

- A. Joint Filler shall be a dry sand/cement mixture consistency of colored Portland cement to match color of pavers and conforming to ASTM C-150.
 - 1. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 (1.18-mm) sieve and no more than 10 percent passing No. 200 (0.075-mm) sieve.
 - 2. Joint Filler shall be Gator Maxx by Alliance Designer Products Inc. at www.alliancegator.com. Color as selected by architect.

2.8 JOINT SEALANT

- A. Expansion Joint sealant material shall be as herein before in Division 32, Section "32 13 73 Site Work Joint Sealants."

2.9 MORTAR MIX

- A. General: Comply with referenced standards and with manufacturer's written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing times and other procedures needed to produce setting bed of uniform quality and with optimum performance characteristics. Discard mortar when they have reached their initial set.
 - 1. Latex Modified Portland Cement Setting Bed Mortar: Proportion and mix Portland cement, aggregate and latex additive for setting bed to comply directions of latex additive manufacturer and as necessary to produce stiff mixture with a moist surface when bed is ready to receive pavers.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive stone paving and conditions under which stone will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone paving.
 - 1. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Concrete base slab shall be provided in accordance with Division 3, Section "Site Concrete". Slab shall have a broom finish. Coordinate with work of concrete placement and make corrections as necessary.
- A. Vacuum clean concrete substrates to remove dirt, dust, debris and loose particles.
- B. Remove substances from concrete substrates that could impair mortar bond, including curing and sealing compounds, from oil and laitance.
- C. Clean unit pavers surfaces that have become dirty or stained by removing soil, stains and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes

and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

- D. Subgrade Preparation: Shall be as specified in Division 31, Section "31 20 00 Earthwork."
- E. Concrete base shall be constructed as specified in Division 3, Section "Site Concrete."

3.3 INSTALLATION, GENERAL

- A. Layout of Work: Accurately layout paving work to patterns and conditions as indicated, encountered on site, and specified for installation. Comply with set out control points as indicated and coordinate with other work of project. Provide additional control points and stakeouts as required to effect correct alignments and grade elevations. Advise Landscape Architect or Owner's Representative of any discrepancies or on-site conditions detrimental to critical layouts and obtain approved correction.
- B. Prior to prime application and setting bed placement, verify slab placement to correct line and grade and with correct finish and thoroughly clean base surface to be covered with paving system of all dust, debris, or contaminants.
- C. Do not use paving materials with chips, cracks, voids, discolorations and other defects that might be visible or cause staining in finished work.
- D. Cut unit pavers with motor driven masonry saw equipment to provide clean, sharp and edges which are not chipped. Cut units to provide pattern indicated and to fit adjoining work neatly. Use units without cutting where possible. Hammer cutting is not acceptable.
 - 1. For concrete pavers, a block splitter may be used.
 - 2. Scribe and field cut pavers as necessary to fit at abstractions. Produce tight and neat joints.
- E. Joint Pattern: Set unit pavers to comply with contract documents and approved Shop Drawings. Match for color and pattern by using units numbered in sequence as indicated on approved Shop Drawings.
- F. Tolerances: Do not exceed 1/16 inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches and 1/4 inch in 10 feet from level or indicated slope, for finished surface of paving.
- G. Expansion and Control Joint Installation: Provide for sealant filled joints at locations and width indicated. Provide joint filler as backing for sealant filled joints where indicated. Install joint filler before setting pavers. Expansion joints at concrete base shall be spaced at 20 feet O.C. maximum. Sealant materials and installation are specified in Division 2 Section "Site Work joint Sealants".
- H. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.

3.4 MORTAR SETTING BED APPLICATIONS

- A. Saturate concrete with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.
- B. Apply cement-paste slush coat over surface of concrete about 15 minutes before placing setting bed. Limit area of slush coat to avoid its drying out before placing setting bed. Do not exceed 1/16-inch thickness for bond coat.
- C. Apply mortar setting bed over bond coat immediately after applying bond coat. Spread and screed setting bed to uniform thickness at subgrade elevations required for accurate setting of stone to finished grades indicated.
- D. Mix and place only as much mortar setting bed as can be covered with pavers before initial set. Cut back, bevel edge, remove, and discard setting-bed material that has reached initial set before placing pavers.
- E. Place stone or paver before initial set of cement occurs. Immediately before placing stone on setting bed, apply uniform 1/16-inch-thick, slurry bond coat to bed or to back of each paver unit with a flat trowel.
- F. Tamp stone or paver with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each unit in a single operation before initial set of mortar; do not return to areas already set and disturb stone for purposes of realigning finished surfaces or adjusting joints.
- G. Fill joints after setting. Fill full of sand/cement mix as specified herein under item 2.7 "Joint Filler". Sweep joints full, mist with water and let settle as per manufacturer recommendations and then repeat the operation. Do not fill joints when temperatures for the duration of the joint fill material curing period are going to be lower than those recommended by the joint fill material manufacturer. Joints mix color shall be as approved by the Landscape Architect.

3.5 ADJUSTING AND CLEANING

- A. Remove and replace unit pavers that are loose, chipped, broken, stained or otherwise damaged or that do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.
- B. In-Progress Cleaning: Clean paving as work progresses. Remove mortar fines and smears from exposed paver surfaces; wash and scrub clean.
- B. Clean paving after setting is complete. Use procedures recommended by Paver manufacturer for types of application.

3.6 PROTECTION

- A. Prohibit traffic from installed stone for a minimum of 72 hours.
- B. Protect stone paving during construction. Where adjoining areas require construction work access, cover stone paving with a minimum of 3/4-inch (19-mm) untreated plywood over non-staining Kraft paper.

END OF SECTION

SECTION 32 16 40
GRANITE (BELGIUM) BLOCK CURB

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work under this Section shall consist of providing all labor, plant, materials and equipment necessary and required to install all of the granite curbs in accordance with the Contract Documents.

Work shall include, but not be limited to:

1. Stone Curb – Granite Block

- B. Work shall also include all associated items and operations necessary and required to complete the installations, including but not limited to surface preparation, formwork, finishing and curing.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Asphalt: Section 32 12 16
- B. Site Concrete: Section 03 30 50

1.03 GENERAL CONDITIONS

- A. General Requirements - The Contractor shall install all curbs and sidewalks as specified in the locations and to the lines and grades as shown on the Drawings and/or as directed by the Architect.
- B. Contractor's Responsibility - The Contractor shall be responsible for laying out and installing all curbs and sidewalks in accordance with the cross-sections, lines and grades as specified herein and shown on the Drawings and/or in accordance with the directions of the Architect. All curbs and sidewalks which are not constructed to the proper section, grade or alignment shall be corrected by repair or replacement by the Contractor in accordance with the directions of the Architect and at no additional cost to the Owner.
- C. Protection from Damage - The Contractor shall protect all curb and sidewalk installation from damage until acceptance of the Work by the Owner. Any damage prior to acceptance of the Work, shall be repaired or replaced by the Contractor, at his expense.
- D. Submittals - A sample of the stone to be used for curb shall be submitted to the Architect for his review and approval prior to ordering.

PART 2 – MATERIALS

2.01 MATERIALS

- A. Granite Block Curb – stone for curb shall be grey Jumbo Belgium Block, 4" x 8" x 10" thick.

- B. Granite Block Curb to be supplied by Masonry Depot, Yonkers, NY. (914)969-777 or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Unless otherwise specified, granite block curb shall be set in a continuous concrete foundation as shown in detail on the Drawings. Concrete shall be placed in such a manner that will provide firm and uniform bearing for the full length of the curb. Care shall be taken not to displace the curb during the placement of the concrete.

3.02 JOINTS

- B. Individual stone sections shall be fitted so that the width of joints will not exceed 3/4 inch. The joints between individual curb sections shall be fully grouted with a 1:2 cement mortar grout and neatly pointed flush with the curb surface. Grout shall be carefully applied, and extreme care taken so as not to stain the exposed face and top of the curb.

3.03 CLEANING

- A. Excess materials shall be cleaned with water immediately as the work progresses. Cleaning the stone shall be done when mortar is fresh and before it hardens.

END OF SECTION

SECTION 32 31 13

CHAIN LINK FENCE

PART 1 - GENERAL

1.00 GENERAL REQUIREMENTS

- A. Work of this section shall be governed by the Contract Documents. Provide materials, labor, equipment, and services necessary to furnish, deliver, and install all work of this section as shown on the drawings as specified herein, and/or as required by job conditions.

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SCOPE

- A. Work of this section shall include but not be limited to the following:
 - 1. Chain link fences at locations and of height shown on the drawings.
 - 2. Swing gates, sizes as noted, complete with frames and hardware.

1.03 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings to the Architect for review in accordance with the requirements of the Contract Documents.
 - 2. Shop drawings shall include elevations, plans, sections and details with gauges, sizes, dimensions and finishes clearly noted. Anchoring of line posts shall be indicated as well as all other fencing and bracing components.
 - 3. Gates shall be indicated in elevation and all hardware shall be scheduled and clearly noted.
- B. Samples:
 - 1. Fabric with vinyl cladding - 6" x 6".
- C. Provide submittals as listed and/or enumerated in Division 1 of these specifications.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the job site, ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name, and manufacturer's name. Delivered materials shall be identical to approved samples and certificates.
- B. Store materials under cover in a dry and clean location, off the ground, and remove materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.

PART 2 - PRODUCTS

2.00 MATERIALS

- A. All fittings, hardware and equipment shall be designed to carry one hundred percent (100%) overload.
- B. Malleable iron castings shall be powder coated after hot dipped galvanizing in accordance with ASTM Serial Designation: A-153-82.
- C. Pressed steel fittings and appurtenances shall be powder coated after hot dipped galvanizing in accordance with ASTM Serial Designation: A-123-89.
- D. All fittings, hardware and equipment shall be powder coated of a color to match the framework and shall be of the materials listed in the following schedule:

FENCE/GATE PART

MATERIAL

- | | |
|--|--|
| 1. Boulevards, Corner (Split)
Fittings and End Fittings | Malleable Iron or Pressed Steel-3/16" thick |
| 2. Post Caps and Post Line Tops | Malleable Iron or Pressed Steel - 3/16" thick |
| 3. Couplings | Galv. Steel Pipe - 1/8" thick with 1/4" Dia. Full
Depth Rivet |
| 4. Gate Hinges | Malleable Iron or Pressed Steel-1/4" thick with 1"
Dia. Stainless Steel Pin Welded to 1/2" thick Pin
Support |
| 5. Bolts and Nuts | Galv. Steel or Stainless Steel as indicated on Plans |
| 6. Tension Bars | 1/4" x 3/4" Galv. Steel for 2" and 1-3/4" Mesh,
3/16" x 3/8" Galv. Flat Steel for 1" Mesh |
| 7. Tension Bands | 1/8" x 1" Pressed Steel |
| 8. Truss Rods | 1/2" Dia. Galv. Steel |
| 9. Truss Tightener | 3/8" x 1" Galv. Steel |
| 10. Truss Clamp | 1/4" Pressed Steel |
| 11. Locking Device | Outer Housing - Malleable Iron Inner Parts,
including Bolt- Stainless Steel, 18-8, 14 gauge |
| 12. Gate Stop | 7/16" malleable iron |
| 13. Drive Pins and Set Screws | Stainless Steel, 18-8 |

- E. POSTS AND RAILS: TYPE I - Posts and rails shall be standard weight galvanized steel pipe of the sizes shown on the plans and shall conform to ASTM Serial Designation F-1083 Schedule 40, except for chain link fence posts 20'-0" height, which shall be Schedule 80. Posts and rails shall be hot dip galvanized inside and outside in accordance with ASTM Serial Designation F-1083 or:
For fence up to and including ten (10) feet height, posts and rails may be TYPE II, SS-40 steel tubing as manufactured by Allied Tube and Conduit Corp. of Harvey, Illinois, or approved equal. Tubing must conform to ASTM A-569, cold rolled steel pipe and coated with a minimum of 0.9 ounces of zinc per square foot, a minimum of 15 micrograms of zinc chromate per square inch. Steel pipe supplied under this option shall be of the same outside diameter as Schedule 40 pipe and achieve a minimum yield strength of 50,000 p.s.i.
- F. SURFACE COATINGS:

- 1. All posts, rails and fittings shall be powder coated with either polyvinyl chloride (PVC) or TGIC-Polyester (with the exception of the turnbuckles and threaded ends)

of the truss rods, both of which shall be sprayed with powder coat touch-up after installation).

2. Galvanizing of all components shall provide an acceptable substrate for applied powder coatings. No lacquer, urethane or other coatings which would prevent proper adhesion of powder coating shall be applied to the pipe.
 3. The powder coating shall be applied to the galvanized surfaces in such a manner that the coating will not peel off. Insure surfaces to be coated are clean and dry and free of grease, dust, rust, etc. All coated parts shall first receive phosphating and chromating treatments to improve the adhesion of the surface coating. Color to be black unless otherwise indicated on the plans.
 4. The entire fence installation shall be coated with one of the two following types of powder coating, (with the exception of gates, all of which shall be TGIC-Polyester and fabric which shall always be PVC). All Fence components shall be coated on all surfaces, of a color to match the framework. All coated surfaces shall comply with the adhesion specifications listed in ASTM F1043.
- G. TYPE A - Polyvinyl Chloride Powder Coating: PVC Powder coating shall be applied to the galvanized steel or iron by the fluid bed method to a preheated base which has been cleaned and primed prior to submersion in vinyl, resulting in a firm bond between the PVC and the metal. PVC shall be applied to a film thickness of 10 to 15 mils on framework and fittings, and 7 to 12 mils on fabric without voids, tears or cuts that reveal the substrate and shall thoroughly adhere to the metal without peeling when scratched with a pick device or knife blade point.
- H. TYPE B - TGIC-Polyester Powder Coating:
1. TGIC-Polyester Powder shall be applied to the galvanized steel or iron in such a manner that the coating will not peel off. The TGIC-Polyester shall be applied at a film thickness of 3 to 6 mils by electrostatic spray process and bake finished per manufacturer's directions. The TGIC-Polyester shall be applied without voids, tears or cuts that reveal the substrate and shall thoroughly adhere to the metal without peeling when scratched with a pick device or knife blade point.
- I. TESTS:
1. Field Test For PVC Powder Coating: As per ASTM F668, three sample sections of the PVC powder coated fence shall be tested for bonding of the powder coat to the metal. Each test will consist of making two cuts parallel to the axis of the pipe or fitting, through the coating, appx. 1/16 inch (1.6 mm) apart, at least 1/2 inch (12.7 mm) long. With a knife peel back a section of the coating between 1/8 inch (3.2 mm) and 1/4 inch (6.4 mm) long to produce a tab. Attempt to remove the 1/16 inch strip of coating by pulling the tab. The fence shall be deemed acceptable if the coating breaks rather than separates from the metal on all three samples.
 2. Laboratory Test For TGIC-Polyester Powder Coat: At the discretion of the Engineer, a sample of the TGIC-Polyester powder coated fence shall be laboratory tested for bonding of the powder coating to the metal. Test shall be the Cross Hatch test per ASTM D3359, Method B. Failure to satisfactorily pass this test shall be a basis for rejection.

3. TOUCH-UP & REPAIR: For minor damage caused by installation, transportation, field welding and cutting of metal powder coated surfaces: clean welds, bolted connections, abraded or sawcut areas, then:
 - a. On welded and cut surfaces, apply organic zinc repair paint complying with ASTM A780, then repair powder coating per number 2 below. Galvanizing repair paint shall have 65 percent zinc by weight. Thickness of repair paint shall be not less than that required by ASTM A123.
 - b. On damaged powder coated surfaces, touch-up finish in conformance with manufacturer's recommendations. Provide touch-up such that repair is not visible from a distance of six feet (6').

J. FABRIC:

1. Fabric shall be hot dip galvanized steel wire mesh as per ASTM A641, with a thermally fused polyvinyl chloride powder coating of 7 to 12 mils thick as per ASTM F668 class 2b. Color to match framework. Fabric shall be produced by methods recognized as good commercial practices. Core wire tensile strength shall be 75,000 psi (517 MPa).
2. Wire used for the manufacture of fabric shall meet the requirements of ASTM F668 and shall be capable of being woven into fabric without the PVC coating cracking or peeling. PVC coating shall be a dense, impervious covering free of voids. Excessive roughness, bubbles, blisters, bruises and flaking will be a basis for rejection. PVC shall be thermally fused. Bonded or extruded and glued surface coating will not be permitted. Fabric shall be stretched to provide a smooth, taut, uniform appearance free from sag.
3. Field Test: PVC coating on fabric shall be field tested for adherence to the metal as outlined elsewhere in this specification.
4. Thickness of Fabric: One (1) Inch Mesh: Uncoated wire dimension shall be .120 inches in diameter (11 gauge). Zinc coating shall be 0.30 ounces per square foot of wire surface.
5. One and Three Quarter (1-3/4) Inch and Two (2) Inch Mesh: Uncoated wire dimension shall be .192 inches in diameter (6 gauge). Zinc coating shall be .3 ounces per square foot of wire surface.
6. Selvages: Fabric shall be barbed at the top and knuckled at the bottom on fences over 6'-0" high. Fabric on fences 4'-0" and 6'-0" shall be knuckled top and bottom. Loops of knuckled fabric shall be closed or nearly closed. The wire ends of barbed selvages shall be twisted in a closed helix of 1- matching turns and cut at an acute angle. The length of the ends beyond the twist shall be at least 1/4 inch long. One (1) inch mesh shall be knuckled both top and bottom.

K. TIES:

1. Tie-wire core thickness shall be 6 gauge (.192") wrought aluminum alloy 1100-H16 wire with an extruded vinyl coating in accordance with ASTM A641 Class 3. PVC shall be applied to a film thickness of 20 to 22 mils. Ties shall be spaced fifteen (15) inches apart on rails and twelve (12) inches apart on posts. The ends of ties shall be wound in a telegraph twist two and one half turns. Color to match mesh. Contractor shall touch-up PVC coating on ties damaged as result of installation.

L. GATES:

1. Gates shall be furnished and installed on reinforced concrete slabs where indicated on the plans or directed by the Engineer. All gates shall be galvanized steel and shall be TGIC-Polyester powder coated after fabrication per requirements for fence framework outlined elsewhere in this specification. Welded joints shall have a suitable rust preventive coating applied to the welds prior to powder coating. Gate fabric shall match line fabric adjacent to gate opening. Gates shall be installed plumb, level and secure for full opening without interference. The hinges shall be so designed to permit the gate to swing a full 180 degrees.

M. Gate Locking Device:

1. This latch shall be a stainless steel drop rod or plunger bar arranged to engage the gate stop. Gate Stop shall be installed as per the plans. Locking device shall be constructed so that the center drop rod or plunger bar cannot be raised when the gate is locked. The locking device bolt hardware shall be tack welded and filed smooth after installation to prevent loosening. The locking device shall have provisions for a padlock. All necessary fittings and gate holders to lock gates in both open and closed positions shall be furnished. The locking device shall be entirely enclosed as shown on the plans or shall be an approved equal locking device.

N. PADLOCK:

1. The Contractor shall furnish one (1) padlock for each single gate and each leaf of double gates. The padlocks shall be American No. 5571 as manufactured by American Lock Co. of Crete, Illinois, or approved equal. All padlocks for the same park facility shall be keyed alike, with two (2) inch width by three-quarter (3/4) inch thick brass body, maximum security, five (5) pin tumblers with hardened alloy steel chrome plated shackle no less than three-eighths (3/8) inch diameter and two (2) inch clearance (elongated shackle). A galvanized steel chain, nine (9) inches long shall be fastened to the gate and body of each lock. The chain shall be five-sixteenths (5/16) inch by one and three-eighths (1-3/8) inch. The Contractor shall furnish two (2) keys for each padlock.

O. BOLT AND HARDWARE INSTALLATION:

1. Nuts and bolts shall be galvanized but not powder coated. Cans of TGIC-Polyester or PVC touch-up powder coating shall be used to paint the nuts and bolts per manufacturer's recommendations. The ends of all bolts shall be peened after tightening.
2. Bolts which are installed six feet (6') or less above grade shall not protrude more than 1/4" beyond the nut after tightening. All rough edges resulting from the cutting of bolts to achieve this requirement shall be filed smooth to the satisfaction of the Engineer. All post caps, corner and end fittings, and gate hinges on all fence elevations are to be secured in place with #14 SS drive screws to the satisfaction of the Engineer.

PART 3 - EXECUTION

3.00 INSPECTION

- A. Study the contract drawings and specifications with regard to the work as shown and required under this section so as to insure its completeness.
- B. Examine surfaces and conditions to which this work is to be attached and notify the Architect if conditions or surfaces exist which are detrimental to the proper and expeditious

installation of the work. Starting on the work shall imply acceptance of the surfaces and conditions to perform the work as specified.

- C. Verify dimensions taken at the job site affecting the work. Bring field dimensions which are at variance to the attention of the Architect. Obtain decision regarding corrective measures before the start of the installation.
- D. Cooperate in the coordination and scheduling of the work of this Section with the work of other sections so as not to delay job progress.

3.01 INSTALLATION

- A. Installation of fencing and gates specified herein shall be performed by experienced workmen in strict accordance with reviewed shop drawings.
- B. Prior to installation of the fence the Contractor shall check the fence layout with the Architect who must approve the layout before any of the work is done.
- C. Chain link fence shall be as shown on drawings.
- D. All posts shall be set vertical and plumb in concrete foundations of the depth and diameter shown in detail on the drawings. Posts shall be equally spaced along each side with post spacing not greater than ten (10) feet and shall be set to the required grade and alignment.
- E. Fabric shall be securely fastened to posts, rails, braces and tension wire by approved method. The fabric shall be secured to all end, corner and gate posts with stretcher bars fastened to the posts and stretcher bands spaced at a maximum of 14 inches in a manner permitting adjustment of fabric tension. Fabric shall be continuous along each stretch of fence.
- F. All top rails shall pass through the base of the post caps and shall form a continuous brace from end to end of each stretch of fence. Top rail lengths shall be joined with sleeve couplings with expansion sleeves provided at 100-foot intervals. Top rails shall be securely fastened to end posts by approved rail end connectors. Horizontal braces shall be provided at end and corner panels between line post and each adjacent end, corner, and gate post midway between the top rail and ground as shown in detail on the Drawings. Diagonal truss rod with turn buckle shall also be provided at these locations.
- G. Gate(s) and their hardware shall operate smoothly and quietly for use intended and acceptable to the Architect and the Owner.

3.03 PROTECTION AND CLEANING

- A. Afford installed work proper and adequate protection. Vinyl coated elements which are damaged, scratched or chipped shall be repaired and/or replaced as directed by the Architect or Owner.
 - 1. Clean surfaces of dirt and grime.

END OF SECTION

SECTION 32 31 19

SITE HANDRAILS & RAILINGS

PART 1 - GENERAL

1.0 GENERAL REQUIREMENTS

- A. Work of this Section shall be governed by the contract documents. Provide materials, labor, equipment and services necessary to furnish, deliver and install all work of this Section as shown on the Drawings, as specified herein, and/or as required by job conditions.
- B. The work shall include but not be limited to the following:
 - 1. Handrails, Railings and Panels.

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Handrails and Railings: Provide handrails and railings capable of withstanding structural loads required by ASCE 7 without exceeding allowable design working stress of materials for handrails, railings, anchors, and connections.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 SUBMITTALS

- A. Shop Drawings: Show fabrication and installation of handrails and railings. Include plans, elevations, sections, details, and attachments to other Work.
 - 1. For installed railings indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Paint Substitution: A written request for paint substitution must be submitted to the Architect. The Contractor shall submit this request, along with manufacturer's data sheets for approval, a minimum of two (2) weeks prior to the intended date of paint application. All paint substitutes must be approved in writing prior to use.
- B. Provide submittals as listed and/or enumerated in Division 1 of these specifications.

1.4 QUALITY ASSURANCE

- A. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of handrails and railings that are similar to those indicated for this Project in material, design, and extent.
- B. Source Limitations: Obtain each type of railing through one source from a single manufacturer.

1.5 STORAGE

- A. Store railings in a dry, well-ventilated, weathertight place.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify handrail and railing dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating handrails and railings without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION

- A. Coordinate installation of anchorages for handrails and railings. Furnish Setting Drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.8 SCHEDULING

- A. Schedule installation so handrails and railings are mounted only on completed walls. Do not support temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.0 SUSTAINABILITY REQUIREMENTS

- A. Minimum Recycled Content defined in Section "Sustainable Design Requirements".
 - 1. Steel Products: 25%.
- B. Regional Content defined in Section "Sustainable Design Requirements". Report Regional Content only. No minimum requirement.

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Custom Fabrication Inc. 2903 NY Route 7 P.O. Box 431 Harpursville, NY 13787 (215)922-4579.

2.2 METALS

- A. General: Provide metal free from pitting, seam marks, roller marks, stains, discolorations, and other imperfections where exposed to view on finished units.
1. Handrails, Railings and panels shall have galvanized and powdercoated steel components.
- B. Steel: Comply with the following requirements for each form required:
1. Steel Tubing: Cold-formed steel tubing, ASTM A500, Grade A, unless another grade is indicated or required by structural loads.
 2. Steel Rails and Bars: Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.
 3. Steel Plates, Channels, Shapes, and Bars: ASTM A 36/A 36M.
 4. Welded -Wire Mesh: lockcrimp weave square pattern 2" x 2" wire mesh made from .192 inch (4.9-mm) nominal diameter wire complying with ASTM A510M.
 5. Fasteners shall be Type 304 stainless steel and conform to ASTM A307.
- C. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.
1. Provide cast brackets with flange tapped for concealed anchorage to threaded hanger bolt.
 2. Provide formed or cast brackets with predrilled hole for exposed bolt anchorage.
 3. Provide formed steel brackets with predrilled hole for bolted anchorage and with snap-on cover that matches rail finish and conceals bracket base and bolt head.
 4. Provide brackets with interlocking pieces that conceal anchorage. Locate set screws on bottom of bracket.

2.3 MISCELLANEOUS MATERIALS

- A. FILLER METAL & ELECTRODES: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded or brazed and as required for color match, strength, corrosion resistance, and compatibility in fabricated items.
- B. GROUT: Grout for fence posts shall be non-shrink, cement-based grout such as Sonneborn 10K Grout as manufactured by ChemRex, Shakopee, MN or SikaGrout 212, as manufactured by Sika Corporation, Lyndhurst, NJ, or approved equal.
- C. SEALANT: Sealant around fence post shall be one-part polyurethane, elastomeric adhesive such as Sonneborn's Ultra Sealant, as manufactured by ChemRex, Shakopee, MN or Sikaflex-1a, as manufactured by Sika Corporation, Lyndhurst, NJ, or approved equal.

2.4 GALVANIZING:

- A. Galvanized Handrails and Railings: All components to be powdercoated shall be Galvanized. Hot-dip galvanize exterior steel and iron handrails and railings to comply with ASTM A 123. Hot-dip galvanize hardware for exterior steel and iron handrails and railings to comply with ASTM A 153/A 153M. Galvanized components to be let dry and cool naturally and shall not be "quenched"
- B. Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- C. For galvanized handrails and railings, provide galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

2.5 POWDER COATING:

- A. Handrails, Railings and panels shall receive corrosion resistant treatment followed by two step powder coating as follows:
- B. Corrosion Resistant Treatment: All fabrication and welding shall be completed prior to application of the corrosion resistant coating, metal pieces shall be cleaned of all weld spatter, mill scale, varnish, rust, grease, and the like and the surface mechanically or chemically prepared to receive the coating. This corrosion resistant coating shall be a multi-step iron phosphate bath coating process.
- C. Polyester Powder Coating shall be applied to the iron phosphate coated metal pieces in such a manner that the coating will not peel off. The manufacturer shall perform all processes required to achieve a smooth material bond. The surface coat shall be an electrostatically sprayed, lead-free, TGIC (triglycidyl isocyanurate) polyester powder coating applied to a minimum of 5 mil thickness (total) applied in two applications. Each powder application shall be oven cured at temperatures between 400- and 450-degrees Fahrenheit for a period of 20 minutes. The TGIC polyester powder coating shall be Secural by Spraylat, Mt. Vernon, NY; or Tiger Drylac Series 38 as manufactured by Tiger Drylac U.S.A., Reading, PA, or approved equal. Finished surfaces shall comply with ASTM Standard as follows:

D.	PHYSICAL PROPERTIES	TEST METHODS	ACCEPTANCE CRITERIA
	1. Adhesion cross hatching	D-3359B	5B (0% area removed)
	2. Flexibility conical mandrel	D-522	Pass 3/8" mandrel
	3. Pencil hardness	D-3363	Pencil hardness 2H minimum
	4. Impact resistance	D-2794	140-inch pounds minimum
	5. Overbake resistance-Adhesion	D-2454	5B
	6. Overbake resistance-Hardness	D-2454	Pencil hardness 2H minimum
	7. Overbake resistance-Direct Impact	D-2454	140-inch pounds minimum
	8. Humidity resistance-250 hours	D-4585	No visible change to surface
	9. Weatherability	D-822	No visible change to surface

2.6 PAINTING FENCE POSTS AND PANELS:

- A. If so, determined by the owner or the architect the handrails and railings shall receive three (3) coats of paint. The first coat shall be shop applied; the second and third coat shall be field applied. Im-

mediately prior to painting, all surfaces of fences and gates shall be thoroughly free of debris. All surfaces that are rust free shall be treated in accordance with SP-1, Solvent Cleaning. Treatment shall be performed with a solvent such as mineral spirits, xylol, or turpentine to remove all dirt, grease, and foreign matter. Surfaces that show evidence of scale and rust shall be cleaned in accordance with SP-2, Hand Tool Cleaning, a method generally confined to wire-brushing, sandpaper, hand scrapers, or hand impact tools or SP-3, Power Tool Cleaning, a method generally confined to power wire brushes, impact tools, power sanders, and grinders in order to achieve a sound substrate. After the fence and gates have been cleaned and prepared, they shall be painted as follows:

1. First Coat (Shop Applied): Sherwin Williams # E41N1 Metal Primer, Brown, as manufactured by Sherwin Williams Company, Woodside, NY, or approved equal. Primer is an alkyd oil, flat finish coating having a dry film thickness of 3 to 4 mils. Paint requires twenty-four (24) hours drying time before recoating. Performance shall meet or exceed the standards of Federal Specification TT-P-86H.
2. Second Coat (Field Applied): Sherwin Williams High Solids Alkyd Metal Primer, B50 Series, Reddish Brown, or approved equal. Primer is an alkyd low luster coating having a dry film thickness of 3-5 mils. Paint requires four (4) hours drying time before recoating (with alkyds)
3. Third Coat (Field Applied): Sherwin Williams Steel Master 9500 Silicone Alkyd # B56-300 Black or approved equal. Topcoat silicone alkyd high gloss coating having a dry film thickness of 2-4 mils. Paint requires sixteen (16) hours drying time @ 77 degrees F.
4. All paints shall be applied when ambient air temperature is forty-five (45) degrees F. and rising and when surfaces to be painted are moisture free. No painting will be allowed below the minimum ambient air temperature. In addition, no painting will be allowed below the temperature at which moisture will condense on surfaces. Refer to the Dew Point Chart in Section C, Article 16 to find the minimum allowed moisture free temperature.

2.7 FABRICATION

- A. Assemble handrails and railings in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- B. Form changes in direction of railing members as follows:
 1. As detailed.
- C. Welded Connections: Fabricate handrails and railings for connecting members by welding. Cope components at perpendicular and skew connections to provide close fit, or use fittings designed for this purpose. Weld connections continuously to comply with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove flux immediately.
 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

- D. Brackets, Flanges, Fittings, and Anchors: Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings, and anchors to connect handrail and railing members to other construction.
- E. Provide inserts and other anchorage devices to connect handrails and railings to concrete or masonry. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railings. Coordinate anchorage devices with supporting structure.
- F. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.
- G. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- H. Cut, reinforce, drill, and tap components, as indicated, to receive finish hardware, screws, and similar items.
- I. Provide weep holes or another means to drain entrapped water in hollow sections of railing members that are exposed to exterior or to moisture from condensation or other sources.
- J. Fabricate joints that will be exposed to weather in a watertight manner.
- K. Close exposed ends of railing members with prefabricated end fittings.
- L. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of railing and wall is 1/4 inch or less.

2.8 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

2.9 STEEL FINISHES

- A. For ungalvanized steel handrails and railings, provide ungalvanized ferrous metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.
- B. Preparation for Shop Priming: After galvanizing, thoroughly clean handrails and railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic-phosphate process.
- C. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed handrails and railings:
 - 1. Interiors (SSPC Zone 1A): SSPC-SP 7, "Brush-off Blast Cleaning."

- D. Apply shop primer to prepared surfaces of handrails and railings, unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
 - 1. Do not apply primer to galvanized surfaces.
 - 2. Stripe paint edges, corners, crevices, bolts, and welds.
- E. Painted Finish: Comply with Section 2.5 of this specification.

PART 3 - EXECUTION

3.0 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing handrails and railings. Set handrails and railings accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails so variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Adjust handrails and railings before anchoring to ensure alignment at abutting joints. Space posts at interval indicated, but not less than that required by structural loads.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing handrails and railings and for properly transferring loads to in-place construction.

3.1 ATTACHING HANDRAILS TO WALLS

- A. Attach handrails to wall with wall brackets. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface.
- B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets to building construction as follows:
 - 1. For solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.

3. For steel-framed gypsum board assemblies, fasten brackets directly to steel framing or concealed reinforcements using self-tapping screws of size and type required to support structural loads.

3.2 ANCHORING POSTS

- A. Anchor posts to metal surfaces with flanges, angle or floor type as required by conditions, connected to posts and to metal supporting members as follows:
 1. For steel railings, weld flanges to post and bolt to metal supporting members.
- B. Install removable railing sections, where indicated, in slip-fit metal sockets cast into concrete.

3.3 CLEANING

- A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 Section "Painting."
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.4 PROTECTION

- A. Protect finishes of handrails and railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at the time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit or provide new units.

END OF SECTION

SECTION 32 93 00
PLANTING, SEEDING and TOPSOIL

PART 1 - GENERAL

1.00 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division I specification sections, apply to this section.

1.02 SUMMARY

- A. Unless specifically excluded hereinafter under WORK OF OTHER SECTIONS, provide labor, materials, equipment, and services necessary and incidental to complete work described by this Section's title shown above. Work includes, but is not necessarily limited to:
1. Fine Grading.
 2. Landscape Contractor is responsible for amending and re-working all On-Site Topsoil and Planting Soil Backfill Mix required to complete the Landscape Development Work. The Earthwork & Drainage Contractor is responsible under this contract for obtaining any off-site topsoil, if needed, or disposing of excess topsoil unless otherwise directed by the Owner's Representative
Topsoil: Earthwork & Drainage Contractor to provide on site topsoil that is screened (without admixture of subsoil or slag and shall be free of stones, lumps, plants, roots, sticks, and extraneous matter.
 3. The Earthwork & Drainage Contractor shall provide screened topsoil meeting the requirements in section 2.01 of this Specification. The Contractor shall stockpile this topsoil within the project area at a location designated by the Owner and shall provide the Owner with measurements of the stockpile certified by a licensed surveyor to verify the quantity.
 4. Preparation of Planting Areas as required.
 5. Furnishing and installing all Plant Material.
 6. Furnishing and installing all Shredded Hardwood Bark Mulch.
 7. Independent Soil Testing for each area to be seeded (provide results to Owner/Landscape Architect before amending soil or proceeding with any seeding operations).
 8. Furnish and Hydroseed all Lawn Areas (as required).
 9. Furnish and Hydroseed all Upland Grass Areas (as required).
 10. Furnish and Hydroseed all Shaded Upland Grass Areas (as required).
 11. Rebuild pre-existing stacked stone wall (allowance per Bid Guide)
 11. Removal of excess soil after completion of Landscaping work from site.
 12. Maintenance of all Work until Final Acceptance.
 13. Clean up of Work Area as outlined in these specifications.
- B. Related sections include the following:
1. Division 31, "Site Demolition, Clearing and Preparation".
 2. Division 31, "Earthwork".

3. Division 31, "Erosion and Sediment Control".

1.03 QUALITY ASSURANCE:

A. Project Execution:

1. The Landscape Work shall be done by a single firm specializing in landscaping work.

B. Field Supervision:

1. Landscape Contractor shall maintain an experienced full-time supervisor on project site when Landscape installation is in progress.

C. Source Quality Control:

1. General: Ship landscape materials with certificates of inspection as required by governmental authorities. Comply with governing regulation applicable to landscape materials.
2. Do not make substitutions: If specified landscape material is not obtainable, submit to Landscape Architect proof of non-availability and proposal for use of equivalent material. When authorized, adjustment of Contract amount will be made.

Analysis and Standards: Package standard products with manufacturer's laboratory made in accordance with methods established by the certified analysis. For other materials, provide analysis by recognized Association of Official Agricultural Chemists, wherever applicable or as further specified.

3. Trees and Shrubs: Provide trees and shrubs grown in a recognized nursery in accordance with good horticultural practice. Provide healthy, vigorous stock grown under climatic conditions similar to conditions in the locality of the project and free of disease, insects, eggs, larvae, and defects such as knots, sunscald, injuries, abrasions or disfigurement.

Sizes: Provide trees and shrubs of the sizes shown as specified. Trees and shrubs of larger size may be used if acceptable to Landscape Architect, and if sizes of roots or balls are increased proportionately.

4. Inspection: The Landscape Architect reserves the right to inspect trees and shrubs either at place of growth or at site before planting, for compliance with requirements for name, variety, size and quality.

1.04 SUBMITTALS

- A. Certification: For information only, submit 2 copies of certificates of inspection as required by governmental authorities, and manufacturer's or vendor's certified analysis for soil amendments and fertilizer materials. Submit other data substantiating that materials comply with specified requirements.

- B. Schedule of Work: For information only, submit 3 copies of tentative schedule to Owner and/or Owner's Agent along with Landscape Architect. Contractor shall keep all parties above apprised of any changes so that the Owner's Agent is aware of scheduled work at least 24 hours prior to said work being started.
- C. Maintenance Instructions: Submit two copies of typewritten instructions recommending procedures to be established by the Owner for the maintenance of landscape work for one year. Submit prior to expiration of required maintenance period(s).

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at the site. Include the year of production and date of packaging.
- B. Plant Materials:
 - 1. Trees and Shrubs: Provide freshly dug trees and shrubs. Do not use trees or shrubs which have been in cold storage or heeled-in. Do not prune prior to delivery. Do not bend or bind-tie trees or shrubs in such manner as to damage bark, break branches or destroy natural shape. Provide protective covering during delivery.
 - 2. Deliver trees and shrubs after preparations for planting have been completed and plant immediately. If planting is delayed more than six hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist.
 - 3. Label at least one tree and one shrub of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name.
 - 4. Do not remove container-grown stock from containers until planting time.
 - 5. Contractor shall be responsible for the storage and maintenance of any and all plant material, which cannot be planted once it has been received by the Contractor. It is anticipated that this storage and maintenance will need to be done off site, since onsite space for plant storage will be very limited. Contractor shall provide the Landscape Architect with a detailed program for this storage and maintenance including but not limited to Mulching, Fertilizing, Irrigating, Wind Protection, etc.

1.06 JOB CONDITIONS

- A. Installer must examine the sub-grade, verify the elevations, observe the conditions under which work is to be performed, and notify the Landscape Architect of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

- B. Proceed with and complete the landscape work as rapidly as portions of the site become available, working within the seasonal limitations for each kind of landscape work required.
- C. Utilities: Determine location of underground utilities and perform work in a manner, which will avoid possible damage. Hand excavate, as required, to minimize possibility of damage to underground utilities. Maintain grade stakes set by others until removal is mutually agreed upon by all parties concerned.
- D. When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, immediately notify Landscape Architect and wait for approval before planting.

1.07 COORDINATION AND SCHEDULING

- A. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.
- B. No trees, shrubs or vines shall be planted when the ground is frozen or in excessively moist condition.
- C. Coordinate work with Landscape Architect to facilitate delivery and unloading of plant material.
- D. Coordinate work with preparation of planting areas, availability of approved soil analysis and recommendations for each area.
- E. Coordination with Lawns: Plant trees and shrubs after final grades are established and prior to planting of lawns, unless otherwise acceptable to the Landscape Architect. If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.

1.08 INSPECTION OF MATERIALS

- A. All materials shall be subject at any time and at any place to the inspection and approval of the Landscape Architect. Samples of any materials may be required by the Landscape Architect.

1.09 PROTECTION

- A. Protect existing trees, shrubs and other hardscape elements against damage including trespassing, and erosion.
- B. Protect all existing plant material in the area of this contract, whether inside or outside the contract limit line, against any damage, which in the opinion of the Landscape Architect will cause death or major retardation. Such material shall be replaced with same size and species by the Contractor at no additional cost should such damage occur.

1.10 PURCHASE ORDER

- A. One copy of all purchase orders and shipping bills, invoices, or memoranda of shipment of materials used in work under this division shall be furnished to the Landscape Architect upon request during or at completion of work.

1.11 FINAL INSPECTION

- A. Inspection of work will be made at the conclusion of work (at acceptance of the project). Submit written notice requesting final inspection at least 10 days prior to anticipated date.

1.12 MAINTENANCE

- A. Maintain lawns for not less than the period stated below, and longer as required to establish an acceptable lawn.
 - 1. Seeded and/or sodded lawns, 60 days from point of installation. If seeded in the Fall and not given full 60 days of maintenance, or if not considered acceptable at that time, continue maintenance the following Spring until acceptable lawn is established.
- B. Maintain lawns by watering, fertilizing, weeding, mowing, trimming and other operations such as rolling, re-grading, and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.
 - 1. Watering:
 - Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawn uniformly moist to a depth of 4" inches (100 mm).
 - a. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 - b. Water lawn at a minimum rate of 1" inch (25 mm) per week.
 - 2. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 40 percent of grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet.
- C. Maintain plant material by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease. Restore or replace damaged tree wrappings. Maintain plant material for the following period:

1. Maintenance Period: 12 months following Final Acceptance.
- D. Maintain plant material immediately after placement until plants are well established and exhibit a vigorous growing condition. Continue maintenance until termination of warranty period.
- E. Maintenance to include:
 1. Cultivation and weeding plant beds and tree pits.
 2. Irrigating sufficient to saturate root system.
 3. Pruning, including removal of dead or broken branches and treatment of pruned areas or other wounds.
 4. Neatly trimming plants when necessary.
 5. Disease and pest control.
 6. Maintaining guys and stakes. Repair or replace accessories when required.
 7. Replacement of mulch.
 8. Remove leaves from planting areas.
 9. Insure watering when rainfall is less than 1" per week and during periods of excessive heat. Shrubs will receive 3.5 gallons per plant and trees 7-10 gallons per inch of caliper per week or as directed by the Landscape Architect acceptance of the completed contract or at a minimum until the end of the Maintenance Season (end of November). Maintenance shall include watering, cultivating, control of insects, fungus, and other horticultural operations necessary for the proper growth of all plants.

1.13 TAGGING MATERIAL

- A. All trees shall be tagged at the nurseries while still in the ground prior to digging. The Contractor shall purchase landscape materials at nurseries within one hundred and fifty (150) miles from the project site allowing the landscape architect to travel to the nurseries to tag the trees. The contractor shall obtain the nurseries digging seasons schedule as soon as possible so tagging trips can be scheduled while the trees are still in the ground.
- B. Landscape Architect reserves the right to select and seal all plants in the field.
- C. No substitutions will be made unless authorized by the Landscape Architect.
- D. The Landscape Architect may reject any material which does not represent species as outlined in the Plant List.

1.14 GUARANTEE INSPECTIONS

Guarantee inspections shall take place after maintenance and guarantee period.

1.15 FINAL ACCEPTANCE

The work of this Section will be accepted upon the completion of all work of this Project including maintenance and guarantee.

1.16 GUARANTEE

- A. Guarantee all seeded areas through the specified maintenance period, and until final acceptance.
- B. Guarantee trees and shrubs, for a period of **ONE YEAR** after date of acceptance, against defects including death and unsatisfactory growth, except for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents which are beyond landscape installers control. Final decisions regarding replacement shall be made by the Landscape Architect. Contractor, if not maintaining the property during the two-year guarantee, shall be responsible for making monthly inspections and issuing written reports detailing any maintenance practices he observes which would in anyway negate his guarantee obligation. These written reports will be submitted to the parties designated by the owner.
- C. Remove and replace trees, shrubs, or other plants found to be dead or in unhealthy condition during guarantee period. Plant missing trees, shrubs, and plants. Make final replacements prior to or during growth season following end of guarantee period. Furnish and plant replacements, which comply with requirements shown and specified. Also, at request of Landscape Architect, replace trees and shrubs which are in doubtful condition at end of guarantee period.

PART 2 - PRODUCTS

2.01 SOIL

A. TOPSOIL

Topsoil for seeded and sodded areas shall be stripped natural topsoil as described below:

- 1. Stripped Topsoil: Topsoil shall be from on-site sources as treated and amended by the landscape contractor. It shall be without admixture of subsoil or slag and shall be free of stones, lumps, plants or their roots, sticks and extraneous matter, and shall not be moved, placed or used while in a frozen or muddy condition.

If approved, natural topsoil not having the hydrogen-ion value specified above may be amended by the contractor, at his own expense, to bring it within the specified limits. Topsoil shall meet the following mechanical analysis:

	<u>Passing %</u>
1" Screen	100%

1/2" Screen	97-100%
No. 4 Mesh Sieve	90-100%
No. 10	85-95%
No. 140	20-50%
No. 270	10-30%

Topsoil shall consist of natural mineral soil supplemented by the contractor with compost or other organic material or supplement intended to raise the percentage of organic matter or adjust the pH. Topsoil shall contain the required organic matter determined by loss, on ignition, of moisture-free samples dried in accordance with the current method of the Association of Agricultural Chemists. The organic content shall range from 5 - 15%. The acidity range shall be pH 5.0 to pH 7 inclusive. When necessary, limestone shall be added to the topsoil to reach the specified pH range.

2. Soil sample tests will be ordered by the Landscape Architect and shall be made by a state or commercial laboratory using methods approved by the Associates of Official Agricultural chemists or the State Agricultural Experiment Station (AgSource Laboratories or approved equal)

Such analysis will be paid for by the Landscape Contractor. Re-working of topsoil may be made after approval of the analysis by the Landscape Architect.

There shall be a minimum of 6" of topsoil (after settlement) in all landscaped areas.

Note: The Screened Topsoil shall adhere to the properties outlined in Section 2.01 "Topsoil".

2.02 SOIL AMENDMENTS (applied per soil test recommendations)

- A. Limestone: Limestone to be used at topsoil for all seeded areas.
- C. Compost: Organic Compost (sludge derived compost is not acceptable) with the texture and pH range suitable for the intended use.
- D. Fertilizer: Fertilizer to be used for all seeded areas.
- E. Organic Fertilizer and Soil Conditioner for Tree Pits: All trees and shrubs shall be treated with PHC Tree Saver which is a Mycorrhizal Fungal Transplant Inoculant. Apply in tree pits in rates indicated by manufacturer. PHC Tree Saver is manufactured by Plant Health Care, Inc., 440 William Pitt Way, Pittsburgh, Pennsylvania, 1-800-421-9051.
- F. Organic Fertilizer to be Spread Over Tree Pits Mulch: All mulch over tree pits shall receive organic slow release 8-4-4 fertilizer to prevent the decomposition process of robbing the soil form nitrogen. Fertilizer shall be Sustane 8-4-4 which is manufactured by Sustane Natural Fertilizer Inc. 310 Holiday Ave., P.O. 19, Cannon Falls, Minnesota 55009, 1-800-352-9245.

2.03 GRASS MATERIALS

- A. Seed for Lawn Areas: Provide fresh, clean, new crop seed complying with the tolerance for purity and germination established by the official seed Analysts of North America. Provide grass Mix as indicated below and provided by All Pro Horticultural 516-777-8668 or approved equal of the grass species, proportions and minimum percentages of purity, germination and maximum percentage of weed seed as specified. Seeding Rate to be ten (10) pounds per 1000 square feet.

Blend	Parts	Purity	Min % Germination
BLUEGRASS - One or more of the following varieties: Bluenote, Arrowhead, Volt, Bluechip Plus, Rugby	20%	98%	80%
PERENNIAL RYEGRASS - One or more of the following varieties: Stellar II, Topgun II Apple GLX, Revenge, Secretariat II	20%	98%	85%
TALL FESCUE - One or more of the following varieties: Spyder LS, Summer, Rhizing Star, Regenerate	60%	98%	85%

Total weed content shall not exceed .25% of total seed mixture.

- B. Other Seed Mixes. All seed mixes shall be supplied by All Pro Horticultural 516-777-8668 or by approved equal.

1. Upland Grass Mix

Avena sativa, Cereal Oats, 35% @ 40 lbs/acre
Schizachyrium scoparium (*Andropogon scoparius*), Little Bluestem, 30% @ 15
lbs/acre
Festuca brevipila, Hard Fescue, 28% @ 40 lbs/acre
Chamaecrista fasciculata (*Cassia f.*), Partridge Pea, 3% @ 10 lbs/acre
Rudbeckia hirta, Blackeyed Susan, 3% @ 10 lbs/acre
Penstemon digitalis, Tall White Beardtongue, 1% @ 3 lbs/acre

2. Basin Mix for Basin Area in Parking Lot Seeding rate: 5 lbs/1,000 SF

Panicum clandestinum (*Dichanthelium c.*), Deer Tongue, 30%
Poa palustris, Fowl Bluegras, 30%
Bromus ciliates, Fringed Brome, 20%

Carex scoparia, Blunt Broom Sedge, 14%

Juncus effuses, Soft Rush 2%

Ageratina altissima, White Snakeroot, 2%

Seaside Goldenrod (S), 2%

- C. Sod Quality Standards: Unless otherwise specified, all sod shall be nursery cultivated Sports Turf Bluegrass Blend Sod, well rooted, reasonably free from weeds and meeting the following minimum requirements:

1. Grown in accordance with The Department of Agriculture rules and regulations for "Certified Turfgrass Sod". Sod shall be free of quackgrass, annual bluegrass, bindweed, Canada thistle, wild garlic, wild onion, Muhlenbergia, bentgrass, bermuda grass, clover, common broadleaf weeds and plants of varieties other than those specified.
2. Sod shall be inspected in the nursery and approved by the OWNER prior to harvesting.
3. Blend: the seed blend will consist of the three following Hybrid Bluegrass varieties (blended by volume):

40% P-105

30% MIDNIGHT STAR

30% BRILLIANT

4. Substantiating Information: Submit grower's name, soil type where grown, thatch thickness, age, species, and blend of grass or field location from which sod is to be cut.
5. Thatch Layer: Not more than 3/16".
6. ALL SOD shall have been grown on a sand based SOIL MATCHING THE ANALYSIS as follows:

Particle Size Analysis

% Gravel	0.3%
% Sand	92.4%
% Silt	4.5%
% Clay	2.8%

Sand Sieve Size Analysis (ASTM F-1632)

Gravel	(>2mm)	0.3%
V. Coarse Sand	(2.0-1.0mm)	4.3%
Coarse Sand	(1.0-0.5mm)	25.9%
Medium Sand	(0.5-0.25mm)	42.3%
Fine Sand	(0.25-0.15mm)	15.1%
Very	(0.15-.010mm)	2.8%
Fine Sand	(0.10-0.05mm)	2.0%
Silt	(0.05-0.002mm)	4.5%
Clay	(<0.002mm)	2.8%

Acid Reaction	None	D15	D85
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Sphericity/Angularity medium sphericity/sub-rounded 0.16mm 0.74mm

Physical Properties (ASTM F -1815-97)

Bulk density g/cm3	Total porosity	Air-filled porosity at 30 cm	Capillary porosity at 30cm	Saturated Conductivity in/hr
				0.7
<u>(ASTM F-1647-97,Method A)</u>				
Particle density (g/cm3)		Organic matter percentage (LOI)		

7. Pre-Harvest Sod Maintenance: Maintain for a minimum of three (3) months at a maximum height of 2"; mow prior to harvesting and on same day as harvesting at a minimum height of 1-5/8 inches.
8. Sod shall be of a uniform color, density and thickness and of the species, variety (ies) and/or blend specified.
9. Dimensions of Sod: 42-48" contiguous width by 40-70' long of uniform thatch thickness and delivered in rolls. Split widths, voids, breaks, splits or partial rolls will not be accepted. Sod shall maintain the original cut size or original shape and dimensions throughout handling and installation.
10. Sod shall be delivered and placed within forty-eight (48) hours after being harvested.

2.04 HYDROSEEDING MATERIALS

A. Lawn Area Hydro-Seeding.

1. Stockosorb 660 water holding gel, as manufactured by Evonik,
3. Conwed 1000, 100% Wood Hydro Mulch
4. Tackifier 3, Tacking Agent as manufactured by Profile Products.
5. 19-26-5 Starter Fertilizer, as manufactured by The Andersons
6. Weed control shall be Tenacity, as manufactured by Syngenta

B. Upland Area & Shaded Upland Area Hydro-Seeding.

1. Upland Grass Mix & Shaded Upland Grass Mix, specification item # 2.03-B, to be manually sown under prior to hydro-mulching. Alternatively, the seed mixture may be Hydro-Seeded using no more than 300 Lbs of Hydro Mulch per Acre, serving as a visual marker without impeding seed-soil contact.
2. Hydro-Mulching over the top of the sown seed.
 - a. Hydro mulch shall be a combination of Flexterra, as manufactured by Profile Products and of Conwed 1000 Wood Mulch Such that each Hydro-Seeder load contains equal portions of both mulches.
 - b. Stockosorb 660 water holding gel, as manufactured by Evonik.
 - c. Tackifier 3, Tacking Agent as manufactured by Profile Products.
 - c. 19-26-5 Starter Fertilizer, as manufactured by The Andersons.

2.05 PLANT MATERIALS

- A. Name and Variety: Provide plant materials true to name and variety established by the American Joint Committee on Horticultural Nomenclature "Standardized Plant Names," Second Edition, 1942.
- B. Quality: Provide trees, shrubs and other plants complying with the recommendations and requirements of ANSI Z60.1 "Standard for Nursery Stock" and as further specified.
- C. Deciduous Trees: Provide trees of height and caliper listed in contract drawings. Provide single stem trees except where special forms are shown or listed.
 - 1. Provide balled and burlapped (B&B) deciduous trees.
 - 2. Container grown deciduous trees will be acceptable in lieu of balled and burlapped deciduous trees subject to specified limitations of ANSI Z60.1 for container stock.
- D. Deciduous Shrubs: Provide shrubs of the height shown or listed and with not less than the minimum number of canes required by ANSI 260.1 for the type and height of shrub required.
 - 1. Provide balled and burlapped (B&B), bare root (B.R.) or container deciduous shrubs as specified in plant list.
 - 2. Container grown deciduous shrubs will be acceptable in lieu of balled and burlapped deciduous shrubs subject to the specified limitations for container grown stock.

2.06 MISCELLANEOUS LANDSCAPE MATERIALS

- A. Mulch:
 - 1. Mulch around tree Pits: Shredded Hardwood Bark Mulch shall be a natural forest product composed of shredded bark or wood not exceeding three inches (3") in length and one inch (1") in width. Mulch shall be derived from tree material, not from wood waste or by-products like sawdust, shredded palettes, or other debris. Mulch shall be natural in color and not dyed. It shall be of a uniform grade with no additives or any other treatment. Mulch with leaves, twigs, and/or debris shall not be acceptable. The pH factor should range from 5.8 to 6.2. Mulch shall be free from any extraneous materials, and shall be spread to a 4" depth minimum (after settlement).
- B. Deer Tree Protector: Provide and install deer protection tubes clamped to a stake at each tree sapling. Protector shall be 48" tall Miracle Tube as manufactured by Tree Pro (800)875-8071.
- C. Tree Guying:
 - 1. Guy Cable: 5-strand, $\frac{3}{16}$ inch (4.8mm) diameter, galvanized steel cable, with three (3) $\frac{3}{8}$ "x6" galvanized turnbuckle, with epoxy anchoring system.
 - 2. Anchor: three (3) $\frac{3}{8}$ inch (10 mm) galvanized eyebolts.
 - 3. Cable Cover: PVC, brightly colored.
 - 4. Nylon Tree Strap: 1"x18" long with grommets to receive cable. As supplied by: GCS Inc., North Wales, PA or approved equivalent.

- D. Trunk-Wrap: Two layers of burlap wrapped and tied around all tree trunks of 2"–2½" caliper trees for protection from deer antlers rubbing.

PART 3 - EXECUTION

3.01 PREPARATION OF PLANTING SOIL

- A. Amended screened Topsoil shall be further amended by the Landscape Contractor as outlined in "B" below.
- B. Mix amended Topsoil to include the following:
1. For Trees, Shrubs and all Ground covers (herbaceous and coniferous): Compost at three part topsoil to one part compost.
 2. For Trees and Shrubs: PHC Tree Saver Organic fertilizer/soil conditioner, shall be applied as follows:

<u>Plant Size</u>	<u>Ounce Rate</u>	<u>Tree Saver packet Rate</u>
1 Gallon	1	1/3
2 Gallon	2	2/3
3 to 7 Gallons	3	1
7 to 15 Gallons	3	1
20 to 30 Gallons	6	2
24" Ball/Box	6	2
36" Ball/Box	9	3
48" Ball/Box	12	4

3.02 GENERAL PREPARATION

- A. Layout individual tree and shrub locations and areas for multiple plantings. Stake locations and outline areas and secure Landscape Architect's acceptance before start of planting work. Make minor adjustments as may be requested and/or dictated by field conditions.

3.03 EXCAVATION FOR TREES AND SHRUBS

- A. Excavate pits, beds, and trenches, with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage. Loosen hard subsoil in bottom of excavation.
- B. For balled and burlapped (B&B) trees and shrubs, make excavations at least the equivalent of two and a half times as wide as the ball radius and equal to the ball depth, plus the following allowance for setting of ball on a layer of compacted backfill: Allow for 6" setting layer of planting soil mixture. If ball depth is less than depth of excavation, use ¾" clean gravel with a soil separator on top to make up the difference.

- C. For container grown stock, excavate as specified for balled and burlapped stock, adjusted to size of container width and depth.
- D. Fill excavations for trees and shrubs with water and allow to percolate out before planting. If no percolation or poor percolation is evidenced, Drill 12" diameter vertical drains 6' deep minimum or until a free draining material is encountered. Fill vertical drains with ¾" clean gravel and cover with a soil separator or provide drainage as per plans for various locations.

3.04 PLANTING

A. Planting Trees and Shrubs

1. Set balled and burlapped (B&B) stock on layer of compacted planting soil mixture, plumb and in center of pit or trench with top of ball at same elevation as adjacent finished landscape grades.

Apply the solution to the excavated planting hole at the rate of 5 gallons per inch of caliper for trees and 3 gallons for 12" of root ball for shrubs. Subsequently place plant in planting hole and drench plant ball with "Terra-Wet". After "Terra-Wet" application place backfill around base and sides of ball and work each layer to settle backfill and eliminate voids and air pockets.

During the placement of backfill place PHC Tree Saver at quantities specified and as per manufacturer's recommendations. Spread granules about 6" below top of root ball and cover with compost and topsoil mix.

When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill. Remove collar ropes only. Retain burlap on balls.

2. Set bare root stock on cushion of planting soil mixture. Spread roots, apply "Terra-Wet" to root mass by spraying. Then carefully work backfill around roots by hand and puddle with water until backfill layers are completely saturated. Plumb before backfilling and maintain plumb while working backfill around roots and placing layers above roots. Set collar 1" to 2" above adjacent finish landscape grades. Spread cut roots without tangling or turning up to surface. Cut injured roots clean, do not break.
3. Set container grown stock as specified for balled and burlapped stock, except cut cans on two sides with an approved can cutter; remove bottoms of wooden boxes after partial backfilling so as not to damage root balls.
4. Dish top of backfill to allow for mulching. For spring planting, provide additional backfill berm around edge of excavations to form shallow saucer to collect water. Note: Surface of all Shrub Beds shall be crowned or sloped as required to achieve a 3% minimum surface pitch and insure positive surface drainage.

5. Guy trees with no fewer than 3 guy cables, utilize nylon tree straps to protect tree trunk. Anchor guys to planter walls with eyebolts. Provide turnbuckles for each guy cable and tighten securely.
6. Wrap burlap around all trunks of size trees 2"-2 1/2" caliper for deer antlers rubbing protection. Tie burlap around entire length of tree trunks to height of branching
7. Mulch pits, trenches, planted areas, and existing trees to remain (not including woodland trees). Provide not less than the following thickness of mulch and work into top of backfill and finish level with adjacent finish grades. Provide 4" depth minimum (after settlement).
8. Install Tree Pro tree protector for all saplings. Sleeve protector around trunk clump provided plastic clamps to stake and stake firmly into the ground next to sapling.
9. Prune, thin out and shape trees and shrubs in accordance with standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by the Landscape Architect, do not cut tree leaders, and remove only injured or dead branches from flowering trees, if any. Prune shrubs to retain natural character and accomplish their use in the landscape design. Required shrub sizes are the size after pruning.
10. Remove and replace excessively pruned or misformed stock resulting from improper pruning.

C. Preparation for Seeded Areas

1. Earthwork & Drainage Contractor shall be responsible for subgrade. Landscape Contractor shall be responsible for accepting or rejecting this grade prior to starting his work. Commencing Landscape operations constitutes acceptance of subgrade. Loosen subgrade of lawn areas to a minimum depth of 4". Remove stones over 1" in any dimension and sticks, roots, rubbish and other extraneous matter.

Limit preparation to areas, which will be planted promptly after preparation. Place a minimum of 4" inches of un-amended topsoil over prepared grade and again remove stones and other extraneous matter as described above. See site drawings for information on subgrade in various areas.
2. Spread topsoil to minimum depth required to meet lines, grades and elevations shown, after light rolling and natural settlement (4" after settlement). Place approximately 1/2 of total amount of topsoil required. Work into top of loosened subgrade to create a transition layer and then place remains of topsoil. Add specified soil amendments (as per Section 3.01 of this specification) and mix thoroughly into the upper 4 inches of topsoil.

3. Where final grades are not indicated, finish grades shall be of uniform level or slope between points for which elevations are given or from such points to existing grades, except that tops and bottoms of banks shall be rounded. Subgrade elevations shall be understood to be the specified depth below finished grades.
4. Swales, where shown, shall not be considered narrow gutters or trenches. They shall be of definite or uniform lawn surface without sharp breaks in grade. The soil of the subgrades is to be made loose and friable to a depth of four inches.
5. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before seeding. Do not create a muddy soil condition.
6. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

D. Hydro-seeding for Lawn, Upland and Shaded Upland Grass Mixes

Type I. Lawn Area Hydro-Seeding

1. Lawn Area Mix shall be applied at 10 Lbs per 1,000 SqFt.
2. Stockosorb 660 water holding gel, as manufactured by Evonik, applied at 10 Lbs per Acre.
3. Conwed 1000, 100% Wood Hydro Mulch, shall be applied at 2,500 Lbs per Acre.
4. Tackifier 3, Tacking Agent as manufactured by Profile Products, applied at 72 Lbs per Acre.
5. 19-26-5 Starter Fertilizer, as manufactured by The Andersons, applied at 200 Lbs per Acre.
6. Tenacity, as manufactured by Syngenta, applied at 5oz per Acre for weed control.

Type II. Upland Area & Shaded Upland Area Hydro-Seeding

3. Upland Grass Mix & Shaded Upland Grass Mix, specification item # 2.03-C, to be manually sown under prior to hydro-mulching. Alternatively, the seed mixture may be Hydro-Seeded using no more than 300 Lbs of Hydro Mulch per Acre, serving as a visual marker without impeding seed-soil contact.
4. Hydro-Mulching over the top of the sown seed.
 - a. Hydro mulch shall be a combination of 1,250 Lbs of Flexterra, as manufactured by Profile Products, per Acre and 1,250 Lbs of Conwed 1000 Wood Mulch per Acre. Such that each Hydro-Seeder load contains equal portions of both mulches.
 - b. Stockosorb 660 water holding gel, as manufactured by Evonik, applied at 10 Lbs per Acre.

- c. Tackifier 3, Tacking Agent as manufactured by Profile Products, applied at 72 Lbs per Acre.
- d. 19-26-5 Starter Fertilizer, as manufactured by The Andersons, applied at 100 Lbs per Acre.

3.05 CLEANUP AND PROTECTION

- A. During landscape work, store materials and equipment where directed. Keep pavements clean and work area in an orderly condition.
- B. Protect landscape work and material from damage due to landscape operations, operations by other Contractors and trades and trespassers. Maintain protection during installations and maintenance periods. Treat, repair or replace damaged landscape work as directed. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after Landscape is established.

3.06 MAINTENANCE INSTRUCTIONS

- A. Begin maintenance immediately after planting. Maintain trees, shrubs, and other plants until end of Maintenance Season (end of November), but in no case less than 60 days after planting.
- B. Maintain trees, shrubs and other plants by pruning, cultivating, and weeding as required for healthy growth. Restore planting saucers. Reset trees and shrubs to proper grades or vertical position as required. Spray as required to keep trees and shrubs free of insects and disease.
- C. Maintain lawns for not less than the period stated below, and longer as required to establish an acceptable lawn.
 - 1. Seeded lawns, until end of Maintenance Season at end of November (But Not Less Than 60 Days). If seeded in fall continue maintenance the following spring until acceptable lawn is established.
- D. Maintain lawns by watering, fertilizing, weeding, mowing, trimming and other operations such as rolling, regrading, and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare area, all to the acceptance of the Landscape Architect.
- E. Submit two copies of typewritten instructions recommending procedures to be established by the Owner for the maintenance of landscape work for one full year. Based on the outline contained herein.

3.07 INSPECTION & ACCEPTANCE

- A. When the landscape work is completed, including maintenance, the Landscape Architect will, upon request, make an inspection to determine acceptability. The landscape work may be inspected for acceptance in parts agreeable to the Landscape Architect, provided the work offered for inspection is complete, including maintenance, and that the area comprises a complete unit or area of substantial size.
- B. Where inspected landscape work does not comply with the requirements replace rejected work and continue specified maintenance until re-inspected by the Landscape Architect and found to be acceptable. Remove rejected plants and material promptly from the project site.

END OF SECTION

SECTION 33 13 53
SEPTIC SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Septic Tank
 - 2. Pump Pit
 - 3. Effluent Pumps
 - 4. Pipe and fittings
 - 5. Absorption Trenches
 - 6. Distribution Boxes
- B. Related Sections include other Division 33 Sections.

1.3 DEFINITIONS

- A. SSTs: Subsurface sewage treatment system.
- B. PE: Polyethylene plastic.
- C. PVC: Polyvinyl chloride plastic.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Effluent Pumps and floats
 - 2. Forcemain piping
 - 3. Gravity pipe
 - 4. Perforated pipe
- B. Shop Drawings: Include manhole openings, covers, pipe connections, and accessories for the following precast concrete structures:
 - 1. Septic tank.

2. Pump Pit.
 3. Distribution boxes.
- C. Coordination Drawings: Show piping, underground structures, and other utilities. Indicate size and invert elevations of piping and structures.
- D. Operation and Maintenance Data: For effluent pumps, include emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of septic system and are based on the specific system indicated.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 SEPTIC TANK

- A. Precast Concrete Septic Tank: ASTM C 1227, two-chamber, precast, reinforced-concrete tank and covers.
1. Design: For A-16 (HS20-44) traffic loading according to ASTM C 890.
 2. Manholes: 30" minimum diameter opening with reinforced-concrete risers to grade and access lid with steel lift rings. Include manhole over the inlet and outlet pipe of each septic tank compartment top.
 3. Inlet and Outlet Access: 30-inch minimum diameter, reinforced-concrete access lids with steel lift rings. Include access centered over inlet and outlet.
 4. Resilient Connectors: Of size required for piping, fitted into inlet and outlet openings.
- B. Capacity and Characteristics:

1. Capacities: 1,000 and 6,000 gallons
2. Inlet and Outlet Size: 4" NPS

2.3 PUMP PIT

- A. Precast concrete pump pit: One-Chamber, precast, reinforced concrete tank and covers.
1. Design: For A-16 (HS20-44) traffic loading according to ASTM C 890.
 2. Inlet and Outlet Access: 30-inch minimum diameter, reinforced-concrete access lids with steel lift rings. Include access centered over inlet and outlet.
 3. Resilient Connectors: Of size required for piping, fitted into inlet and outlet openings.
- B. Capacity and Characteristics:
1. Capacity: 2,500 gallons
 2. Inlet and Outlet Size: 4" NPS inlet, two 2" NPS outlets

2.4 GREASE TRAP

- A. Precast Concrete Septic Tank: ASTM C 1227, one-chamber, precast, reinforced-concrete tank and covers.
1. Design: For A-16 (HS20-44) traffic loading according to ASTM C 890.
 2. Manholes: 24" minimum diameter opening with reinforced-concrete risers to grade and access lid with steel lift rings. Include manhole over the inlet and outlet pipe of each tank compartment top.
 3. Inlet and Outlet Access: 24-inch minimum diameter, reinforced-concrete access lids with steel lift rings. Include access centered over inlet and outlet.
 4. Resilient Connectors: Of size required for piping, fitted into inlet and outlet openings.
- B. Capacity and Characteristics:
1. Capacities: 1,000 gallons
 2. Inlet and Outlet Size: 4" NPS

2.5 EFFLUENT PUMPS

- A. Description: Single-stage, centrifugal, end-suction, submersible, sewage grinder pump direct-connected effluent pump complying with UL 778 and with HI 1.1-1.2 and HI 1.3 for submersible sewage pumps.
1. Manufacturers:
 - a. Goulds Model #3885 WE2OH; or approved equal.

2. Pumps: Duplex arrangement.
 - a. Casing: Cast iron, with open inlet and legs or base that elevate pump to permit flow into impeller, and discharge companion flange arranged for vertical discharge.
 - b. Impeller: Stainless steel; semiopen design and secured to shaft.
 - c. Pump and Motor Shaft: Stainless steel, with factory-sealed, grease-lubricated ball bearings and mechanical seals.
 3. General requirements for motors:
 - a. Motors: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor waterproof power cable of length required, with grounding plug and cable-sealing assembly for connection at pump.
 - b. Cable: Waterproof cable of length required, with cable-sealing assembly for connection at pump.
 - c. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
 4. Pump Discharge Piping: PVC SDR 21 with schedule 80 fittings with glued joints.
- B. Capacity and Characteristics:
1. Each Pump:
 - a. Capacity: 30-33 GPM
 - b. Total Dynamic Head: 95-98 FEET
 - c. Motor Horsepower: 2.0 HP
 2. Contractor shall install 2 pumps and supply a third pump as a spare (3 total.)

2.6 DISTRIBUTION BOXES

- A. Description: Precast concrete, single-chamber box and cover.
1. Design: Made according to ASTM C 913, and for A-16 (HS20-44) traffic loading according to ASTM C 890.
 2. Manholes: 28" minimum diameter opening cover with steel lift rings in center of distribution box.
 3. Pipe Connections: Resilient adjustable connectors, of size required for piping, fitted into inlet and outlet openings. Include watertight plugs in outlets not required.
- B. Capacity and Characteristics:
1. Type: Precast concrete distribution box.
 2. Inlet Size: 4" NPS.

3. Number of Outlets: Fourteen.
4. Outlet Size: 4" NPS.

2.7 DISTRIBUTION PIPES AND FITTINGS

- A. To be used from septic tank to pump pit.
- B. Pipe: ASTM D 1785, SDR 38 PVC, with plain ends for solvent-cemented joints.
- C. Fittings: ASTM D 2466, SDR 38 PVC, socket type.

2.8 SEWER FORCEMAIN PIPE AND FITTINGS:

- A. Sewer Forcemain Pipe and Fittings: PVC SDR 21, complying with ASTM D-1784 and D-2241 pipe and matching PVC schedule 80 fittings, for solvent weld (Glued) joints, ASTM D-1784 and D-2241.

2.9 LEACHING PIPES AND FITTINGS

- A. Pipe: PE, complying with ASTM F 810, perforated for absorption trenches, non-perforated from distribution boxes to absorption trenches.
 1. Fittings: ASTM D 2729 PVC for loose joints.

2.10 ABSORPTION-TRENCH MATERIALS

- A. Filtering Material: 3/4 to 1-1/2 inches washed gravel or clean, dust free crushed stone.
- B. Filter Mat: Geotextile woven or spun filter fabric, in 1 or more layers, for minimum total unit weight of 3 oz./sq. yd.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements and other conditions affecting performance of septic systems.
- B. Verify compatibility with and suitability of soil structure and materials.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EARTHWORK

- A. Excavating, trenching, and backfilling for piping are specified in Division 33 Section "Site/Utility Earthwork."
 - 1. Stockpile topsoil for reuse in finish grading without intermixing with other excavated material. Stockpile materials away from edge of excavation and do not store within drip line of remaining trees.
 - 2. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
- B. Excavating and Backfilling for Septic Tank, pump pit and sewer forcemain cleanout manholes:
 - 1. Excavate sufficient width and length to depth determined by inlet elevation. Provide level bottom.
 - 2. Backfill with excavated soil, mounding soil above original grade without compacting.
- C. Excavating and Backfilling for Absorption Trenches:
 - 1. Excavate for absorption trenches 24 inches wide and 24 inches deep, minimum.
 - 2. Backfill trench absorption fields with excavated soil, mounding soil above original grade without compacting.

3.3 SEPTIC TANK INSTALLATION

- A. Install precast concrete septic tank level according to ASTM C 891.
- B. Make direct connections to pump pit piping.
- C. Fill septic tank with water.

3.4 PUMP PIT INSTALLATION

- A. Install pump pit level.
- B. Set submersible effluent pumps on pump pit floor. Make direct connections to distribution piping.

3.5 DISTRIBUTION BOX INSTALLATION

- A. Install precast concrete distribution boxes according to ASTM C 891 and at invert elevations indicated. Set level and plumb.

3.6 PIPING INSTALLATION

- A. Install distribution piping according to the following:
 - 1. PVC Sewer Pipe and Fittings: ASTM D 2321.
- B. Install leaching piping according to the following:
 - 1. Use perforated pipe and fittings for trench absorption fields with perforations at bottom.
 - 2. PE Sewer Pipe: ASTM F 481.
 - 3. PVC Sewer Pipe and Fittings: ASTM F 481.

3.7 PIPE JOINT CONSTRUCTION

- A. Basic piping joint construction: Where specific joint construction is not indicated, follow piping manufacturer's written instructions.
- B. Join distribution piping according to or with the following:
 - 1. PVC Sewer Pipe and Fittings: ASTM F 402 and ASTM D 2855 for solvent-cemented joints, or ASTM D 3212 and ASTM D 3034 for gasketed joints.
- C. Join leaching piping with or according to the following:
 - 1. Install leaching pipe and fittings for absorption trenches with closed joints, unless otherwise indicated.
 - 2. PE Sewer Pipe: With PVC socket fittings and loose joints, with ABS gasketed fittings according to ASTM D 2751, or with PVC gasketed fittings and gasketed joints according to ASTM D 3034.
- D. Join dissimilar pipe materials according to ASTM D 5926, with couplings and gaskets compatible with pipe materials being joined.

3.8 ABSORPTION TRENCHES INSTALLATION

- A. Filtering Material: Place supporting layer of filtering material over the trench base to a compacted depth not less than 6 inches below bottom of pipe.
- B. Refer to Part 3 "Piping Installation" and "Pipe Joint Construction" articles for specific piping material installation.
- C. Install distribution piping at minimum slope of 1 percent.
- D. Install leaching piping solidly bedded in filtering material, with full bearing for each pipe section throughout its length. Maintain pipe alignment and install pipe level (no slope).

1. Install perforated pipe with perforations down and joints tightly closed. Install collars and couplings as required.
 2. Install elbow fittings with tight joints.
 3. Place additional filtering material around sides to a minimum compacted depth of 2 inches above the top of leaching piping.
- D. Install filter mat over filter material before backfilling.
- E. Backfill according to Division 31 "Earthwork Moving" Article.

3.9 IDENTIFICATION

- A. Identification materials and their installation are specified in Division 31. Arrange for installation of green detectable warning tape directly over sewer forcemain piping.

3.10 CONNECTIONS

- A. Piping installation requirements are specified in other Division 33 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Ground effluent pumps according to applicable regulations.
- C. Connect wiring: Pump and control wiring shall be run from the pump pit to the adjacent above ground junction box/disconnect switch provided by the Electrical Contractor. All connections at the junction box/disconnect switch shall be made by the Electrical Contractor.

3.11 FIELD QUALITY CONTROL

- A. System Tests: Perform testing of completed septic system piping and structures according to authorities having jurisdiction.
- B. Additional Tests: Fill septic tank and pump pit with water and let stand overnight. If water level recedes, locate and repair leaks and retest. Repeat tests and repair until no leaks exist.
- C. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not put into service before inspection and approval.
 2. Test completed piping systems according to authorities having jurisdiction.
 3. Schedule tests and inspections by Engineer with at least 48 hours' advance notice.
 4. Submit separate reports for each test.
 5. Forcemain: Testing of the PVC forcemain shall be a hydrostatic test for a minimum of 60 minutes, at a minimum pressure of 50 psi at the pump pit. The allowable leakage is 0.5 gallons per 1,000 L.F. of pipe for any 30 minute period.

6. Leaks and loss in test pressure constitute defects that must be repaired.
 7. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.
- D. The pump system shall be tested once all other septic tank and SSTs components have been tested.
1. After the contractor has stated to the engineer that the installation is complete and ready for continuous operation, the contractor shall conduct a running test of the pumps and controls in the presence of the Engineer to demonstrate proper operating condition.
 2. All equipment and controls will be re-tested, adjusted, modified and/or replaced; and re-tested as often as necessary to meet the specified requirements to the satisfaction of the Engineer.

3.12 CLEANING

- A. Clear interior of piping and structures of dirt and other superfluous material as work progresses.
- B. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of workday or when work stops.

END OF SECTION 33 13 53

SECTION 33 30 00
SANITARY SEWERAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, Division 01 General Requirements, Section 31 20 00 Earthwork, Section 31 23 33 Trenching and Backfilling, and Section 31 50 00 Excavation Support and Protection.

1.2 SUMMARY

- A. This Section includes sanitary sewerage outside the building.

1.3 DEFINITIONS

- A. PE: Polyethylene plastic.
- B. PVC: Polyvinyl chloride plastic.

1.4 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Nonpressure-Piping Pressure Ratings: At least equal to system test pressure.
- B. Pressure rated pipe and fittings, 200 psi pressure rating.

1.5 SUBMITTALS

- A. Shop Drawings: Include plans, elevations, details, and attachments for the following:
 - 1. Precast concrete tanks and manholes, including cast iron frames and covers.
 - 2. Pipe and fittings.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Provide in accordance with Division 01 General Requirements.
- B. Do not store plastic structures, pipe, and fittings in direct sunlight.
- C. Protect pipe, pipe fittings, and seals from dirt and damage.
- D. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

1.7 PROJECT CONDITIONS

- A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.
- B. Locate existing structures and piping to be closed and abandoned.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Engineer not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Engineer's written permission.

PART 2 - PRODUCTS

2.1 PIPES AND FITTINGS

- A. PVC Sewer Pipe and Fittings: According to the following:
 - 1. PVC Sewer Pipe and Fittings, NPS 12 (DN375) and Smaller: ASTM D 3034, SDR-35, for solvent-cemented joints or gasketed joints.
 - a. Gaskets: ASTM F 477, elastomeric seals.
 - 2. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 2241, SDR 21, for solvent-cemented or gasketed joints.
 - a. Gaskets: ASTM F 477, elastomeric seals.
- B. Ductile-Iron Pipe and Fittings:
 - 1. Restrained joint pipe shall be ductile iron manufactured in accordance with the requirements of ANSI/AWWA C151/A21.51. Push-on joints for such pipe shall be in accordance with ANSI/AWWA C111/A21.11 "Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings". Pipe thickness shall be designed in accordance with ANSI/AWWA C150/A21.50 "Thickness Design of Ductile-Iron Pipe" Class 52.
 - 2. Restrained joint fittings and the restraining components shall be ductile iron in accordance with applicable requirements of ANSI/AWWA C110/A21.10 and/or C153/A21.53. Push-on joints for such fittings shall be in accordance with ANSI/AWWA C111/A21.11.

3. Restrained joint pipe and fittings shall be U.S. Pipe's Tyton Joint Pipe with Field Lok 350 gaskets or approved equal.
4. Cement mortar lining and seal coating for pipe and fittings shall be in accordance with ANSI/AWWA C104/A21.4 Asphaltic outside coating shall be in accordance with ANSI/AWWA C151/A21.51 for pipe and ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 for fittings.
5. Restrained push-on joints for pipe and fittings shall be designed for a water working pressure of 350 psi for sizes 4-inch through 24-inch.
6. Restrained push-on joint pipe and fittings shall be capable of being deflected after assembly.

2.2 SPECIAL PIPE COUPLINGS AND FITTINGS

- A. Sleeve-Type Pipe Couplings: ASTM C 1173, rubber or elastomeric sleeve and band assembly fabricated to mate with OD of pipes to be joined, for nonpressure joints.
 1. Sleeve Material for Plastic Pipe: ASTM F 477, elastomeric seal.
 2. Sleeve Material for Dissimilar Pipe: Compatible with pipe materials being joined.
 3. Bands: Stainless steel, at least one at each pipe insert.
- B. Pipe and Tube Fittings:
 1. Ductile-Iron, Flexible Expansion Joints: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Units have 2 gasketed ball-joint sections and 1 or more gasketed sleeve sections. Include 250-psig (1725-kPa) minimum working-pressure rating; epoxy, interior coating according to AWWA C550; length for offset and expansion indicated; and glands, rubber gaskets, and bolts and nuts according to AWWA C111.
 2. Ductile-Iron, Deflection Fittings: Compound coupling fitting with sleeve and flexing sections, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include 250-psig (1725-kPa) minimum working-pressure rating; cement- mortar lining or epoxy, interior coating according to AWWA C550; deflection of at least 20 degrees (0.34 radians); and glands, rubber gaskets, and bolts and nuts according to AWWA C111.
 3. Ductile-Iron Fittings for PVC Pipe: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type; push-on- or mechanical-joint type. Include dimensions matching PVC pipe, cement-mortar lining and seal coat according to AWWA C104, and rubber compression gaskets according to AWWA C111.
 4. Mechanical joint restraining glands shall be "megalug 2000 PV" as manufactured by Ebaa Iron Sales, Inc. or approved equal.

2.3 MANHOLES

- A. Normal-Traffic Precast Concrete Manholes: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.
1. Diameter: 48 inches (1200 mm) minimum, unless otherwise indicated. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
 2. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 5-inch (125-mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
 3. Riser Sections: 5-inch (125-mm) minimum thickness, and lengths to provide depth indicated.
 4. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 5. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
 6. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229- mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover.
 7. Steps: Fiberglass individual steps. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into base, riser, and top section sidewalls with steps at 12-inch (300-mm) intervals.
 8. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
 9. Shall be designed for H-20 loading.
- B. Manhole Frames and Covers: ASTM A -48, Class 35B, gray iron castings designed for heavy-duty service. Include 22 $\frac{3}{8}$ -inch ID by 6-inch (150-mm) riser with 4-inch (100-mm) minimum width flange, and 24-inch- diameter cover. Include indented top design with lettering "SEWER" cast into cover.

2.4 CONCRETE

- A. Portland Cement Design Mix: 4000 psi (27.6 MPa) minimum, with 0.45 maximum water- cementitious materials ratio.
1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 400), deformed steel.
- B. Structure Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi (27.6 MPa) minimum, with 0.45 maximum water- cementitious materials ratio. Include channels and benches in manholes.
1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved

channels with smooth, uniform radius and slope.

a. Invert Slope: 2 percent through manhole.

2. Benches: Concrete, sloped to drain into channel.

a. Slope: 4 percent.

C. Ballast and Pipe Supports: Portland cement design mix, 3000 psi (20.7 MPa) minimum, with

1. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
2. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 5-inch (125-mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
3. Riser Sections: 5-inch (125-mm) minimum thickness, and lengths to provide depth indicated.
4. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
5. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
6. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229- mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover.
7. Steps: Fiberglass individual steps. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into base, riser, and top section sidewalls with steps at 12-inch (300-mm) intervals.
8. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
9. Shall be designed for H-20 loading.

D. Manhole Frames and Covers: ASTM A -48, Class 35B, gray iron castings designed for heavy-duty service. Include 22 $\frac{3}{8}$ -inch ID by 6-inch (150-mm) riser with 4-inch (100-mm) minimum width flange, and 24-inch- diameter cover. Include indented top design with lettering "SEWER" cast into cover.

2.5 CONCRETE

A. Portland Cement Design Mix: 4000 psi (27.6 MPa) minimum, with 0.45 maximum water- cementitious materials ratio.

1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 400), deformed steel.

B. Structure Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-

cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - a. Invert Slope: 2 percent through manhole.
 2. Benches: Concrete, sloped to drain into channel.
 - a. Slope: 4 percent.
- C. Ballast and Pipe Supports: Portland cement design mix, 3000 psi (20.7 MPa) minimum, with 0.58 maximum water-cementitious materials ratio.
1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 400), deformed steel.

2.6 PROTECTIVE COATINGS

- A. Description: One-coat, coal-tar epoxy; 15-mil (0.38-mm) minimum thickness, unless otherwise indicated; factory or field applied to the following surfaces:
1. Concrete Manholes: On exterior surface.

2.7 CLEANOUTS

- A. PVC Cleanouts: PVC body with PVC threaded cap. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping. Cleanout to be encased in minimum 6" I.D. Valve box cover with "sewer" stamped on cover.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Section 31 20 00 Earth Moving and Section 31 23 33 Trenching and Backfilling.

3.2 IDENTIFICATION

- A. Materials and their installation are specified in Section 31 20 00 Earth Moving for installing green warning tape directly over piping buried 18" from finished grade.

3.3 PIPING APPLICATIONS

- A. General: Include watertight joints.

B. Gravity-Flow Piping: Use the following:

1. NPS 4, NPS 6 and NPS 8 (DN100 and DN200): PVC, SDR 35, sewer pipe and fittings; solvent- cemented joints; or gaskets and gasketed joints.

3.4 SPECIAL PIPE COUPLING AND FITTING APPLICATIONS

A. Special Pipe Couplings: Use where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.

1. Use the following pipe couplings for nonpressure applications:
 - a. Sleeve type to join piping, of same size, or with small difference in OD.
 - b. Increaser/reducer-pattern, sleeve type to join piping of different sizes.
2. Use the following pipe couplings for pressure applications:
 - a. Sleeve type solvent cement of same size.

B. Special Pipe Fittings: Use where indicated.

3.5 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewerage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- D. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.

3.6 PIPE JOINT CONSTRUCTION AND INSTALLATION

- A. General: Join and install pipe and fittings according to installations indicated.

- B. Hub-and-Spigot, Cast-Iron Soil Pipe and Fittings: With rubber gaskets according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook." Use gaskets that match class of pipe and fittings.
- C. DIP Piping, Gasketed Joints: Use joining materials according to ANSI/AWWA C111/A21.11. Construct joints with elastomeric seals and lubricant according to AWWA C600 or AWWA M41 and pipe manufacturer's written instructions.
- D. PVC Pressure Pipe and Fittings: Join and install according to AWWA M23.
- E. PVC Sewer Pipe and Fittings: As follows:
 - 1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
 - 2. Join profile sewer pipe fittings with gaskets according to ASTM D 2321 and manufacturer's written instructions.
 - 3. Install according to ASTM D 2321.
 - 4. Join pipe with solvent cement fittings according to ASTM D 2855.
- F. System Piping Joints: Make joints using system manufacturer's couplings, unless otherwise indicated.
- G. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

3.7 MANHOLE INSTALLATION

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Form continuous concrete channels and benches between inlets and outlet. Channels shall be Trowel finished with smooth surface, benches shall have a broom finish.
- C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3" above finished surface elsewhere, unless otherwise indicated.
- D. Install precast concrete manhole sections with gaskets according to ASTM C 891.

3.8 CLEANOUT INSTALLATION

- A. Set cleanout frames and covers flush with surrounding grade or as indicated on plans.
- B. Set cleanout frames and covers in pavement areas with tops flush with pavement surface.

3.9 TAP CONNECTIONS

- A. Make connections to existing piping and underground structures so finished Work complies as nearly as practical with requirements specified for new Work.
- B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch (150-mm) overlap, with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 3000 psi (20.7 MPa).
- C. Make branch connections from side into existing piping, NPS 4 to NPS 20 (DN100 to DN500). Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 3000 psi (20.7 MPa).
- D. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.10 FIELD QUALITY CONTROL

- A. Clear interior of piping and structures of dirt and superfluous material as work progresses.
 - 1. Place plug in end of incomplete piping at end of day and when work stops.
 - 2. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.
- B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (600 mm) of backfill is in place, and again at completion of Project.
 - 1. Submit separate reports for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 95 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Re-inspect and repeat procedure until results are satisfactory.

- C. Test new piping systems, and parts of existing systems that have been altered, extended, or re- paired, for leaks and defects.
 - 1. Do not put into service before inspection and approval.
 - 2. Test completed piping systems according to authorities having jurisdiction.
 - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 - 4. Submit separate reports for each test.
 - 5. Manholes and Sanitary Sewerage: Perform manhole vacuum testing in accordance with the latest revision of ASTM C1244-02. Perform low-pressure air testing of piping in accordance with the latest revision of ASTM F1417-92, Section 8.2.2, Time-Pressure Drop Method for a 0.5 psi drop.
 - 6. Sewer Forcemain: Perform pressure and leakage test hydrostatically. Each forcemain test shall be for a minimum of 2 hours and at a minimum test pressure of 1.5 times operation pressure or 50 psi, whichever is greater. Allowable leakage for each forcemain is 0.5 gallons per 1,000 feet for 30 minutes.

END OF SECTION 33 30 00

SECTION 33 41 00
STORM UTILITY DRAIN PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, Division 01 General Requirements, Section 31 20 00 Earthwork, Section 31 23 33 Trenching and Backfilling, and Section 31 50 00 Excavation Support and Protection.

1.2 SUMMARY

- A. This Section includes storm drainage as shown on the project drawings.

1.3 DEFINITIONS

- A. HDPE: High-Density Polyethylene plastic.
- B. PVC: Polyvinyl chloride plastic.

1.4 SUBMITTALS

- A. Shop Drawings: Include plans, elevations, details, and attachments for the following:
 - 1. Precast concrete inlets, catch basins, and other structures, including frames, covers, and grates.
 - 2. Drainage Piping.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Provide in accordance with Division 01 Requirements.
- B. Do not store plastic structures, pipe, and fittings in direct sunlight.
- C. Protect pipe, pipe fittings, and seals from dirt and damage.
- D. Handle precast concrete inlets and other structures according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

- A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.
- B. Locate existing structures and piping to be closed and abandoned.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe and fitting materials.

2.2 PIPES AND FITTINGS

- A. Corrugated PE Drainage Tubing and Fittings: AASHTO M 252, Type S, with smooth waterway for coupling joints.
 - 1. Soiltight Couplings: AASHTO M 252, corrugated, matching tube and fittings to form soiltight joints.
- B. Corrugated PE Pipe and Fittings: AASHTO M 294, Type S, with smooth waterway for coupling joints.
 - 1. Soiltight Couplings: AASHTO M 294, corrugated, matching pipe and fittings to form soiltight joints.
- C. PVC Type PSM Solid and Perforated Piping:
 - 1. Pipe: ASTM D 3034, SDR 35, PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
 - 2. Fittings: ASTM D 3034, PVC with bell ends
 - 3. Gaskets: ASTM F 477, elastomeric seals
 - 4. Perforations: ASTM F758 / AASHTO M278 Hole Pattern

2.3 STORMWATER INLETS

- A. Yard Drain Inlets: Made with horizontal gutter opening, of materials and dimensions according to the project drawings. Include heavy-duty frames and grates.
- B. Catch Basins: Made with vertical curb and horizontal gutter openings, of materials and dimensions according to project drawings. Include heavy-duty frames and grates.
- C. Drain Inlets: Made with horizontal gutter opening, of materials and dimensions according to the project drawings. Include heavy-duty frames and grates.

D. Frames and Grates: Dimensions, opening pattern, free area, and other attributes as indicated on the project drawings.

1. Material: ASTM A 536, Grade 60-40-18 minimum, ductile-iron casting.

2.4 CONCRETE

A. Portland Cement Design Mix: 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-cementitious ratio.

1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, (Grade 420) deformed steel.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 31 20 00 Earth Moving and Section 31 23 33 Trenching and Backfilling.

3.2 PIPING APPLICATIONS

A. General: Include watertight, silttight, or soiltight joints.

B. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to applications indicated.

C. Gravity-Flow Piping: Use the following:

1. NPS 4 and NPS 6 (DN100 and DN150): Corrugated PE drainage tubing and fittings, silttight couplings, and coupled joints.
2. NPS 8 to NPS 15 (DN200 to DN375): Corrugated PE drainage tubing and fittings, soiltight couplings, and coupled joints in NPS 8 and NPS 10 (DN200 and DN250). Use corrugated PE pipe and fittings, soiltight couplings, and coupled joints in NPS 12 and NPS 15 (DN300 and DN375).

3.3 SPECIAL PIPE COUPLING AND FITTING APPLICATIONS

- A. Special Pipe Couplings: Use where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.
 - 1. Use the following pipe couplings for nonpressure applications:
 - a. Sleeve type to join piping, of same size, or with small difference in OD.
 - b. Increaser/reducer-pattern, sleeve type to join piping of different sizes.

3.4 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- D. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Extend storm drainage piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.
- F. PE Pipe and Fittings: As follows:
 - 1. Join Pipe, tubing, and fittings with couplings for soiltight joints according to manufacturer's written instructions.
 - 2. Install according to ASTM D 2321 and manufacturer's written instructions.
 - 3. Install corrugated piping according to the Corrugated Polyethylene Pipe Association's "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings".
- G. System Piping Joints: Make joints using system manufacturer's couplings, unless otherwise indicated.
- H. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

3.5 STORMWATER INLET INSTALLATION

- A. Construct inlets to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.6 FIELD QUALITY CONTROL

- A. Clear interior of piping and structures of dirt and superfluous material as work progresses.
 - 1. Place plug in end of incomplete piping at end of day and when work stops.
 - 2. Flush piping between inlets and other structures to remove collected debris, if required by authorities having jurisdiction.
- B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (600 mm) of backfill is in place, and again at completion of Project.
 - 1. Submit separate reports for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Reinspect and repeat procedure until results are satisfactory.
- C. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 - 1. Do not enclose, cover, or put into service before inspection and approval.
 - 2. Test completed piping systems according to authorities having jurisdiction.
 - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 - 4. Submit separate reports for each test.

END OF SECTION 33 41 00

SECTION 34 41 13
TRAFFIC SIGNS

PART 1 GENERAL

1.01 SUBMITTALS

- A. Shop Drawings: Show shop drawings, not necessarily to scale, but sufficient enough in detail to show color, wording, lettering size and style, overall sign size, construction details and installation details for each type of sign.

PART 2 PRODUCTS

2.01 TRAFFIC SIGNS

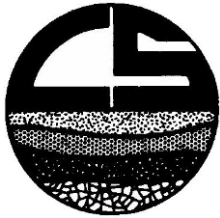
- A. Construction Materials: Comply with the applicable requirements of DOT Section 645.
- B. Posts: Galvanized steel.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Erect signs in their designated locations, as indicated and in accordance with the approved shop drawings and the applicable requirements of DOT Section 645.
- B. Protect surfaces and finishes from abrasion and other damage during handling and installation.
- C. Replace damaged or faulty signs.

END OF SECTION



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22 March 2022

Girl Scouts of Greater New York
40 Wall Street, Suite 708
New York, NY 10005

Attn: Ms. Melissa D'Andrea
Chief Program Officer

Re: Report on Subsurface Soil and Foundation Investigation
Proposed New Building and Septic System
Camp Kaufmann
Pawling, NY (CSA Job #20-147)

Dear Ms. D'Andrea:

In accordance with our revised proposal revised 5 November 2021 and your subsequent authorization, we have completed a Subsurface Soil and Foundation Investigation for the referenced site. The purpose of this study was to determine the nature and engineering properties of the subsurface soil and the groundwater conditions for the new construction, to recommend a practical foundation scheme, and to determine the allowable bearing capacity of the site soils. We understand that the planned construction will consist of a new building and septic system.

Our scope of work for this project included the following:

1. Reviewed the proposed layout, the existing site conditions, the expected soil conditions, and planned this study.
2. Observed the excavation of five test pits, performed by others in the area of the proposed construction.
3. Laid out the test pit locations in the field, visually identified the soil layers encountered, obtained soil samples, and prepared detailed test pit logs and a Test Pit Location Plan.
4. Tested select samples in our laboratory for soil identification analysis.
5. Analyzed the field data, laboratory data and prepared this report containing the results of this study.

1.0 SITE DESCRIPTION

The site is located at 117 Camp Road in Pawling, New York. The majority of proposed new dining building area is occupied by existing buildings. The remainder of the area is covered with landscape. Existing site grades within the proposed building area range from approximately +896.0 to +904.0 and slope upward from south to north.

2.0 PROPOSED CONSTRUCTION

We understand that the proposed construction will include a new dining hall building. The finished floor elevation and proposed site grades are unknown at this time. With a finished floor elevation of +899.0, minor cuts ranging up to 3 to 4 feet will be required to achieve the planned subgrade elevations. The following evaluation is based on information that has been provided to our office as of the date of this report. Once the project plans have been further developed, a copy of the plans should be forwarded to our office so that we can review them along with the recommendations in this report. At that time, any changes or additional recommendations can be provided, if required.

3.0 SUBSURFACE CONDITIONS

To determine the subsurface soil and groundwater conditions at the site, 5 test pits were advanced by others at the locations shown on the enclosed Test Pit Location Plan. The test pits were performed using a conventional backhoe excavator. Detailed test pit logs have been prepared and are included in this report. The test pits were completed in February 2022 under the full-time inspection of Carlin-Simpson & Associates. Our field engineer visually identified all of the soil samples obtained during the boring operations. Select soil samples were tested in our laboratory for soil identification. The results of the laboratory tests are included in this report.

3.1 Soils

The soil descriptions shown on the boring logs are based on the Burmister Classification System. In this system, the soil is divided into three components: Sand (S), Silt (\$), and Gravel (G). The major component is indicated in all capital letters, the lesser in lower case letters. The following modifiers indicate the quantity of each lesser component:

<u>Modifier</u>	<u>Quantity</u>
trace (t)	0 - 10%
little (l)	10% - 20%
some (s)	20% - 35%
and (a)	35% - 50%

The subsurface soil conditions encountered in the test borings at the site can be summarized as follows:

<u>Stratum 1</u> Topsoil	At the surface in all 5 test pits is topsoil that ranges from approximately 6 to 10 inches in thickness.
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<u>Stratum 2</u> Sandy Silt or Silty Sand with Gravel	Underlying the topsoil in each test pit is medium stiff brown SILT some (to and), coarse to fine Sand, trace coarse to fine Gravel with cobbles and boulders or medium dense brown coarse to fine Sand, some (to and) Silt, and coarse to fine Gravel with cobbles and boulders. This stratum extends to depths ranging from 2'0" to 8'6" below the existing ground surface.
<u>Stratum 3</u> Highly to Completely Weathered Gneiss	Beneath the sandy silt with gravel layer in test pit TP-1 is completely to highly weathered Gneiss bedrock. This layer is soil like in state, however there are denser pockets that likely cannot be conventionally excavated. The weathered shale was encountered at a depth of 7'6" below the existing ground surface in test pit TP-1. Test pit TP-1 was terminated in this stratum at a depth of 7'6" below existing ground surface.
<u>Stratum 4</u> Gneiss Bedrock	Below the sandy silt with gravel or silty sand with gravel in the remaining test pits is Gneiss bedrock. This bedrock was encountered at depth of 2'0" to 8'6" below existing ground surface elevation. Test pits TP-2 through TP-5 were terminated in this stratum upon bucket refusal on likely harder bedrock.

3.2 **Bedrock**

Based on our experience and the boring observations, the in-situ bedrock at the site will range from completely weathered in a soil-like state to moderately weathered, fair quality bedrock. The rock generally transitions into harder, more intact, bedrock with increasing depth. The completely weathered rock was encountered in TP-1 at a depth of 7'6" (approximate elevation +890.0) below the existing ground surface. Backhoe bucket refusal on harder bedrock was encountered at depths ranging from 2'0" to 8'6" below the existing ground surface (elevation +892.5 to +896.0). The bedrock observations are summarized in Table 1 below.

We anticipate that some of the foundation excavations will extend into completely to highly weathered rock. Penetration into the completely weathered rock with excavation equipment will depend on the degree of weathering and fracturing in the rock. The upper few feet of rock may be "rippable" by using large construction equipment, but we anticipate that the "rippability" of the bedrock will be variable and limited. It should not be assumed that the completely weathered rock (very dense material in a soil-like state) can be excavated with conventional equipment. Harder rock may be encountered in unexplored areas of the building footprint, and the use of hydraulic hammers may be required to excavate the harder bedrock. Additional issues related to foundations bearing on rock are discussed in Sections 5.2 of this report.

3.3 **Groundwater**

During the subsurface investigation, groundwater was not encountered above the bedrock surface in any of the test pits. However, perched or trapped groundwater may be encountered in the silty site soils or along the bedrock surface. Groundwater on the subject site will be controlled by the topography and the underlying bedrock surface. As surface water infiltrates the ground, the water will travel along the soil/rock interface and through fractures in the bedrock.

During construction, we expect that perched or trapped water may be encountered within the silty site soils and/or along the soil/rock interface, especially during wet periods. Proper groundwater

control measures will be required where water is encountered in the site excavations. Variations in the location of the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, and other factors not immediately apparent at the time of this exploration.

3.4 Summary of Test Pit Observations

A summary of the observations for the test pits performed at the referenced site are provided in Tables 1 below.

Table 1 – Boring Observation Summary

Boring No.	Approximate Ground Surface Elevation	Depth to Groundwater	Depth to Bedrock (Elevation)
TP-1	+897.5	NE to 7'6"	CWR @ 7'6" (+890.0)
TP-2	+900.0	NE to 4'0"	BR @ 4'0" (+896.0)
TP-3	+903.0	NE to 8'6"	BR @ 8'6" (+894.5)
TP-4	+898.0	NE to 5'6"	BR @ 5'6" (+892.5)
TP-5	+897.0	NE to 2'0"	BR @ 2'0" (+895.0)

NE – Not Encountered

BR – Bucket Refusal on Probable Bedrock, unrippable

CWR – Highly to Completely Weathered Rock, rippable

4.0 BUILDING EVALUATION

We understand that the proposed construction will include a new 13,320 square foot dining hall. Site grades in the area of the proposed dining hall range from approximately elevation +902.0 to +899.0. With a finished floor elevation of +899.0, minor cuts ranging up to 3 to 4 feet will be required to achieve the planned subgrade elevations. A summary of the boring observations are provided in Table 1 above.

The new building foundations may be designed as shallow spread footings bearing on the virgin soils, new compacted fill, completely weathered rock or bedrock. The building slab can be designed as a slab on grade bearing on densified site soils, new compacted fill or bedrock. Recommendations for preparation of the building area is provided in Section 5.1. Foundation design recommendations are provided in Section 5.2 and slab recommendations are provided in Section 5.3.

4.1 Building Area Preparation

In order to prepare the site for construction, all structures shall be demolished/removed and surface materials such as asphalt and topsoil shall be removed from the planned addition area, extending at least ten (10) feet beyond the new construction limits, where practical. All debris resulting from the demolition of these structures must be completely removed from the new addition area, extending at least ten (10) feet beyond the new addition limits, where practical. This shall include the complete removal of all foundations, walls, utilities, pavement, and miscellaneous debris.

Where the removal of existing structures or associated materials extends below the planned addition, the resulting excavations shall be backfilled with new compacted fill as described below.

Existing utilities, where they are encountered within the planned building area, should be either abandoned or rerouted around the new building. Once the utility has been rerouted or abandoned, the section of pipe and any associated structure within the building area should be completely removed. The removal of the pipe and structure must also include any loose fill around the pipe or structure. After the pipe, associated structure, and associated loose backfill have been removed, the resulting excavation shall be backfilled with new controlled fill as described below.

Handling Groundwater During Construction

Based on the proposed construction and the observed subsurface conditions, perched groundwater may be encountered during construction. Where perched/trapped groundwater is encountered, dewatering may be required to construct the foundations and to prepare the subgrade. The use of sump pits and pumps may be used to remove the water from the building area. The sump pits shall consist of a perforated pipe at least 8-inches in diameter, surrounded by crushed stone and filter fabric. The sump pits should be installed just outside the planned excavation area and at least two (2) feet below the anticipated bottom of the lowest excavation.

Handling Wet and Sensitive Subgrades

The bearing stratum for the proposed addition will consist of silty soils or bedrock. As discussed above, construction dewatering may be required to construct the foundations and to prepare the building subgrade. In the event that the exposed building subgrade at the bottom of the excavation is wet, stabilizing the subgrade soil with geotextile fabric and crushed stone may be required prior to the placement of new compacted fill. Carlin-Simpson & Associates will determine this during construction as the conditions are exposed. Where needed, the subgrade soil should be stabilized with geotextile fabric, such as Mirafi 500X or equivalent, and 3/4-inch clean crushed stone.

To prepare the subgrade surface for the geotextile fabric and crushed stone, all surface water, loose soil, mud, topsoil and organic material must be removed from the area. After the subgrade is prepared, a layer of geotextile fabric (Mirafi 500X or equivalent) shall be laid out on the subgrade surface. Adjacent layers of geotextile fabric should be overlapped a minimum of six (6) inches. The excavation shall then be filled with 12 to 18 inches of 3/4-inch clean crushed stone. The crushed stone shall be placed in maximum 12-inch layers and compacted by several passes of a small vibratory drum roller. The crushed stone shall provide a firm working surface, provide protection for the geotextile filter fabric, minimize pumping of the subgrade soil, and can be used to support the proposed floor slab.

Installation of New Structural Fill

New fill required to achieve final grades shall consist of either engineer-approved on-site soil or imported sand and gravel. Imported sand and gravel shall contain less than 20% by weight passing a No. 200 sieve. The new fill shall be placed in layers not exceeding one (1) foot in thickness and each layer shall be compacted to at least 95% of its Maximum Modified Dry Density (ASTM D1557). Each layer must be compacted, tested, and approved by the Carlin-Simpson & Associates field representative prior to placing subsequent layers. The suitability of the excavated soil for reuse as compacted structural fill is discussed in Section 5.3 below.

If imported structural fill will be required during construction, the imported structural fill shall meet the following specified gradation:

<u>US Standard Sieve Size</u>	<u>Percent Finer By Weight</u>
3 inch	100
No. 4	30-80
No. 40	10-50
No. 200	0-20

4.2 Building Foundations Recommendations

Once the planned building subgrade has been prepared as described Section 5.1 above, the new foundations may be constructed on the densified virgin site soils, engineering compacted fill, completely weathered bedrock or hard intact bedrock. The new building foundations may be designed as a shallow spread footing using a net design bearing pressure as listed in the Table 2 below.

Bedrock Special Construction Procedures

Where rock is encountered in the foundation excavations, “Special Construction Procedures” must be employed. When continuous wall footings or closely spaced column footings (20 feet or less) bear on dissimilar material (i.e. rock and soil) the potential for differential movement exists. A footing bearing in rock will not move, whereas a footing bearing on soil will settle slightly due to the compressive nature of all soils when subjected to new loads. The area between movement and non-movement will develop a (shear) stress point. Cracks in foundations and walls will be the result from such movement. Therefore, continuous wall footings must bear either entirely on rock or entirely on soil for any individual structure. Alternatively, for larger structures, transition zones can be constructed to create a gradual transition from a soil to a rock bearing subgrade.

Where rock and soil both exist at the bearing elevation in a foundation excavation, the footings must either be lowered to bear entirely on rock, or a minimum of 18 inches of rock must be removed from below planned footing bottom. The over-excavated 18 inches must then be filled with a granular material having a maximum particle size of 1/2-inch and containing at least 10% but not more than 30% material by weight passing a No. 200 sieve. The fill shall be placed in six (6) inch layers and each layer shall be compacted to at least 95% of its Maximum Modified Dry Density (ASTM D-1557). This procedure will create a “cushion” atop the rock and reduce the potential for differential movement. For soft, rippable rock, this procedure will not be required.

Adjacent column footings greater than 20 feet apart may bear on dissimilar material (i.e. soil and rock). Any individual column footing must bear entirely on the same type bearing material (i.e. all soil or all rock). In addition, new footings constructed on sloping bedrock must be keyed into the bedrock surface.

If during the excavation for continuous foundations, the transition from soil to rock is gradual (i.e. from medium dense soil to dense weathered rock to very dense rock) over a distance of 20 feet or more, the “Special Construction Procedures” may not be required. This would have to be evaluated in the field on a case-by-case basis by the representative from Carlin-Simpson & Associates or a qualified geotechnical engineer at the time of construction.

Where the transition from rock to soil is abrupt within the excavation for continuous wall foundations, transition zones can be constructed by over-excavating the rock in steps and increasing the “soil cushion” thickness over a distance of 24 feet or more. To construct the transition zone, the bedrock is over-excavated in a series of steps, each step being six (6) inches in depth and at least eight (8) feet in length. The first step is six (6) inches deep, the second step is 12 inches deep, and the final step is 18 inches deep. The over-excavation is then backfilled with the soil cushion material described above. A detail showing a typical transition zone (FIG-2) is attached in the appendix of this report.

Foundation Design Parameters

All foundations shall bear on the densified virgin soil, new engineer-approved compacted fill, completely weathered bedrock or intact bedrock. All of the exterior footings shall bear at the minimum depth listed below for protection from frost. Interior column footings may bear on the virgin soil, new structural fill or bedrock just below the floor slab provided the building is heated during winter. The footings shall have minimum dimensions as listed below.

Table 2 – Addition Foundation Design Parameters

Description	Value
Foundation Bearing Material	New Structural Fill, Virgin Soil, or Bedrock
Net Design Bearing Pressures: <i>New Structural Fill or Virgin Soil</i> <i>Weathered bedrock/bedrock</i>	3,000 psf 8,000 psf
Minimum Frost Depth	48 inches
Minimum Column Dimension	30 inches
Minimum Wall Dimension	18 inches

The excavations for the new foundations shall be performed under the full-time inspection of Carlin-Simpson & Associates. The on-site representative shall confirm that the foundation bearing material is capable of supporting the design bearing pressure.

Prior to the installation of the reinforcement steel and concrete, the bottoms of the foundation excavations should be cleaned of all loose material. The foundation subgrade shall be compacted with a small vibratory drum trench compactor (i.e. Wacker Model RT560), a heavy vibratory plate tamper (i.e. Wacker BPU 3545A or equivalent), or a “jumping jack” style tamper (i.e. Wacker Model BS 600). The preparation of the footing bearing subgrade should be performed under the observation of a representative from Carlin-Simpson & Associates. If instability is observed during the compaction of the bearing subgrade, the soft soil shall be removed and replaced with new compacted fill.

4.3 Floor Slab

The floor may be designed as a slab on grade bearing on densified virgin soil (Stratum 2), highly to completely weathered rock (Stratum 3), or new engineer-approved structural fill. Floor slab design parameters are provided in Table 3 below. A layer of 3/4-inch crushed stone is recommended

beneath the concrete slab for additional support and drainage. Provisions for sub slab drainage, sump pits and pumps are required for lower levels, see detailed recommendations below.

Table 3 – Slab Design Parameters

Description	Value
Slab Subgrade Material	Densified Virgin Soil/ New Structural Fill / Completely Weathered Rock
Modulus of Subgrade Reaction (k)	200 pci
Crushed Stone Cushion Thickness	6 inches

New fill for the floor slab shall consist of either suitable on-site soil or imported sand and gravel. Imported sand and gravel shall contain less than 20% material by weight passing a No. 200 sieve. The new fill shall be placed in layers not exceeding one (1) foot in loose thickness and each layer shall be compacted to at least 92% of its Maximum Modified Dry Density (ASTM D1557). Fill layers shall be compacted, tested, and approved before placing subsequent layers.

4.4 Settlement

Settlement of individual footings, designed in accordance with recommendations presented in this report, is expected to be within tolerable limits for the proposed structure. For footings placed on natural soils or new compacted fill approved by Carlin-Simpson & Associates and constructed in accordance with the requirements outlined in this report, maximum total settlement is expected to be on the order of 1-inch or less. Maximum differential settlement between adjacent columns or load bearing walls is expected to be on the order of ½-inch.

The above settlement values are based on our engineering experience with similar soil conditions and the anticipated structural loading, and are to guide the structural engineer with his design. To minimize difficulties during the foundation installation phase, it is critical that Carlin-Simpson & Associates be retained to observe the foundation bearing surfaces and to confirm the recommended bearing pressures and unsuitable materials have been removed from beneath the new foundations.

4.5 Seismic Design Considerations

From site-specific test boring data, the Site Class was determined from Table 1613.2.2 of the New York State Building Code. The site-specific data used to determine the Site Class typically includes soil test borings to determine Standard Penetration resistances (N-values). Based on estimated average N-values in the upper 100 feet of soil profile, the site can be classified as Site Class C –Very Dense Soil and Soft Rock Profile.

New structures should be designed to resist stress produced by lateral forces computed in accordance with Section 1613 of the New York State Building Code. The values in Table 4 shall be used for this project.

Table 4 – Seismic Design Values

Description	Value
Mapped Spectral Response Acceleration for Short Periods, [Fig 1613.2.1 (1)]	$S_S=0.220g$
Mapped Spectral Response Acceleration at 1-Second Period, [Fig 1613.2.1 (2)]	$S_1=0.056g$
Site Coefficient [Table 1613.2.3 (1)]	$F_a= 1.30$
Site Coefficient [Table 1613.2.3 (2)]	$F_v= 1.50$
Max Considered Earthquake Spectral Response for Short Periods [Eq 16-36]	$S_{MS}=0.287g$
Max Considered Earthquake Spectral Response at 1-Second Period [Eq 16-37]	$S_{M1}=0.085g$
Design Spectral Response Acceleration for Short Periods [Eq 16-38]	$S_{DS}=0.191g$
Design Spectral Response Acceleration for 1-Second Period [Eq 16-39]	$S_{D1}=0.056g$

5.0 SITE EVALUATION

Our recommendations for the proposed site development including the new utilities, concrete and asphalt pavement, temporary excavations, and the suitability of the existing site soils for reuse as structural fill are provided below.

5.1 Utilities

New utilities may bear in the existing site soils, new compacted fill, completely weathered rock or bedrock. The bottom of all trenches should be excavated clean and shaped so a hard bottom is provided for the pipe support. If any soft or unsuitable soil conditions are encountered during construction, the unsuitable materials must be removed and replaced with new compacted fill.

Trench hammering or blasting may be required to install the new utilities in portions of the site where rock is encountered above the planned utility invert elevation. In the event, rock is encountered in the utility excavations, it must be removed to at least six (6) inches below planned pipe invert. The over-excavated six (6) inches shall then be filled with new sandy fill and compacted to at least 92% of its Maximum Modified Dry Density (ASTM D-1557) to act as a cushion on the rock.

In the event that the trench bottom becomes soft due to the inflow of surface or trapped water, the soft soil shall be removed and the excavation filled with a minimum of six (6) inches of 3/4-inch clean crushed stone to provide a firm base for support of the pipe. Sump pits and pumps should be adequate to keep the excavations dry.

After the utility is installed, the trench must be backfilled with compacted fill. The fill shall consist of suitable on-site soil or imported sand and gravel. Imported fill shall contain less than 20% by weight passing a No. 200 sieve. Large rock fragments and boulders must not be placed directly against the pipe. Controlled compacted fill shall be placed in one (1) foot loose layers and each layer shall be compacted to at least 92% of its Maximum Modified Dry Density (ASTM D-1557). The backfill must be free of topsoil, debris, and large boulders or rock fragments.

5.2 Temporary Construction Excavations and Excavation Protection

Temporary construction excavations should be conducted in accordance with the most recent OSHA guidelines or applicable federal, state or local codes. A qualified person should evaluate the

excavations at the time of construction to determine the appropriate soil type and allowable slope configuration. Based on the boring data, we believe the site soils and rock would have the following classifications as defined by the OSHA guidelines.

<u>Soil/Rock Type</u>	<u>Possible Classification</u>	<u>Maximum Slope or Bench</u>
Existing Fill	Type “C”	1½H:1V
Virgin Soil/ Completely Weathered Bedrock	Type “B” or “C”	1H:1V to 1½H:1V
Bedrock	Type “A”	3/4H :1V

Temporary support (i.e. trench boxes, sheeting and shoring, etc.) should be used for any excavation that cannot be sloped or benched in accordance with the applicable regulations, where necessary to protect adjacent utilities and structures, or where saturated soils or water seepage is encountered within the excavation.

A New York State licensed professional engineer must design all temporary and permanent support systems. The contractor will select the shoring type and submit design calculations for the proposed shoring method to Carlin-Simpson & Associates for review. The soil adjacent to the temporary support system will exert a horizontal pressure against the system. This pressure is based on the soil unit weight, coefficient of active earth pressure, and depth of the excavation. In addition, hydrostatic pressures and surcharge loads from adjacent driveways, construction equipment, or stored materials near the excavation must be incorporated into the design of the support system, as applicable. Support of Excavation design parameters are listed in Table 5 below.

Table 5 – Temporary Sheet piling and Shoring Design Parameters

Description	Value
Moist Unit Weight (pcf)	130
Friction Angle (ϕ , deg)	30
Cohesion (c, psf)	0
Active Earth Pressure Coefficient (k_a) ¹	0.33
Equivalent Fluid Pressure (pcf)	42.9
Passive Earth Pressure Coefficient (k_p) ¹	3.0

5.3 Suitability of the In-Situ Soils for Use as Compacted Fill

The suitability of each soil stratum for use as compacted fill is discussed below. .

Stratum 2

Sandy Silt

Stratum 2 generally consists of medium stiff brown SILT some (to and), coarse to fine Sand, trace coarse to fine Gravel with cobbles and boulders or medium dense brown coarse to fine Sand, some (to and) Silt, and coarse to fine Gravel with cobbles and boulders. The sandy silt stratum will be very moisture sensitive and has a very high percentage of silt which may be difficult to compact adequately. In general this stratum is suitable for reuse as compacted fill provided it is dry enough to compact and any large cobbles or boulders are removed prior to reuse.

The boring observations indicate that the on-site soils contain a very high percentage of silt (>50%). The high silt content soils, will be moisture sensitive. If the soil becomes too wet, it will be difficult to achieve adequate compaction.

Proper moisture conditioning of the soil will be required. New compacted fill should be within 2% (+/-) of its optimum moisture content at the time of placement. In the event that the on-site material is too wet at the time of placement and cannot be adequately compacted, the soil should be aerated and allowed to dry or the material removed and a drier cleaner fill material used. In the event that the on-site material is too dry at the time of placement and cannot be adequately compacted, water may be needed to increase the soil moisture content for proper compaction as structural compacted fill.

The in-situ soils which exist throughout the site may become soft and weave if exposed to excessive moisture and construction traffic. The instability will occur quickly when exposed to these elements and it will be difficult to stabilize the subgrade. We recommend that adequate site drainage be implemented early in the construction schedule and if the subgrade becomes wet, the contractor should limit construction activity until the soil has dried.

The minimum compaction requirements for the various areas of the site are summarized in Table 6 below.

Table 6 – Minimum Compaction Requirements

Area	Maximum Modified Dry Density (ASTM D-1557)
Below foundations	95%
Below Slab	92%
Adjacent to Foundation Walls	92%
Pavement Areas	92%
Exterior Slabs and Sidewalks	92%
Utility Trenches	92%
Landscape Areas	90%

6.0 GENERAL

The findings, conclusions and recommendations presented in this report represent our professional opinions concerning subsurface conditions at the site. The opinions presented are relative to the dates of our site work and should not be relied on to represent conditions at later dates or at locations not explored. The opinions included herein are based on information provided to us, the data obtained at specific locations during the study and our past experience. If additional information becomes available that might impact our geotechnical opinions, it will be necessary for Carlin-Simpson & Associates to review the information, reassess the potential concerns, and re-evaluate our conclusions and recommendations.

Regardless of the thoroughness of a geotechnical exploration, there is the possibility that conditions between borings and test pits will differ from those encountered at specific boring or test pit locations, that conditions are not as anticipated by the designers and/or the contractors, or that either natural events or the construction process have altered the subsurface conditions. These variations are an inherent risk associated with subsurface conditions in this region and the approximate methods used to obtain the data. These variations may not be apparent until construction.

The professional opinions presented in this geotechnical report are not final. Field observations and foundation installation monitoring by the geotechnical engineer, as well as soil density testing and other quality assurance functions associated with site earthwork and foundation construction, are an extension of this report. Therefore, Carlin-Simpson & Associates should be retained by the Owner to observe all earthwork and foundation construction, to document that the conditions anticipated in this study actually exist, and to finalize or amend our conclusions and recommendations. Carlin-Simpson & Associates is not responsible or liable for the conclusions and recommendations presented in this report if Carlin-Simpson & Associates does not perform the observation and testing services.

Therefore, in order to preserve continuity in this project, the Owner must retain the services of Carlin-Simpson & Associates to provide full time geotechnical related monitoring and testing during construction. At a minimum, this shall include the observation and testing of the following: 1) the removal of unsuitable soil, where required; 2) the proofrolling of the subgrade soil prior to the placement of new compacted fill; 3) the placement and compaction of controlled fill; 4) the excavation for the addition foundations; and 5) the preparation of the subgrade for the floor slab.

This report has been prepared in accordance with generally accepted geotechnical engineering practice. No other warranty is expressed or implied. The evaluations and recommendations presented in this report are based on the available project information, as well as on the results of the exploration. Carlin-Simpson & Associates should be given the opportunity to review the final drawings and site plans for this project to determine if changes to the recommendations outlined in this report are needed. Should the nature of the project change, these recommendations should be re-evaluated.

This report is provided for the exclusive use of PS&S and the project specific design team and may not be used or relied upon in connection with other projects or by other third parties. Carlin-Simpson & Associates disclaims liability for any such third party use or reliance without express written permission. Use of this report or the findings, conclusions or recommendations by others will

be at the sole risk of the user. Carlin-Simpson & Associates is not responsible or liable for the interpretation by others of the data in this report, nor their conclusions, recommendations or opinions.

If the conditions encountered during construction vary significantly from those stated in this report, this office should be notified immediately so that additional recommendations can be made.

Thank you for allowing us to assist you with this project. Should you have any questions or comments, please contact this office.

Very truly yours,

CARLIN-SIMPSON & ASSOCIATES

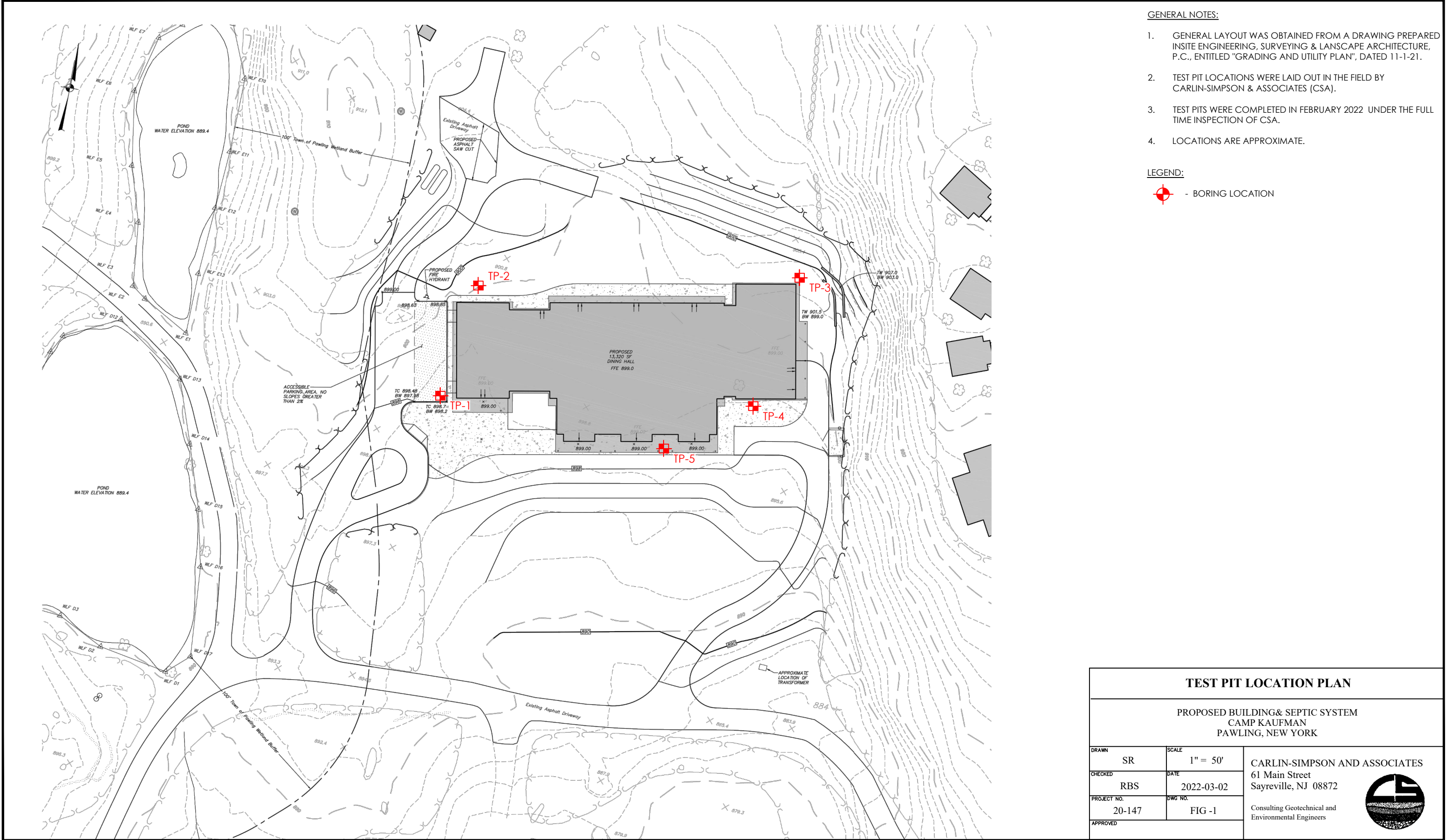
Stephen Rossi

Stephen Rossi, P.E.
Project Engineer



ROBERT B. SIMPSON, P.E.





CARLIN-SIMPSON & ASSOCIATES, LLC

Consulting Engineers
Geotechnical & Environmental

Proposed Dining Hall
Camp Kaufmann
Pawling, NY
20-147

1 February 2022

TP-1 **Elevation +897.5**

0'0"-0'10"	Brown topsoil	
0'10"-7'6"	Brown SILT some (+), coarse to fine Sand, trace fine Gravel	medium dense, moist
7'6"	Bedrock completely weathered	
	No Groundwater Encountered	

TP-2 **Elevation +900.0**

0'0"-0'7"	Brown topsoil	
0'7"-4'0"	Brown SILT and (-), coarse to fine Sand, trace (+) coarse to fine Gravel with cobbles and boulders	medium dense, moist
4'0"	Refusal on backhoe, probable bedrock	
	No Groundwater Encountered	

TP-3 **Elevation +903.0**

0'0"-1'0"	Brown topsoil	
1'0"-8'6"	Brown coarse to fine Sand, some (+) Silt, and coarse to fine Gravel, with cobbles and boulders	medium dense, moist
8'6"	Refusal on backhoe, probable bedrock	
	No Groundwater Encountered	

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Consulting Engineers
Geotechnical & Environmental

Proposed Dining Hall
Camp Kaufmann
Pawling, NY
20-147

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TP-4 **Elevation +898.0**

0'0"-0'6" Brown topsoil

0'6"-5'6" Brown coarse to fine Sand, and (-) Silt,
and coarse to fine Gravel, with cobbles
and boulders medium dense, moist

5'6" Refusal on backhoe, probable bedrock

No Groundwater Encountered

TP-5 **Elevation +897.0**

0'0"-0'7" Brown topsoil

0'7"-2'0" Brown SILT and (+), coarse to fine Sand,
trace (+) coarse to fine Gravel with cobbles
and boulders medium dense, moist

2'0" Refusal on backhoe @ 1'-2' (varies), probable bedrock

No Groundwater Encountered

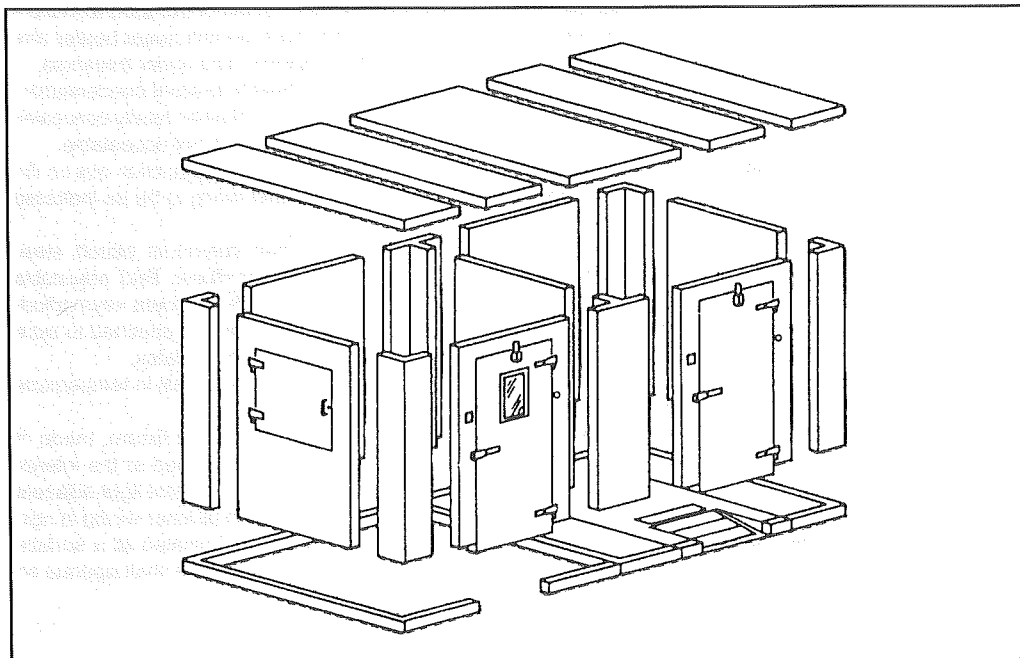
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PROJECT:

ITEM NUMBER:

MODEL NUMBER:

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- Heavy duty, extruded, anodized aluminum load bearing door frame jamb.
- Deadbolt locking handle with independent key/padlock feature and inside safety release.
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- Magnetic door gaskets and spring actuated door closer.
- Heated pressure relief port on all freezers.
- Indoor and outdoor roof and ceiling support systems.
- Fifteen year panel warranty.
- NSF approved.
- UL & FM flame spread 25 approved panels.
- UL and CSA electrical approved door section.
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- City of Los Angeles approved.
- City of Houston approved.
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- State of Wisconsin Building Product approved.
- USDA accepted.
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OPTIONS

- Selection of interior and exterior surfaces and finishes.
- Various door styles and sizes.
- Wide range of computer sized and balanced refrigeration systems.
- Indoor and outdoor roof and ceiling support systems.

ACCESSORIES

- Interior and exterior door kickplates.
- Cooler and freezer door viewports.
- Interior and exterior ramps.
- Bumper rails, trim strips and closure panels.
- Various security alarm systems.
- Extra lights and special switches.
- Shelving in free-standing and wall mount styles.
- Special floor underlayments and topside plating.

SPECIFICATIONS

1.0 GENERAL:

1.1 Walk-in coolers and freezers to consist of precision constructed modular 4" thick rigid polyurethane foamed-in-place interchangeable panels. Panels are designed for easy installation, expansion and relocation.

1.2 Panels shall be prefabricated modular construction consisting of 100% foamed-in-place polyurethane insulation, bonded by an adhesive to the interior and the exterior metal pan skins and heat cured for life long stability.

1.3 Each wall panel skin is to be formed using a double 90° bend on each edge to add strength and rigidity. Panels are to be in 6 inch increments, with a minimum width of 12 inches.

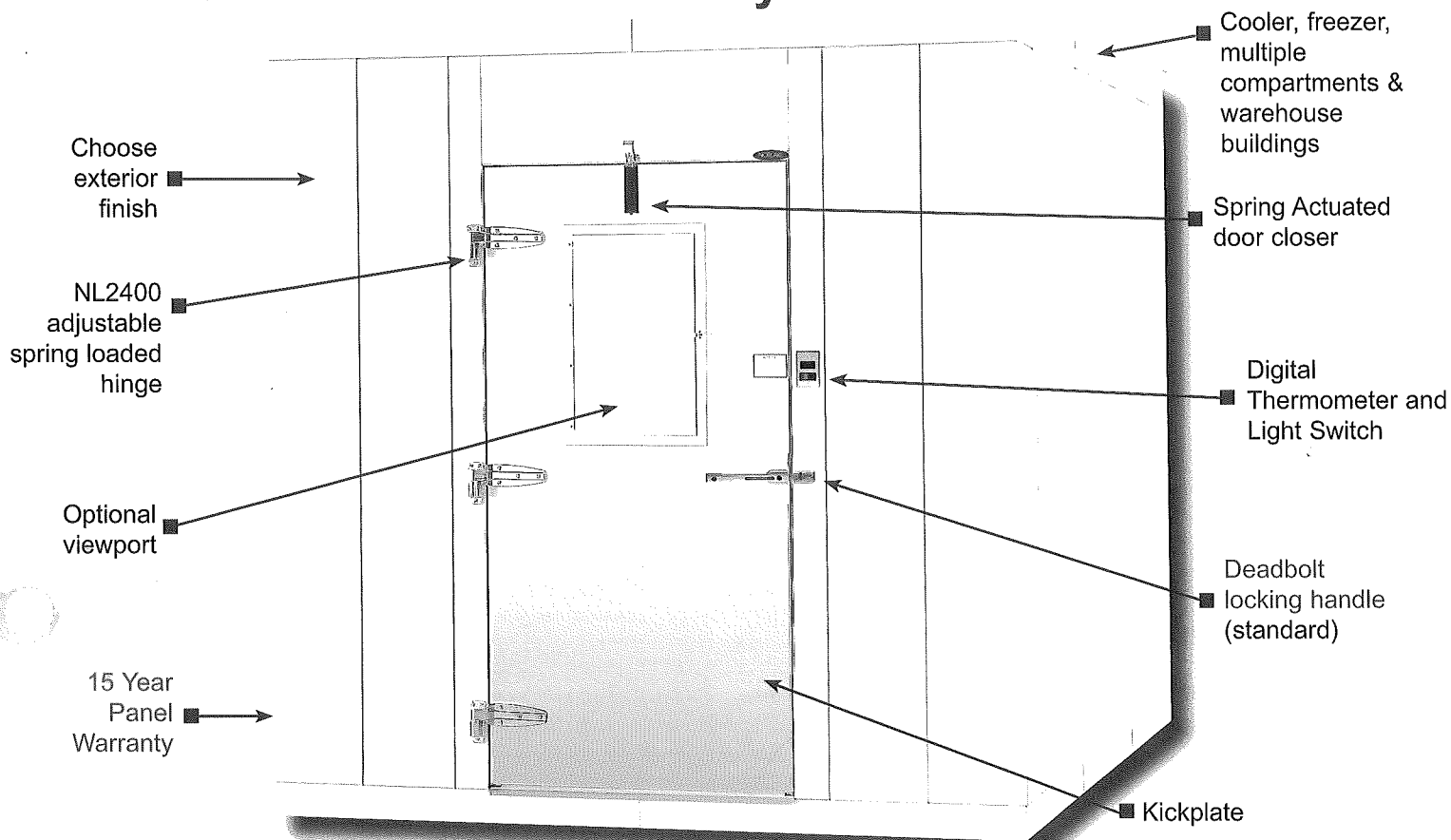


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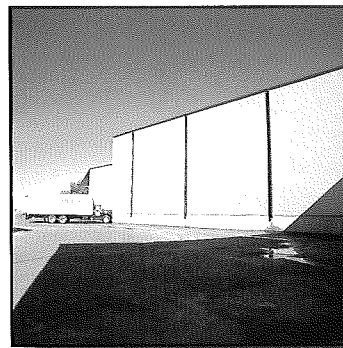
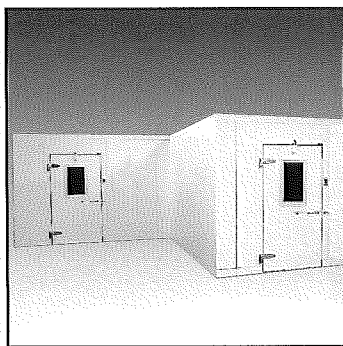
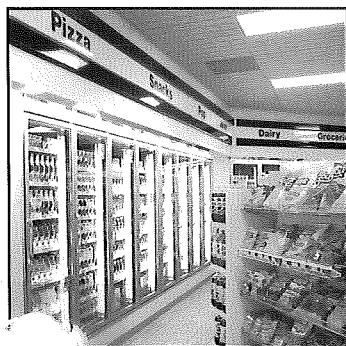
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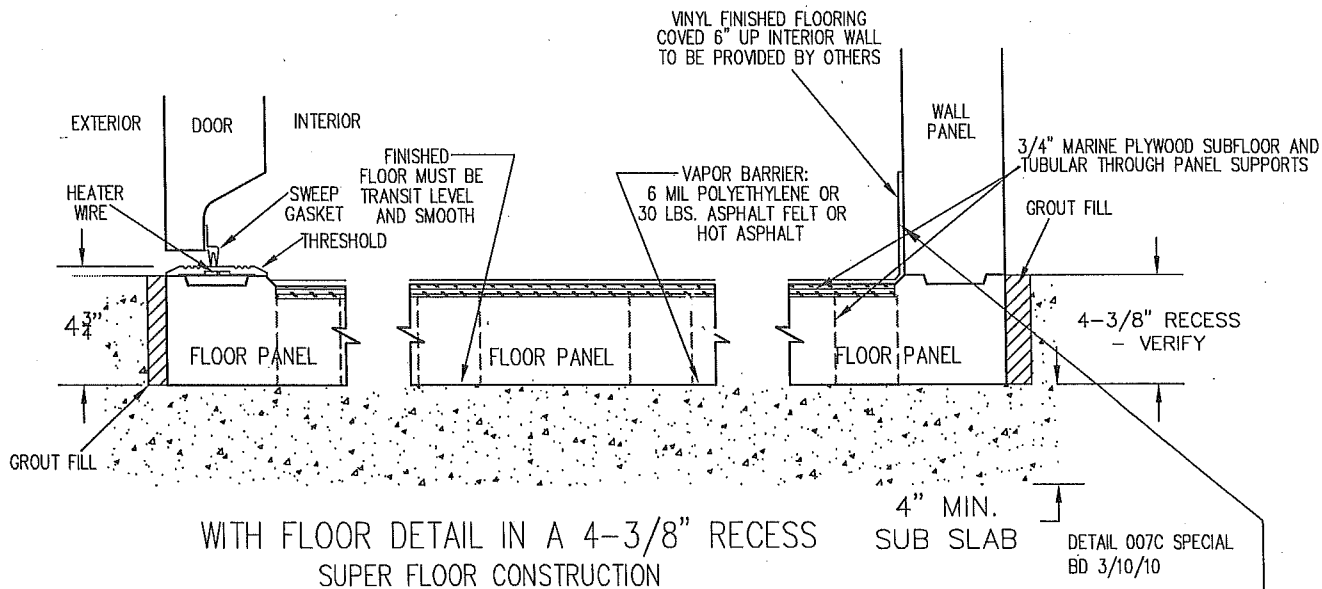
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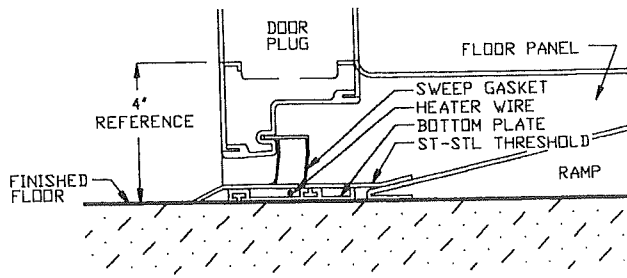


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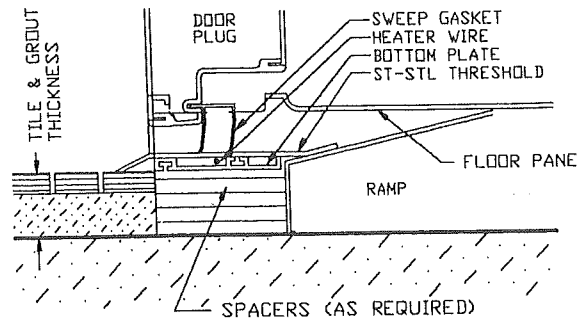
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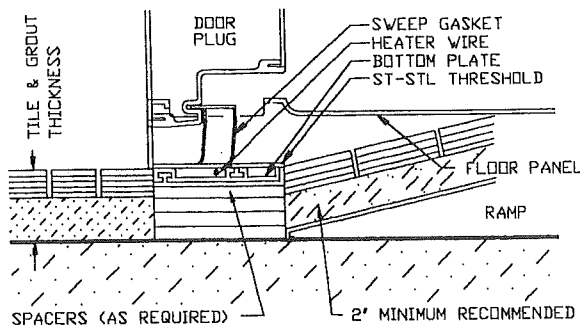
Ramps



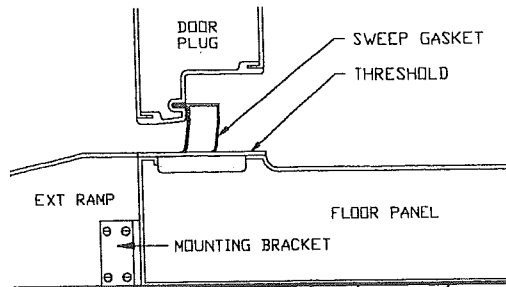
**INTERIOR RAMP
COOLER OR FREEZER**
DETAIL (25)



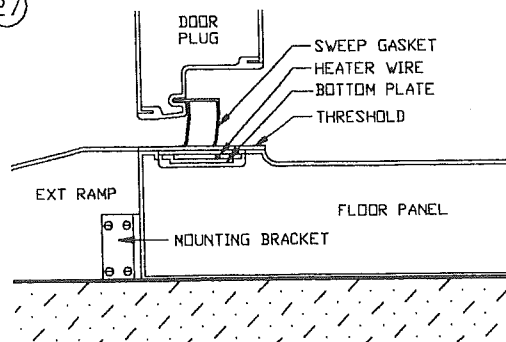
**INTERIOR RAMP WITH
TILE AND GROUT EXTERIOR
COOLER OR FREEZER**
DETAIL (26)



**INTERIOR RAMP WITH
TILE AND GROUT
EXTERIOR AND INTERIOR
COOLER OR FREEZER**
DETAIL (27)



EXTERIOR RAMP COOLER
DETAIL (35)



EXTERIOR RAMP FREEZER
DETAIL (36)

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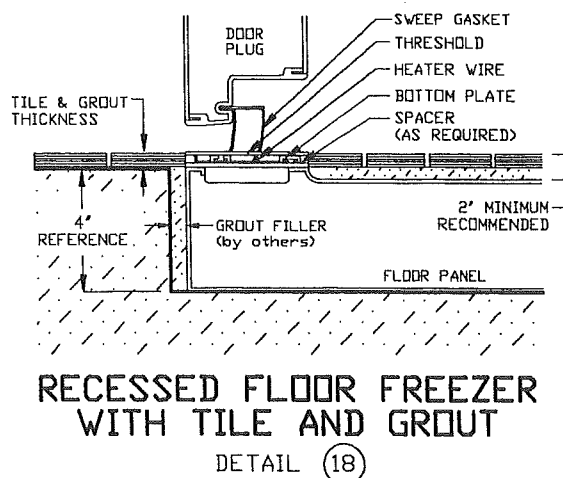
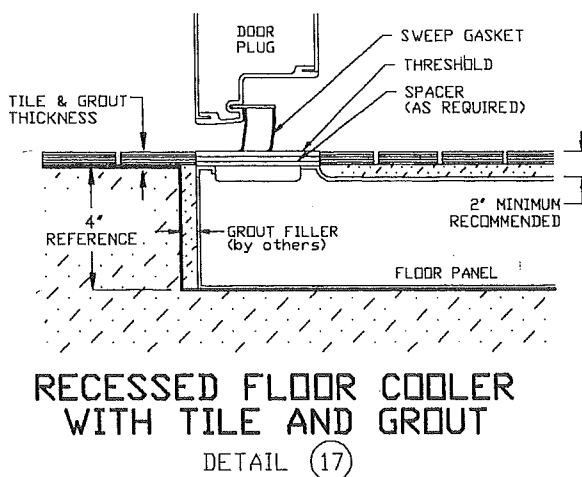
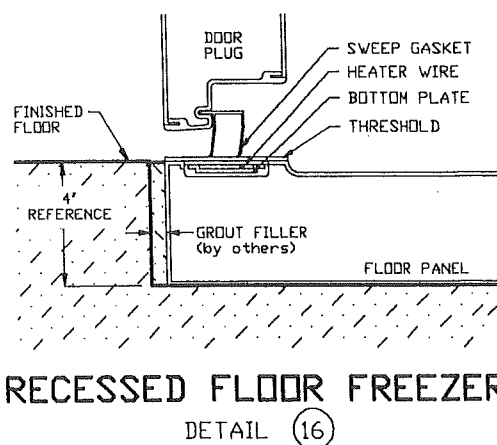
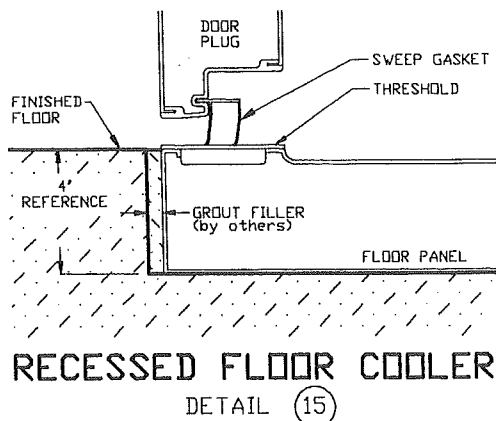


FINELINE™ Custom Walk-ins

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Condensed Specifications for Architects and Consultants

FLOORS

Recessed Floor



FINELINE™ Custom Walk-ins

NOTE: Factory requires separate measurements for each of the following: depth of the pit, leveling sand, tile and grout. This information is essential for determining the door height adjustment.

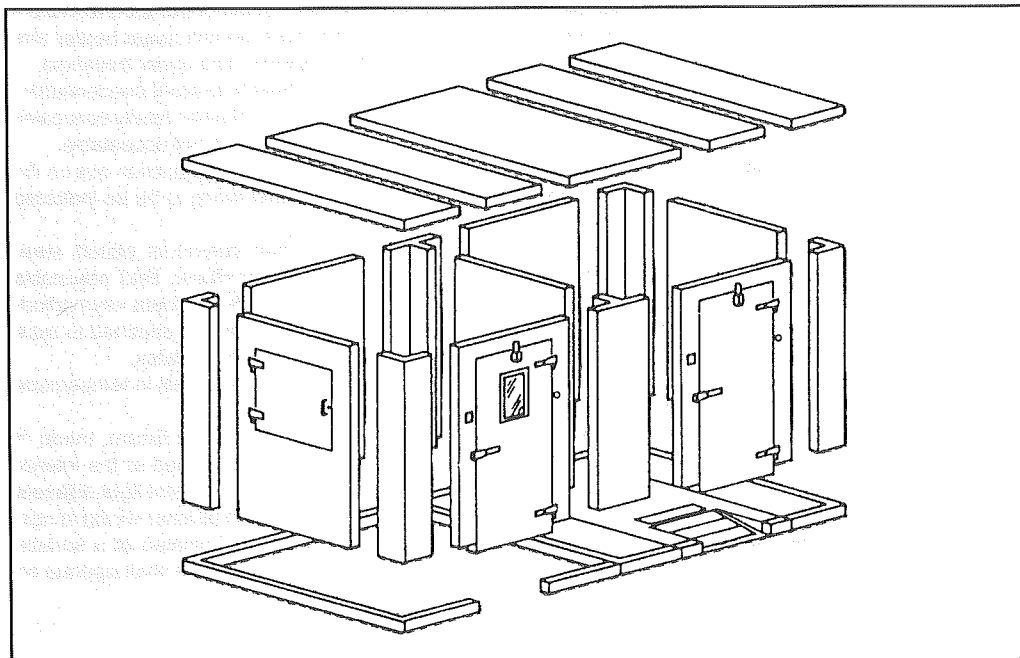
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727 Second Street
P.O. Box 248
Hudson, Wisconsin 54016

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715-386-2323
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PROJECT:

ITEM NUMBER:

MODEL NUMBER:

STANDARD FEATURES

- Coolers, freezers and combination cooler/freezers.
- Modular panel construction for easy installation, expansion and relocation.
- 26 gauge corrosion resistant stucco embossed temper passed coated steel.
- .100 smooth aluminum interior floor (on models with floor).
- Floorless models provided with NSF approved vinyl sealers.
- Full 4" thick panels foamed-in-place with HFC-134a polyurethane insulation which is CFC & HCFC Free. Zero Ozone Depletion!
- Doors equipped with heavy duty polished chrome hardware.
- Heavy duty, extruded, anodized aluminum load bearing door frame jamb.
- Deadbolt locking handle with independent key/padlock feature and inside safety release.
- Vapor proof light fixture.
- Magnetic door gaskets and spring actuated door closer.
- Heated pressure relief port on all freezers.
- Indoor and outdoor roof and ceiling support systems.
- Fifteen year panel warranty.
- NSF approved.
- UL & FM flame spread 25 approved panels.
- UL and CSA electrical approved door section.
- City of New York (MEA) approved.
- City of Los Angeles approved.
- City of Houston approved.
- Oregon State approved.
- State of Wisconsin Building Product approved.
- USDA accepted.
- Factory Mutual
- Registered by UL to ISO 9001:2000

OPTIONS

- Selection of interior and exterior surfaces and finishes.
- Various door styles and sizes.
- Wide range of computer sized and balanced refrigeration systems.
- Indoor and outdoor roof and ceiling support systems.

ACCESSORIES

- Interior and exterior door kickplates.
- Cooler and freezer door viewports.
- Interior and exterior ramps.
- Bumper rails, trim strips and closure panels.
- Various security alarm systems.
- Extra lights and special switches.
- Shelving in free-standing and wall mount styles.
- Special floor underlayments and topside plating.

SPECIFICATIONS

1.0 GENERAL:

1.1 Walk-in coolers and freezers to consist of precision constructed modular 4" thick rigid polyurethane foamed-in-place interchangeable panels. Panels are designed for easy installation, expansion and relocation.

1.2 Panels shall be prefabricated modular construction consisting of 100% foamed-in-place polyurethane insulation, bonded by an adhesive to the interior and the exterior metal pan skins and heat cured for life long stability.

1.3 Each wall panel skin is to be formed using a double 90° bend on each edge to add strength and rigidity. Panels are to be in 6 inch increments, with a minimum width of 12 inches.



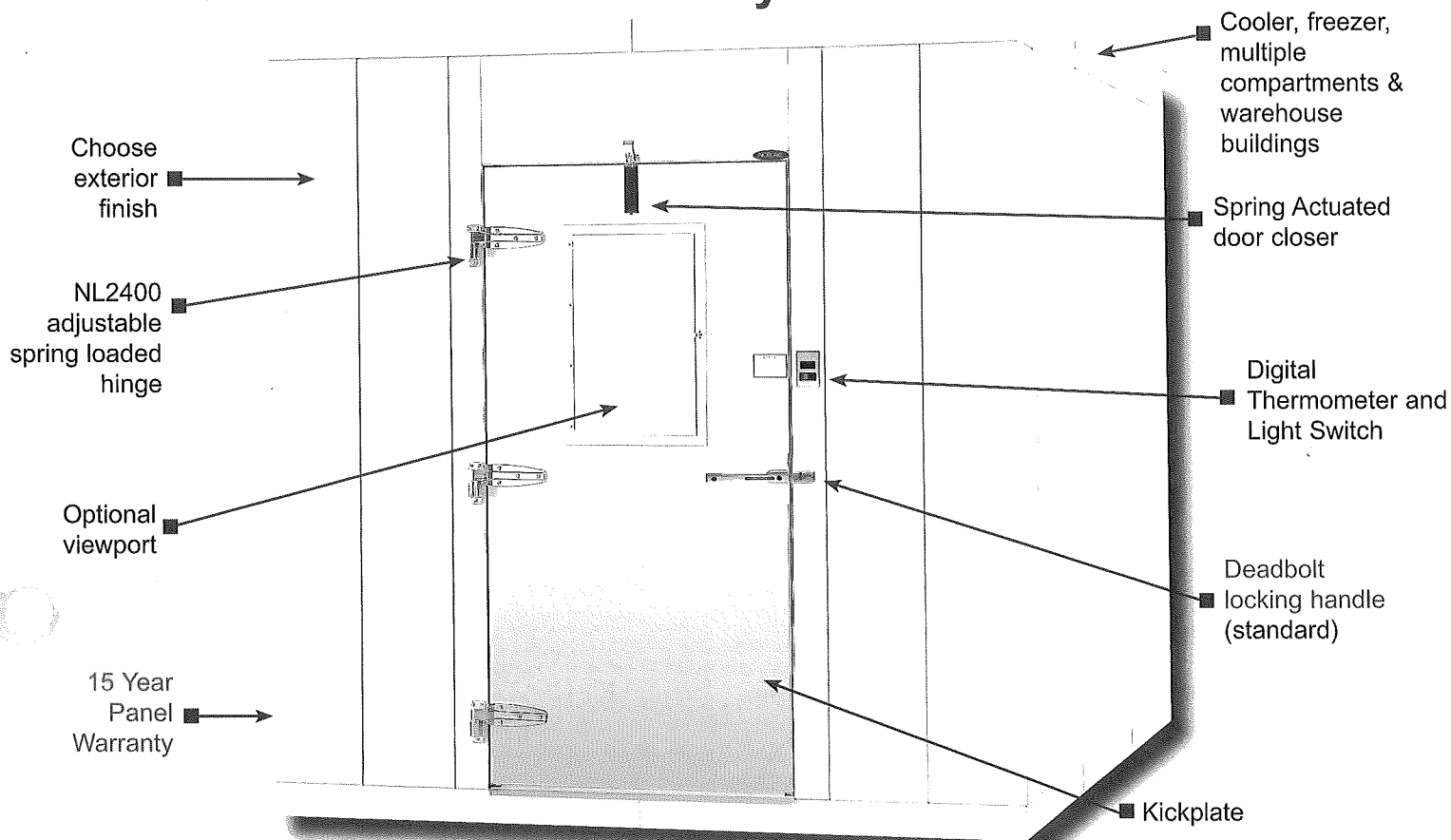
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FINELINE™ Custom Walk-ins

NORLAKE® FINELINE™ WALK-INS

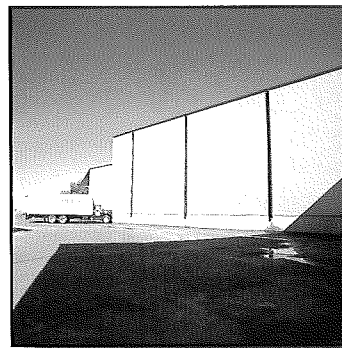
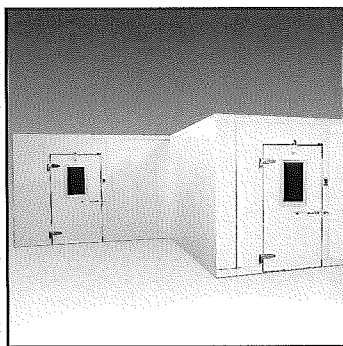
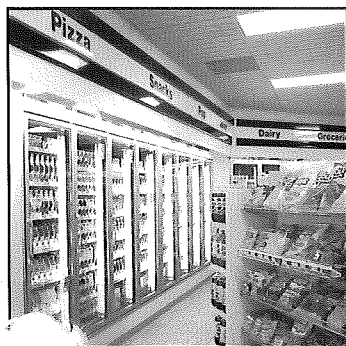
CUSTOM BUILT TO YOUR SPECIFICATIONS

CFC Free HFC-134a Polyurethane Insulation



The Ultimate in Walk-in Design.. Designed & Built to Fit Your Needs...

US Energy Independence and Security Act of 2007 compliant



Specify Any Size,
Special Shape,
Special Angles, Glass
Doors, Color, Metal
Finish, Single or Multiple
Compartments

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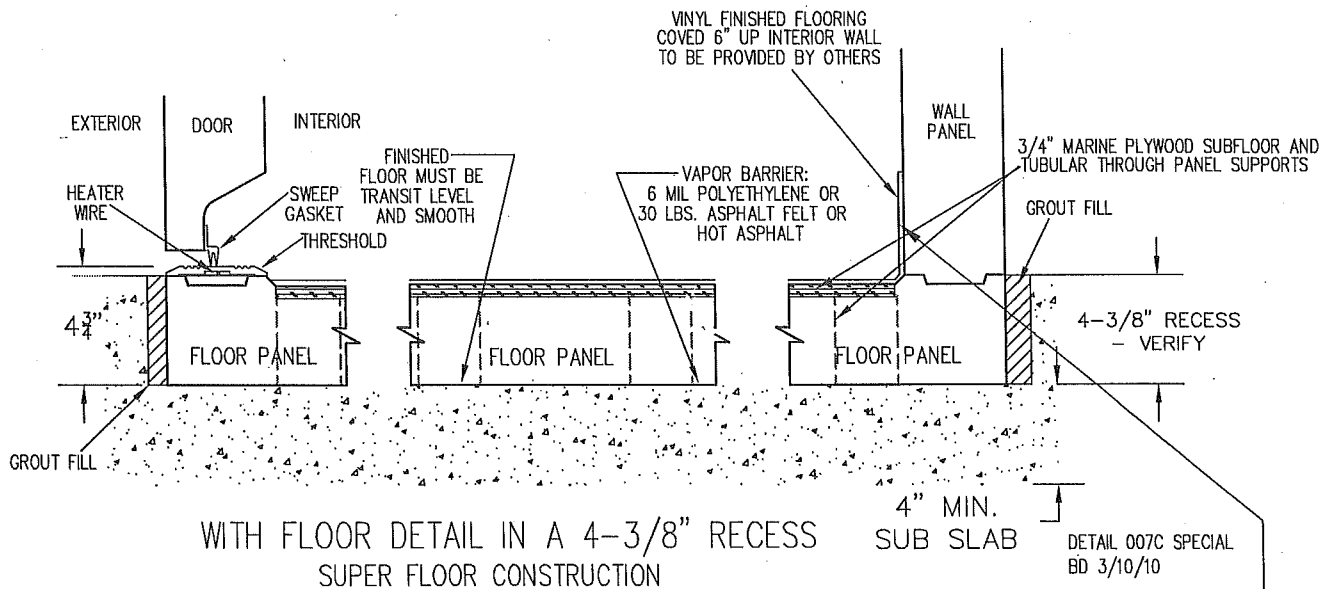
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RECESSED PANELS IN 6" DEPRESSION WITH
4" INSULATION AND 2" MUD & TILE.
SEE KA-5 DETAIL SHEET CSR-1-2 SECTION



FINELINE™ Custom Walk-ins

OPTIONS

- Selection of interior and exterior surfaces and finishes.
- Various door styles and sizes.
- Wide range of computer sized and balanced refrigeration systems.
- Indoor and outdoor roof and ceiling support systems.

2746 Girl Scouts-ny



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SPECIFICAT
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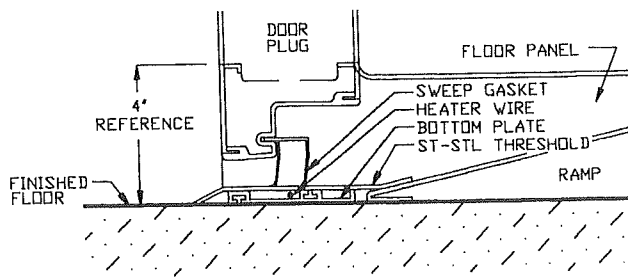


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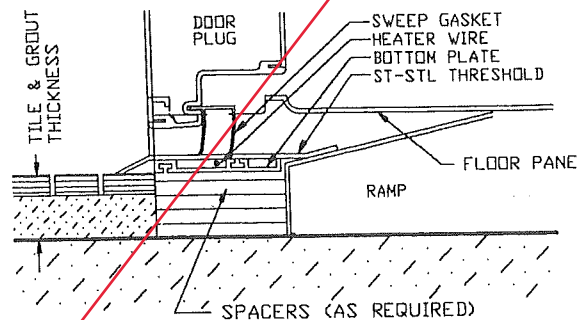
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FLOORS

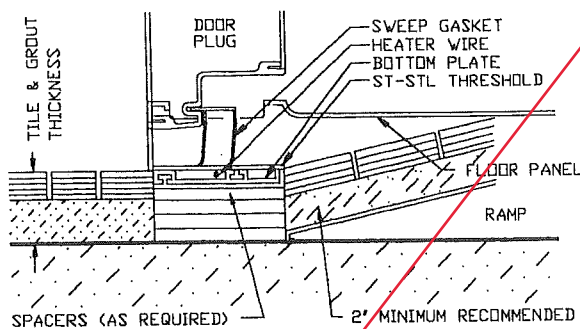
Ramps



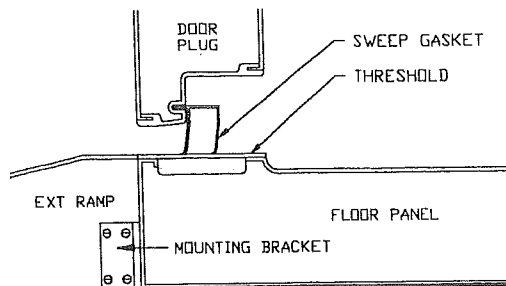
**INTERIOR RAMP
COOLER OR FREEZER**
DETAIL (25)



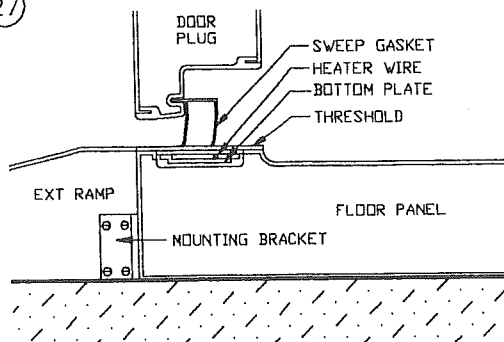
**INTERIOR RAMP WITH
TILE AND GROUT EXTERIOR
COOLER OR FREEZER**
DETAIL (26)



**INTERIOR RAMP WITH
TILE AND GROUT
EXTERIOR AND INTERIOR
COOLER OR FREEZER**
DETAIL (27)



EXTERIOR RAMP COOLER
DETAIL (35)



EXTERIOR RAMP FREEZER
DETAIL (36)

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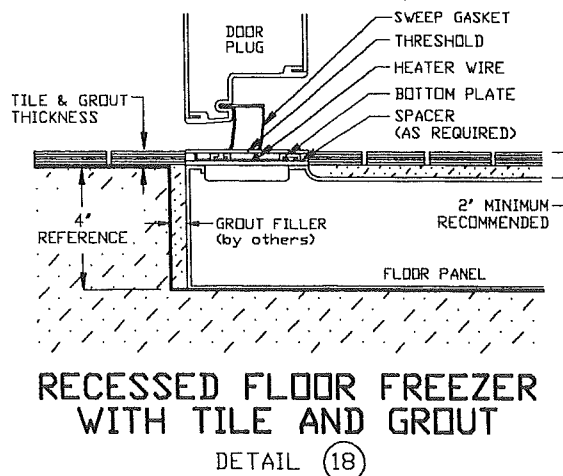
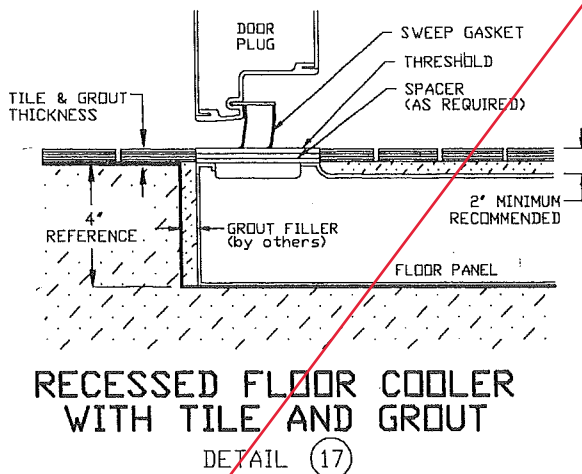
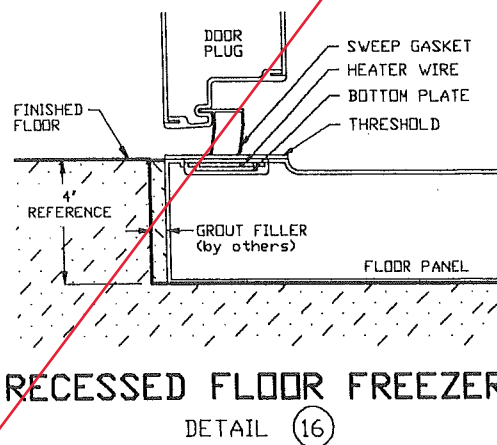
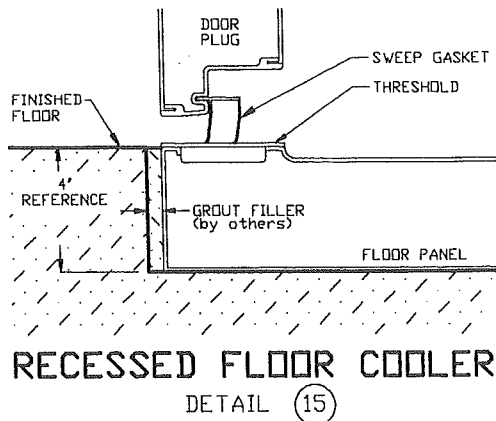
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Condensed Specifications for Architects and Consultants

FLOORS

Recessed Floor



NOTE: Factory requires separate measurements for each of the following: depth of the pit, leveling sand, tile and grout. This information is essential for determining the door height adjustment.

FINELINE™ Custom Walk-ins



MSMD020MC CONDENSING UNIT



Note: Pictures are for illustration only,
and may not reflect the listed model.



GENERAL

REFRIGERANT	VOLTAGE	COMPRESSOR TYPE	COMPRESSOR MODEL	HP	AWEF	LISTINGS
R-448A/R-449A	208-230/60/3	Scroll	ZS15KAE-TF5	2	5.61	UL/CUL

BTUH CAPACITY (At Saturated Suction Temperature (SST) and 90° Ambient at Condenser)

-30	-20	-10	20	25	30	35	45
-	-	-	15,441	17,060	18,825	20,746	25,102

BTUH CAPACITY (At Saturated Suction Temperature (SST) and 100° Ambient at Condenser)

-30	-20	-10	20	25	30	35	45
-	-	-	14,206	15,695	17,319	19,086	23,094

DIMENSIONAL DATA

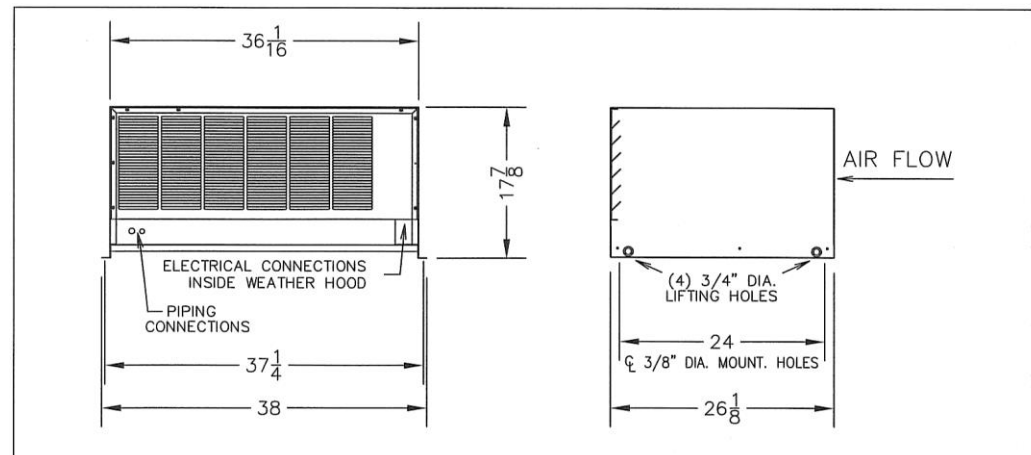
OVERALL (to nearest inch)			WT (lbs)	BASE SIZE	BASE/HOOD
L	W	H			
38	27	18	240	M2	021M

INSTALLATION

REFRIGERANT	RECEIVER TANK (lbs) 90%/90°F	CONNECTIONS		ESTIMATED TOTAL HEAT REJECTION (BTUH)
		LIQUID	SUCTION	
R-448A/R-449A	10.1	1/2	7/8	8

ELECTRICAL

MCA	MOP	COMP VOLTS	COMP PHASE	COMP HZ	COMP RLA	COMP LRA	OTHER LOAD DATA	
24	25	208-230	3	60	9.6	58	VOLTS	208-230
FAN PHASE	FAN HZ	FAN FLA	FAN HP	FAN QUANTITY	MAX EVAP FAN AMPS	MAX EVAP DEF HEATER AMPS	PHASE	1
1	60	0.5	1/20	2	10	20.0	AMPS	0.5





E1MD0136A-TA2

EVAPORATOR UNIT



Note: Pictures are for illustration only,
and may not reflect the listed model.

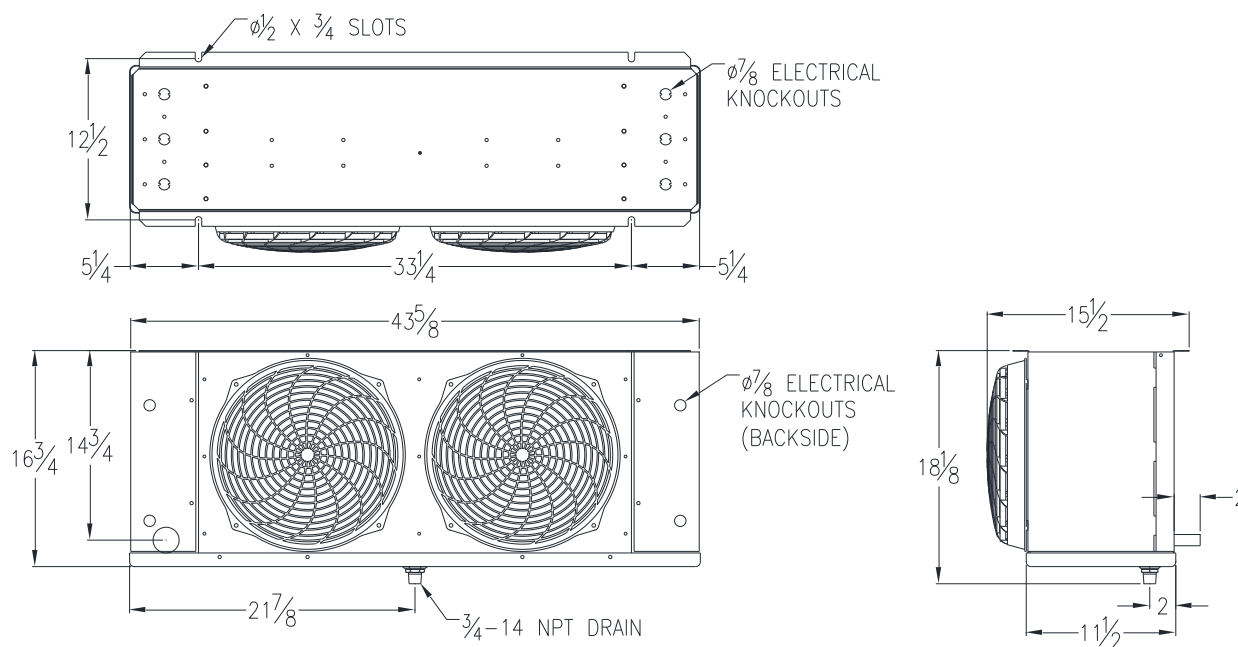


GENERAL					
REFRIGERANT	VOLTAGE	EVAPORATOR MODEL	DEFROST SCHEME	CONTROLLER	LISTINGS
R-448A/R-449A	115/60/1	WL6A117SDA5	AIR	THERMOSTAT	UL/CUL

BTUH CAPACITY (At Saturated Suction Temperature (SST) with 10° TD)							
-30	-20	-10	20	25	30	35	45
-	-	-	-	13,600	13,818	14,036	14,473

DIMENSIONAL DATA				INSTALLATION			
OVERALL (inches)			WT (lbs)	CONNECTIONS		REFRIGERANT TYPE	
L	W	H		LIQUID	SUCTION		
43.625	15.5	16.75	58	3/8	7/8	R-448A/R-449A	

EVAPORATOR ELECTRICAL DATA				EXPANSION VALVE		DISTRIBUTOR NOZZLE/ORIFICE	
FAN QUANTITY	FAN AMPS	DEFROST AMPS		TXV/EEV			
		1 PHASE	3 PHASE	PART NUMBER	MODEL NUMBER	PART NUMBER	TYPE
2	1.6	N/A	N/A	09-09342	EBFDE-A-C	-	L, #1/2





MSLD020MC CONDENSING UNIT



Note: Pictures are for illustration only,
and may not reflect the listed model.



GENERAL

REFRIGERANT	VOLTAGE	COMPRESSOR TYPE	COMPRESSOR MODEL	HP	AWEF	LISTINGS
R-448A/R-449A	208-230/60/3	Scroll	ZF07KAE-TF5	2	-	UL/CUL

BTUH CAPACITY (At Saturated Suction Temperature (SST) and 90° Ambient at Condenser)

-30	-20	-10	20	25	30	35	45
5,650	7,229	9,127	-	-	-	-	-

BTUH CAPACITY (At Saturated Suction Temperature (SST) and 100° Ambient at Condenser)

-30	-20	-10	20	25	30	35	45
4,859	6,434	8,123	-	-	-	-	-

DIMENSIONAL DATA

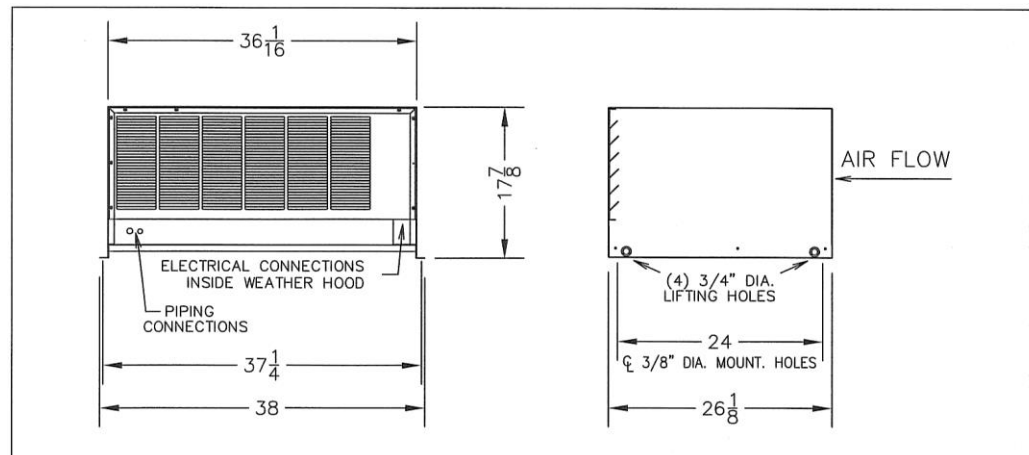
OVERALL (to nearest inch)			WT (lbs)	BASE SIZE	BASE/HOOD
L	W	H			
38	27	18	240	M2	021M

INSTALLATION

REFRIGERANT	RECEIVER TANK (lbs) 90%/90°F	CONNECTIONS		ESTIMATED TOTAL HEAT REJECTION (BTUH)
		LIQUID	SUCTION	
R-448A/R-449A	10.1	3/8	7/8	-

ELECTRICAL

MCA	MOP	COMP VOLTS	COMP PHASE	COMP HZ	COMP RLA	COMP LRA	OTHER LOAD DATA	
18	20	208-230	3	60	8.6	58	VOLTS	208-230
FAN PHASE	FAN HZ	FAN FLA	FAN HP	FAN QUANTITY	MAX EVAP FAN AMPS	MAX EVAP DEF HEATER AMPS	PHASE	1
1	60	0.5	1/20	2	6	15.0	AMPS	0.5





E1LD0076B-TE2

EVAPORATOR UNIT



Note: Pictures are for illustration only,
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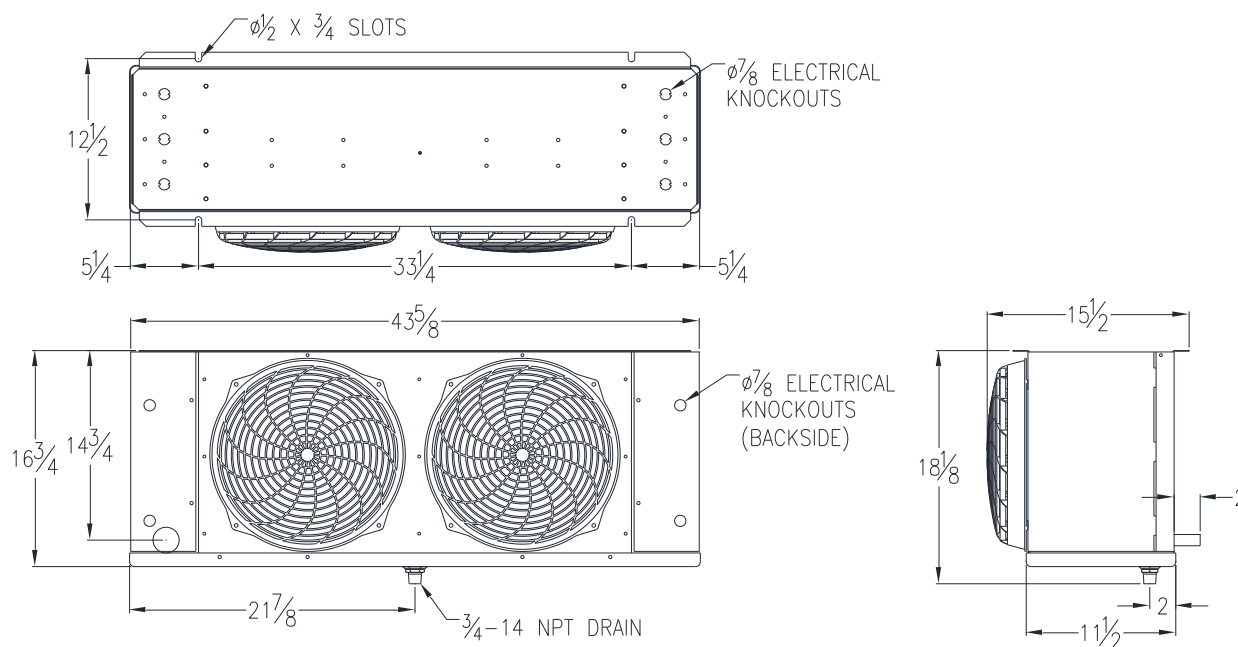


GENERAL					
REFRIGERANT	VOLTAGE	EVAPORATOR MODEL	DEFROST SCHEME	CONTROLLER	LISTINGS
R-448A/R-449A	208-230/60/1	WL6E066DDAS	ELECTRIC	THERMOSTAT	UL/CUL

BTUH CAPACITY (At Saturated Suction Temperature (SST) with 10° TD)							
-30	-20	-10	20	25	30	35	45
7,315	7,600	7,885	-	-	-	-	-

DIMENSIONAL DATA				INSTALLATION			
OVERALL (inches)			WT (lbs)	CONNECTIONS		REFRIGERANT TYPE	
L	W	H		LIQUID	SUCTION		
43.625	15.5	16.75	52	3/8	7/8	R-448A/R-449A	

EVAPORATOR ELECTRICAL DATA				EXPANSION VALVE		DISTRIBUTOR NOZZLE/ORIFICE	
FAN QUANTITY	FAN AMPS	DEFROST AMPS		TXV/EEV			
		1 PHASE	3 PHASE	PART NUMBER	MODEL NUMBER	PART NUMBER	TYPE
2	1.0	9.8	N/A	09-10578	EBFDE-A-ZP	-	L, #1





Profit from the Eagle Advantage®

Specification Sheet

Short Form Specifications

Eagle RediPak® (EAGLEbrite® Zinc, Chrome, Valu-Master® Gray Epoxy, Valu-Gard® Green Epoxy, EAGLEgard® Green Epoxy) Wire Shelving Unit, model _____. Patented QuadTruss® design wire shelves, two-piece post assemblies, and tapered split sleeves packaged in one complete box.



four-shelf unit

Options / Accessories

- ☐ Dividers
- ☐ Ledges

EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our SpecFAB® Division.

Phone: 302-653-3000 • Fax: 302-653-3091 • e-mail: specfab@eaglegrp.com

Item No.: _____
Project No.: _____
S.I.S. No.: _____

RediPak® Wire Shelving Units

MODELS:

- | | |
|------------------------------------|------------------------------------|
| <input type="checkbox"/> 1836*63 | <input type="checkbox"/> 2436*63 |
| <input type="checkbox"/> 1836*63-5 | <input type="checkbox"/> 2436*63-5 |
| <input type="checkbox"/> 1836*74 | <input type="checkbox"/> 2436*74 |
| <input type="checkbox"/> 1836*74-5 | <input type="checkbox"/> 2436*74-5 |
| <input type="checkbox"/> 1848*63 | <input type="checkbox"/> 2448*63 |
| <input type="checkbox"/> 1848*63-5 | <input type="checkbox"/> 2448*63-5 |
| <input type="checkbox"/> 1848*74 | <input type="checkbox"/> 2448*74 |
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| <input type="checkbox"/> 1860*63 | <input type="checkbox"/> 2460*63 |
| <input type="checkbox"/> 1860*63-5 | <input type="checkbox"/> 2460*63-5 |
| <input type="checkbox"/> 1860*74 | <input type="checkbox"/> 2460*74 |
| <input type="checkbox"/> 1860*74-5 | <input type="checkbox"/> 2460*74-5 |

* See charts on back for complete model numbers.

Design and Construction Features

- Patented QuadTruss® design (patent #5,390,803) makes shelves up to 25% stronger and provides a retaining ledge for increased stability and product retention.
- Available in 18" and 24" (457 and 610mm) widths and 36", 48" and 60" (914, 1219 and 1524mm) lengths.
- Complete shelving unit in one box.
- The combination of numerically-calibrated posts, tapered split sleeves, and shelf collars makes assembling these units a simple, three-step exercise:
 - 1) assemble two-piece post by threading top half onto bolt in lower half;
 - 2) snap split sleeves onto post over number of your choice;
 - 3) and slide shelf collar over split sleeves.
- A positive lock between shelf and post is created without the use of any tools.
- Shelving units may be adjusted or completely changed just as easily.
- Offered in five finishes: EAGLEbrite® zinc, chrome, Valu-Master® gray epoxy, Valu-Gard® green epoxy, and EAGLEgard® green epoxy.

Certifications / Approvals



Spec sheets available for viewing, printing or downloading from our online literature library at www.eaglegrp.com

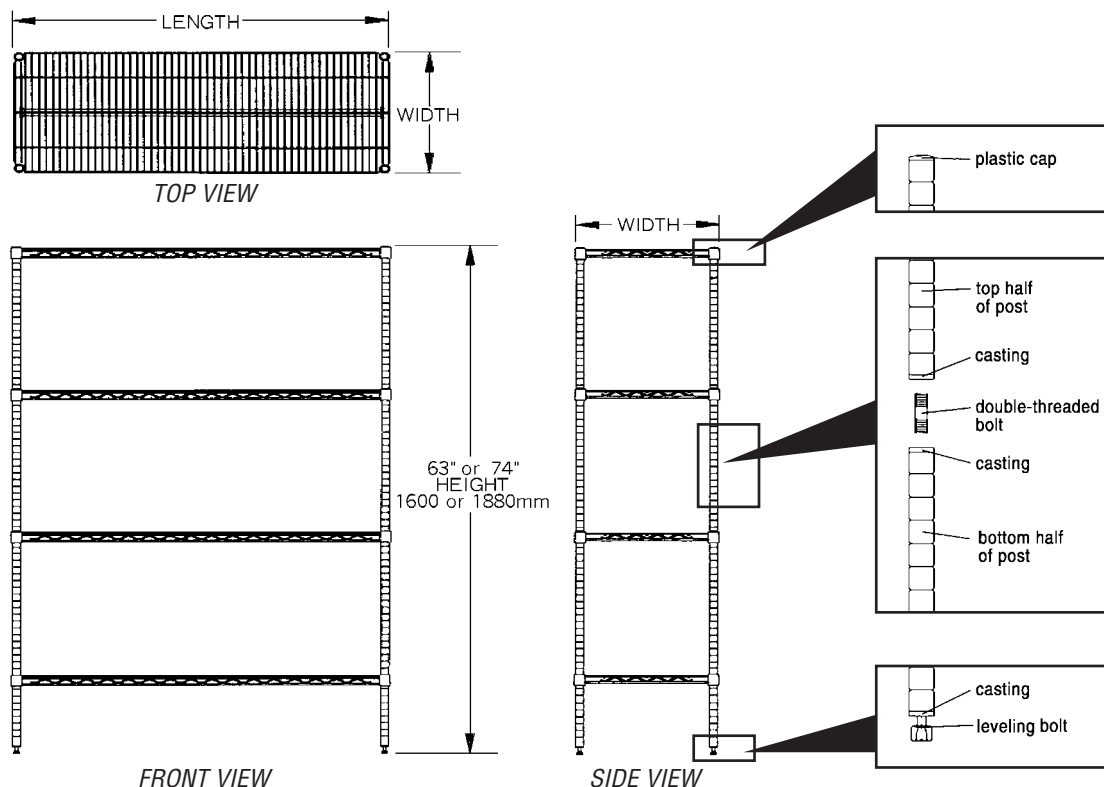
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Profit from the Eagle Advantage®

Item No.: _____
 Project No.: _____
 S.I.S. No.: _____

RediPak® Wire Shelving Units



4-Shelf Units Includes four wire shelves and four two-piece posts.

with 63" (1600mm) height					with 74" (1880mm) height					width		length		weight	
EAGLEbrite® model #	chrome model #	Valu-Master® model #	Valu-Gard® model #	EAGLEgard® model #	EAGLEbrite® model #	chrome model #	Valu-Master® model #	Valu-Gard® model #	EAGLEgard® model #	in.	mm	in.	mm	lbs.	kg
1836Z63	1836C63	1836V63	1836VG63	1836E63	1836Z74	1836C74	1836V74	1836VG74	1836E74	18"	457	36"	914	52	23.6
1848Z63	1848C63	1848V63	1848VG63	1848E63	1848Z74	1848C74	1848V74	1848VG74	1848E74	18"	457	48"	1219	64	29.0
1860Z63	1860C63	1860V63	1860VG63	1860E63	1860Z74	1860C74	1860V74	1860VG74	1860E74	18"	457	60"	1524	84	38.1
2436Z63	2436C63	2436V63	2436VG63	2436E63	2436Z74	2436C74	2436V74	2436VG74	2436E74	24"	610	36"	914	68	30.8
2448Z63	2448C63	2448V63	2448VG63	2448E63	2448Z74	2448C74	2448V74	2448VG74	2448E74	24"	610	48"	1219	80	36.3
2460Z63	2460C63	2460V63	2460VG63	2460E63	2460Z74	2460C74	2460V74	2460VG74	2460E74	24"	610	60"	1524	100	45.4

5-Shelf Units Includes five wire shelves and four two-piece posts.

with 63" (1600mm) height					with 74" (1880mm) height					width		length		weight	
EAGLEbrite® model #	chrome model #	Valu-Master® model #	Valu-Gard® model #	EAGLEgard® model #	EAGLEbrite® model #	chrome model #	Valu-Master® model #	Valu-Gard® model #	EAGLEgard® model #	in.	mm	in.	mm	lbs.	kg
1836Z63-5	1836C63-5	1836V63-5	1836VG63-5	1836E63-5	1836Z74-5	1836C74-5	1836V74-5	1836VG74-5	1836E74-5	18"	457	36"	914	61	27.7
1848Z63-5	1848C63-5	1848V63-5	1848VG63-5	1848E63-5	1848Z74-5	1848C74-5	1848V74-5	1848VG74-5	1848E74-5	18"	457	48"	1219	76	34.5
1860Z63-5	1860C63-5	1860V63-5	1860VG63-5	1860E63-5	1860Z74-5	1860C74-5	1860V74-5	1860VG74-5	1860E74-5	18"	457	60"	1524	101	45.8
2436Z63-5	2436C63-5	2436V63-5	2436VG63-5	2436E63-5	2436Z74-5	2436C74-5	2436V74-5	2436VG74-5	2436E74-5	24"	610	36"	914	81	36.7
2448Z63-5	2448C63-5	2448V63-5	2448VG63-5	2448E63-5	2448Z74-5	2448C74-5	2448V74-5	2448VG74-5	2448E74-5	24"	610	48"	1219	96	43.6
2460Z63-5	2460C63-5	2460V63-5	2460VG63-5	2460E63-5	2460Z74-5	2460C74-5	2460V74-5	2460VG74-5	2460E74-5	24"	610	60"	1524	121	54.9

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ND-2 Series

Exhaust Only Hood

CaptiveAire's Premier Canopy

The ND-2 Series is a Type I, Wall cooking surface temperatures. Includes a mechanical baffle and performance enhancing lip and containment.

REFER TO
PRELIMINARY SHOP
DRAWINGS

for 450°F, 600°F and 700°F cooking surface temperatures. Includes a mechanical baffle and containment.

Fully Integrated Package

CaptiveAire sells this hood as a stand-alone appliance to be integrated into a kitchen ventilation application, or provided as part of a FULLY INTEGRATED PACKAGE designed by CaptiveAire and pre-engineered for optimum performance. The package consists of the hood, an integral utility cabinet, factory pre-wired electrical controls, and a listed fire suppression system. Other options include a listed exhaust fan, a listed make-up air unit and listed, factory-built ductwork.

Advantages

- ▶ **Exhaust Flow Rates:** Superior exhaust flow rates. A 4' Hood can operate at 150 CFM/ft or 600 total CFM. Available in single or back-to-back configurations.
- ▶ **ETL Listed:** ETL Listed for use over 450°F, 600°F and 700°F cooking surface temperatures, which provides flexibility in designing kitchen ventilation systems. ETL Listed to US and Canadian safety standards, ETL Sanitation Listed and built in accordance with NFPA 96.
- ▶ **Capture and Containment:** Insulated, double-wall rigid front has aerodynamic design that reduces radiant heat into kitchen, prevents condensation and provides exceptional capture and containment of cooking vapors. This is accomplished with the signature ND-2 "mechanical baffle" on the front of the hood's capture area and the "C-shaped" design of the hood's capture area. Mechanical baffle provides a built-in wiring chase for optimal positioning of electrical controls and outlets on the front face of the hood without penetrating capture area or requiring external chase way.
- ▶ **Convenient Design:** Factory pre-wired lighting to illuminate the cooking surface is accessible from the bottom of the hood. Fitted with UL Listed, pre-wired, incandescent light fixtures and tempered glass globes to hold up to a standard 100 watt bulb. Pre-punched hanging angles on each end of hood and additional set provided for hoods longer than 12'.
- ▶ **Construction:** Polished stainless steel on the interior and exterior of the front enhance aesthetics. Fully welded and polished front corners. Fabricated from
- ▶ **Grease Extraction:** All hoods come standard with stainless steel baffle filters and a deep grease trough which allows for easy cleaning. Captrate Combo® and Captrate Solo® filters are optional. Grease drain system with removable 1/2 pint cup for easy cleaning. Standard filter stops eliminate gaps between filters.
- ▶ **Reduced Lead Times and Shipping Costs:** Produced on a high volume assembly line at one of six manufacturing facilities to reduce lead times and shipping costs.
- ▶ **Clearance to Combustibles:** Standard built in 3" rear standoff to meet NFPA 96 requirements, when installed in a wall application.
- ▶ **Controls:** Hoods can be equipped with modular utility cabinets and end standoffs. Optional listed light and fan control switches flush mounted and pre-wired through electrical chase way.
- ▶ **Optional Make-Up Air:** Make-up air can be supplied through optional front and/or side plenums (ND-2 Series with PSP or AC-PSP Accessory).
- ▶ **Optional Self Cleaning Technology:** The Self Cleaning Hood option adds a spray bar that extends the full length of the hood immediately behind the filters. The system cleans grease from the plenum and portion of the duct with the daily hot water spray cycle.
- ▶ **Optional CORE Protection:** The CORE Fire Protection System is an automatic, pre-engineered fire suppression system which is ETL listed to UL Standard

Type 430 stainless steel with option of Type 304 available.

- ▶ **Channels:** Hood comes standard with structural channels on top and wrapper channels on the bottom.
- ▶ **Reduced Weight:** Rigid single wall end panels reduce weight.

300. The CORE Protection System is designed to provide primary coverage for ventilating equipment including hoods, ducts, plenum and filters.

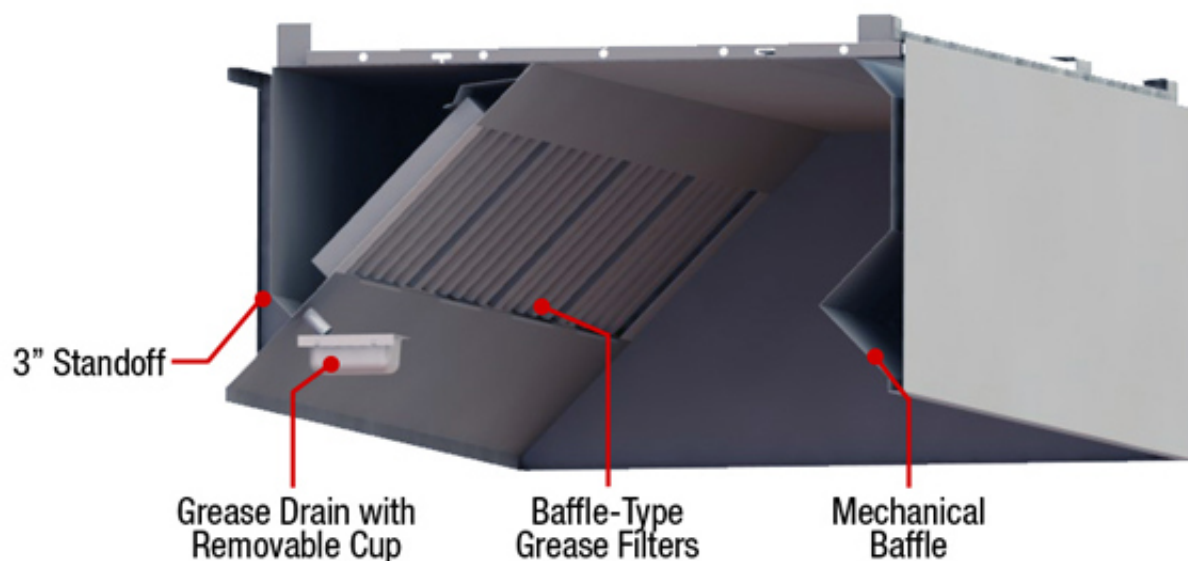
- ▶ **Optional Heat Recovery Coil:** This option is available for hoods with CORE Protection. A listed coil accessory can be added to the hood plenum to recover heat from the exhaust stream. Warm air in the exhaust stream passes over the coil and heats the cold water in the coil, acting as a preheater on the hot water supply line for the restaurant or facility.

Performance

AVG. COOKING SURFACE TEMP. (°F)	CONFIGURATION	MIN. EXHAUST CFM / FT.
450°F	Single Wall Hood 2 Wall Hoods Back-to-Back	150 300
600°F	Single Wall Hood 2 Wall Hoods Back-to-Back	200 400
700°F	Single Wall Hood 2 Wall Hoods Back-to-Back	250 500

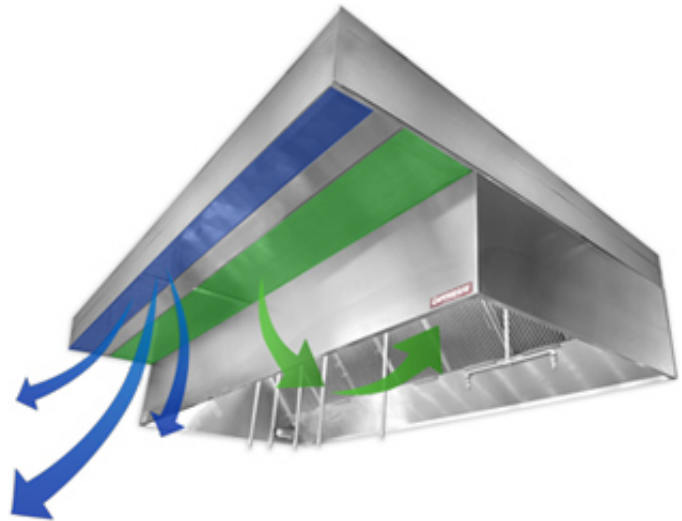
Recommended Duct Sizing: Exhaust - Based on 1500 FPM

Features



Optional Make-Up Air Accessory

- Provides the required make-up air for your kitchen system
- Delivers AC where it is needed most
- AC air does not interfere with the hoods capture and containment
- Convenient termination for AC ductwork in kitchen
- Stainless steel construction to match the ventilation hoods
- Insulated to prevent condensation
- Make-up plenum is located nearest the hood; the air conditioned plenum is away from the hood
- Make-up air stream and the air conditioned air stream are not permitted to mix until leaving the dual plenum
- Perforated, stainless steel diffuser plates provide even air distribution
- Optional LED Lights



Make-up air is evenly distributed along the length of the hood through the first plenum and **conditioned air** is delivered through the outer plenum.

Optional Vertical End Panels (VEP & WVEP)

Energy Savings

- VEPs provide improved capture and containment by directing effluents into the hood and blocking cross drafts
- Allows exhaust CFM reductions up to 18%
- Equivalent reduction in makeup air
- This saves on fan energy, make-up air heating/cooling energy
- Possible equipment downsizing, reduces upfront cost

Design

- Stainless steel matches hood finish
- Gas chase allows appliance lines to run between wall and end panel
- Double-wall insulated construction
- Adjustable feet
- May allow for a reduction in required side overhangs

Safety

- Encloses the hood area, preventing flames or embers from escaping
- Ensures equipment is not accidentally moved outside of the hood area
- Stainless steel construction for sanitation and longevity
- Legs raise bottom of panel off floor to allow room for cleaning

- Hemmed edges prevent sharp surfaces
 - Wide Vertical End Panels (WVEPs) provide an increased level of heat containment and fire protection, especially useful for high radiant load appliances such as solid fuel
-

Options

Utility Cabinet: Listed for integral side mount and fabricated of same material as hood. Cabinet can house listed fire suppression system and listed, pre-wired electrical controls.

Front Perforated Supply Plenum: Provides low velocity make-up air for the kitchen and is discharged in front of the hood. Perforated diffuser plates allow for even air distribution and supply riser includes a volume damper for easy balancing. Side Perforated Supply Plenums can be added to optimize the air flow if necessary.

Enclosure Panels: Constructed of stainless steel. Sized to extend from hood top to ceiling, enclosing pipe and hanging parts.

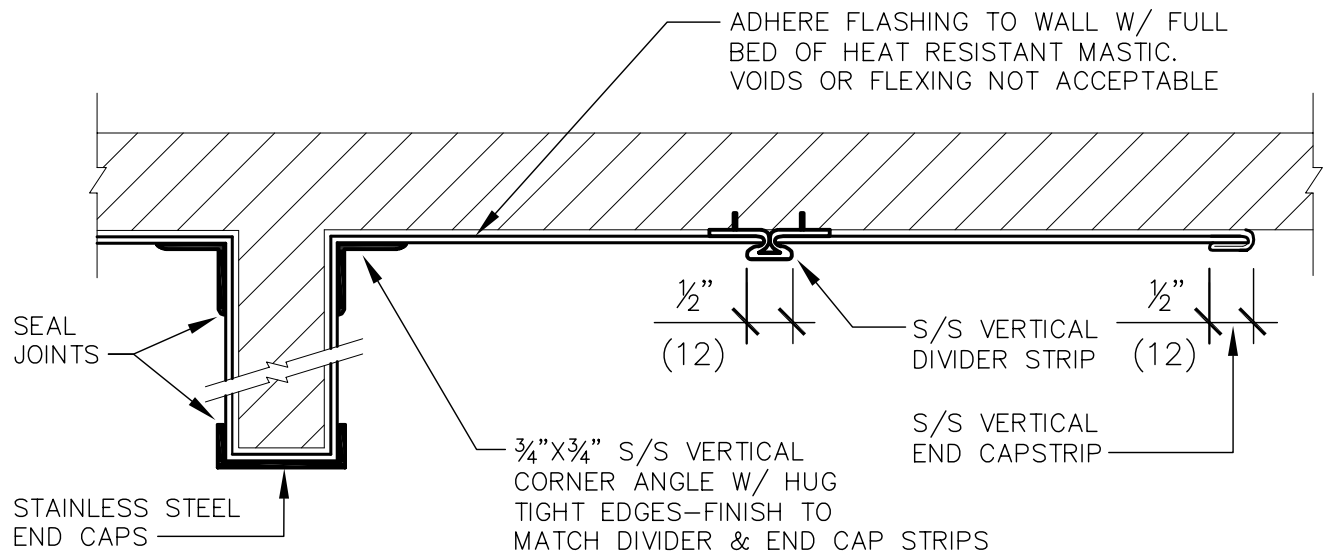
End Panels: Should be used to maximize hood performance and eliminate the effects of cross drafts in kitchen. units constructed of stainless steel and sized according to hood width and cooking equipment. Exposed edges hemmed for safety and rigidity.

Roof Top Package: Combination ETL Listed exhaust/supply air unit with factory prewired and mounted motors, trunkline and curb vented on exhaust side.

Separate Exhaust and/or Make-Up Air Fans: ETL Listed single exhaust fans and supply-air fans and curbs available.

Fire Suppression System: UL 300 fire suppression system.

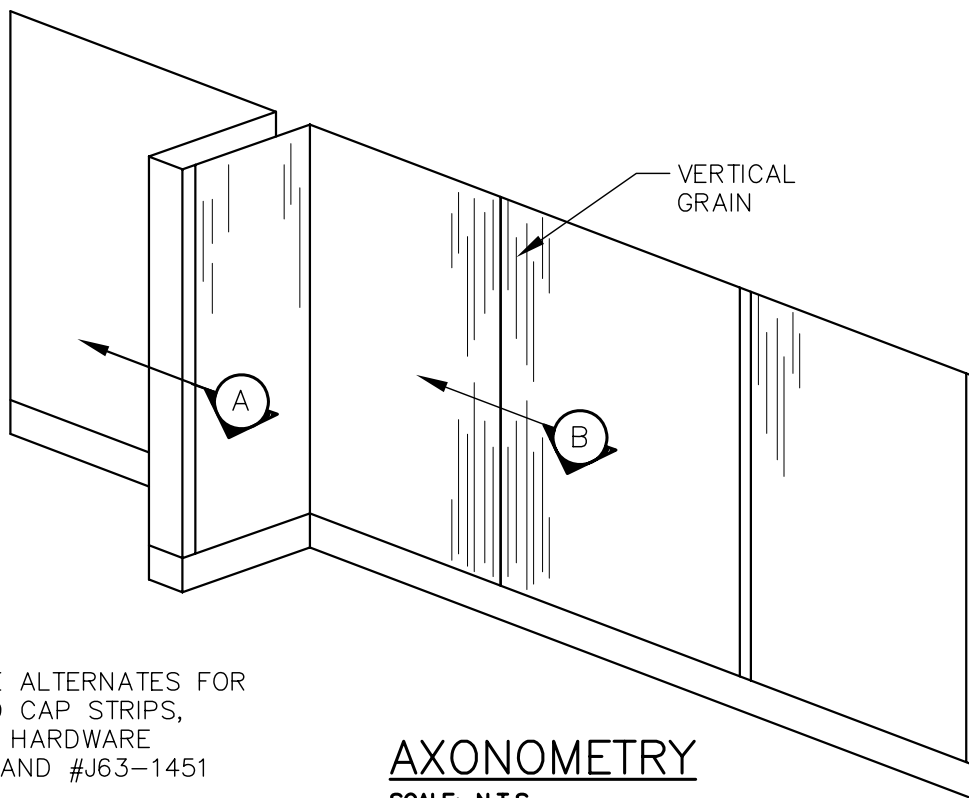
Lighting: Recessed Incandescent, Recessed Fluorescent, Compact Fluorescent, Recessed LED, Halogen

**SECTION A**

SCALE: N.T.S.

SECTION B

SCALE: N.T.S.



NOTE:
ACCEPTABLE ALTERNATES FOR
DIVIDER AND CAP STRIPS,
COMPONENT HARDWARE
#J64-1450 AND #J63-1451

AXONOMETRY

SCALE: N.T.S.

Clevenger Frable 
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN **LaVallee**
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

WALL FLASHING DETAIL

11-23-12

C-2-11



FOUR OPEN BURNER RANGE

TITAN FOUR OPEN BURNER RANGE



JTRH-4-36 with optional high riser.

DESCRIPTION:

Heavy duty open burner range, with oven below. To be model #JTRH _____ manufactured by Jade Range. Provided with four steel top grates. To have four 35,000 BTU/hr. cast iron open top burners controlled by infinite gas valves. One spill pan below all burners. To have 14 gauge all welded body with stainless steel front and sides. All gas tubing to be stainless steel throughout. To have 6" stainless steel adjustable legs.

SPECIFY BASE

☐ STANDARD OVEN

To have conventional oven base with stainless steel lining. Oven sides and bottom to be removable without tools. Provide with two oven racks. Thermostat to adjust from 150°F to 550°F with 35,000 BTU burner. Oven interior 28-1/4" W x 14" H x 27-3/4" D.

☐ CONVECTION OVEN

To have convection base with 14 gauge stainless steel interior. Provide with two oven racks. Thermostat to adjust from 150°F to 550°F with 30,000 BTU burner. Provide with 1/4 HP 115/60/1 blower motor. Oven interior 28" W x 13-3/4" H x 24-1/2" D.

SPECIFY TYPE OF GAS WHEN ORDERING.

SPECIFY ALTITUDE WHEN ABOVE 2,000 ft.

MODEL NO.

DESCRIPTION

<input type="checkbox"/> JTRH-4-36	4 OPEN BURNERS WITH OVEN
<input type="checkbox"/> JTRH-4-36C	4 OPEN BURNERS WITH CONVECTION OVEN

STANDARD FEATURES

- Four individual lift-off steel top grates
- Four 35,000 BTU/hr cast iron open burners
- Variable size multi-point gas connection—see utility information for details
- One stainless steel pilot per burner
- 14 gauge all welded body construction
- Stainless steel oven interior (bottom and sides removable without tools on standard oven)
- Two chrome plated oven racks (wires curled and welded around main frame with no sharp ends)
- Oven control located in cool zone
- Stainless steel gas tubing throughout
- Stainless steel front, sides and stub back
- Stainless steel adjustable 6" legs
- Stainless steel tray bed
- Stainless steel 6" plate shelf
- 3/4" gas regulator (shipped loose, must be installed for proper operation)

AVAILABLE OPTIONS

- ☐ Stainless steel high riser
- ☐ Stainless steel double high riser
- ☐ Stainless steel high shelf
- ☐ Stainless steel double high shelf
- ☐ Stainless steel tubular high shelf
- ☐ Stainless steel tubular double high shelf
- ☐ Common plate shelf with Item(s) Model(s) _____
- ☐ Cap and cover manifold. Left ☐ Right ☐

ACCESSORIES

- ☐ 6" casters, front two locking (5" diameter wheel)
- ☐ 36" flex hose with quick disconnect (3/4" connection)
- ☐ 48" flex hose with quick disconnect (3/4" connection)
- ☐ 1" gas pressure regulator (specify gas type)
- ☐ 1-1/4" gas pressure regulator (specify gas type)
- ☐ Additional oven rack (two supplied with range)



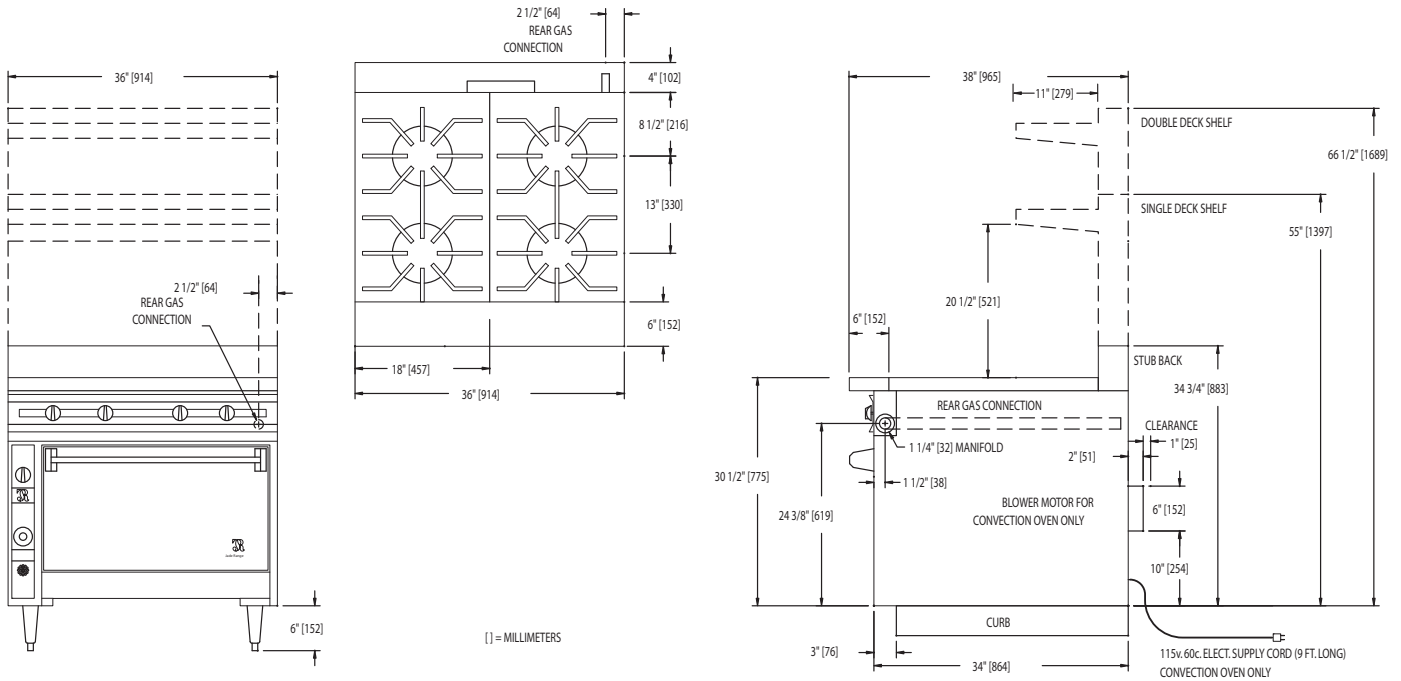
WWW.JADERANGE.COM

JADE RANGE, LLC., A MIDDLEBY COMPANY • 2650 Orbiter Street • Brea, CA 92821 • PHONE: 800-884-5233 FAX: 714-961-2550
Note: In line with their policy to continually improve products, Jade reserves the right to change materials and specifications without notice. PRINTED IN USA

JADE



FOUR OPEN BURNER RANGE



MODEL	BTUS	WIDTH	DEPTH	HEIGHT	APPX. SHP. WT.
JTRH-4-36	175,000	36"	38"	SEE DRAWING	680 LBS.
JTRH-4-36C	170,000	36"	38"	SEE DRAWING	730 LBS.

CONVECTION OVEN ONLY:

- Power Supply: 115/60/1 - 6 foot cord with 3 prong plug
- Total maximum amps 4.0/oven
- Electronic Spark Ignitor: activated by power switch, ignites standing pilot
- Fan Switch: three positions, on for normal operation, on for quick cool down, off.

NOTE: SPECIFY TYPE OF GAS WHEN ORDERING.

UTILITY INFORMATION:

- Ranges are supplied with 1-1/4" front manifold connection and a 1" or 3/4" capped rear manifold connection. For rear manifold connection, remove cap. Ranges are supplied with 3/4" gas pressure regulator. For 1-1/4" or 1" gas pressure regulator, see accessories. (Specify required front manifold cap and cover when ordering.)
- Required operating pressure:
Natural Gas 5" W.C. minimum
Propane Gas 10" W.C. minimum
14" W.C. maximum

Note: This unit must be connected with the gas appliance regulator supplied.



THERMOSTATICALLY CONTROLLED GRIDDLES

THERMOSTATICALLY CONTROLLED GRIDDLES



JGT-2436



JGT-2436-F

DESCRIPTION

Thermostatically controlled griddle to be Model #JGT-_____ manufactured by Jade Range. To have 24" deep highly polished steel plate 1" thick and one thermostatically controlled 30,000 BTU/hr. burner, each 12" of griddle. Provide stainless steel pitched gutter with full 2" x 3" drain. Furnish 3" high stainless steel rear and side splashes. To be of 14 gauge stainless steel all welded construction with stainless steel front, plate shelf, pilot tips, gas tubing throughout and legs with adjustable feet. Unit will have a 3/4" gas regulator.

OPEN BURNERS

Two 30,000 BTU cast iron open burners per 12" section with one 12" x 24". Lift-off cast iron top grate, each to have one stainless steel pilot per burner.

SPECIFY TYPE OF GAS WHEN ORDERING.

SPECIFY ALTITUDE WHEN ABOVE 2,000 FT.

MODEL NO.

DESCRIPTION

<input type="checkbox"/> JGT-2424	24" WIDE THERMO-GRIDDLE
<input type="checkbox"/> JGT-2436	36" WIDE THERMO-GRIDDLE
<input type="checkbox"/> JGT-2448	48" WIDE THERMO-GRIDDLE
<input type="checkbox"/> JGT-2460	60" WIDE THERMO-GRIDDLE
<input type="checkbox"/> JGT-2472	72" WIDE THERMO-GRIDDLE
<input type="checkbox"/> JGT-2484	84" WIDE THERMO-GRIDDLE
<input type="checkbox"/> FLOOR MODEL	ADD "-F" TO END OF MODEL NUMBER
<input type="checkbox"/> 2 OPEN BURNERS	ADD "-2" TO MODEL NUMBER (INCREASES WIDTH BY 12")
<input type="checkbox"/> 4 OPEN BURNERS	ADD "-4" TO MODEL NUMBER (INCREASES WIDTH BY 24")
<input type="checkbox"/> 6 OPEN BURNERS	ADD "-6" TO MODEL NUMBER (INCREASES WIDTH BY 36")
<input type="checkbox"/> BURNERS ON LEFT	ADD "L" BEHIND NUMBER OF BURNERS ADDED

Example: JGT-2436-2L-F: Floor model thermostatic griddle 36" wide with two open burners on left. (Burners are standard on right).

STANDARD FEATURES

- Stainless steel sides, front, and plate shelf
- Full 24" deep highly polished steel plate 1" thick
- One thermostatically controlled 30,000 BTU/hr. burner every 12" of griddle.
- Stainless steel pitched gutter with 2" x 3" drain
- 3" high stainless steel rear and side splashes
- 14 gauge stainless steel all welded construction
- Stainless steel legs welded into the frame
- High capacity 14 gauge welded drip tray
- Stainless steel gas tubing throughout
- Stainless steel pilot tips resist corrosion
- 3/4" gas regulator, included

OPTIONS & ACCESSORIES

- ☐ Stainless steel 8" extended plate shelf
- ☐ 8" deep cutting board, ☐ Poly
- ☐ 6" casters, front two locking (floor models only)
- ☐ 36" flex hose with quick disconnect & restraining device
- ☐ 48" flex hose with quick disconnect & restraining device

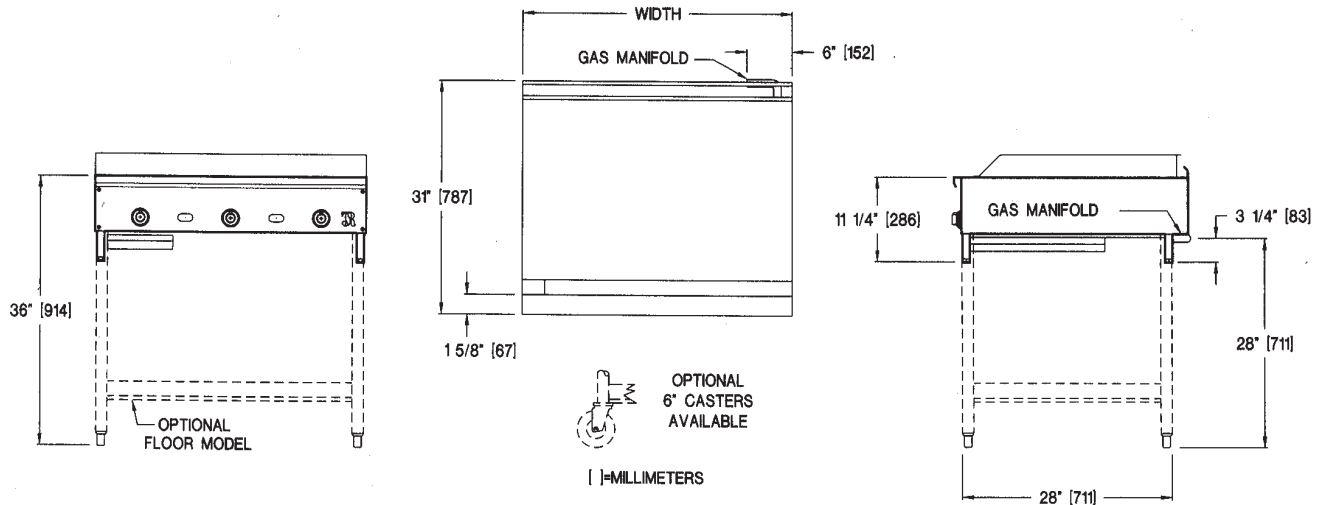
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THERMOSTATICALLY CONTROLLED GRIDDLES



MODEL	BTUS	WIDTH	DEPTH	HEIGHT	APPX. SHP. WT.	APPX. CUBE COUNTER/FLOOR
JGT-2424	60,000	24"	31"	SEE DRAWING	260 LBS.	15/24
JGT-2436	90,000	36"	31"	SEE DRAWING	350 LBS.	21/38
JGT-2448	120,000	48"	31"	SEE DRAWING	450 LBS.	27/49
JGT-2460	150,000	60"	31"	SEE DRAWING	520 LBS.	33/62
JGT-2472	180,000	72"	31"	SEE DRAWING	630 LBS.	39/72
JGT-2484	210,000	84"	31"	SEE DRAWING	750 LBS.	45/83
OPEN BURNER SECTIONS						
-2	30,000*	12"*	31"	SEE DRAWING	80 LBS.*	
-4	60,000*	24"*	31"	SEE DRAWING	140 LBS.*	
-6	90,000*	36"*	31"	SEE DRAWING	210 LBS.*	

* Add to above units respective quantities.

NOTE: SPECIFY TYPE OF GAS WHEN ORDERING.

UTILITY INFORMATION:

- 3/4" Connection
- Required operating pressure:
Natural Gas 5" W.C. minimum
Propane Gas 10" W.C. minimum
14" W.C. maximum

Note: This unit must be connected with the gas appliance regulator supplied.



DURAPAN™ SERIES

GAS, OPEN OR MODULAR BASE,
30 & 40 GALLON (115 & 150 LITER)

Project _____
Item _____
Quantity _____
FCSI Section 11400 _____
Approved _____
Date _____

Braising Pans / Tilting Skillets

Models

- SGL-30-TR • SGM-30-TR
- SGL-40-TR • SGM-40-TR



Open base model shown

- Adjustable, Electronic Thermostat controls temperature from 100°F to 425°F
- High Efficiency Heating System with even heat distribution
- Electronic Spark Ignition (ESS)
- Fast Heat-Up and Recovery Time-Preheats in 11 minutes, full capacity from cold to boiling in 60 minutes
- Spring Assist Cover with Adjustable Vent and Full Width Handle
- On/Off Switch, Thermostat Knob and Pilots, recessed to avoid breakage
- Four Stainless Steel, Level adjustable feet, rear flanged for bolting
- All Controls are serviceable from the front of the unit
- Two pilot lights; Green = Power on, Amber = Temperature Cycling
- Meets IPX6 Water Rating Requirements
- High Limit Safety Device set at 475°F (246°C)
- Anti-Splash Pouring Lip
- Supplied with Cord & Plug for 115-volt controls
- Typical approvals include AGA, CSA, CE and NSF

Short Form Specifications

Shall be CLEVELAND, Tilting Skillet;
Model SG _____ - _____ - TR gas
(TYPE _____) - holding no less than _____
gallons (_____ liters); complete with
Thermostatic Safety and Gas Controls; Gallon
Markings; Stainless Steel Clad 5/8" Cooking
Surface; Hand Tilt; Spring Assist Cover with
adjustable Vent. All Stainless Steel
Construction.

Standard Features

- Leg or Modular Base
- Full 30/40 Gallon (115/150 Liters) Capacity Rating to Bottom of Pouring Lip
- Hydraulic Hand Tilt with quick lowering feature (HTS)
- Stainless Steel Clad 5/8" Cooking Surface Guaranteed against warping
- Stainless Steel Coved Cornered Pans with both Gallon and Liter Markings
- All Stainless Steel Construction for durability and easy cleaning

Options & Accessories

- Sliding Drain Drawer with Splash Screen (SLD) (for SGL models only)
- Power Tilt with Hand Tilt Override (PT1)
- Double or Single Pantry Faucet (SPS14, DPS14), includes Faucet Mounting Bracket
- Double or Single Pantry Skillet Filler with 60" hose (SKF-S or DKF-S)
- Hot & Cold Water Pre-Rinse Spray Head with Hose (PRS-S)
- Gas types other than natural
- Voltage Option:
- VOSK4, 220/240 Volt, 50 Hz, 1 Phase - for export
- Food Strainers for pouring spout (FS)
- Vegetable Steamers (VS)
- Poaching Pans (PP)
- Wall Mounting (WMS)
- In-Wall Carrier (IWCS)
- Pan Carriers (PCS), not available on 30 gallon models with a Tangent Draw-Off Valve
- 2" Tangent Draw-Off Valve (TD2), left side only

KE004046-93 rev B



DIMENSIONS

MODEL	A	B	C	D	E	G
SGL-30-TR	36" (915mm)	32" (812mm)	9" (229mm)	5" (127mm)	20" (508mm)	32 7/8" (835mm)
SGL-40-TR	48" (1220mm)	44" (1118mm)	12 1/8" (308mm)	8" (203mm)	22" (559mm)	44 7/8" (1140mm)

SPECIFICATIONS

ELECTRICAL SUPPLY (6' CORD & PLUG)			GAS SUPPLY (PIPING 3/4" NPT)		CLEARANCE	
VOLTS:	120	220/240	TYPE: NAT or LP		MIN. TO COMBUSTABLE SURFACES:	
PHASE:	1	1	WATER COLUMN: 4.5 (NAT), 10.5 (LP)		SIDES: 0, REAR: 6" (153mm)	
AMPS:	1.8	.83	BTU PER CU. FT.: 1000 (NAT), 2500 (LP)		MIN. TO NON COMBUSTABLE SURFACES: SIDES & REAR: 0	
FREQ:	60 HZ	50 HZ	SUPPLY PRESSURE: 5" W.C. MIN (NAT), 11" W.C. MIN (LP)		NOTE: 4 1/2" (115mm) required on right hand side for faucet	
			BTU RATINGS: SGL-30-TR: 91,000 per hour SGL-40-TR: 130,000 per hour			



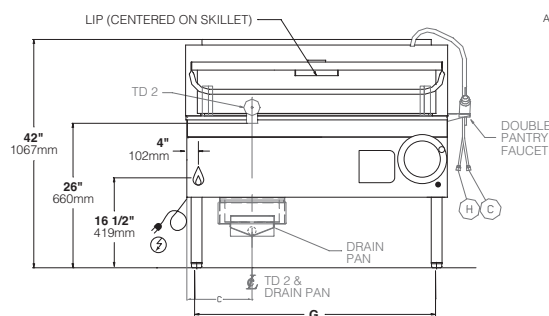
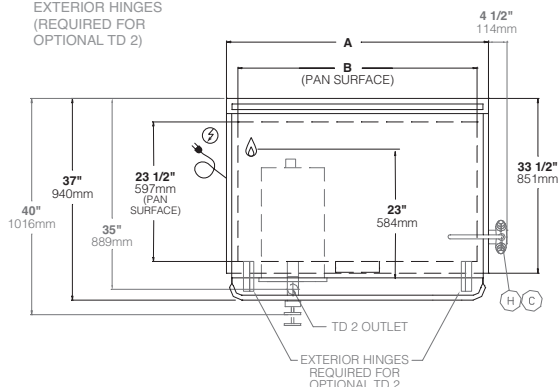
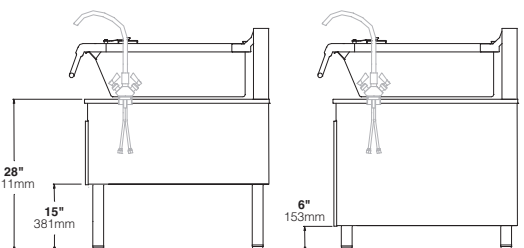
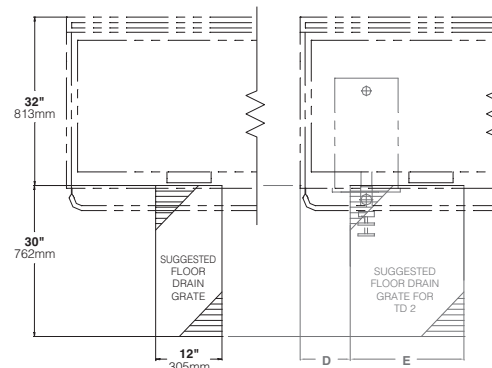
EXTERIOR HINGES
(REQUIRED FOR
OPTIONAL TD 2)

Shipping Weights & Dimensions

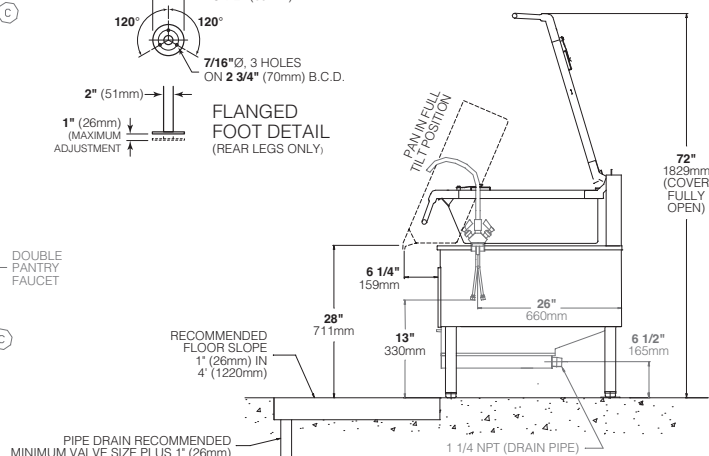
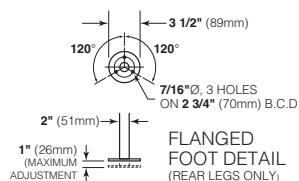
Model -	
SGL30TR	Weight - 504 lbs Width - 44" Depth - 44" Height - 54"
SGL40TR	Weight - 624 lbs Width - 48" Depth - 58" Height - 54"

CAPACITIES

In 4 oz. servings. Other sizes may be calculated.
30 gallons / 115 Liters 960
40 gallons / 150 Liters 1280



NOTE: NON STANDARD ITEMS ARE SHOWN IN GRAY



NOTES:

Cleveland Range reserves right of design improvement or modification, as warranted.
Many regional, state and local codes exist and it is the responsibility of the owner and installer to comply with the codes.
Cleveland Range equipment is built to comply with applicable standards for manufacturers. Included among those approval agencies are U.L., NSF, CGA, CSA, ETL and others.

(NOT TO SCALE)

Braising Pans / Tilting Skillets



ASFT

Anti-Spill Floor Trough

General Information

Project Name: _____

Consultant: _____

Item #: _____

Model #: _____

Quantity: _____



Shown with
Subway Grating (SG)



Specifications

ASFT Floor Troughs are 14GA type 300 series stainless steel. Horizontal corners are coved and the trough is integrally pitched toward a waste outlet with a stainless steel beehive strainer and a 4" OD tailpiece.

Anti-Spill features are built into the trough, which is 6" deep.

Recessed flange and 1" deep ledge for IMC grating are integral with the unit.

Joints are TIG welded and leak-proof. Exposed surfaces finished brush satin.

Product Guide

Use in Commercial and Institutional Buildings or large food prep facilities for high volume, rapid discharge application.

Anti-Spill feature directs splashing waste water to inside corners of the trough away from the equipment.

Recessed outer flange supports floor tile and provides a grout pocket.

Setting frame for waterproof membrane and/or integral seepage flange with "weep" holes can be added for wet floor areas.

Extension arms and intersections available for multiple equipment layout.

Options*

- ☐ **DOD** - 3", 3½", 5", 6", 8" OD Tube (circle one)
- ☐ **WTO** - Waste Tube over 3" Long
- ☐ **AW** - Additional Wastes
- ☐ **WCP** - Waste Cup Strainers
- ☐ **BH** - Beehive Strainers (Each)
- ☐ **OCW** - Off Center Waste (Each)
- ☐ **ST12** - Scrap Tray Up to 18" Wide
- ☐ **PWT** - Perforated Waste Pipe
- ☐ **SF-2** - Special Size Setting Flange 2" Deep
- ☐ **SF-4** - Special Size Setting Flange 2" to 4" Deep
- ☐ **OWT** - Oversize Waste Tube
- ☐ **FSG** - Seepage Flange w/ Weep Holes
- ☐ **ST20** - Scrap Tray 20" Long
- ☐ **DSE** - Drain on the End
- ☐ **ROD** - Rim on Drain
- ☐ **BSPC** - Basket Strainer w/ Handle & Chain
- ☐ **BXD** - Box Type Drain
- ☐ **BSX** - Beehive Strainer for Box Drain
- ☐ **GA-12** - 12GA Upgrade

*See Price List for Complete Options

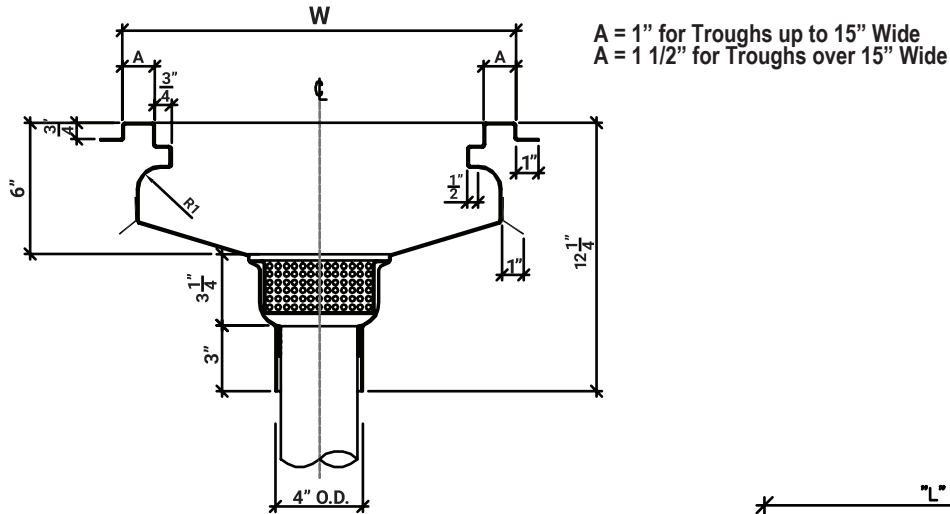
ASFT-90 0321



ASFT

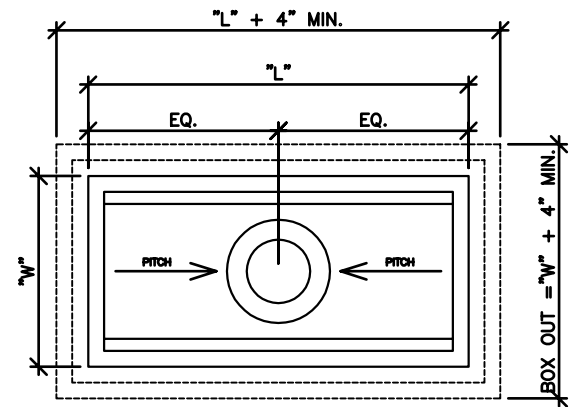
Anti-Spill Floor Trough

DRAWINGS



A = 1" for Troughs up to 15" Wide
A = 1 1/2" for Troughs over 15" Wide

Box Out Size



Trough Area

- Width (PIT) = Width ("W") + 4" Minimum
- Length (PIT) = Length ("L") + 4" Minimum
- Depth (PIT) = Depth of Trough + 1/2" + Finish Floor
- Size of Rough-In Hole For Drains 7 1/2" Ø Minimum

ANTI-SPILL FLOOR TROUGHS

Model	Size (W x L)	Model	Size (W x L)	Model	Size (W x L)	Model	Size (W x L)
□ ASFT-1218	12" x 18"	□ ASFT-1824	18" x 24"	□ ASFT-2430	24" x 30"	□ ASFT-3036	30" x 36"
□ ASFT-1224	12" x 24"	□ ASFT-1830	18" x 30"	□ ASFT-2436	24" x 36"	□ ASFT-3048	30" x 48"
□ ASFT-1230	12" x 30"	□ ASFT-1836	18" x 36"	□ ASFT-2448	24" x 48"	□ ASFT-3060	30" x 60"
□ ASFT-1236	12" x 36"	□ ASFT-1848	18" x 48"	□ ASFT-2460	24" x 60"	□ ASFT-3072	30" x 72"
□ ASFT-1248	12" x 48"	□ ASFT-1860	18" x 60"	□ ASFT-2472	24" x 72"	□ ASFT-3084	30" x 84"
□ ASFT-1260	12" x 60"	□ ASFT-1872	18" x 72"	□ ASFT-2484	24" x 84"	□ ASFT-3096	30" x 96"
□ ASFT-1272	12" x 72"	□ ASFT-1884	18" x 84"	□ ASFT-2496	24" x 96"	□ ASFT-30108	30" x 108"
□ ASFT-1284	12" x 84"	□ ASFT-1896	18" x 96"	□ ASFT-24108	24" x 108"	□ ASFT-30120	30" x 120"
□ ASFT-1296	12" x 96"	□ ASFT-18108	18" x 108"	□ ASFT-24120	24" x 120"		
□ ASFT-12108	12" x 108"	□ ASFT-18120	18" x 120"	□ ASFT-3024	30" x 24"		
□ ASFT-12120	12" x 120"	□ ASFT-2424	24" x 24"	□ ASFT-3030	30" x 30"		

Note - Standard troughs up to 96" have one (1) waste at center. Over 96", troughs have two (2) wastes equidistant.

Specifications subject to change without notice.

ASFT-90 0321



DFG-100-ES

**Full-Size, Standard Depth
Dual Flow Gas Convection Oven**



OPTIONS AND ACCESSORIES

(AT ADDITIONAL CHARGE)

■ Legs, casters & stands

- ☐ 6" (152mm) seismic legs
- ☐ 6" (152mm) casters
- ☐ 4" (102mm) low profile casters (double only)
- ☐ 25" (635mm) stainless steel stand w/rack guides
- ☐ 29" (737mm) stainless steel, fully welded open stand with pan supports

■ Controls

- ☐ SSI-D - Solid state infinite control w/digital timer
- ☐ SSI-M - Solid state infinite control w/manual timer
- ☐ SimpleTouch - NEW touchscreen control with ability to store and group recipes. Includes rack timing, Cook&Hold, Fan Delay, Fan Pulse, and HACCP storage capability

■ Gas hose w/quick disconnect restraining device:

- ☐ 48" (1219mm) hose
- ☐ 36" (914mm) hose
- ☐ Stainless steel oven liner
- ☐ Extra oven racks
- ☐ Stainless steel solid back panel
- ☐ Gas manifold (for double sections)
- ☐ Prison package (includes security control panel and stainless steel back)
- ☐ Flue connector
- ☐ Direct vent

OPTIONS AND ACCESSORIES

(AT NO ADDITIONAL CHARGE)

- ☐ Solid stainless steel doors

Project _____

Item No. _____

Quantity _____

Standard depth baking compartment - accepts five 18" x 26" standard full-size baking pans in left-to-right positions. All data is shown per oven section, unless otherwise indicated.

Refer to operator manual specification chart for listed model names.

EXTERIOR CONSTRUCTION

- Full angle-iron frame
- Stainless steel front, top, and sides
- Dual pane thermal glass windows encased in stainless steel door frames
- Powder coated door handle with simultaneous door operation
- Triple-mounted pressure lock door design with turnbuckle assembly
- Ball bearing slide out front control panel for easy cleaning
- 1" solid block plus 1" mineral fiber insulation for a total of 2" of insulation

INTERIOR CONSTRUCTION

- Double-sided porcelainized baking compartment liner (16 gauge)
- Stainless steel combustion chamber
- Single inlet blower wheel
- Five chrome-plated racks, eleven rack positions with a minimum of 1-5/8" (41mm) spacing
- Interior halogen lights

OPERATION

- Direct fired gas system
- Electronic spark ignition control system
- Removable inshot burners
- Internal pressure regulator
- Manual gas service cut-off switch located on the front of the control panel
- Solid state thermostat with temperature control range of 200°F (93°C) to 500°F (260°C)
- Two speed fan motor
- 3/4 horsepower blower motor with automatic thermal overload protection
- Control area cooling fan

STANDARD FEATURES

- SSD - Solid state digital control with LED display, Cook & Hold and Pulse Plus®
- 25" (635mm) adjustable stainless steel legs (for single units)
- 6" (152mm) adjustable stainless steel legs (for double sections)
- Three year parts and two year labor warranty
- Five year limited oven door warranty*

** For all international markets, contact your local distributor.*

NOTE: The company reserves the right to make substitutions of components without prior notice

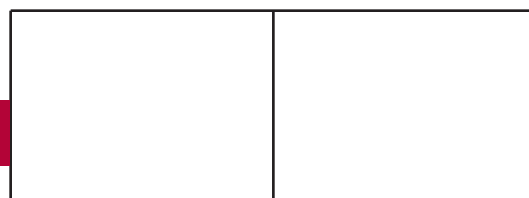


www.blodgett.com

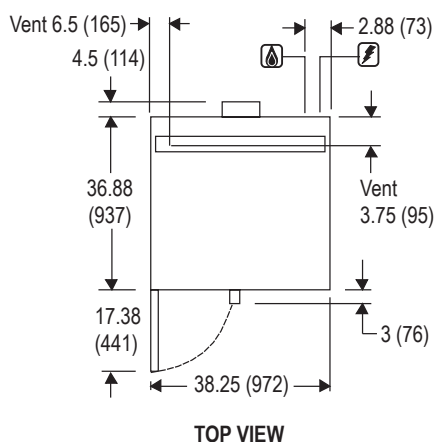
42 Allen Martin Drive, Essex Junction, VT 05452
Phone: (802) 658-6600 | Fax: (802) 864-0183



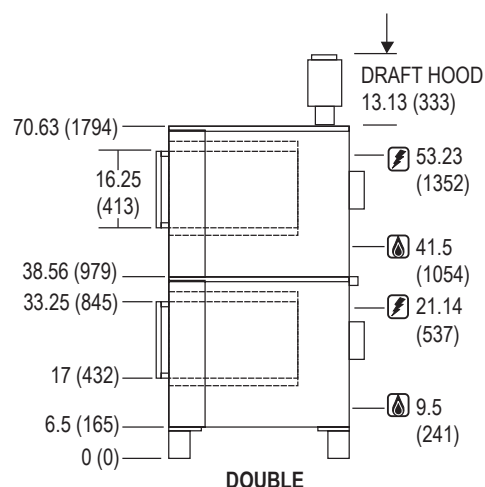
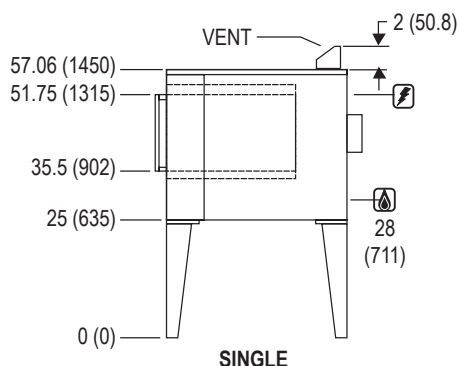
DFG-100-ES



APPROVAL/STAMP



DIMENSIONS ARE IN INCHES (MM)



SHORT FORM SPECIFICATIONS Provide Blodgett full-size convection oven model DFG-100-ES, (single/double) compartment. Each compartment shall have (porcelainized/stainless) steel liner and shall accept five 18" x 26" standard full-size bake pans. Stainless steel front, top and sides. Doors shall be (solid stainless steel/dual pane thermal glass windows) with single powder coated handle and simultaneous operation. Unit shall be gas heated with electronic spark ignition and shall cook by means of a direct fired system with a gas shutoff switch on the front of the control panel. Air in baking chamber distributed by single inlet blower wheel powered by a two-speed, 3/4 HP motor with thermal overload protection. Each chamber shall be fitted with two halogen lamps, and five chrome-plated removable racks. Control panel shall be recessed with solid state digital control with LED display, Cook & Hold and Pulse Plus. Provide three years parts, two year labor and five year door warranty. Provide options and accessories as indicated.

DIMENSIONS

Floor space	38-1/4" (972mm) W x 36-7/8" (937mm) D
Interior	29" (737mm) W x 20" (508mm) H x 24-1/4" (616mm) D
If oven is on casters	
Single	Add 4-1/2" (114mm) to height
Double	Height dimensions remain the same
Double Low Profile	Subtract 2.5" (64mm) from all height dimensions

PRODUCT CLEARANCE

From combustible and non-combustible construction

0" (0)mm)

MINIMUM ENTRY CLEARANCE

Uncrated	32-1/16" (814mm)
Crated	37-1/2" (953mm)

SHIPPING INFORMATION

Approx. Weight

Single	600 lbs. (273 kg)
Double	1295 lbs. (589 kg)

Crate Size

37-1/2" (952mm) x 43-1/2" (1105mm) x 51-3/4" (1315mm)
(2 crates required for double)

GAS SUPPLY (per section)

3/4" NPT

Inlet Pressure

Natural Gas	7.0" W.C. min. – 10.5" W.C. max.
Propane	11.0" W.C. min. – 13.0" W.C. max.

Manifold Pressure

Natural Gas	3.5" W.C.
Propane	10" W.C.

MAXIMUM INPUT

45,000 BTU/hr (13.2 Kw) per oven section

POWER SUPPLY

115 VAC, 1 phase, 8 Amp, 60 Hz., 2-wire with ground, 3/4 H.P., 2 speed motor, 1120 and 1680 RPM

6' (1.8m) electric cord set furnished on 115 VAC ovens only.

230V CE model, 1 phase, 3 Amp, 50 Hz., 2-wire with ground, 1/2 H.P., 2 speed motor, 1440/930

R-102™ RESTAURANT FIRE SUPPRESSION SYSTEMS

Data/Specifications



FEATURES

- Low pH Agent
- Proven Design
- Reliable Cartridge Operated
- Aesthetically Appealing
- UL Listed – Meets Requirements of UL 300
- ULC Listed – Meets Requirements of ULC/ORD-C1254.6

APPLICATION

The ANSUL® R-102™ Restaurant Fire Suppression System is an automatic, pre-engineered, fire suppression system designed to protect the following areas associated with cooking equipment; ventilating equipment including hoods, ducts, plenums, and filters; fryers; griddles and range tops; upright, natural charcoal, or chain-type broilers; electric, lava rock, mesquite or gas-radiant char-broilers and woks.

The system is ideally suitable for use in restaurants, hospitals, nursing homes, hotels, schools, airports, and other similar facilities.

Use of the R-102 system is limited to interior applications only. The regulated release and tank assemblies must be mounted in an area where the air temperature will not fall below 32 °F (0 °C) or exceed 130 °F (54 °C). The system must be designed and installed within the guidelines of the UL/ULC Listed Design, Installation, Recharge, and Maintenance Manual.

SYSTEM DESCRIPTION

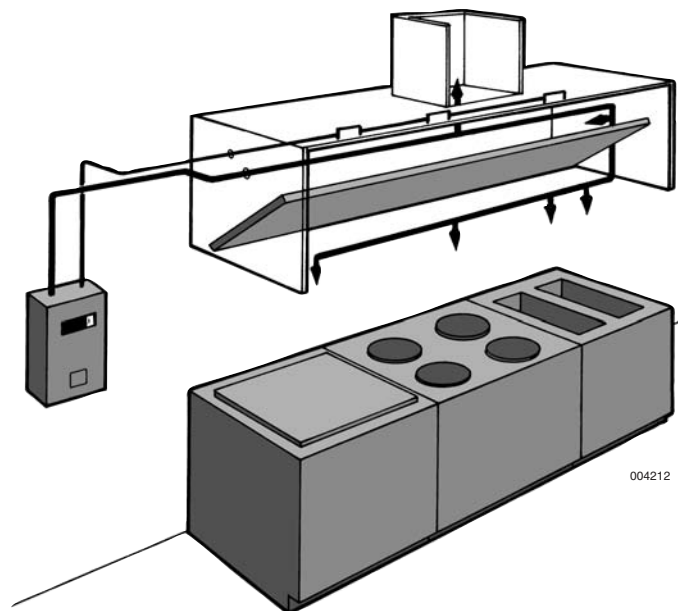
The restaurant fire suppression system is a pre-engineered, wet chemical, cartridge-operated, regulated pressure type with a fixed nozzle agent distribution network. It is listed with Underwriters Laboratories, Inc. (UL/ULC).



004215

The system is capable of automatic detection and actuation and/or remote manual actuation. Additional equipment is available for mechanical or electrical gas line shut-off applications.

The detection portion of the fire suppression system allows for automatic detection by means of specific alloy rated fusible links, which, when the temperature exceeds the rating of the link, the link separates, allowing the regulated release to actuate.



004212

A system owner's guide is available containing basic information pertaining to system operation and maintenance. A detailed technical manual is also available including system description, design, installation, recharge, and maintenance procedures, plus additional equipment installation and resetting instructions.

The system is installed and serviced by authorized distributors that are trained by the manufacturer.

The basic system consists of an ANSUL AUTOMAN® regulated release assembly which includes a regulated release mechanism and a wet chemical storage tank housed within a single enclosure. Nozzle blow-off caps, detectors, cartridges, agent, fusible links, and pulley elbows are supplied in separate packages in the quantities needed for fire suppression system arrangements.

Additional equipment includes remote manual pull station, mechanical and electrical gas valves, pressure switches, and electrical switches for automatic equipment and gas line shut-off. Accessories can be added such as alarms, warning lights, etc., to installations where required.

Tanks can be used in multiple arrangements to allow for larger hazard coverage. Each tank is limited to a listed maximum amount of flow numbers.



COMPONENT DESCRIPTION

Wet Chemical Agent – The extinguishing agent is a mixture of organic salts designed for rapid flame knockdown and foam securement of grease related fires. It is available in plastic containers with instructions for wet chemical handling and usage.

Agent Tank – The agent tank is installed in a stainless steel enclosure or wall bracket. The tank is constructed of stainless steel.

- Tanks are available in two sizes: 1.5 gallon (5.7 L) and 3.0 gallon (11.4 L). The tanks have a working pressure of 110 psi (7.6 bar), a test pressure of 330 psi (22.8 bar), and a minimum burst pressure of 600 psi (41.4 bar).

The tank includes an adaptor/tube assembly. The adaptor is chrome-plated steel with a 1/4 in. NPT female gas inlet and a 3/8 in. NPT female agent outlet. The adaptor also contains a bursting disc seal which prevents the siphoning of agent up the pipe during extreme temperature variations.

- Regulated Release Mechanism** – The regulated release mechanism is a spring-loaded, mechanical/pneumatic type capable of providing the expellant gas supply to one or two agent tanks, depending on the capacity of the gas cartridge used. It contains a factory installed regulator deadset at 110 psi (7.6 bar) with an external relief of approximately 180 psi (12.4 bar). It has automatic actuation capabilities by a fusible link detection system and remote manual actuation by a mechanical pull station.

The regulated release mechanism contains a release assembly, regulator, expellant gas hose, and agent storage tank housed in a stainless steel enclosure with cover. The enclosure contains knock-outs for 1/2 in. conduit. The cover contains an opening for a visual status indicator.

It is compatible with mechanical gas shut-off devices; or, when equipped with a field or factory-installed switch, it is compatible with electric gas line or appliance shut-off devices.

- Regulated Actuator Assembly** – When more than two agent tanks are required, the regulated actuator is available to provide expellant gas for additional tanks. It is connected to the cartridge receiver outlet of the regulated release mechanism providing simultaneous agent discharge. It contains a regulated actuator deadset at 110 psi (7.6 bar) with an external relief of approximately 180 psi (12.4 bar). It has automatic actuation capabilities by a fusible link detection system and remote manual actuation by a mechanical pull station.

The regulated actuator assembly contains a regulated actuator, regulator, expellant gas hose, and agent tank housed in a stainless steel enclosure with cover. The enclosure contains knockouts to permit installation of the expellant gas line.

Discharge Nozzles – Each discharge nozzle is tested and listed with the R-102 system for a specific application. Nozzle tips are stamped with the flow number designation (1/2, 1, 2, and 3). Each nozzle must have a metal or rubber blow-off cap to keep the nozzle tip orifice free of cooking grease build-up.

APPROVALS

Applicable Standards: ULI listed under EX-3470; ULC listed under CEX-747; meets requirements of NFPA 96 (Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment); NFPA 17A (Standard on Wet Chemical Extinguishing Systems).

ORDERING INFORMATION

Order all system components through your local authorized ANSUL Distributor.

SPECIFICATIONS

An ANSUL R-102 Fire Suppression System shall be furnished. The system shall be capable of protecting all hazard areas associated with cooking equipment.

1.0 GENERAL

1.1 References

- 1.1.1 Underwriters Laboratories, Inc. (UL)
 - 1.1.1.1 UL Standard 1254
 - 1.1.1.2 UL Standard 300
- 1.1.2 Underwriters Laboratories of Canada (ULC)
 - 1.1.2.1 ULC/ORD-C 1254.6
- 1.1.3 National Fire Protection Association (NFPA)
 - 1.1.3.1 NFPA 96
 - 1.1.3.2 NFPA 17A

1.2 Submittals

- 1.2.1 Submit two sets of manufacturer's data sheets
- 1.2.2 Submit two sets of piping design drawings

1.3 System Description

- 1.3.1 The system shall be an automatic fire suppression system using a wet chemical agent for grease related fires.
- 1.3.2 The system shall be capable of suppressing fires in the following areas associated with cooking equipment: ventilating equipment including hoods, ducts, plenums, and filters; fryers; griddles and range tops; upright, natural charcoal, or chain-type broilers; electric, lava rock, mesquite or gas-radiant char-broilers.
- 1.3.3 The system shall be the pre-engineered type having minimum and maximum guidelines established by the manufacturer and listed by Underwriters Laboratories, Inc. (UL).
- 1.3.4 The system shall be installed and serviced by personnel trained by the manufacturer.
- 1.3.5 The system shall be capable of protecting cooking appliances by utilizing either dedicated appliance protection and/or overlapping appliance protection.

SPECIFICATIONS

1.4 Quality Control

- 1.4.1 Manufacturer: The R-102 Restaurant Fire Suppression System shall be manufactured by a company with at least thirty years experience in the design and manufacture of pre-engineered fire suppression systems. The manufacturer shall be ISO 9001 registered.
- 1.4.2 Certificates: The wet agent shall be a specially formulated, aqueous solution of organic salts with a pH range between 7.7 – 8.7, designed for flame knock-down and foam securement of grease-related fires.

1.5 Warranty, Disclaimer, and Limitations

- 1.5.1 The pre-engineered restaurant fire suppression system components shall be warranted for five years from date of delivery against defects in workmanship and material.

1.6 Delivery

- 1.6.1 Packaging: All system components shall be securely packaged to provide protection during shipment.

1.7 Environmental Conditions

- 1.7.1 The R-102 system shall be capable of operating in a temperature range of 32 °F to 130 °F (0 °C to 54 °C).

2.0 PRODUCT

2.1 Manufacturer

- 2.1.1 Ansul Fire Protection, One Stanton Street, Marinette, Wisconsin 54143-2542, Telephone (715) 735-7411.

2.2 Components

- 2.2.1 The basic system shall consist of an ANSUL AUTOMAN regulated release assembly which includes a regulated release mechanism and a wet chemical storage tank housed within a single enclosure. Nozzles, blow-off caps, detectors, cartridges, agent, fusible links, and pulley elbows shall be supplied in separate packages in the quantities needed for fire suppression system arrangements. Additional equipment shall include remote manual pull station, mechanical and electrical gas valves, pressure switches, and electrical switches for automatic equipment and gas line shut-off.
- 2.2.2 Wet Chemical Agent: The extinguishing agent shall be a specially formulated, aqueous solution of organic salts with a pH range between 7.8 – 8.2, designed for flame knockdown and foam securement of grease related fires.
- 2.2.3 Agent Tank: The agent tank shall be installed in a stainless steel enclosure or wall bracket. The tank shall be constructed of stainless steel. Tanks shall be available in two sizes; 1.5 gallon (5.7 L) and 3.0 gallon (11.4 L). The tanks shall have a working pressure of 110 psi (7.6 bar), a test pressure of 330 psi (22.8 bar), and a minimum burst pressure of 600 psi (41.4 bar). The tank shall include an adaptor/tube assembly containing a burst disc union.
- 2.2.4 Regulated Release Mechanism: The regulated release mechanism shall be a spring-loaded, mechanical/pneumatic type capable of providing the expellant gas supply to one or two agent tanks depending on the capacity of the gas cartridge used. It shall contain a factory installed regulator deadset at 110 psi (7.6 bar) with an external relief of approximately 180 psi (12.4 bar).

It shall have the following actuation capabilities: automatic actuation by a fusible link detection system and remote manual actuation by a mechanical pull station.

The regulated release mechanism shall contain a release assembly, regulator, expellant gas hose, and agent storage tank housed in a stainless steel enclosure with cover. The enclosure shall contain knockouts for 1/2 in. conduit. The cover shall contain an opening for a visual status indicator.

It shall be compatible with mechanical gas shut-off devices; or, when equipped with a field or factory-installed switch, it shall be compatible with electric gas line or appliance shut-off devices.

- 2.2.5 Regulated Actuator Assembly: When more than two agent tanks are required, the regulated actuator shall be available to provide expellant gas for additional tanks. It shall be connected to the cartridge receiver outlet of the regulated release mechanism providing simultaneous agent discharge. The regulator shall be deadset at 110 psi (7.6 bar) with an external relief of approximately 180 psi (12.4 bar). The regulated actuator assembly shall contain a regulated actuator, regulator, expellant gas hose, and agent tank housed in a stainless steel enclosure with cover. The enclosure shall contain knockouts to permit installation of the expellant gas line.
- 2.2.6 Discharge Nozzles: Each discharge nozzle shall be tested and listed with the R-102 system for a specific application. Nozzles tips shall be stamped with the flow number designation (1/2, 1, 2, and 3). Each nozzle shall have a metal or rubber blow-off cap to keep the nozzle tip orifice free of cooking grease build-up.
- 2.2.7 Distribution Piping: Distribution piping shall be Schedule 40 black iron, chrome-plated, or stainless steel pipe conforming to ASTM A120, A53, or A106.
- 2.2.8 Detectors: The detectors shall be the fusible link style designed to separate at a specific temperature.
- 2.2.9 Cartridges: The cartridge shall be a sealed steel pressure vessel containing either carbon dioxide or nitrogen gas. The cartridge seal shall be designed to be punctured by the releasing device supplying the required pressure to expel wet chemical agent from the storage tank.

3.0 IMPLEMENTATION

3.1 Installation

- 3.1.1 The R-102 fire suppression system shall be designed, installed, inspected, maintained, and recharged in accordance with the manufacturer's listed instruction manual.

3.2 Training

- 3.2.1 Training shall be conducted by representatives of the manufacturer.

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715-735-7411
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2746 Girl Scouts-ny

Clevenger-Frable-LaVallee

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Page: 35



Profit from the Eagle Advantage®

Specification Sheet

Short Form Specifications

Eagle Three-Compartment Sink, model _____, with 2"-wide "Euro-Style" edging on front and sides. Units constructed of heavy gauge type 304 stainless steel top and sink bowls. Sinks to be deep-drawn, seamless, and have all corners coved. Drainboards, when required, shall be "V" creased for positive drainage. 9½" high backsplash with 1" upturn and tile edge. Legs to be 1½" O.D. galvanized tubing with front-to-back crossbracing, and 1" high impact plastic adjustable bullet feet.



three-compartment sink
with double drainboards
(faucet not included)



**FEATURING
2"-WIDE
EURO-STYLE
EDGING**

Options / Accessories

- | | |
|--|--|
| <input type="checkbox"/> Stainless steel legs | <input type="checkbox"/> Faucets |
| <input type="checkbox"/> Stainless steel bullet feet | <input type="checkbox"/> Sink covers |
| <input type="checkbox"/> Lever drains | <input type="checkbox"/> Waste outlets |
| <input type="checkbox"/> Twist handle drains | <input type="checkbox"/> Sink kits |
| <input type="checkbox"/> Twist drain brackets | <input type="checkbox"/> Overflow hole |

EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our **SpecFAB®** Division.

Phone: 302-653-3000 • Fax: 302-653-3091 • e-mail: specfab@eaglegrp.com

Item No.: _____
Project No.: _____
S.I.S. No.: _____

314 Series Coved Corner Three-Compartment Sinks

MODELS:

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| <input type="checkbox"/> 314-16-3 | <input type="checkbox"/> 314-18-3 | <input type="checkbox"/> 314-22-3 | <input type="checkbox"/> 314-24-3 |
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| <input type="checkbox"/> 314-16-3-24R | <input type="checkbox"/> 314-18-3-24R | <input type="checkbox"/> 314-22-3-24R | <input type="checkbox"/> 314-24-3-24R |

Materials

- Sink bowls: Heavy gauge type 304 stainless steel.
- Top: Drainboards, backsplash and euro-style edging are heavy gauge type 304 stainless steel.
- Legs: 1½" (41mm)-diameter heavy-gauge galvanized tubing with plated 12-gauge gussets and high-impact corrosion resistant fully adjustable bullet feet. Crossbracing is 1" (25mm)-diameter heavy-gauge galvanized tubing.

Design and Construction Features

- All bowls have deep-drawn one-piece seamless construction, using state-of-the-art hydraulic presses.
- Sink bowls have generous radius with minimum dimension of 3" (76mm) and are rectangular for maximum capacity.
- New 20" x 16" (508 x 406mm) bowl design, with enhanced polishing techniques.
- 13½" (343mm) water level is standard.
- Swirl-away drainage.
- Leg gusset assemblies welded adjacent to sink bowl for maximum weight support and stability.
- 9½" (241mm) standard backsplash includes 1" (25mm) upturn and tile edge for easy installation and feathering to wall/splash surface.
- "V" creased drainboards for positive drainage.

Mechanical:

- Water supply is ½" (13mm) IPS for hot and cold lines.
- Faucet holes are 1½" (29mm) punched on 8" (203mm) centers; two sets of faucet holes are punched where indicated on chart (back page).
- Basket-type waste drain included fits sink bowls' 3½" (89mm) opening and features 1½" (38mm) outlet.

Certifications / Approvals



AUTOQUOTES



EG20.29 Rev. 10/12

Spec sheets available for viewing, printing or downloading from our online literature library at www.eaglegrp.com

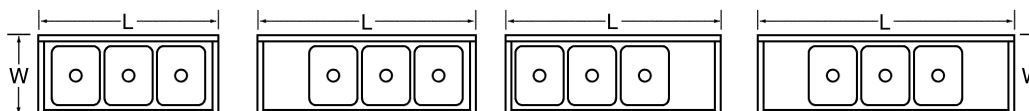
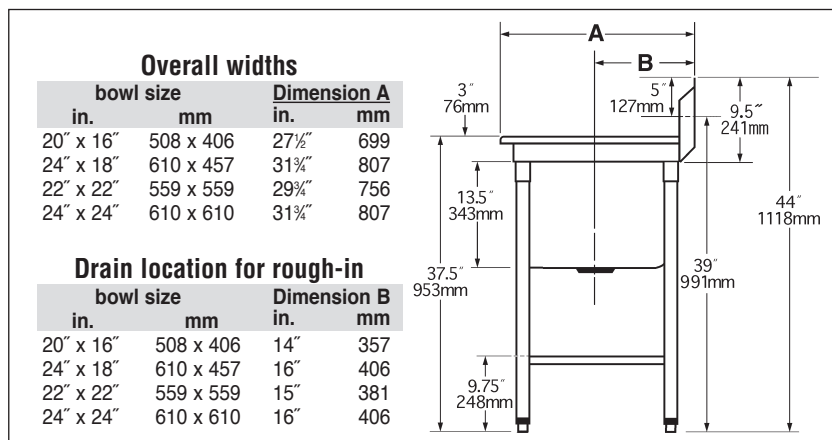
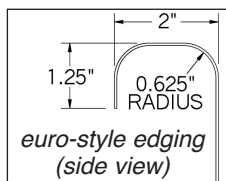
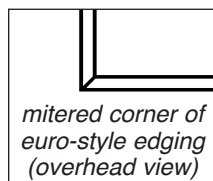
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Profit from the Eagle Advantage®

Item No.: _____
 Project No.: _____
 S.I.S. No.: _____

314 Series Coved Corner Three-Compartment Sinks



model #	BOWL DIMENSIONS				DRAINBOARD		OVERALL DIMENSIONS				weight	
	width	length	width	length	quantity	length	width	length	width	length	lbs.	kg
	in.	mm	in.	mm		in.	mm	in.	mm	in.	mm	
314-16-3	20"	508	16"	406	0	-		27 1/2"	699	58 3/4"	1492	85 38.6
314-16-3-18R or L	20"	508	16"	406	1	18"	457	27 1/2"	699	74 3/8"	1889	104 47.2
314-16-3-18	20"	508	16"	406	2	18"	457	27 1/2"	699	90"	2286	123 55.8
314-16-3-24R or L	20"	508	16"	406	1	24"	610	27 1/2"	699	80 3/8"	2042	110 49.9
314-16-3-24	20"	508	16"	406	2	24"	610	27 1/2"	699	102"	2591	135 61.2
314-18-3*	24"	610	18"	457	0	-		31 3/4"	807	65 1/2"	1664	114 51.7
314-18-3-18R or L*	24"	610	18"	457	1	18"	457	31 3/4"	807	80 3/4"	2051	133 60.3
314-18-3-18*	24"	610	18"	457	2	18"	457	31 3/4"	807	96"	2438	152 68.9
314-18-3-24R or L*	24"	610	18"	457	1	24"	610	31 3/4"	807	86 3/4"	2203	139 63.1
314-18-3-24*	24"	610	18"	457	2	24"	610	31 3/4"	807	108"	2743	164 74.4
314-22-3*	22"	559	22"	559	0	-		29 3/4"	756	77 1/2"	1969	120 54.4
314-22-3-18R or L*	22"	559	22"	559	1	18"	457	29 3/4"	756	93"	2362	139 63.1
314-22-3-18*	22"	559	22"	559	2	18"	457	29 3/4"	756	108 1/2"	2756	158 71.6
314-22-3-24R or L*	22"	559	22"	559	1	24"	610	29 3/4"	756	99"	2515	145 65.8
314-22-3-24*	22"	559	22"	559	2	24"	610	29 3/4"	756	120 1/2"	3061	170 77.1
314-24-3*	24"	610	24"	610	0	-		31 3/4"	807	83 1/2"	2121	125 56.7
314-24-3-18R or L*	24"	610	24"	610	1	18"	457	31 3/4"	807	98 3/4"	2508	144 65.3
314-24-3-18*	24"	610	24"	610	2	18"	457	31 3/4"	807	114"	2896	163 73.9
314-24-3-24R or L*	24"	610	24"	610	1	24"	610	31 3/4"	807	104 3/4"	2661	150 68.0
314-24-3-24*	24"	610	24"	610	2	24"	610	31 3/4"	807	126"	3200	175 79.4

* Features two sets of faucet holes.

EAGLE GROUP

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Phone: 302-653-3000 • Fax: 302-653-2065

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Profit from the Eagle Advantage®

Specification Sheet



19" (483mm) double-jointed
spout faucet



12" (305mm)
heavy duty faucet



standard
wrist handle faucet



12" (305mm)
T&S faucet



T&S
wrist handle faucet

Sink Accessories/Replacements —Faucets and Prerinse Units

STANDARD FAUCETS

8" (203mm) centers.

model #	description
313918	8" (203mm) spout, standard, splash mounted
300716	12" (305mm) spout, standard, splash mounted
300804	14" (356mm) spout, standard, splash mounted
313919	16" (406mm) spout, standard, splash mounted
301001	12" (305mm) spout, heavy duty, splash mounted
301002	14" (406mm) spout, heavy duty, splash mounted
301003	19" (489mm) double-jointed spout, splash mounted
313075	gooseneck, splash mounted

REPAIR KIT FOR STANDARD FAUCETS

model #	description	for faucets #
304146	hot/cold stems, handles, seats, bonnet nuts, O-rings	313918, 313919
368421	hot/cold ceramic cartridge	300716, 300804

STANDARD FAUCETS WITH WRIST HANDLES

Deck mounted with 4" (102mm) centers. Features include 4" (102mm) long wrist handles and rigid gooseneck spout.

model #	description
301005	standard
301004	heavy duty



T&S EXTRA HEAVY DUTY FAUCETS **OUR BEST**

Top-of-the-line. Splash mounted with 8" (203mm) centers. Features T&S quality products.

model #	description
313920	8" (203mm) spout
340380	10" (254mm) spout
313293	12" (305mm) spout
313294	14" (356mm) spout



T&S EXTRA HEAVY DUTY FAUCET WITH WRIST HANDLES **OUR BEST**

Top-of-the-line T&S quality. Deck mounted with 4" (102mm) centers. 4" (102mm) long wrist handles and rigid gooseneck spout.

model #	description
313304	extra heavy duty

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For custom configuration or fabrication needs, contact our SpecFAB® Division.

Phone: 302-653-3000 • Fax: 302-653-3091 • e-mail: quotes@eaglegrp.com

Certifications / Approvals



(fabricated to NSF-applicable standards)



AutoQuotes



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Profit from the Eagle Advantage®

Item No.: _____
 Project No.: _____
 S.I.S. No.: _____

Sink Accessories/Replacements—Faucets and Prerinse Units

PowerPulse™
 spray valve



POWERPULSE™ PRERINSE SPRAY UNITS

Patent-pending design. Uses pulsating jets of water to power-off dried and baked-on food in only 12 seconds (Fisher-Nickel test). Saves water, but does not sacrifice cleaning performance. Easily retrofits onto most existing prerinses.

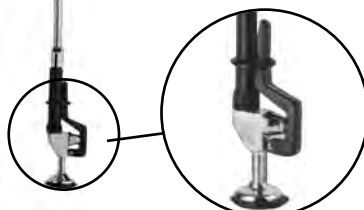
model #	description
384794	uses 0.74 gallons per minute
384795	uses 1.05 gallons per minute



splash mounted
 prerinse spray unit



deck mounted
 prerinse spray unit



prerinse spray
 valve assembly



wall bracket

STANDARD PRERINSE UNITS AND COMPONENTS

model #	description
300719	splash mounted spray unit
300718	deck mounted spray unit
301189	faucet add-on with 12" (305mm) spout
301190	wall bracket
313116	prerinse hose, 36" (914mm) length
313323	prerinse spray valve assembly for spray units #300718 and 300719



T&S splash mounted
 prerinse spray unit



T&S deck mounted
 prerinse spray unit



T&S EXTRA HEAVY DUTY **OUR BEST** PRERINSE UNITS AND COMPONENTS

Top-of-the-line.

model #	description
313296	splash mounted spray unit with wall bracket
313295	deck mounted spray unit with wall bracket
313297	faucet add-on with 12" (305mm) spout for use with #313296 unit



T&S
 prerinse faucet add-on

EAGLE GROUP

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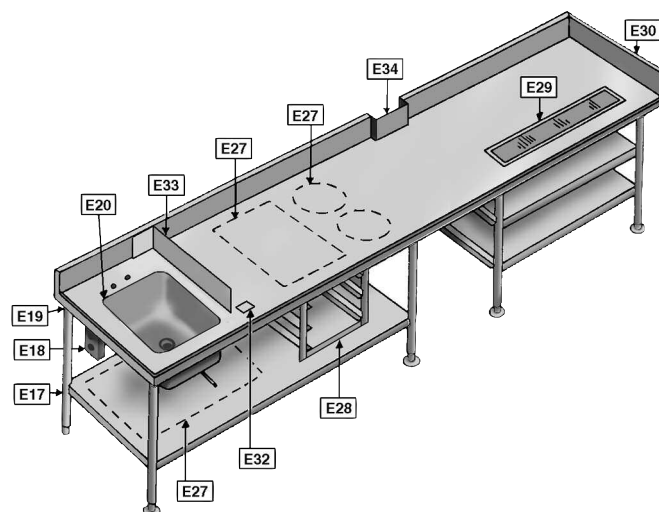
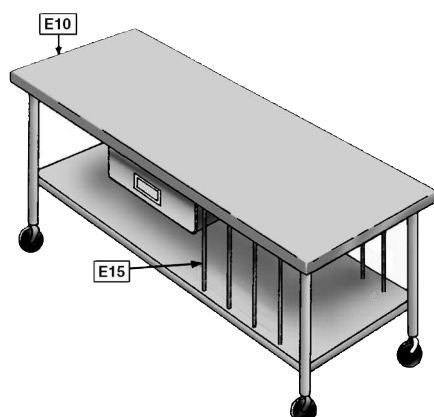
Specification Sheet

Item No.:	_____
Project No.:	_____
S.I.S. No.:	_____

Table Modifications and Accessories

For complete list of E# models and description, see chart below and chart on back page.

Refer to chart below for description of E# models.



model #	description
E10	Square edge table - front and/or rear
E11	Marine counter edge
E12	"V" type marine edge
E13	Bullnose edge
300698	Casters - 4" (102mm)-diameter with brake
300699	Casters - 4" (102mm)-diameter without brake
317635	Casters - 5" (127mm)-diameter with brake
317636	Casters - 5" (127mm)-diameter without brake
300692	Bullet feet - stainless steel
301036	Bullet feet - white metal
300293	Bullet feet - plastic

model #	description
313835	Stainless steel flanged bullet feet
E15	Vertical tray dividers - 4-section assembly, 3" on centers
E17	Special height legs
E18*	Duplex receptacle and mounting plate (under table)
E18.1*	Duplex receptacle in splash (requires at least 6"-high splash)
E18.2*	Pedestal duplex receptacle (top of table or overshell)
E19	Stainless steel gussets

NOT PICTURED

model #	description
606329	Scrap chute, 6" (152mm)-diameter
606331	Knife rack (fits rolled rim, poly, and square edge tables)

* For GFI receptacle, add "-GFI" to E number (example: E18.1-GFI).

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Certifications / Approvals



(fabricated to NSF-applicable standards)



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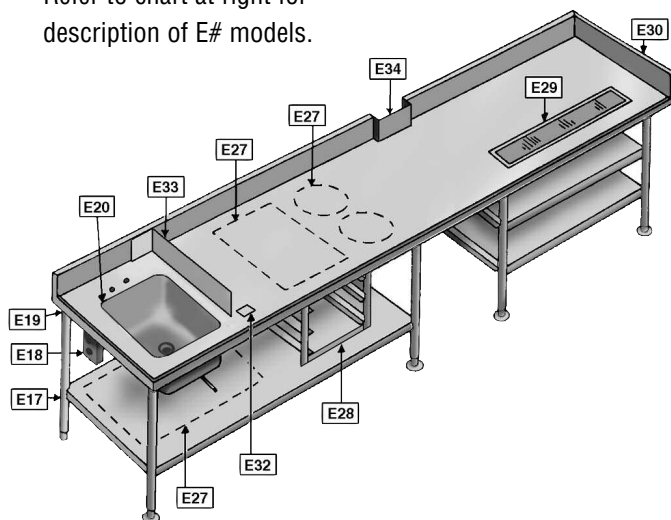
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Table Modifications and Accessories

Refer to chart at right for description of E# models.



model # description

Sinks — complete with faucet and basket drain (Specify location)

E20 - 10" x 14" x 9.5" bowl (254 x 356 x 241mm)

E21 - 14" x 16" x 9.5" bowl (356 x 406 x 241mm)

E22* - 16" x 20" x 8" bowl (406 x 508 x 203mm)

E23* - 16" x 20" x 14" bowl (406 x 508 x 356mm)

E24* - 18" x 20" x 14" bowl (457 x 508 x 356mm)

E24A* - 20" x 20" x 14" (508 x 508 x 356mm)

E25 - 24" x 24" x 14" bowl (610 x 610 x 356mm)

for 36" (914mm)-wide tables

313304 T&S faucet upgrade - deck mount 4" (102mm) centers

300720 Lever drain - 1.5" I.P.S. (38mm)

300721 Lever drain - 2" I.P.S. (51mm)

300722 Lever drain - 2" I.P.S. (51mm) with overflow

341189** Twist handle drain - 1.5" I.P.S. (38mm)

336002** Twist handle drain - 2" I.P.S. (51mm)

341190** Twist handle drain - 2" I.P.S. (51mm) with overflow

E27 Top cutout - square or round (Specify location)

E28 Angle slides for pans, up to six pairs

(Specify location and pan size)

E29 Urn trough, 4.5" wide x 1.25" deep (114 x 32mm) with 1.5" (38mm) drain, complete with louvered grate. (Length must be maximum of 6" shorter than table. Specify location.)

E30 End splash — per end (Specify end), all heights

E31 1.5" (38mm) rear upturn for undershelf

E32 Can opener hole with under table support (Specify location)

E33 Sink splash — single thickness, 4" tall (102mm)

E34 Column cutout (Send floor plan/sketch)

NOT PICTURED

model # description

E35 16 gauge s/s apron in front of sinks or cutouts

E36 Fully welded - top, undershelf & legs

E36A Welded base only - undershelf & legs

E37 NSF sprayed-on sound deadening up to 12' (3658mm)

E37A - for each additional foot

E38-6*** Cantilever mount up to 6' (1829mm)

E38-12*** Cantilever mount up to 12' (3658mm)

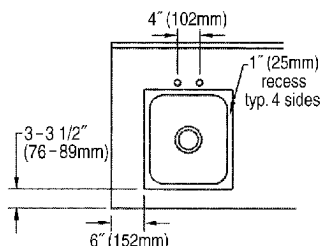
E39 Enclosed backplash

* These sink bowls will not fit in a table any less than 30" (762mm) wide.

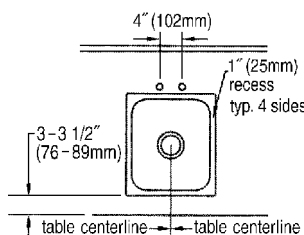
** Optional twist drain brackets available for use with twist handle drains.

*** Applicable to wall mount shelves and pot racks.

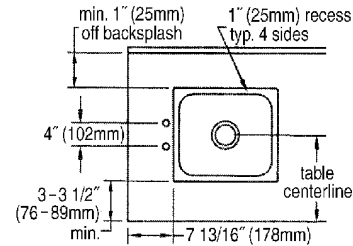
Optional Sinks Built Into Tables – Standard Locations



sink on left/right side of table



sink on center of table



sink with faucet on end of table

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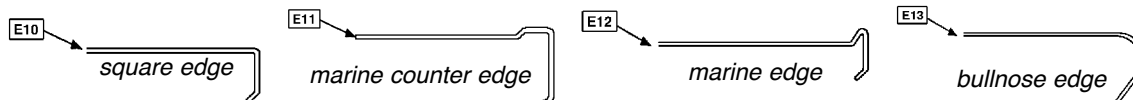
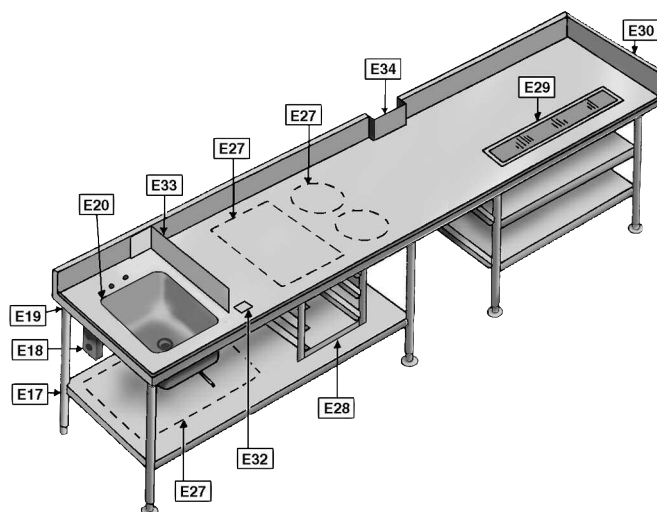
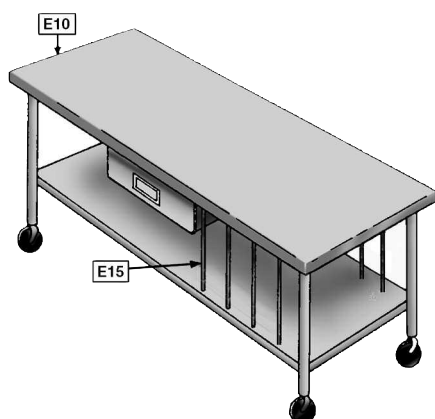
Specification Sheet

Item No.:	_____
Project No.:	_____
S.I.S. No.:	_____

Table Modifications and Accessories

For complete list of E# models and description, see chart below and chart on back page.

Refer to chart below for description of E# models.



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300699	Casters - 4" (102mm)-diameter without brake
317635	Casters - 5" (127mm)-diameter with brake
317636	Casters - 5" (127mm)-diameter without brake
300692	Bullet feet - stainless steel
301036	Bullet feet - white metal
300293	Bullet feet - plastic

model #	description
313835	Stainless steel flanged bullet feet
E15	Vertical tray dividers - 4-section assembly, 3" on centers
E17	Special height legs
E18*	Duplex receptacle and mounting plate (under table)
E18.1*	Duplex receptacle in splash (requires at least 6"-high splash)
E18.2*	Pedestal duplex receptacle (top of table or overshell)
E19	Stainless steel gussets

NOT PICTURED

model #	description
606329	Scrap chute, 6" (152mm)-diameter
606331	Knife rack (fits rolled rim, poly, and square edge tables)

* For GFI receptacle, add "-GFI" to E number (example: E18.1-GFI).

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Certifications / Approvals



(fabricated to NSF-applicable standards)



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EG10.50 Rev. 09/18

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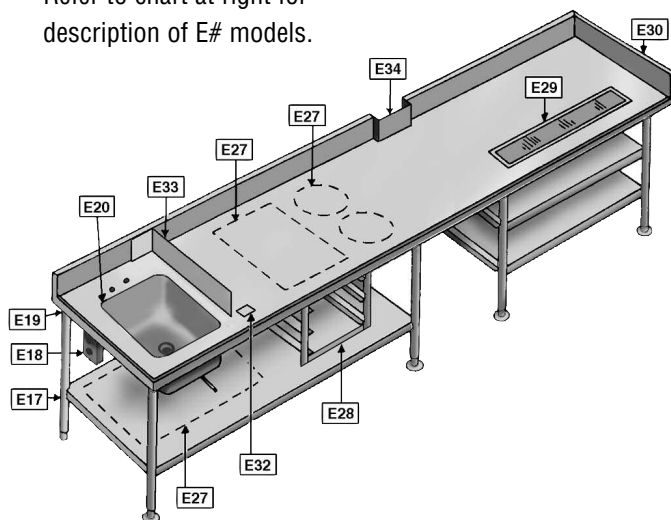
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Table Modifications and Accessories

Refer to chart at right for description of E# models.



model # description

Sinks — complete with faucet and basket drain (Specify location)

E20 - 10" x 14" x 9.5" bowl (254 x 356 x 241mm)

E21 - 14" x 16" x 9.5" bowl (356 x 406 x 241mm)

E22* - 16" x 20" x 8" bowl (406 x 508 x 203mm)

E23* - 16" x 20" x 14" bowl (406 x 508 x 356mm)

E24* - 18" x 20" x 14" bowl (457 x 508 x 356mm)

E24A* - 20" x 20" x 14" (508 x 508 x 356mm)

E25 - 24" x 24" x 14" bowl (610 x 610 x 356mm)

for 36" (914mm)-wide tables

313304 T&S faucet upgrade - deck mount 4" (102mm) centers

300720 Lever drain - 1.5" I.P.S. (38mm)

300721 Lever drain - 2" I.P.S. (51mm)

300722 Lever drain - 2" I.P.S. (51mm) with overflow

341189** Twist handle drain - 1.5" I.P.S. (38mm)

336002** Twist handle drain - 2" I.P.S. (51mm)

341190** Twist handle drain - 2" I.P.S. (51mm) with overflow

E27 Top cutout - square or round (Specify location)

E28 Angle slides for pans, up to six pairs

(Specify location and pan size)

E29 Urn trough, 4.5" wide x 1.25" deep (114 x 32mm) with 1.5" (38mm) drain, complete with louvered grate. (Length must be maximum of 6" shorter than table. Specify location.)

E30 End splash — per end (Specify end), all heights

E31 1.5" (38mm) rear upturn for undershelf

E32 Can opener hole with under table support (Specify location)

E33 Sink splash — single thickness, 4" tall (102mm)

E34 Column cutout (Send floor plan/sketch)

NOT PICTURED

model # description

E35 16 gauge s/s apron in front of sinks or cutouts

E36 Fully welded - top, undershelf & legs

E36A Welded base only - undershelf & legs

E37 NSF sprayed-on sound deadening up to 12' (3658mm)

E37A - for each additional foot

E38-6*** Cantilever mount up to 6' (1829mm)

E38-12*** Cantilever mount up to 12' (3658mm)

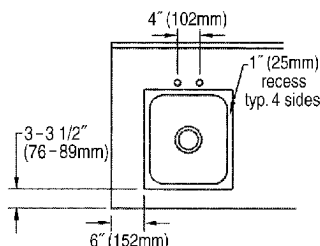
E39 Enclosed backsplash

* These sink bowls will not fit in a table any less than 30" (762mm) wide.

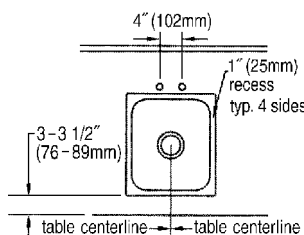
** Optional twist drain brackets available for use with twist handle drains.

*** Applicable to wall mount shelves and pot racks.

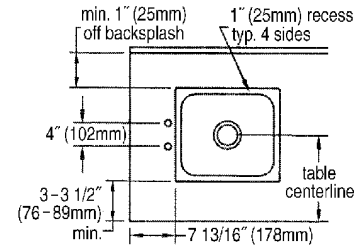
Optional Sinks Built Into Tables – Standard Locations



sink on left/right side of table



sink on center of table



sink with faucet on end of table

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T&S BRASS AND BRONZE WORKS, INC.

2 Saddleback Cove / P.O. Box 1088
Travelers Rest, SC 29690

Model No.

B-0231-WH4

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com


ADA Compliant

This Space for Architect/Engineer Approval

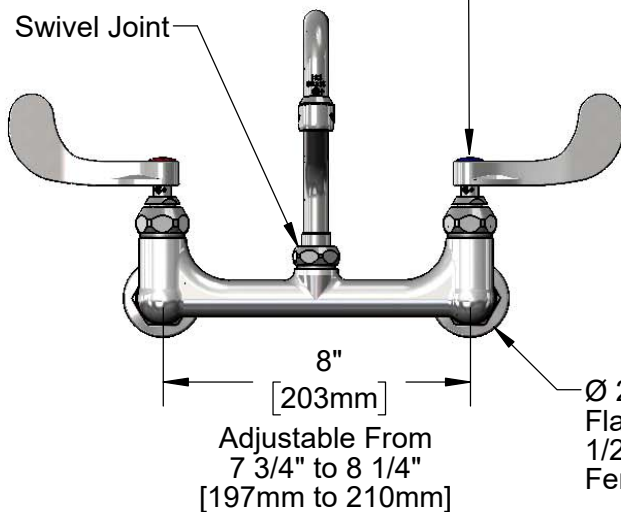
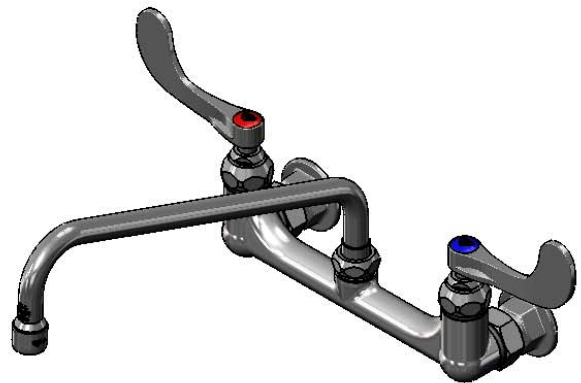
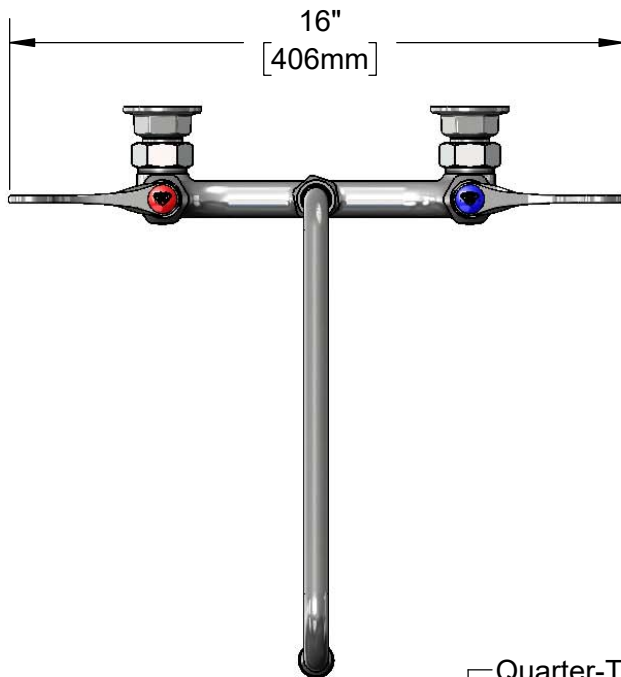
Job Name _____ Date _____

Model Specified _____ Quantity _____

Customer/Wholesaler _____

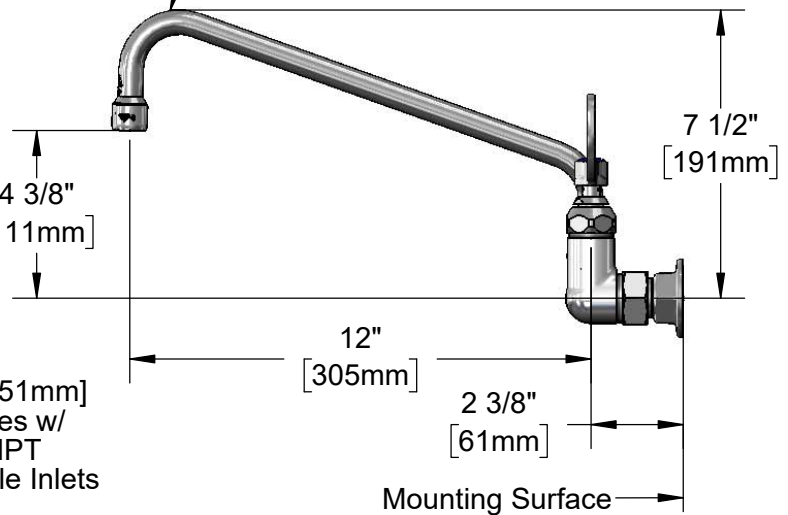
Contractor _____

Architect/Engineer _____



Quarter-Turn
Eterna Cartridges w/
Spring Checks &
Wrist Action Handles w/
Color Coded Indexes

062X
12" Swing Nozzle w/
Stream Regulator Outlet.
Converts to Rigid w/
014200-45 Lock Washer
(Included).


Product Specifications:

8" Wall Mount Mixing Faucet, Quarter-Turn Eterna Cartridges, 4" Wrist Action Handles, 12" Swing Nozzle & 1/2" NPT Female Inlets

Product Compliance:

ASME A112.18.1 / CSA B125.1
NSF 61 - Section 9
NSF 372 (Low Lead Content)
ANSI A117.1 (ADA)

Drawn: MRC Checked: JRM Approved: JHB Date: 01/22/18

Scale: 1:5 Sheet: 1 of 2



T&S BRASS AND BRONZE WORKS, INC.

2 Saddleback Cove / P.O. Box 1088
Travelers Rest, SC 29690

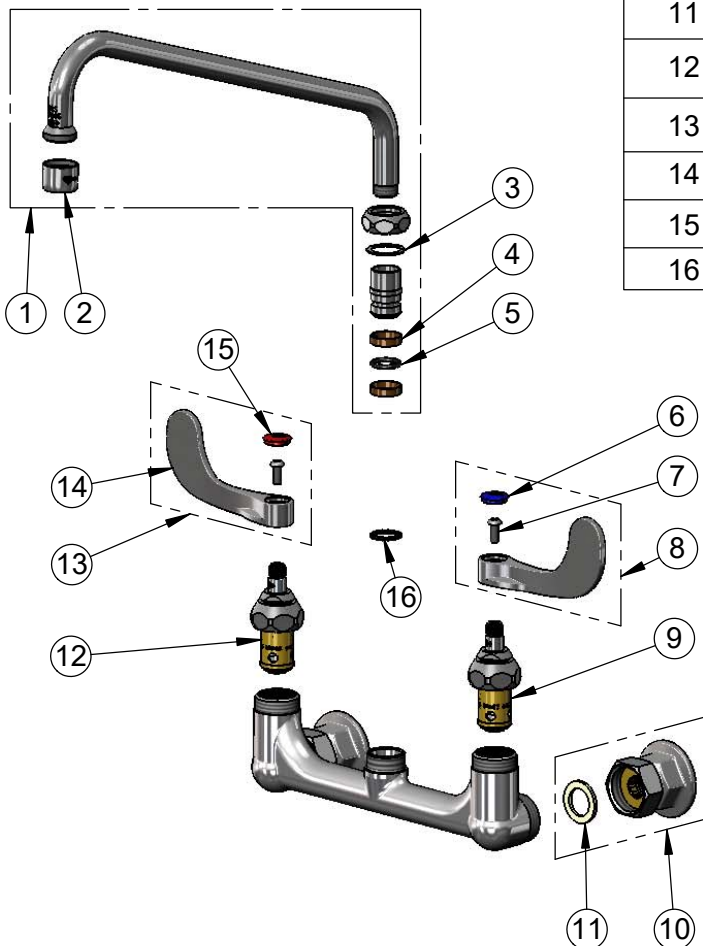
Model No.

B-0231-WH4

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com

ITEM NO.	SALES NO.	DESCRIPTION
1	062X	12" Swivel Nozzle
2	B-PT	Full Flow Stream Regulator, 55/64-27
3	009538-45	Swivel Washer
4	011429-45	Swivel Sleeves (2)
5	001074-45	O-Ring
6	018506-19NS	Blue Button Index, Press-in
7	000925-45	Lab Handle Screw
8	B-WH4C-NS	4" Wrist Action Handle, Screw & Cold Index
9	012442-40NS	Quarter-Turn Eterna Cartridge w/ Spring Check, LTC
10	00AA	1/2" NPT Female Eccentric Flange
11	001019-45	Coupling Nut Washer
12	012443-40NS	Quarter-Turn Eterna Cartridge w/ Spring Check, RTC
13	B-WH4H-NS	4" Wrist Action Handle, Screw & Hot Index
14	B-WH4-NS	Wrist Action Handle (New Style)
15	001193-19NS	Red Button Index, Press-in
16	014200-45	Star Washer, Anti-Rotation



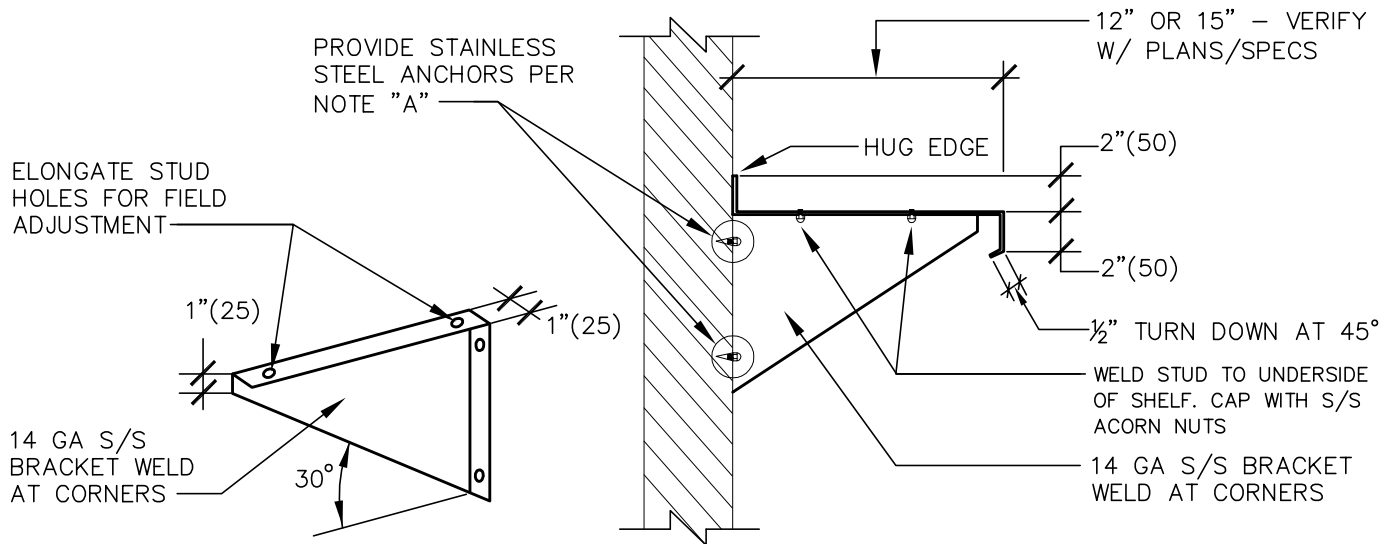
Product Specifications:

8" Wall Mount Mixing Faucet, Quarter-Turn Eterna Cartridges, 4" Wrist Action Handles, 12" Swing Nozzle & 1/2" NPT Female Inlets

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NSF 372 (Low Lead Content)
ANSI A117.1 (ADA)

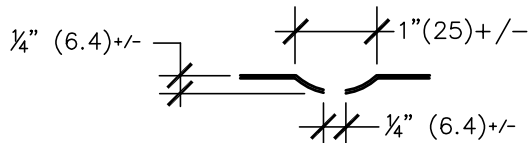
Drawn: MRC Checked: JRM Approved: JHB Date: 01/22/18 Scale: NTS Sheet: 2 of 2

**BRACKET DETAIL**

SCALE: N.T.S.

SECTION

SCALE: N.T.S.

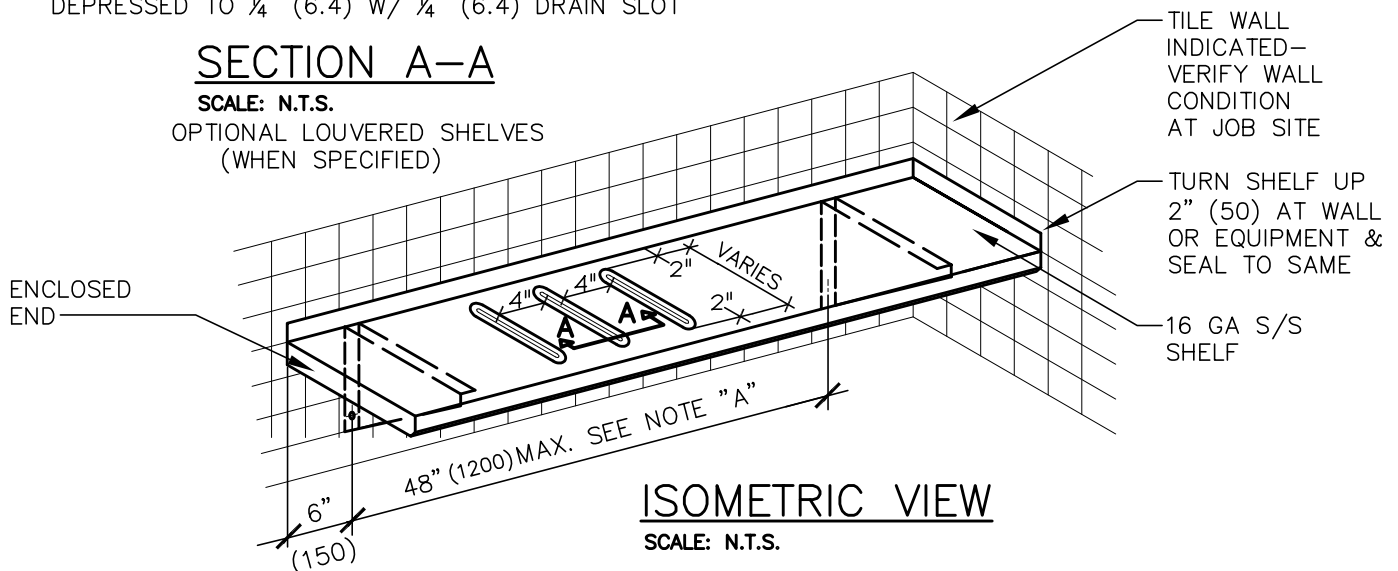


APPROX. 1" (25) WIDE DIE STAMPED LOUVERS
DEPRESSED TO 1/4" (6.4) W/ 1/4" (6.4) DRAIN SLOT

SECTION A-A

SCALE: N.T.S.

OPTIONAL LOUVERED SHELVES
(WHEN SPECIFIED)

**ISOMETRIC VIEW**

SCALE: N.T.S.

NOTE "A":

MAXIMUM SPACING BETWEEN BRACKETS NOT TO EXCEED 48" (1200). VERIFY WALL CONDITION AND SECURE BRACKETS TO SAME WITH A MINIMUM OF (2) APPROPRIATE FASTENERS TO SUPPORT HEAVY LOADS.

Clevenger Frable
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN **LaVallee**
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

EXPOSED BRACKET WALL
MOUNTED OVERSHELF

07-12-13

C-1-2


**LIFETIME
TOUGH**
**CORRECTIONS
APPROVED**

AXD-UTR-15

Item No. _____

Quantity _____

Job Name _____

Spec No. _____

BUN PAN RACKS

BUN PAN / STEAMTABLE RACKS

ALUMINUM CONSTRUCTION

Custom Sizes Available

Model	Spacing/Capacity	H	W	D	Weight
AXD-UTR-20	3"/20 Pans	70"	22"	26"	68
AXD-UTR-15	4"/15 Pans	70"	22"	26"	63
AXD-UTR-12	5"/12 Pans	70"	22"	26"	55
AXD-UTR-10	6"/10 Pans	70"	22"	26"	52
AXD-UTR-18	3"/18 Pans	64"	22"	26"	63
AXD-UTR-11	5"/11 Pans	64"	22"	26"	47
AXD-UTR-9	3"/9 Pans	36"	22"	26"	37
AXD-UTR-5	5"/5 Pans	36"	22"	26"	33

Options:

- | | | | |
|-------------------------------|--------------------|-------------------------------|-----------------------|
| <input type="checkbox"/> /5B | HD Caster Brakes | <input type="checkbox"/> /009 | Pan Stop Aluminum |
| <input type="checkbox"/> /CC | Card Clip | <input type="checkbox"/> /PG | Pan Stop Gravity |
| <input type="checkbox"/> /022 | CornerBumpers (2) | <input type="checkbox"/> /015 | Pan stop Web Strap |
| <input type="checkbox"/> /024 | Corner Bumpers (4) | <input type="checkbox"/> /BA | Solid bottom Aluminum |
| <input type="checkbox"/> /PB | Perimeter Bumper | <input type="checkbox"/> /A | Solid Top Aluminum |
| <input type="checkbox"/> /VB | Vertical Bumper | | |

APPLICATIONS: Corrections approved mobile multi-purpose racks for holding, storing and transporting of 18" X 26" bun pans and 12" X 20" steamtable pans.

CONSTRUCTION: Heavy duty, high tensile extruded aluminum. Type 6063-T5 alloy. LIFETIME WARRANTY for traditional food-service applications.

TRAY SLIDES: 3-1/4" wide pan slides to accommodate 18" X 26" tray and 12" X 20" steamtable pans.

FRAME AND CROSS SUPPORTS: Vertical and horizontal frame sections are extruded extra thick walls 1-1/4" tubular aluminum.

CASTERS: Platform type 5" x 2" w/ Zerk grease fittings, full swivel, non-marking design. Casters are securely bolted to frame to facilitate replacements.



Notes

55 Channel Drive • Port Washington, NY 11050-2216
 8891 NW 102nd Street • Medley, FL 33178
 Tel: 516-944-6271 • Fax: 516-944-0625
 Toll Free: 866-712-7283
 www.channelmfg.com • Email: sales@channelmfg.com

Steam Table Pan Racks

BUN PAN / STEAM TABLE PAN RACKS		STANDARD SERIES ALUMINUM CONSTRUCTION				HEAVY DUTY SERIES ALUMINUM CONSTRUCTION			
Spacing/ Capacity	H	W*	D	MODEL	WT	MODEL	WT		
3" / 20	70"	20½"	26"	UTR-20	54	AXD-UTR-20	68		
4" / 15	70"	20½"	26"	UTR-15	50	AXD-UTR-15	63		
5" / 12	70"	20½"	26"	UTR-12	44	AXD-UTR-12	55		
6" / 10	70"	20½"	26"	UTR-10	41	AXD-UTR-10	52		
3" / 18	64"	20½"	26"	UTR-18	50	AXD-UTR-18	63		
5" / 11	64"	20½"	26"	UTR-11	37	AXD-UTR-11	47		
3" / 9	36"	20½"	26"	UTR-9	29	AXD-UTR-9	37		
5" / 5	36"	20½"	26"	UTR-5	26	AXD-UTR-5	33		

3¼" wide pan slides accommodate 18" x 26" trays and 12" x 20" steam table pans.

*Heavy Duty Series width is ½" wider.



Racks nest
to save floor
space.



UTR-12



AXD-UTR-15

See Page 1 for list of
options and accessories.

LO PROFILE NESTING RACKS

ALUMINUM CONSTRUCTION

MODEL	Spacing/ Capacity	H	W	D	WT
LPNS-19	3"/19	70¼"	15¼"	18½"	26
LPNS-15	4"/15	70¼"	15¼"	18½"	24
LPNS-11	5"/11	64"	15¼"	18½"	25

12 X 20 STEAM TABLE PAN RACKS

				STANDARD SERIES ALUMINUM CONSTRUCTION		STAINLESS SERIES STAINLESS STEEL CONSTRUCTION		HEAVY DUTY SERIES ALUMINUM CONSTRUCTION	
Spacing/ Capacity	H	W	D	MODEL	WT	MODEL	WT	MODEL	WT
3" / 38 (2)	70½"	24½"	26"	ETPR-3S	29	SSPR-3S	66		
5" / 22 (2)	70½"	24½"	26"	ETPR-5S	27	SSPR-5S	51		
3" / 19 (1)	70½"	16½"	22"	ETPR-3E	28	SSPR-3E	58		
5" / 11 (1)	70½"	16½"	22"	ETPR-5E	25	SSPR-5E	46		
3" / 40 (2)	70"	24"	26"					STPR-3	56
5" / 24 (2)	70"	24"	26"					STPR-5	44
8" / 16 (2)	70"	24"	26"					STPR-8	39
3" / 34 (2)	64"	24"	26"	ETPR-3S6	25	SSPR-3S6	60	STPR-36	51
5" / 22 (2)	64"	24"	26"	ETPR-5S6	22	SSPR-5S6	46	STPR-56	40
3" / 19 (1)	64"	16½"	22"	ETPR-3E6	23	SSPR-3E6	53		
5" / 11 (1)	64"	16½"	22"	ETPR-5E6	20	SSPR-5E6	40		
8" / 7 (1)	64"	24"	26"					STPR-86	35
36" HEIGHT									
3" / 18 (2)	36"	24"	26"					STPR-33	36
5" / 10 (2)	36"	24"	26"					STPR-53	30
8" / 8 (2)	36"	24"	26"					STPR-83	24
3" / 18 (2)	36"	24"	26"	ETPR-3S3	17	SSPR-3S3	35		
5" / 10 (2)	36"	24"	26"	ETPR-5S3	15	SSPR-5S3	27		
3" / 9 (1)	36"	16½"	22"	ETPR-3E3	16	SSPR-3E3	31		
5" / 5 (1)	36"	16½"	22"	ETPR-5E3	15	SSPR-5E3	25		

Holds 12" x 20" steam table, deli, or hotel pans.

STPR: Extra wide, 3" heavy duty pan slides support bottom of pan.



STPR-5

MetroMax® Drying Rack Unit — 9.14

Allows superior air circulation and fast drying of trays, pans, lids, pots and all pot sink items. Offers an efficient organized drying area.

- Promotes food safety by eliminating moisture.
- Includes two drop-ins and one cutting board/tray drying rack.
- Stationary and mobile models.

Width (in.)	Length (mm)	Height (in.)	Height (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Description	Cat. No.	List Price Each
24	610	48	1219	75½	1917	106 49	Stationary Unit	PR48X2 1,335.00
26	660	50	1270	68	1702	115 52	Mobile Unit	PR48VX2 1,583.00

Cutting Board and Tray Drying Rack System

Fits 24"x48" (610x1219mm) or longer shelves. Durable gray epoxy finish. Can also be used on 24"x48" (610x1219mm) Super Erecta, MetroMax Q and MetroMax units.

Upright Spacing (in.)	Upright Height (mm)	Upright Height (in.)	Upright Height (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Tray Capacity	Cat. No.	List Price Each
1½	28	6	150	18	8.2	34	TR2448XE	92.00
3	76	6	150	13	5.9	14	TR2448XEA	86.50

Stainless Steel Drop-Ins

Width (in.)	Length (mm)	Height (in.)	Height (mm)	Wire Spacing (in.)	Wire Spacing (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
24	610	45½	1156	5¼	133	¾	19	12 6	DR48S 255.50

Pot and Pan Rack

Description	Width (in.)	Length (mm)	Height (in.)	Height (mm)	Casters (amt.)	Casters (type)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
Solid Embossed	24	610	48	1219	68	1727	2	5MP	125 56	PR48ES 1,562.50
Solid Embossed	24	610	60	1524	68	1727	2	5MPB	153 66	PR60ES 1,613.50
					2	5MPB				

Dish Rack Dollies — 16.14

Lightweight aluminum, but built for heavy service.

- 5" (127mm) non-marking swivel casters.
- Non-marking corner bumpers.
- Tubular steel handle optional on D2020N.

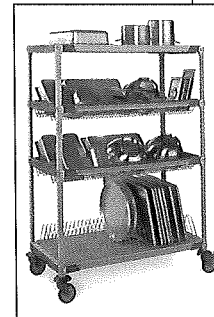
Overall Width (in.)	Overall Width (mm)	Height (in.)	Height (mm)	Type	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
21½ sq.	546	6½	154	Without Handle	13¾	345	D2020N	185.50
21½ sq.	546	33¾	843	With Handle	15¾	400	DH2020N	209.00
				Handle			H2020C	56.50

Dollies under 21½" sq. (546mm) made to order.

Cup/Glass Rack Dollies — 16.14

Store cup/glass racks at a convenient, easy-access height.

Overall Dimensions Width/Length (in.)	Overall Dimensions Width/Length (mm)	Overall Height (in.)	Overall Height (mm)	Type	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
20⅞x20⅞	530x530	12⅞	307	Without Bumpers and Handle	28	12.6	D2121C	402.00
20⅞x23⅞	530x607	36⅞	929	With Handle	33	14.8	DH2121C	438.00
23⅞x23⅞	594x594	12⅞	307	With Corner Bumpers	29	13	CB2121C	438.00
23⅞x25	594x635	36⅞	929	With Corner Bumpers and Handle	34	15.3	CBH2121C	475.00



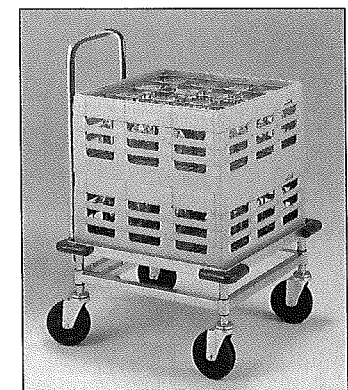
Mobile MetroMax
Drying Rack Unit



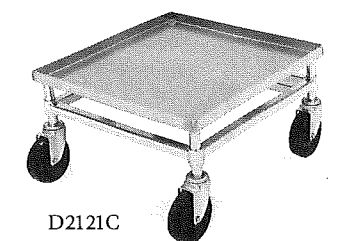
Stationary MetroMax
Drying Rack Unit



Pot and Pan Rack



Dish Rack Dolly (Racks not included)



D2121C

Ware Handling

METRO

Silver Racks — 16.06

Plastic Compartmented Silver Racks

Four sizes available; in a choice of 4, 8, 12, or 16 compartments. Fold-down handles mean racks can be carried or placed on soak sinks without immersing hands. With handles down, rack will not catch on dishwasher curtains.

Size (in.)	Size (mm)	Inside Height (in.)	Inside Height (mm)	Outside Height (in.)	Outside Height (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
3 1/2 x 13 5/8	88 x 346	4 1/8	104	6 5/8*	167	1 1/4	.56	J4	23.50
7 x 13 5/8	177 x 346	4 1/8	104	6 5/8**	167	2 1/2	1.12	P4C8	34.50

*Height with handle raised is 8 1/4" (209mm).

**Height with handle raised is 12" (304mm).

Silver Cylinder

The FC1's patented design features hollow stem in the center, allowing you to place it over pegs in a standard peg rack.

Size (in.)	Size (mm)	Height (in.)	Height (mm)	Approx. Pkd. Wt. Per 12 Pieces (lbs.)	Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
4 5/8 dia. top, 3 9/16 dia. bottom	109 dia. top, 91 bottom	5 1/2	139	4	1.8	FC1	10.00

Smallwares — 17.14

G200 Wire Basket

(Fits Standard Metro Cabinets)

Outside Dimensions Width/Length/Height (in.)	Outside Dimensions Width/Length/Height (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
18x26x4	457x660x101	7	3.1	G200C	102.00

Draining Grate

Outside Dimensions Width/Length (in.)	Outside Dimensions Width/Length (mm)	12 Pieces Per Package Approx. Pkd. Wt. (lbs.)	12 Pieces Per Package Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
8 1/4 x 10 1/2	209 x 266	11	4.9	6511DR	16.00
10 1/8 x 18	256 x 457	22	9.9	6517DR*	25.50
16 1/2 x 24 1/2	419 x 622	28	12.6	6518DR†	36.50

*Fits 12"x20" (305x508mm) pan (#200).

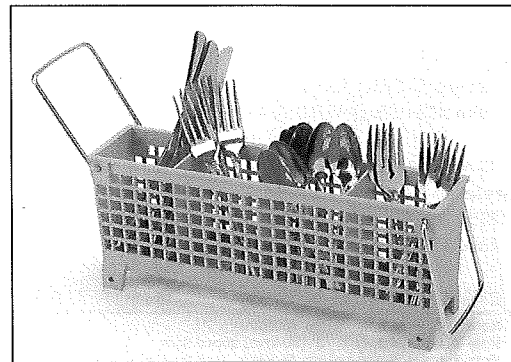
†Fits 18"x26" (457x660mm) baking sheet.

Welded Icing Grate

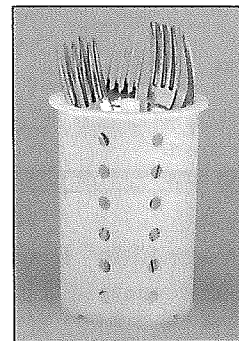
Width/Length (in.)	Width/Length (mm)	12 Pieces Per Package Approx. Pkd. Wt. (lbs.)	12 Pieces Per Package Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
16 1/2 x 24 1/2	419 x 622	40 3/4	18.3	6703R*	30.00
10 1/8 x 18	256 x 457	23	10.3	6704R†	18.00

*Fits 18"x26" (457x660mm) baking sheet.

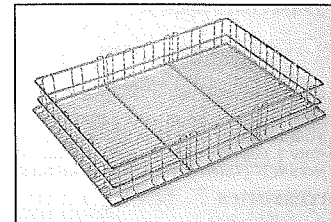
†Fits 12"x20" (305x508mm) pan (#200).



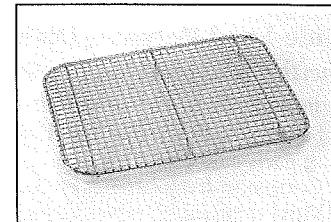
J4



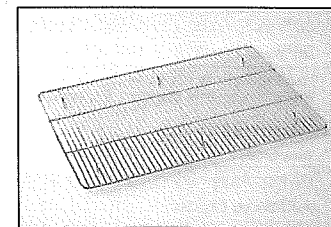
FC1



G200 Wire Basket



Draining Grate



Welded Icing Grate

METRO

MetroMax® Drying Rack Unit — 9.14

Allows superior air circulation and fast drying of trays, pans, lids, pots and all pot sink items. Offers an efficient organized drying area.

- Promotes food safety by eliminating moisture.
- Includes two drop-ins and one cutting board/tray drying rack.
- Stationary and mobile models.

Width (in.)	Width (mm)	Length (in.)	Length (mm)	Height (in.)	Height (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Description	Cat. No.	List Price Each
24	610	48	1219	75 1/2	1917	106	49	Stationary Unit	PR48X2	1,335.00
26	660	50	1270	68	1702	115	52	Mobile Unit	PR48VX2	1,583.00

Cutting Board and Tray Drying Rack System

Fits 24"x48" (610x1219mm) or longer shelves. Durable gray epoxy finish. Can also be used on 24"x48" (610x1219mm) Super Erecta, MetroMax Q and MetroMax units.

Upright Spacing (in.)	Upright Spacing (mm)	Upright Height (in.)	Upright Height (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Tray Capacity	Cat. No.	List Price Each
1 1/8	28	6	150	18	8.2	34	TR2448XE	92.00
3	76	6	150	13	5.9	14	TR2448XEA	86.50

Stainless Steel Drop-Ins

Width (in.)	Width (mm)	Length (in.)	Length (mm)	Height (in.)	Height (mm)	Wire Spacing (in.)	Wire Spacing (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
24	610	45 5/8	1156	5 1/4	133	3/4	19	12	6	DR48S	255.50

Pot and Pan Rack

Description	Width (in.)	Width (mm)	Length (in.)	Length (mm)	Height (in.)	Height (mm)	Casters (amt.)	Casters (type)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
Solid Embossed	24	610	48	1219	68	1727	2	5MP	125	56	PR48ES	1,562.50
Solid Embossed	24	610	60	1524	68	1727	2	5MPB	153	66	PR60ES	1,613.50
							2	5MPB				

Dish Rack Dollies — 16.14

Lightweight aluminum, but built for heavy service.

- 5" (127mm) non-marking swivel casters.
- Non-marking corner bumpers.
- Tubular steel handle optional on D2020N.

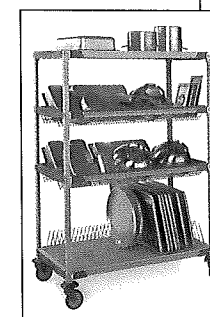
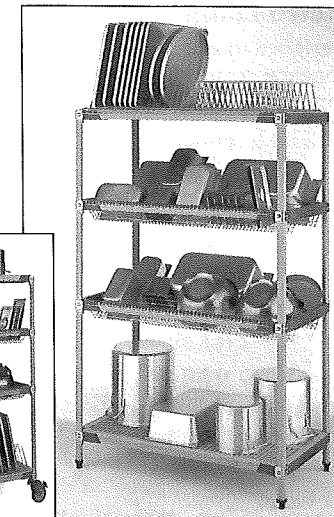
Overall Width (in.)	Overall Width (mm)	Height (in.)	Height (mm)	Type	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
21 1/2 sq.	546	6 1/8	154	Without Handle	13 5/8	345	D2020N	185.50
21 1/2 sq.	546	33 3/8	843	With Handle	15 3/4	400	DH2020N	209.00
				Handle			H2020C	56.50

Dollies under 21 1/2" sq. (546mm) made to order.

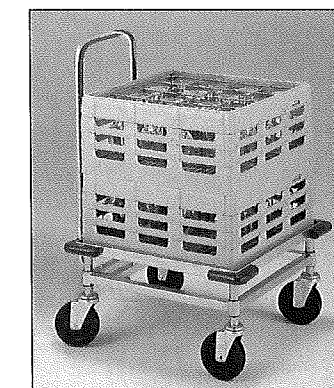
Cup/Glass Rack Dollies — 16.14

Store cup/glass racks at a convenient, easy-access height.

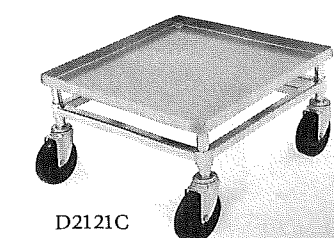
Overall Dimensions Width/Length (in.)	Overall Dimensions Width/Length (mm)	Overall Height (in.)	Overall Height (mm)	Type	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Cat. No.	List Price Each
20 7/8 x 20 7/8	530 x 530	12 1/8	307	Without Bumpers and Handle	28	12.6	D2121C	402.00
20 7/8 x 23 7/8	530 x 607	36 5/8	929	With Handle	33	14.8	DH2121C	438.00
23 3/8 x 23 3/8	594 x 594	12 1/8	307	With Corner Bumpers	29	13	CB2121C	438.00
23 3/8 x 25	594 x 635	36 5/8	929	With Corner Bumpers and Handle	34	15.3	CBH2121C	475.00

Mobile MetroMax
Drying Rack UnitStationary MetroMax
Drying Rack Unit

Pot and Pan Rack



Dish Rack Dolly (Racks not included)



D2121C



Profit from the Eagle Advantage®

Specification Sheet

Short Form Specifications

Eagle RediPak® (EAGLEbrite® Zinc, Chrome, Valu-Master® Gray Epoxy, Valu-Gard® Green Epoxy, EAGLEgard® Green Epoxy) Wire Shelving Unit, model _____. Patented QuadTruss® design wire shelves, two-piece post assemblies, and tapered split sleeves packaged in one complete box.



four-shelf unit

Options / Accessories

- ☐ Dividers
- ☐ Ledges

EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our SpecFAB® Division.

Phone: 302-653-3000 • Fax: 302-653-3091 • e-mail: specfab@eaglegrp.com

Item No.: _____
Project No.: _____
S.I.S. No.: _____

RediPak® Wire Shelving Units

MODELS:

- | | |
|------------------------------------|------------------------------------|
| <input type="checkbox"/> 1836*63 | <input type="checkbox"/> 2436*63 |
| <input type="checkbox"/> 1836*63-5 | <input type="checkbox"/> 2436*63-5 |
| <input type="checkbox"/> 1836*74 | <input type="checkbox"/> 2436*74 |
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| <input type="checkbox"/> 1860*74 | <input type="checkbox"/> 2460*74 |
| <input type="checkbox"/> 1860*74-5 | <input type="checkbox"/> 2460*74-5 |

* See charts on back for complete model numbers.

Design and Construction Features

- Patented QuadTruss® design (patent #5,390,803) makes shelves up to 25% stronger and provides a retaining ledge for increased stability and product retention.
- Available in 18" and 24" (457 and 610mm) widths and 36", 48" and 60" (914, 1219 and 1524mm) lengths.
- Complete shelving unit in one box.
- The combination of numerically-calibrated posts, tapered split sleeves, and shelf collars makes assembling these units a simple, three-step exercise:
 - 1) assemble two-piece post by threading top half onto bolt in lower half;
 - 2) snap split sleeves onto post over number of your choice;
 - 3) and slide shelf collar over split sleeves.
- A positive lock between shelf and post is created without the use of any tools.
- Shelving units may be adjusted or completely changed just as easily.
- Offered in five finishes: EAGLEbrite® zinc, chrome, Valu-Master® gray epoxy, Valu-Gard® green epoxy, and EAGLEgard® green epoxy.

Certifications / Approvals



Spec sheets available for viewing, printing or downloading from our online literature library at www.eaglegrp.com

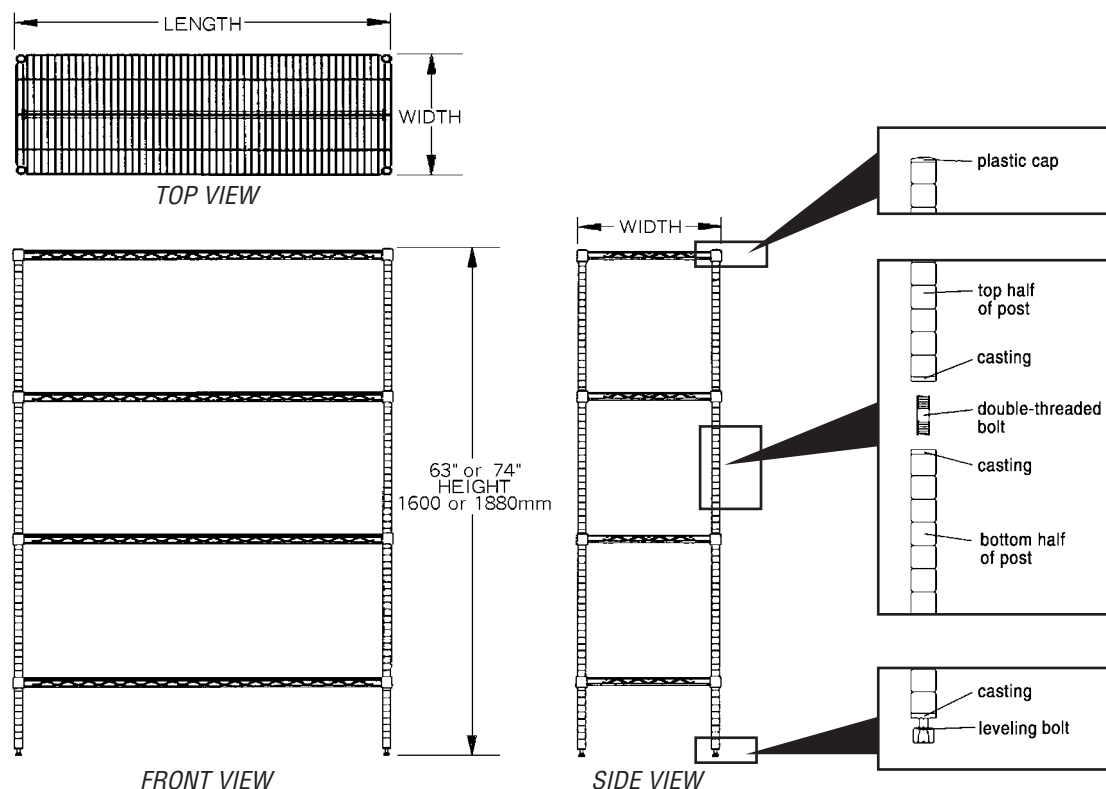
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Profit from the Eagle Advantage®

Item No.: _____
 Project No.: _____
 S.I.S. No.: _____

RediPak® Wire Shelving Units



4-Shelf Units Includes four wire shelves and four two-piece posts.

with 63" (1600mm) height					with 74" (1880mm) height					width		length		weight	
EAGLEbrite® model #	chrome model #	Valu-Master® model #	Valu-Gard® model #	EAGLEgard® model #	EAGLEbrite® model #	chrome model #	Valu-Master® model #	Valu-Gard® model #	EAGLEgard® model #	in.	mm	in.	mm	lbs.	kg
1836Z63	1836C63	1836V63	1836VG63	1836E63	1836Z74	1836C74	1836V74	1836VG74	1836E74	18"	457	36"	914	52	23.6
1848Z63	1848C63	1848V63	1848VG63	1848E63	1848Z74	1848C74	1848V74	1848VG74	1848E74	18"	457	48"	1219	64	29.0
1860Z63	1860C63	1860V63	1860VG63	1860E63	1860Z74	1860C74	1860V74	1860VG74	1860E74	18"	457	60"	1524	84	38.1
2436Z63	2436C63	2436V63	2436VG63	2436E63	2436Z74	2436C74	2436V74	2436VG74	2436E74	24"	610	36"	914	68	30.8
2448Z63	2448C63	2448V63	2448VG63	2448E63	2448Z74	2448C74	2448V74	2448VG74	2448E74	24"	610	48"	1219	80	36.3
2460Z63	2460C63	2460V63	2460VG63	2460E63	2460Z74	2460C74	2460V74	2460VG74	2460E74	24"	610	60"	1524	100	45.4

5-Shelf Units Includes five wire shelves and four two-piece posts.

with 63" (1600mm) height					with 74" (1880mm) height					width		length		weight	
EAGLEbrite® model #	chrome model #	Valu-Master® model #	Valu-Gard® model #	EAGLEgard® model #	EAGLEbrite® model #	chrome model #	Valu-Master® model #	Valu-Gard® model #	EAGLEgard® model #	in.	mm	in.	mm	lbs.	kg
1836Z63-5	1836C63-5	1836V63-5	1836VG63-5	1836E63-5	1836Z74-5	1836C74-5	1836V74-5	1836VG74-5	1836E74-5	18"	457	36"	914	61	27.7
1848Z63-5	1848C63-5	1848V63-5	1848VG63-5	1848E63-5	1848Z74-5	1848C74-5	1848V74-5	1848VG74-5	1848E74-5	18"	457	48"	1219	76	34.5
1860Z63-5	1860C63-5	1860V63-5	1860VG63-5	1860E63-5	1860Z74-5	1860C74-5	1860V74-5	1860VG74-5	1860E74-5	18"	457	60"	1524	101	45.8
2436Z63-5	2436C63-5	2436V63-5	2436VG63-5	2436E63-5	2436Z74-5	2436C74-5	2436V74-5	2436VG74-5	2436E74-5	24"	610	36"	914	81	36.7
2448Z63-5	2448C63-5	2448V63-5	2448VG63-5	2448E63-5	2448Z74-5	2448C74-5	2448V74-5	2448VG74-5	2448E74-5	24"	610	48"	1219	96	43.6
2460Z63-5	2460C63-5	2460V63-5	2460VG63-5	2460E63-5	2460Z74-5	2460C74-5	2460V74-5	2460VG74-5	2460E74-5	24"	610	60"	1524	121	54.9

EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

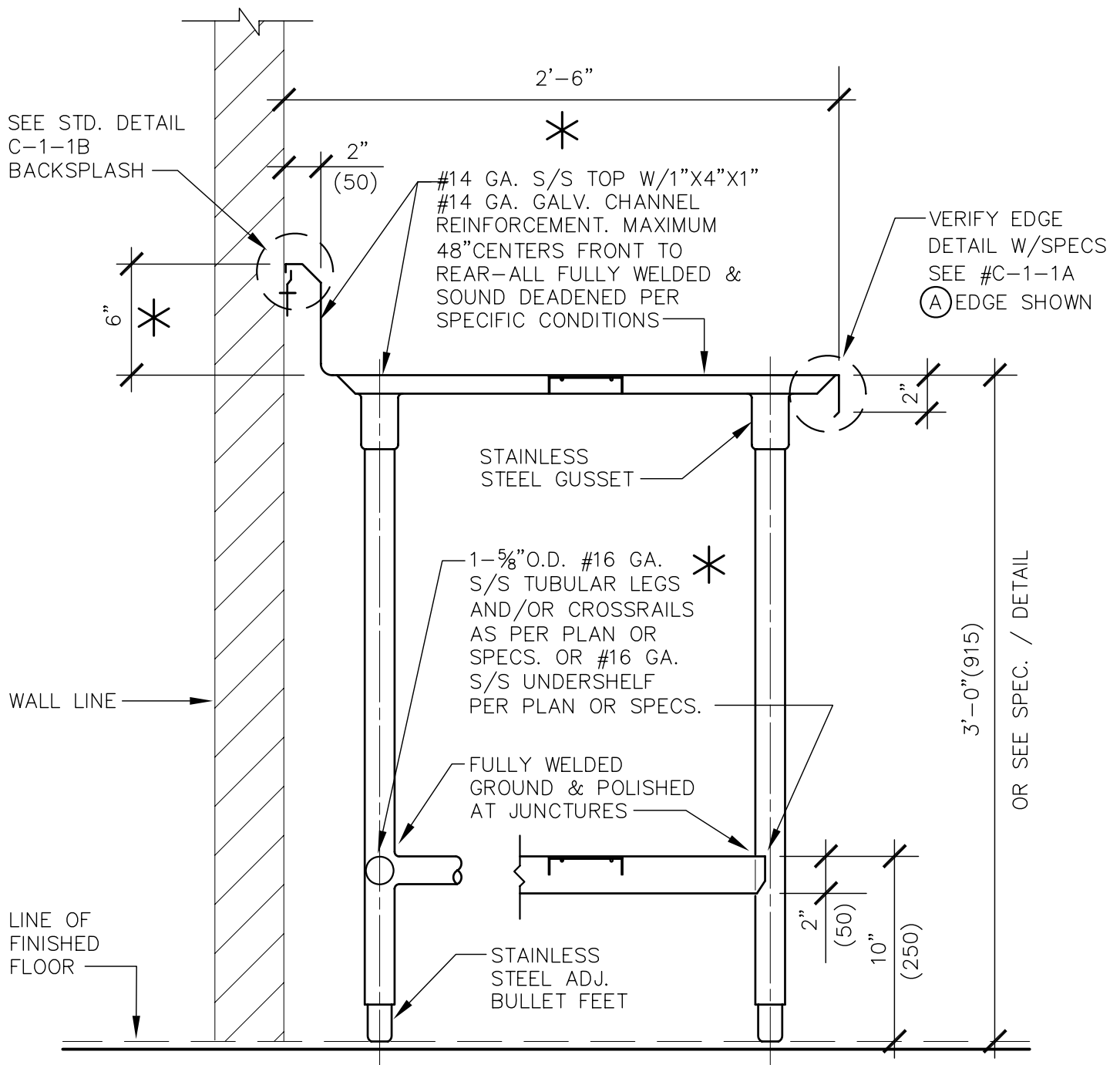
www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

Spec sheets available for viewing, printing or downloading from our online literature library at www.eaglegrp.com

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* OR AS PER DRAWINGS AND/OR SPECIFICATIONS

SECTION

SCALE: 1 1/2" = 1'-0"

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 TEL: 914/997-9660 FAX: 914/997-9671

TYPICAL
WORK TABLE

08-03-12

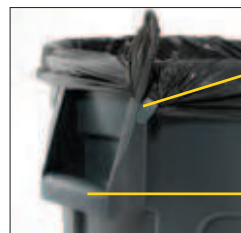
C-7-1

116 UTILITY REFUSE: BRUTE® Utility

BRUTE® 44-Gallon Utility Container

The new BRUTE® with Venting Channels is the most important innovation in refuse collection in decades!

- Smarter ergonomics
- Superior durability
- Liner change-out is fast and safe
- Fits full line of BRUTE® accessories



■ Four can liners cinches allow easy one-step bag retention and eliminate knot tying.

■ Rounded handles provide a comfortable grip.



EASIER HANDLING

Molded base grips on the bottom of the container are deeper and ribbed for better control during emptying.

See it in ACTION

www.rubbermaidbrute.com

OVER
50%
easier**

VENTING CHANNELS

Four venting channels dramatically reduce the force required to remove a filled can liner by over 50%** compared to traditional containers.

All BRUTE® dollies, caddies, and other products and accessories fit the BRUTE® 44-gallon container.



No.	Color	Description	U.S. Dimensions	U.S. Capacity	U.S. Ship Wt/Ctn	Metric Dimensions	Metric Capacity	Metric Ship Wt/Ctn	Can Liners	Pack
FG264360	YEL, RED, GRAY, BLUE, BLA	BRUTE® 44-Gallon Utility Container	24" dia x 31.5" h	44 gal	49.5 lb	61 cm dia x 80 cm	166.5 L	22.5 kg		4
FG264560	YEL, RED, GRAY, BLA	BRUTE® Lid	24.5" dia x 1.5" h	-	11.1 lb	62.2 cm dia x 3.8 cm	-	5 kg		4

* NSF Standard 2 Certification applies to gray, white, and yellow only. NSF Standard 21 applies to all colors. ** Based on internal testing.

BRUTE® Round Containers

Durable, heavy-duty containers for a variety of uses.

- All-plastic, professional-grade construction will not rust, chip, or peel and resists dents
- Strong, snap-on lids provide secure, stable stacking
- Gray, white, and yellow are USDA Meat & Poultry Equipment Group Listed and assist in complying with HACCP guidelines
- Certified to NSF standard #2 (gray, white and yellow only) and Standard #21 (all colors)



FOR BRUTE® RECYCLING
OPTIONS
SEE PAGE 116.



Available in a wide variety of sizes and colors.

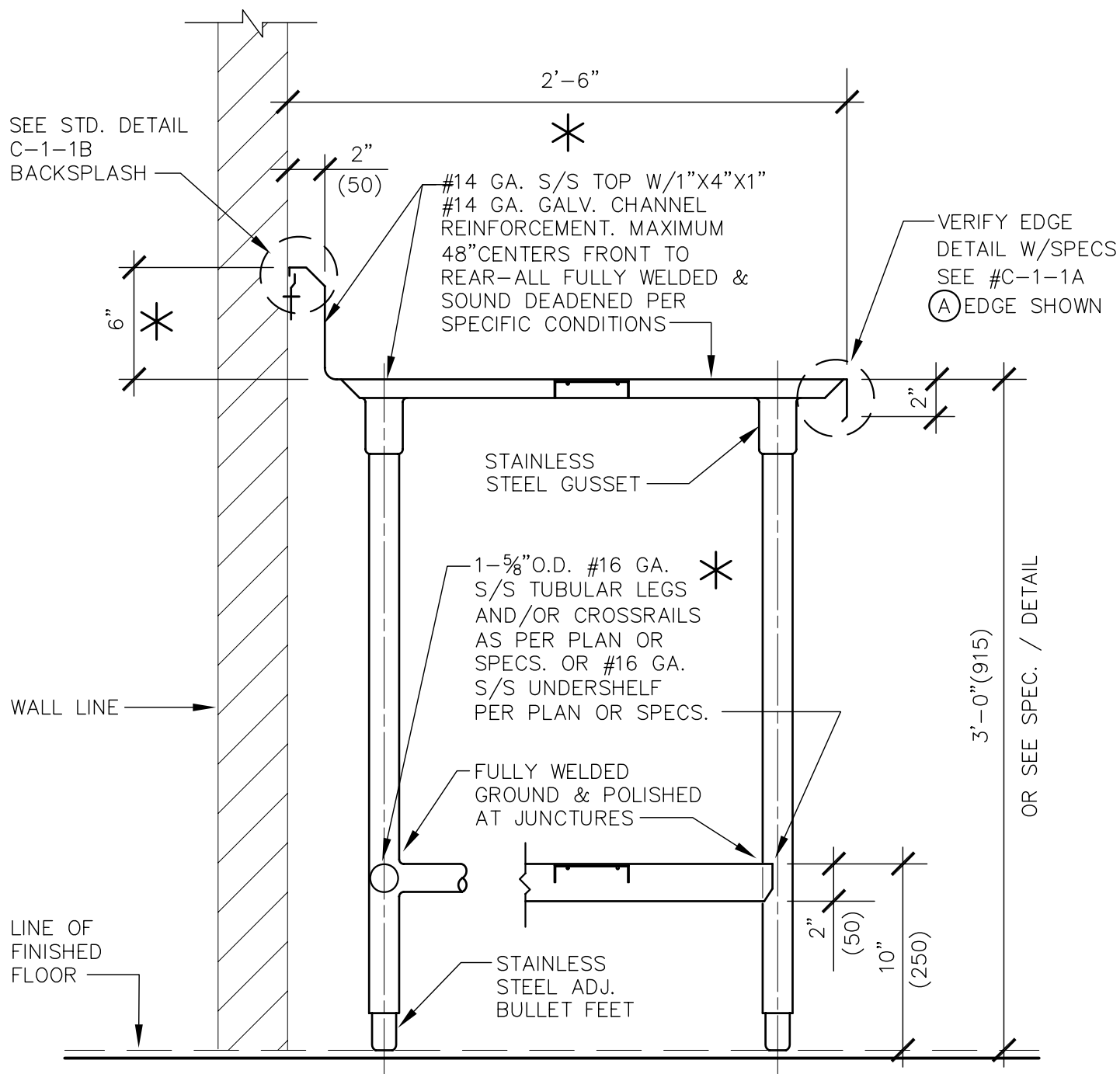
No.	Color	Description	U.S. Dimensions	U.S. Capacity	U.S. Ship Wt/Ctn	Metric Dimensions	Metric Capacity	Metric Ship Wt/Ctn	Can Liners	Pack
FG261000*	WHT, GRAY, RED, YEL, DGRN	BRUTE® Container without Lid	15.63" dia x 17.13" h	10 gal	19.0 lb	39.7 cm dia x 43.5 cm	37.9 L	8.6 kg	5003-88*	6
1779699	BLUE	BRUTE® Container without Lid	15.63" dia x 17.13" h	10 gal	19.0 lb	39.7 cm dia x 43.5 cm	37.9 L	8.6 kg	5003-88*	6
FG262000*	YEL, WHT, GRAY, BLUE, RED, DGRN	BRUTE® Container without Lid	19.5" dia x 22.88" h	20 gal	35.0 lb	49.5 cm dia x 58.1 cm	75.7 L	15.9 kg	5006-88*	6
FG263200*	YEL, WHT, RED, GRAY, DGRN, BLUE	BRUTE® Container without Lid	22" dia x 27.25" h	32 gal	49.5 lb	55.9 cm dia x 69.2 cm	121.1 L	22.5 kg	5007-88*	6
FG264300*	YEL, WHT, RED, GRAY, DGRN, BLUE	BRUTE® Container without Lid	24" dia x 31.5" h	44 gal	52.3 lb	61 cm dia x 80 cm	166.5 L	23.7 kg	5008-88*	4
FG265500*	GRAY, DGRN, WHT, RED, YEL	BRUTE® Container without Lid	26.5" dia x 33" h	55 gal	53.0 lb	67.3 cm dia x 83.8 cm	208.2 L	24 kg	5011-88*	3
1779732	BLUE	BRUTE® Container without Lid	26.5" dia x 33" h	55 gal	53.0 lb	67.3 cm dia x 83.8 cm	208.2 L	24 kg	5011-88*	3

Custom imprinting available; contact Rubbermaid Customer Service at (800) 347-9800 for details.

* NSF Standard 2 Certification applies to gray, white, and yellow only. NSF Standard 21 applies to all colors.

^ Not for sale in California.

WHEN ORDERING PRODUCTS WITH **BOLD** COLOR CODES, PLEASE SPECIFY COLOR CODE AFTER THE PRODUCT NUMBER.
SEE PAGE 271 FOR THE PRODUCT COLOR GUIDE.



* OR AS PER DRAWINGS AND/OR SPECIFICATIONS

SECTION

SCALE: 1 1/2" = 1'-0"

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TYPICAL
WORK TABLE

08-03-12

C-7-1



Profit from the Eagle Advantage®

Specification Sheet

Short Form Specifications

Eagle Hand Sink, model HSA-10-FW. Constructed of all-welded type 304 stainless steel, with deep-drawn positive drain sink bowl, basket drain, inverted "V" edge to prevent spillage, and splash-mounted gooseneck faucet with wrist handles.



#HSA-10-FW

Options / Accessories

- ☐ P-trap
- ☐ Tail piece
- ☐ End splashes*
- ☐ Side mount wall bracket
- ☐ Soap & towel dispenser
- ☐ MICROGARD® antimicrobial protection

* To order end splashes, add suffix "-LS" for left end splash, "-RS" for right end splash, or "-LRS" for left and right end splashes.

EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our **SpecFAB®** Division.

Phone: 302-653-3000 • Fax: 302-653-3091 • e-mail: specfab@eaglegrp.com

Item No.: _____
Project No.: _____
S.I.S. No.: _____

Hand Sink* with Standard Wrist Handle Faucet

MODELS:

☐ HSA-10-FW

Design & Construction Features

- Type 304 stainless steel construction.
- Inverted "V" edge rim retards spillage.
- All-welded construction.
- Positive drain bowl.
- Wall bracket included for added strength.
- One piece, deep-drawn, seamless bowl.
- 1½" (38mm) stainless steel basket waste,
- Gooseneck faucet with wrist blade handles.

* Non-electric. We offer sinks with electric soap dispenser and faucets.

Certifications / Approvals



Spec sheets available for viewing, printing or downloading from our online literature library at www.eaglegrp.com

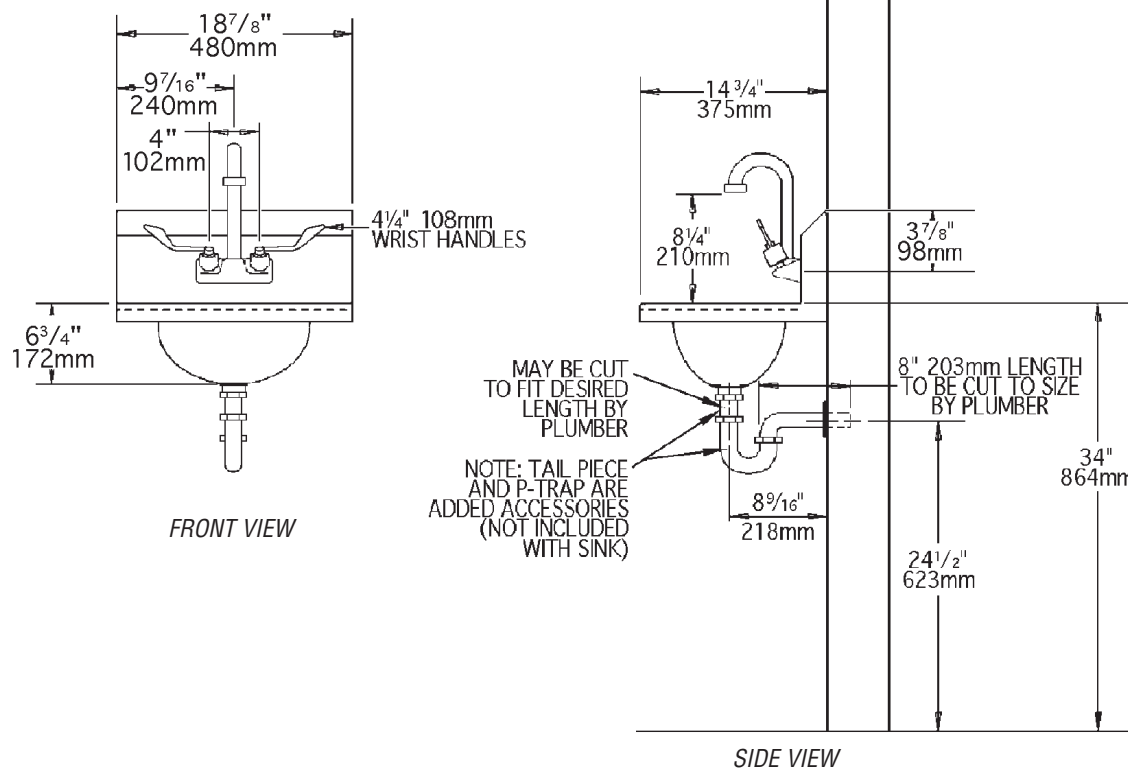
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Profit from the Eagle Advantage®

Item No.: _____
 Project No.: _____
 S.I.S. No.: _____

Hand Sink with Standard Wrist Handle Faucet



model #	bowl size		overall size		weight	
	width	length x depth	width	length x height	lbs.	kg
	in.	mm	in.	mm		
HSA-10-FW	9 ^{3/4} "	13 ^{1/2} " x 6 ^{3/4} "	343 x 248 x 173	14 ^{3/4} " x 18 ^{7/8} " x 12 ^{3/4} "	376 x 480 x 324	14 6.4

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Foodservice Division: Phone 800-441-8440

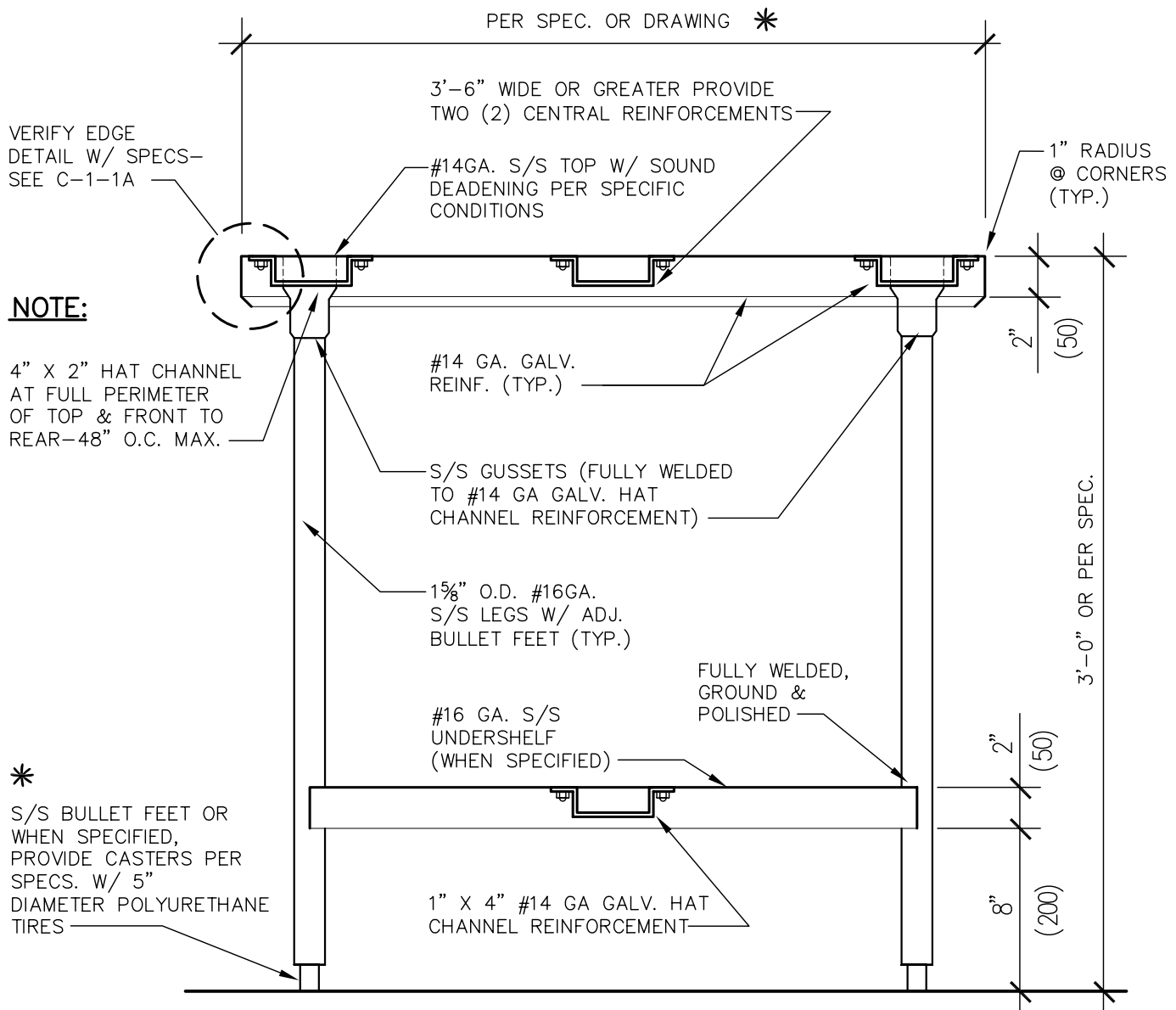
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Rev. 06/09

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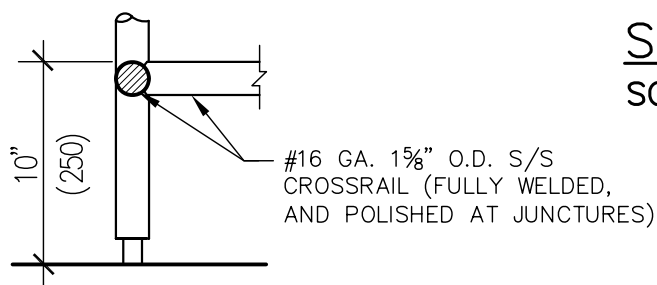
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*
S/S BULLET FEET OR
WHEN SPECIFIED,
PROVIDE CASTERS PER
SPECS. W/ 5"
DIAMETER POLYURETHANE
TIRES

SECTION

SCALE: 1 1/2" = 1'-0"



* OPTIONAL CROSSRAILS

* OR AS PER DRAWINGS AND/OR
SPECIFICATIONS

Clevenger Frable
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN
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TEL: 914/997-9660 FAX: 914/997-9671

TYPICAL
ISLAND TYPE WORKTABLE

12-12-11

C-7-1C

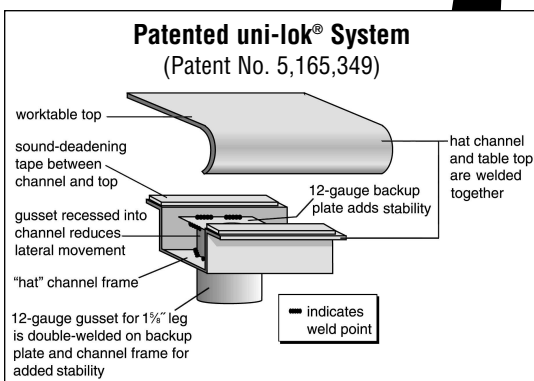


An Eagle Group Company

Specification Sheet

Short Form Specifications

Blendport worktables, Deluxe series, model _____.
 Top constructed of 16 gauge 300 series stainless steel with 1½" roll on front, 4½" backsplash, and sides turned down 90°. Undershelf is adjustable and constructed of heavy gauge galvanized steel. Top reinforced with welded hat channels, and sound deadened. Constructed with uni-lok® patented gusset system with the gussets recessed into the hat channels to reduce lateral movement. Legs are 1½" O.D. galvanized tubing, with galvanized gussets and 1" hi-impact plastic bullet feet.



Worktables with Backsplash and Galvanized Base with Undershelf —Deluxe Series

MODELS:

<input type="checkbox"/> BPT-2424EB-BS	<input type="checkbox"/> BPT-3024EB-BS
<input type="checkbox"/> BPT-2430EB-BS	<input type="checkbox"/> BPT-3030EB-BS
<input type="checkbox"/> BPT-2436EB-BS	<input type="checkbox"/> BPT-3036EB-BS
<input type="checkbox"/> BPT-2448EB-BS	<input type="checkbox"/> BPT-3048EB-BS
<input type="checkbox"/> BPT-2460EB-BS	<input type="checkbox"/> BPT-3060EB-BS
<input type="checkbox"/> BPT-2472EB-BS	<input type="checkbox"/> BPT-3072EB-BS
<input type="checkbox"/> BPT-2484EB-BS	<input type="checkbox"/> BPT-3084EB-BS
<input type="checkbox"/> BPT-2496EB-BS	<input type="checkbox"/> BPT-3096EB-BS

Tabletop

- Patented uni-lok® gusset system (patent #5,165,349): gussets are recessed into hat channel, reducing lateral movement.
- Top reinforced with welded-on hat channel.
- Sound-deadened between top and channels.
- 4½" (114mm)-high 90° backsplash with 1" (25mm) turn at 90°.
- 1½" (38mm)-diameter 180° rolled edge on front. Ends are turned down 90°, providing for flush installations when required.
- 16 gauge 300 series polished stainless steel.

Adjustable Undershelf

- Heavy gauge, galvanized.
- Gusset welded to each corner.

Legs—1½" (41mm)-diameter

- Tables 96" (2438mm) and longer come with six legs or more.
- Heavy gauge galvanized steel.
- 1" (25mm) adjustable hi-impact plastic feet*.

* Optional casters available. Consult factory.

BlendPort®

An Eagle Group Company

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 800-441-8440 • Fax: 302-653-2065

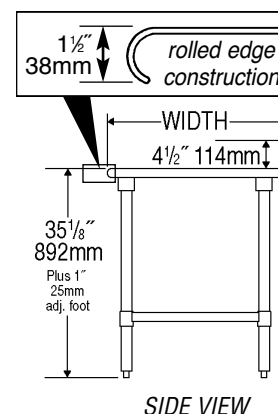
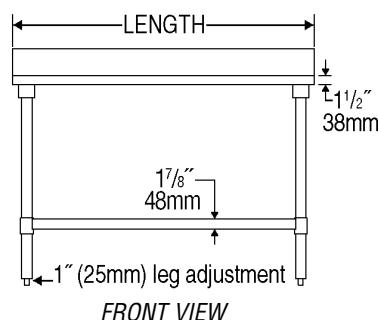
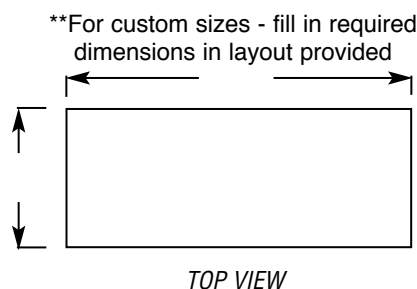
Certifications / Approvals





Item No.: _____
 Project No.: _____
 S.I.S. No.: _____

Worktables with Backsplash and Galvanized Base with Undershelf—Deluxe Series



model #	# of legs	width		length		weight	
		in.	mm	in.	mm	lbs.	kg
BPT-2424EB-BS	4	24"	610	24"	610	43	19.5
BPT-2430EB-BS	4	24"	610	30"	762	48	21.8
BPT-2436EB-BS	4	24"	610	36"	914	53	24.0
BPT-2448EB-BS	4	24"	610	48"	1219	63	28.6
BPT-2460EB-BS	4	24"	610	60"	1524	73	33.1
BPT-2472EB-BS	4	24"	610	72"	1829	85	38.6
BPT-2484EB-BS	4	24"	610	84"	2134	97	44.0
BPT-2496EB-BS	6	24"	610	96"	2438	114	51.7
BPT-3024EB-BS	4	30"	762	24"	610	45	20.4
BPT-3030EB-BS	4	30"	762	30"	762	50	22.7
BPT-3036EB-BS	4	30"	762	36"	914	53	24.0
BPT-3048EB-BS	4	30"	762	48"	1219	70	31.8
BPT-3060EB-BS	4	30"	762	60"	1524	81	36.7
BPT-3072EB-BS	4	30"	762	72"	1829	94	42.6
BPT-3084EB-BS	4	30"	762	84"	2134	108	49.0
BPT-3096EB-BS	6	30"	762	96"	2438	130	59.0

BlendPort®

An Eagle Group Company

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 800-441-8440 • Fax: 302-653-2065

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Rev. 01/20

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Single TF DBC SST 120V w/Funnel Locks

35.7" x 19.2" x 12.1"
(90.7cm x 48.8cm x 30.7cm)



 Servers and airpots sold separately

- Brews 16.3 to 18.9gal (61.7 to 71.5L) of perfect coffee per hour
- Coffee extraction controlled with pre-infusion and pulse brew, digital temperature control, and large sprayhead; coffee strength controlled with variable by-pass.
- Create coffee recipe cards with custom recipes, ad cards with messages that display on the brewer LCD, and dedicated funnels for special coffees with the BrewWISE Recipe Writer using your PC (Windows® compatible).
- Easy pulse interface allows automatic programming of pulse routine
- Preventive maintenance kit: 39641.0000
- Stores individual coffee recipes so operator can easily brew many varieties
- ThermoFresh® servers are vacuum insulated to keep coffee hot for hours.
- Brews 1/2, 1 or 1 1/2gal (1.9, 3.8 or 5.7L) batches
- SplashGard® funnel deflects hot liquids away from the hand
- Energy saver mode reduces tank temperature during idle periods
- Operate any combination of BrewWISE equipment error-free with wireless brewer-grinder interface through Smart Funnel with SplashGard®
- Funnel locks help improve safety

Agency:



Specifications

Product #: 34800.0017

Faucet: Lower

Water Access: Plumbed

Interface: Wireless

Finish: Stainless

Funnel: Smart Funnel

Additional Features

BUNNLINK Compatible

BrewWISE

Electrical & Capacity

Volts	Amps	Watts	Cord Attached	Plug Type	8oz cups/hr 236ml cups/hr	Input H ₂ O Temp.	Phase	# Wires plus Ground	Hertz
120	18.1	2200	Yes	NEMA 5-20P	102	60°F (15.5°C)	1	2	60

Plumbing Requirements

PSI	kPa	Fitting Supplied	Water Flow Required (GPM)
20-90	138-621	3/8" Male Flare Fitting	-

CAD Drawings

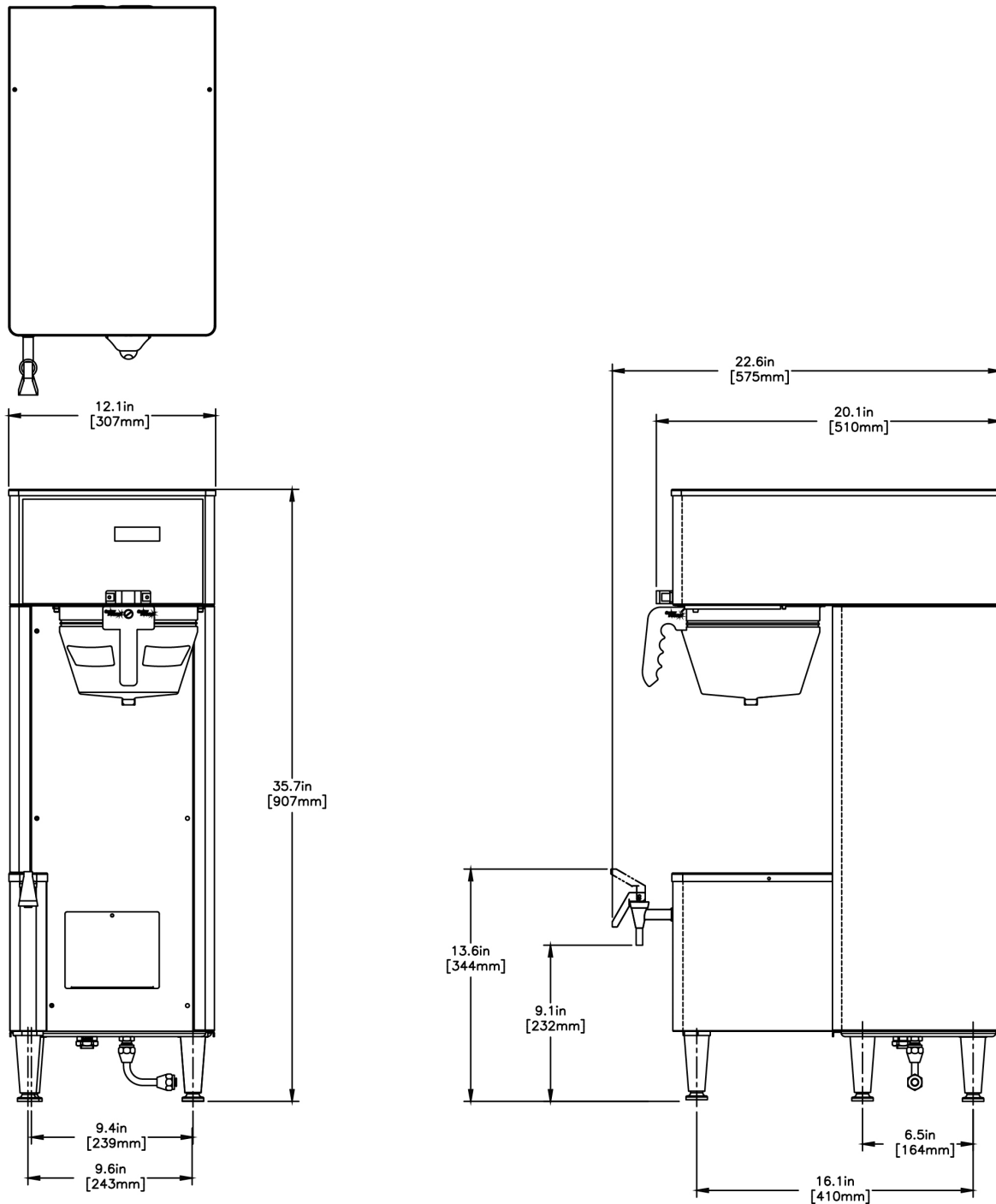
2D	Revit	KLC
●		



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For most current specifications and other info visit bunn.com.

Created on:
09/13/2017



Unit				Shipping				
	Width	Height	Depth	Width	Height	Depth	Weight	Volume
English	12.1 in.	35.7 in.	19.2 in.	-	-	-	60.100 lbs	8.131 ft ³
Metric	30.7 cm	90.7 cm	48.8 cm	-	-	-	27.261 kgs	0.230 m ³



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Created on:
09/13/2017

Related Products & Accessories: Single TF DBC SST 120V w/Funnel Locks(34800.0017)



G9-2T DBC, BLK

Product #: 33700.0001



BREWWISE RECIPE WRITER

Product #: 34444.0000



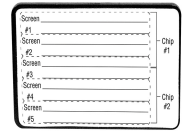
CARD ASSY, RECIPE TRANSFER (BRW)

Product #: 34447.0000



CARD ASSY, TRANSFER-AD (BRW)

Product #: 34448.0000



TARJETA

Product #: 34448.0000



WATER FILTER, EQHP-10L

Product #: 39000.0001



WATER FILTER, EQHP-10

Product #: 39000.0004

Serving & Holding Options: Single TF DBC SST 120V w/Funnel Locks(34800.0017)



TF SERVER, DSG2
1G/3.8L

Product #:42700.0000



TERMO

Product #:42700.0000



TF SERVER, DSG2
1G/3.8L BLK

Product #:42700.0001



TF SERVER, DSG2 1G
CD

Product #:42700.0003



TF SERVER, DSG2 1G
BLK CD

Product #:42700.0004



TF SERVER, DSG2 1.5G
SST

Product #:42750.0000



TF SERVER, DSG2 1.5G
BLK

Product #:42750.0001



TERMO

Product #:42750.0001



TF SERVER, DSG2 1.5G
CD

Product #:42750.0003



TF SERVER, DSG2 1.5G
BLK CD

Product #:42750.0010



TF SERVER, 1G/3.8L
MECH

Product #:44000.0000



TERMO

Product #:44000.0000



TF SERVER, 1G/3.8L
MECH BLK

Product #:44000.0001



TERMO

Product #:44000.0001



TF SERVER, 1.5G/5.7L
MECH

Product #:44050.0000



TERMO

Product #:44050.0000



TF SERVER, 1.5G/5.7L
MECH BLK

Product #:44050.0001



TERMO

Product #:44050.0001

1Gal(3.8L) TF Srvr w/ Base, DSG SST

20.7" x 13.0" x 9.3"
(52.6cm x 33.0cm x 23.6cm)



- Digital sight gauge operates on four easily replaceable AAA batteries with an average 1-year lifespan. Display shows low battery symbol when replacement is needed
- Unique lid design features a pour spout for easy emptying and cleaning
- Vacuum insulated to keep coffee hot for hours
- Volume indicator displays how much coffee is left inside the server
- Four-hour digital count-up timer
- Soft-grip bail handle for easy transportation
- Brew-through lid
- Contemporary styling and wrap program for maximum merchandising
- Drip tray is easily removed for cleaning or to provide extra clearance for dispensing into pitchers
- Fast flow faucet
- Ideal for use with Single or Dual TF DBC Brewers
- Large cup clearance allows for dispensing into cups, decanters and thermal carafes
- Translucent faucet guard provides increased visibility while dispensing

Agency:



Specifications

Product #: 42700.0000

Finish: Stainless

Additional Features

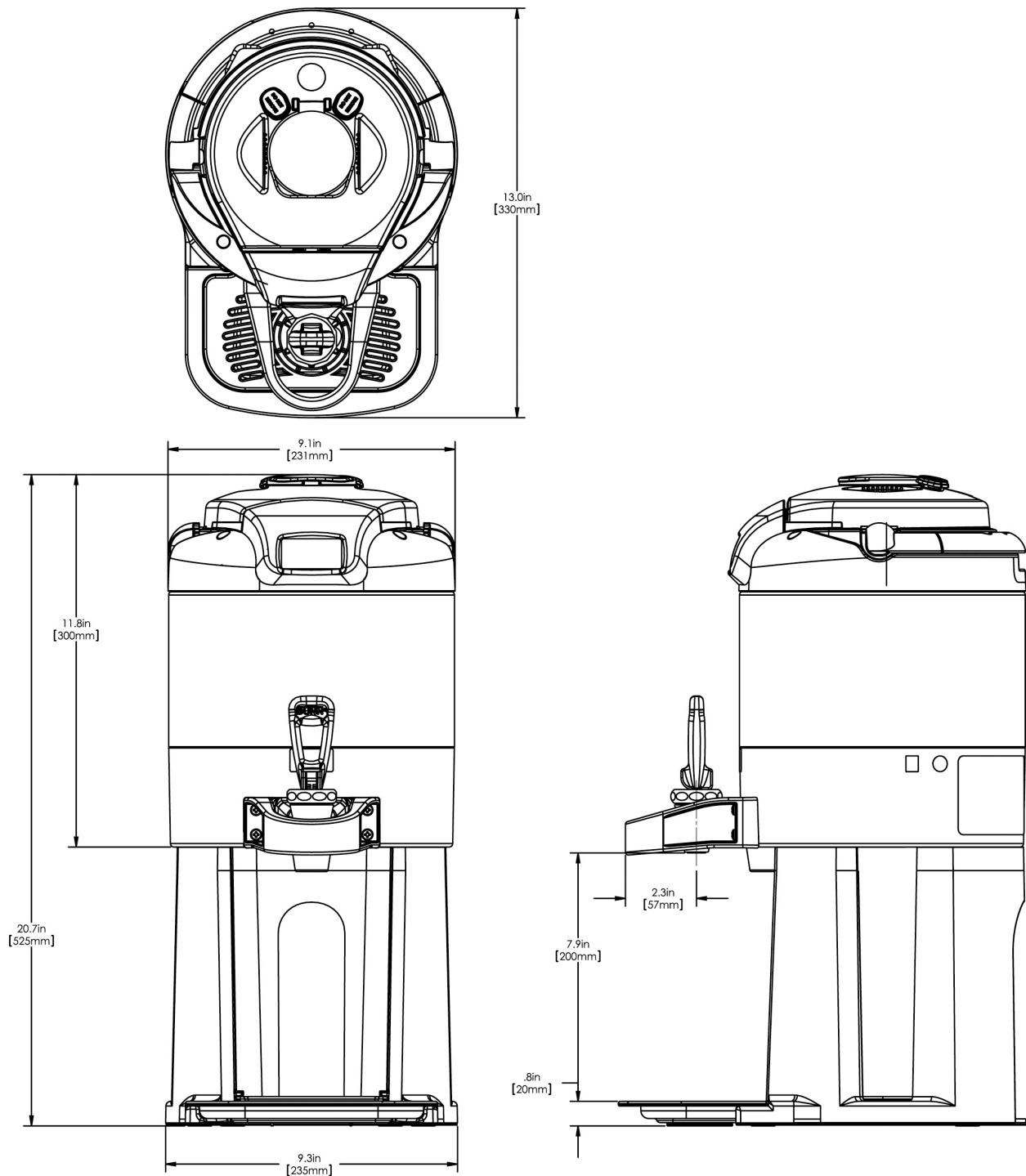
Holding Capacity

English	Metric
-	-



BUNN® reserves the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacements for previously purchased equipment. For most current specifications and other info visit bunn.com.

Created on:
08/29/2017



Unit				Shipping				
	Width	Height	Depth	Width	Height	Depth	Weight	Volume
English	9.3 in.	20.7 in.	13.0 in.	-	-	-	15.500 lbs	2.500 ft³
Metric	23.6 cm	52.6 cm	33.0 cm	-	-	-	7.031 kgs	0.071 m³



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Created on:
08/29/2017

STAND ASSY, TF SERVER BLK

0.0" x 0.0" x 0.0"
(0.0cm x 0.0cm x 0.0cm)

Feature points are currently unavailable.



Agency:

Specifications

Product #: 39795.0003

Finish: Black

Additional Features

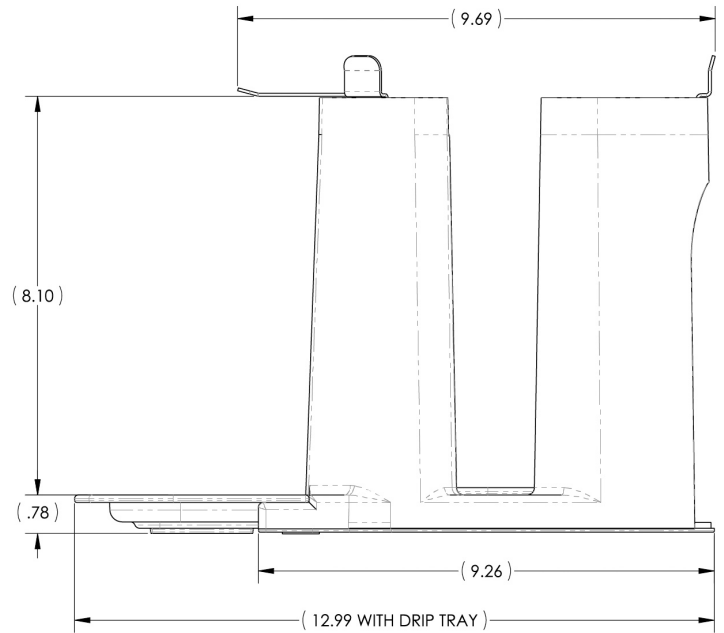
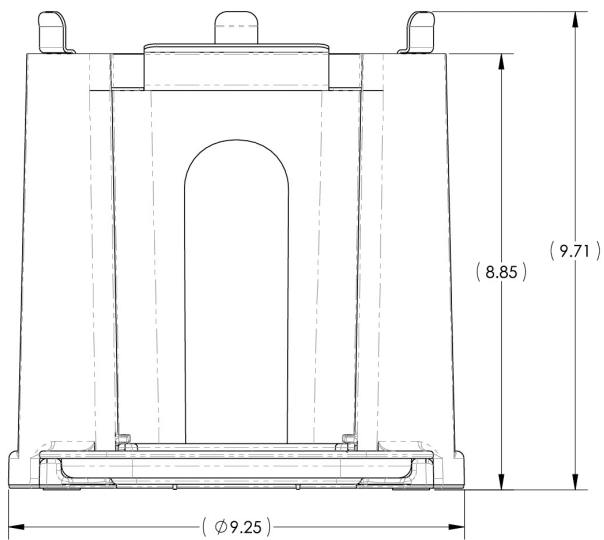
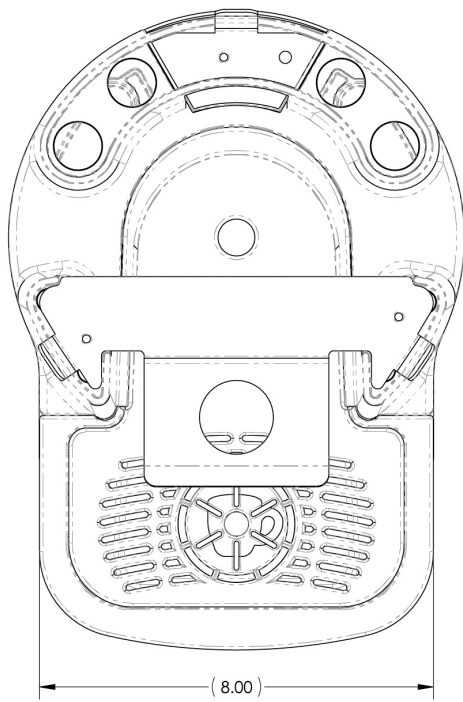
Holding Capacity

English	Metric
-	-



BUNN® reserves the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacements for previously purchased equipment. For most current specifications and other info visit bunn.com.

Created on:
08/29/2017



Unit				Shipping				
	Width	Height	Depth	Width	Height	Depth	Weight	Volume
English	-	-	-	-	-	-	5.550 lbs	1.102 ft³
Metric	-	-	-	-	-	-	2.517 kgs	0.031 m³



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Created on:
08/29/2017

Related Products & Accessories: STAND ASSY, TF SERVER BLK(39795.0003)



TF SERVER, DSG2 1G
SST NOBASE

Product #: 42700.0050



TF SERVER, DSG2 1G
BLK NOBASE

Product #: 42700.0051



TF SERVER, DSG2 1G
SST CD NOBAS

Product #: 42700.0052



TF SERVER, DSG2 1.5G
SST NOBAS

Product #: 42750.0050



TF SERVER, DSG2 1.5G
BLK NOBAS

Product #: 42750.0051



TF SERVER, DSG2 1.5G
SST CD NOBAS

Product #: 42750.0052



TF SERVER, 1G/3.8L
MECH NOBASE

Product #: 44000.0050



TF SERVER, 1G/3.8L
MECH BLK NOBASE

Product #: 44000.0051



TF SERVER, 1.5G/5.7L
MECH NOBASE

Product #: 44050.0050



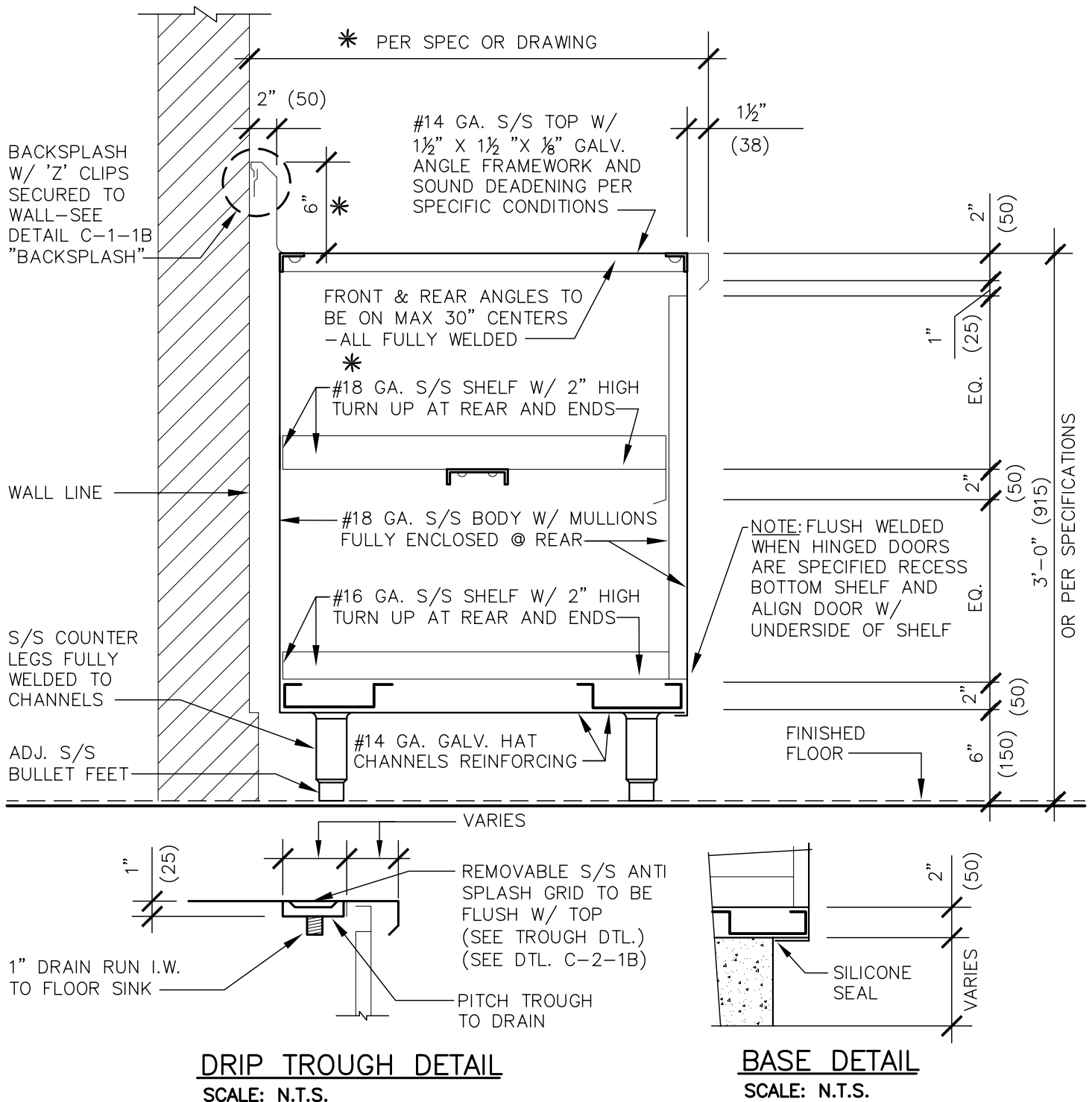
TERMO

Product #: 44050.0050



TF SERVER, 1.5G/5.7L
MECH BLK NOBASE

Product #: 44050.0051



* OR AS PER DRAWINGS AND / OR SPECIFICATIONS

Clevenger Frable 
LaVallee
 FOODSERVICE & LAUNDRY
 CONSULTING & DESIGN
 39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
 TEL: 914/997-9660 FAX: 914/997-9671

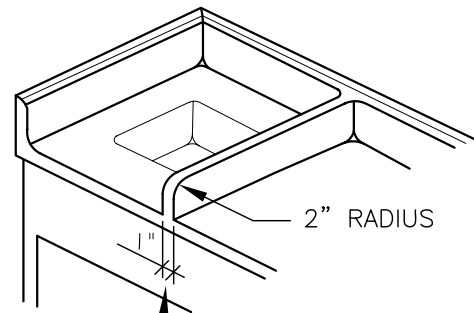
SEMI-ENCLOSED COUNTER

DEC 2011

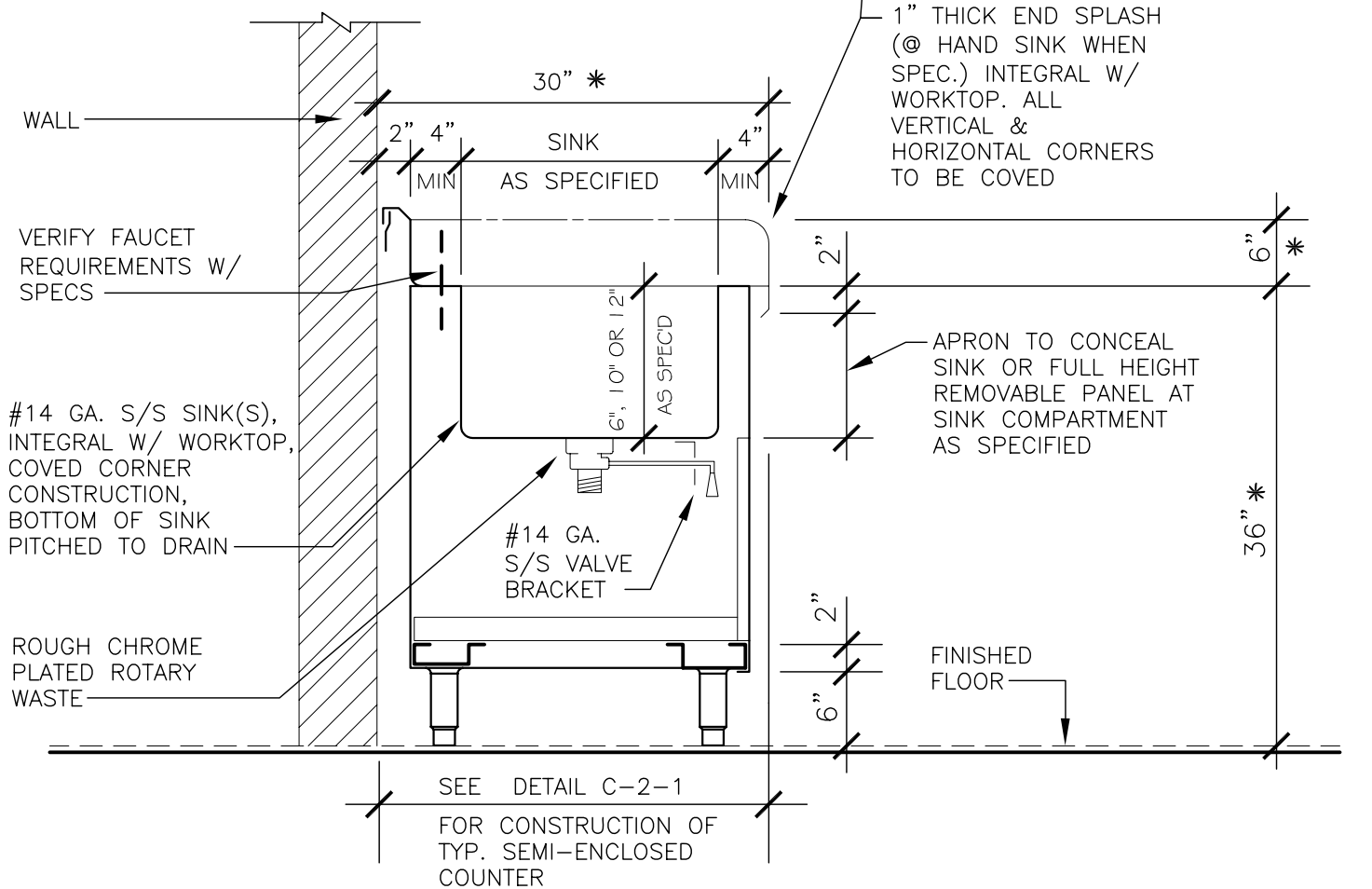
C-2-1

SCHEDULE OF SINKS UNLESS OTHERWISE SPECIFIED

1. HAND SINK 9" X 12" OR
12" X 14" X 6" DEEP
2. BEVERAGE COUNTER 14" X 16" OR
16" X 20" X 10" OR 12" DEEP
3. PREPARATION COUNTER 16" X 20",
18" X 18" OR 20" X 20" X 10" OR 12" DEEP



ISOMETRIC VIEW AT HAND SINK



SECTION

SCALE: N.T.S.

* OR AS PER DRAWINGS AND / OR SPECIFICATIONS

Clevenger Frable 
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN **LaVallee**
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

SEMI-ENCLOSED COUNTER
W/ SINK(S)

03-26-13

C-2-1E

Super Efficient Super Hot Drop-In



Project: _____

Item: _____

Quantity: _____

Date: _____

Drop-in Models	Wells
<input type="checkbox"/> DI-EF-1D	1
<input type="checkbox"/> DI-EF-2D	2
<input type="checkbox"/> DI-EF-3D	3
<input type="checkbox"/> DI-EF-4D	4
<input type="checkbox"/> DI-EF-5D	5
<input type="checkbox"/> DI-EF-6D	6

Standard Features

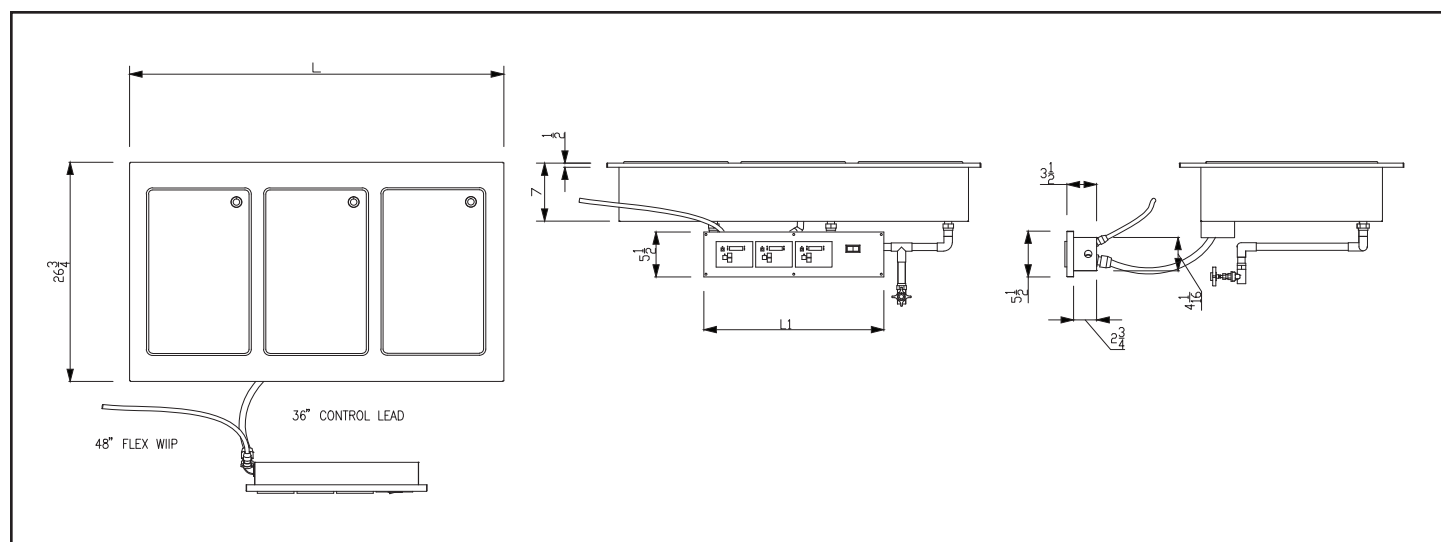
- ✓ Solid state digital controls
- ✓ Full sealing gasket
- ✓ 500 watts (at 208V)
- ✓ Single power source

Optional Features (specify)

- ☐ Custom sign/logo (specify_____)
- ☐ Small pan adapter bars
- ☐ Adapter panel
- ☐ Skirt mounted control adapter
- ☐ Other voltage, phase, cycle (specify_____)

- ▶ Versatile, use wet or dry
- ▶ Fully insulated, for use in any counter
- ▶ 1 to 6 pan units provide for full menus
- ▶ Manifold drains make installation easy
- ▶ Labor saving easy to clean design

Super Efficient Super Hot Drop-In



Model #	Pans	L	L1	Cut-out size	208V, 1 phase		120V, 1 phase		240V, 1 phase	
					Watts	Amps	Watts	Amps	Watts	Amps
DI-EF-1	1	16 1/2"	7 1/4"	22 5/8" x 14 1/4"	500	2.4	661	5.5	661	2.8
DI-EF-2	2	30 1/2"	12"	22 5/8" x 28 1/4"	1000	4.8	1322	11	1322	5.5
DI-EF-3	3	44 1/2"	16 3/4"	22 5/8" x 42 1/4"	1500	7.2	1983	16.5	1983	8.3
DI-EF-4	4	58 1/2"	21 1/2"	22 5/8" x 56 1/4"	2000	9.6	2644	22	2644	11.0
DI-EF-5	5	72 1/2"	26 1/4"	22 5/8" x 70 1/4"	2500	12.0	3305	27.5	3305	13.8
DI-EF-6	6	86 1/2"	31"	22 5/8" x 84 1/4"	3000	14.4	3966	33.1	3966	16.5

General Specifications

Top perimeter frame to be constructed of 14 gauge stainless steel, welded, ground and polished with a thermal break provided between the top and heated sections

Interior pan to be 18 gauge stainless steel, fully welded, ground and polished. To be fully insulated with fiberglass insulation.

The exterior jacket to be constructed of 18 gauge galvanized steel.

Each compartment to have 500 watt heat source with solid state digital controls.

All switches and controls to be fully accessible. Units to be UL listed and shall bear the UL Sanitation seals.

Approval/Submittal (signature required)

Model # _____

Flange Edge Detail:

Turned (T) _____ Hugged (H) _____

(T) = 1/2" 90° turn down
(H) = 14 gauge thickness

Voltage _____

Adherence to LTI installation instructions is required.

Failure to do so may void the warranty.

Signature _____

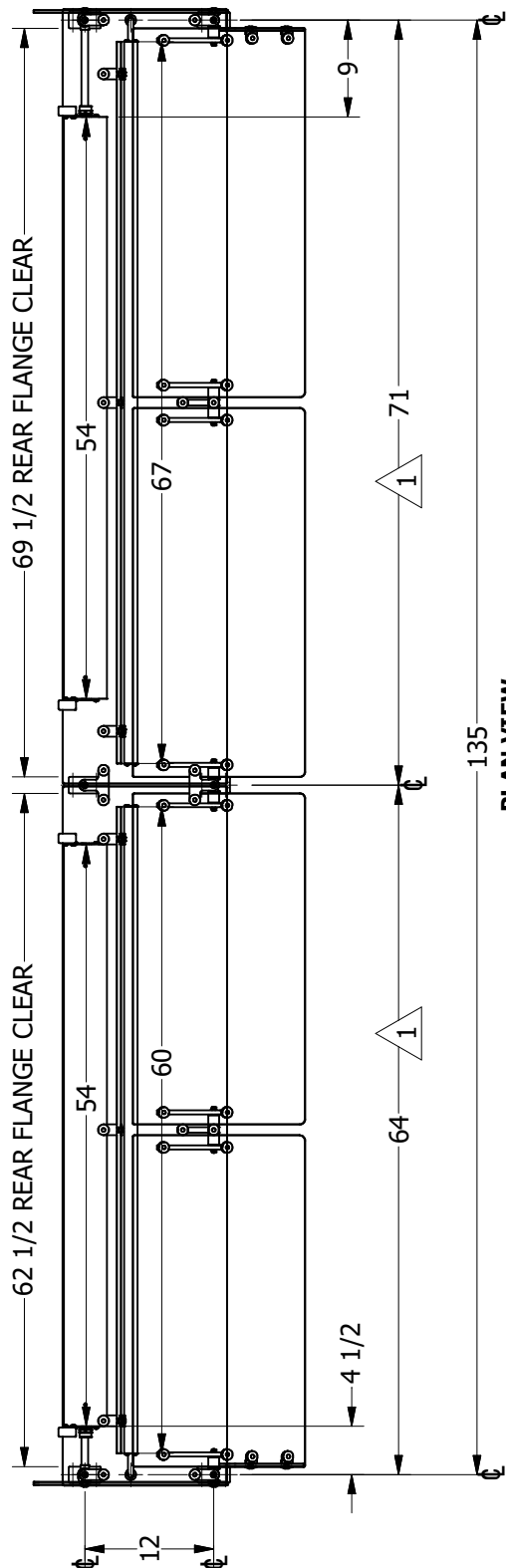
Date _____

Control Panel cut-out size

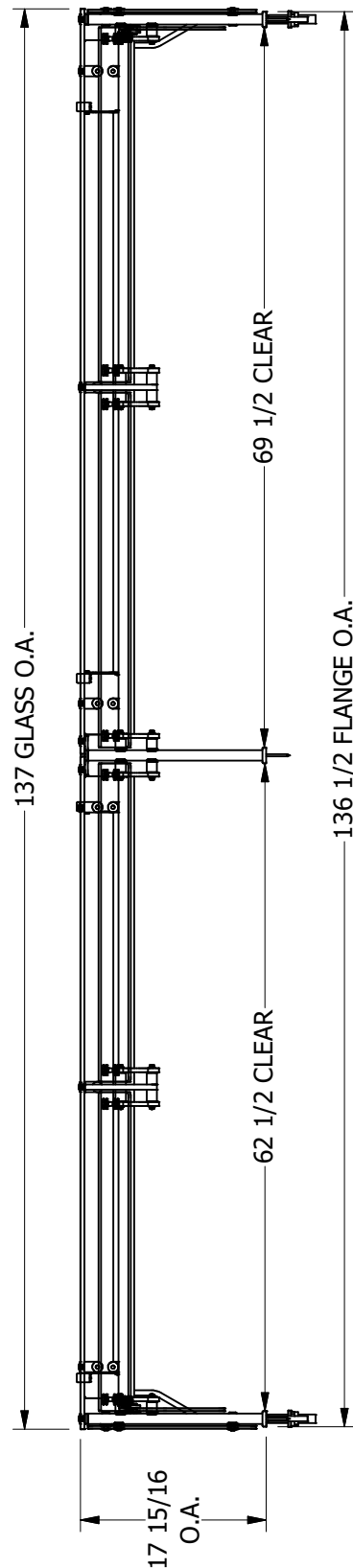
11" X 4 1/4"
15 3/4" X 4 1/4"
20 1/2" X 4 1/4"
25 1/4" X 4 1/4"
30" X 4 1/4"
34 3/4" X 4 1/4"

We reserve the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacement for previously purchased equipment.

All equipment to be built in accordance with the Underwriters Laboratories, Inc. and the National Sanitation Foundation, Inc. standards and shall bear the Underwriters Laboratories, Inc listing label for safety and the Underwriters Laboratories classification label for sanitation.



PLAN VIEW



FRONT VIEW

REVISION HISTORY		
REV	DESCRIPTION	DATE
1	CHANGED DIMS & CHANGED MODEL.	9/8/2020

VG
by **VERSAGARD**

1094 Parkway Ind. Park Dr.
Buford, GA 30518
PH: 678-730-4155
FX: 678-730-2919

CLIENT:

PROJECT: MT VERNON HS FOOD LAB

CUSTOMER PO:

LOI

QTY:

1

MODEL/ITEM: 1-38-VG2-E-HTLED

FINISH:

BRUSHED STAINLESS STEEL

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JOB NO.:

APPROVED BY:

DATE:

08/19/20

SCALE:

SHEET NO.:

1 OF 2

DRAWN:

ML

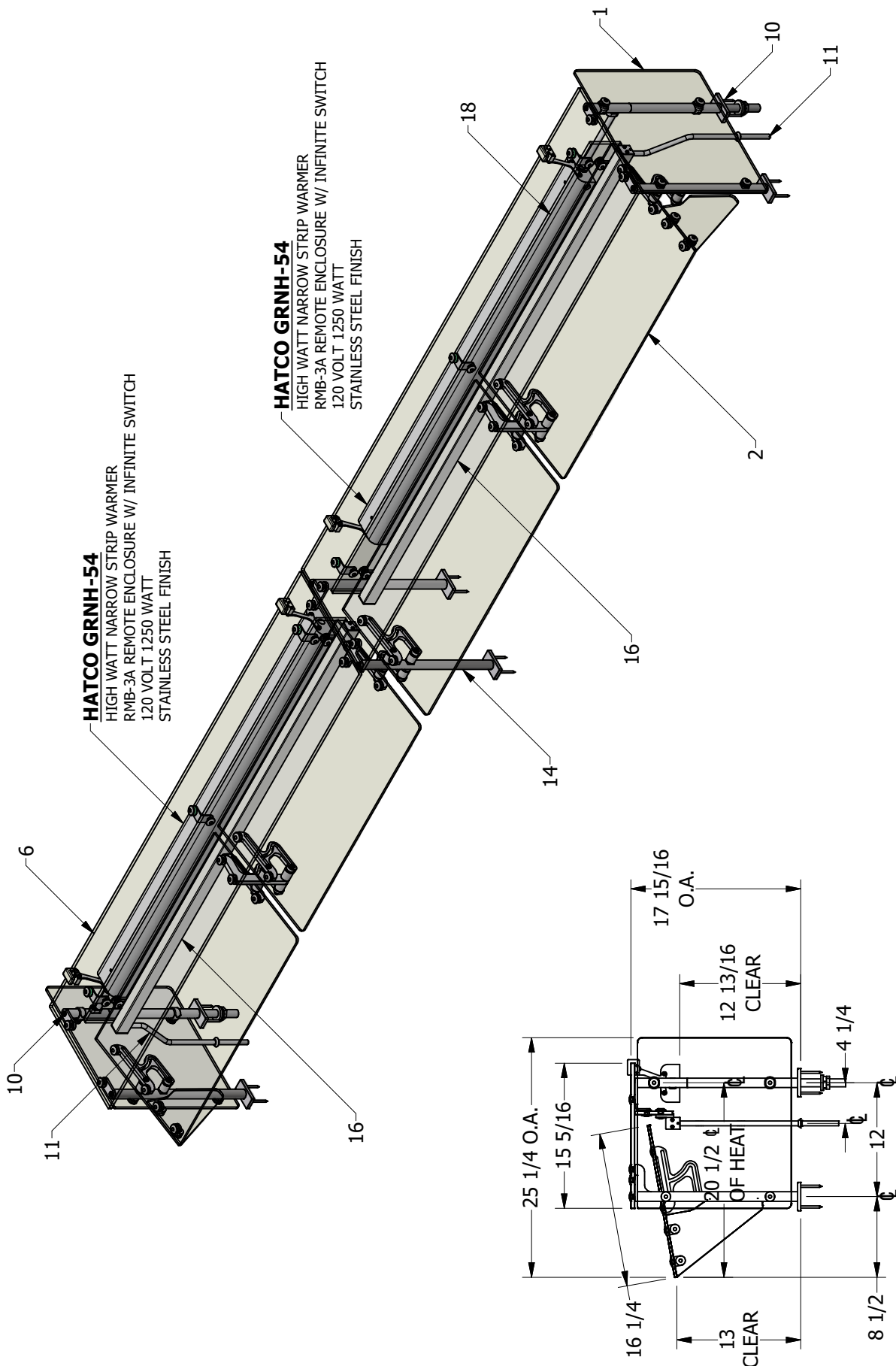
REVISED BY:

BM

REV. DATE:

09/08/20





<div><div><div>VG[®]</div><div>by VERSAGARD</div></div><div>1094 Parkway Ind. Park Dr. Buford, GA 30518 PH: 678-730-4155 FX: 678-730-2919</div></div>		<div>MODEL/ITEM: 1-38-VG2-E-HTLED</div> <div>FINISH: BRUSHED STAINLESS STEEL</div>		<div>QTY.: 1</div> <div>LOI</div>		<div>CLIENT:</div> <div>CUSTOMER PO:</div>		<div>PROJECT:</div> <div>MT VERNON HS FOOD LAB</div>		<div>JOB No.:</div> <div>APPROVED BY:</div>		<div>DATE:</div> <div>08/19/20</div>		<div>SCALE:</div>		<div>NSF</div>	
<div>All product designs © Versa-Gard[®] 2020. No part of the drawings / designs / pictures / renderings represented may be reproduced or transmitted in any form or by photocopying, etc. without expressed written permission by Versa-Gard.</div>										<div>DRAWN:</div> <div>ML</div>		<div>REVISED BY:</div> <div>BM</div>		<div>REV. DATE:</div> <div>09/08/20</div>		<div>SHEET NO.:</div> <div>2 OF 2</div>	



Glo-Ray® Narrow Infrared Strip Heaters

Models: GRN-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

GRNH-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

GRNM-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

Hatco Glo-Ray® Narrow Strip Heaters are great for use in tight spaces and keep the focus on food items being displayed. Ideal for minimal sight obstruction of food product in heated buffet areas. Even the most delicate dishes hold that "just-prepared" look.

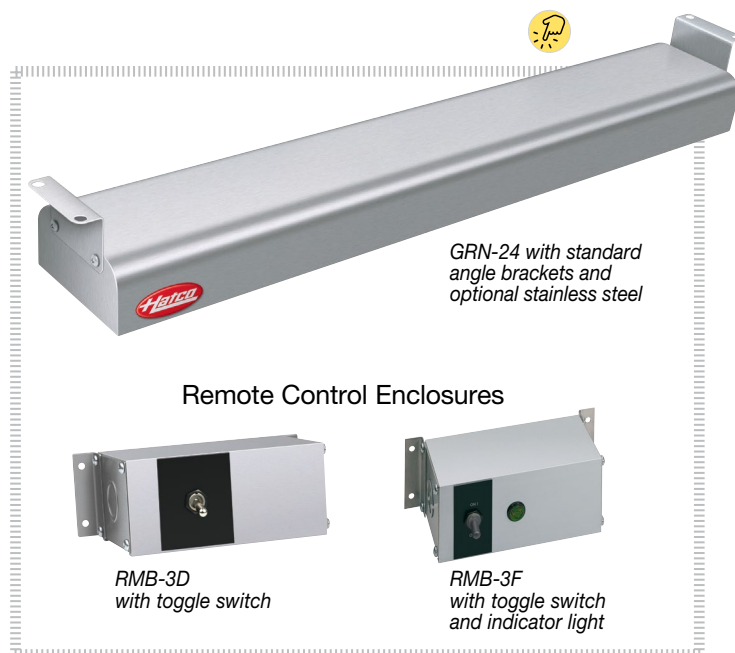
Standard features

- Sleek, slim design with just 2" (51 mm) height and 4" (102 mm) depth keeps the focus on the food in buffet lines
- Available in widths from 18" to 72" (457-1829 mm)
- Pre-focused heat maintains serving temperatures longer without continuing to cook the food
- Optional remote control enclosure in *Designer* colors†
- Sturdy continuous heavy duty Steel housings available in *Designer* colors: Warm Red, Black (standard), Gray Granite, White Granite, Navy Blue, Hunter Green, Antique Copper or Stainless Steel† (GRNM models available in Stainless Steel only)
- Accessorize units with non-adjustable tubular stands in *Designer* colors† (Available in Stainless Steel only for GRNM models)
- Models come with non-adjustable 1.5" (38 mm) angle brackets available in *Designer* colors† (Available in Stainless Steel only for GRNM models)
- Lower wattage elements also available, please consult factory for more information

Project _____

Item # _____

Quantity _____



Options (available at time of purchase only)

Housing in *Designer* Color – Black Standard† (not available for GRNM models)

- ☐ Warm Red ☐ Gray Granite ☐ White Granite ☐ Navy Blue
☐ Hunter Green ☐ Antique Copper ☐ Stainless Steel

Power Leads – Standard 6" (152 mm) – must specify lead length

- ☐ 1'-5' (305-1525 mm) ☐ 6'-10' (1829-3048 mm)
☐ 11'-15' (3352-4572 mm) ☐ 16'-20' (4877-6096 mm)

☐ No Control included – requires selectoin of RMB2-xx control

Remote Box(RMB) – in *Designer* Color – clear Anodized Standard† (GRNM requires RMB2-xx Remote Box)

- ☐ Warm Red ☐ Black ☐ Gray Granite ☐ White Granite
☐ Navy Blue ☐ Hunter Green ☐ Antique Copper

☐ Stainless Steel Hanger tabs in lieu of angle brackets (GRN, GRNH only)

☐ Attached 6' (1829 mm) Cord and Plug Set (120V GRN and GRNH only) on models up to 72" (1829 mm) wide with Standard Chain Mount Kit (two S hooks with two 6" (152 mm) lengths of chain) and hanger tabs (max.1800 watt)

☐ Two S Hooks with two 6" lengths of chain (GRN, GRNH only)

☐ Adjustable Tubular Stands 10"-14" (254-356 mm)

Non-Adjustable Tubular Stands – choose clearance

- ☐ 10" (254 mm) – not avallabe for GRNM models
☐ 12" (305 mm) – not avallabe for GRNM models
☐ 14" (356 mm) ☐ 16" (406 mm)

Designer Color for Tubular Stands (clear Anodized Standard)†

- ☐ Warm Red ☐ Black ☐ Gray Granite ☐ White Granite
☐ Navy Blue ☐ Hunter Green ☐ Antique Copper

†Non-standard colors are non-returnable



IFS anti-microbial coatings use naturally-occurring, environmentally sustainable, silver ions to help inhibit the growth of microbes on the powder coated surface. See www.hatcocorp.com/antimicrobial-paint for more information.



For operation, location and safety information, please refer to the Installation and Operating Manual.



HATCO CORPORATION

P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A. | (800) 558-0607 | (414) 671-6350



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Glo-Ray® Narrow Infrared Strip Heaters

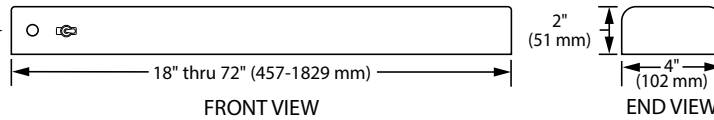
Models: GRN-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

GRNH-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

GRNM-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

GRN, GRNH, GRNM

GRNM units use
remote controls only
(no built-ins)



SPECIFICATIONS - Glo-Ray® Narrow Infrared Strip Heaters

Phase: Single

The shaded areas contain electrical
information for International models

Standard Watt				High Watt				Max Watt				All Models		
Model	Volts	Watts	Amps	Model	Volts	Watts	Amps	Model [○]	Volts	Watts	Amps	Dimensions W x D x H	Optional Plug GRN, GRNH only	Ship Weight*
GRN-18	120	250	2.1	GRNH-18	120	350	2.9	GRNM-18	120	450	3.8	18" x 4" x 2" (457 x 102 x 51 mm)	NEMA 5-15P	GRN 5 lbs. (3 kg.) GRNH 7 lbs. (4 kg.) GRNM 7 lbs. (4 kg.)
	208		1.2		208		1.7		208		2.2		-	
	240		1.0		240		1.5		240		1.9		-	
	220	250	1.1		220	350	1.6		220	-	-		-	
	240		1.0		240		1.5		240		-		-	
	220-230 (CE)*		1.1-1.2		220-230 (CE)*		1.6-1.7		220-230		-		-	
	230-240 (CE)*	230-250	1.0-1.0		230-240 (CE)*	321-350	1.4-1.5		230-240	-	-		-	
GRN-24	120	350	2.9	GRNH-24	120	500	4.2	GRNM-24	120	650	5.4	24" x 4" x 2" (610 x 102 x 51 mm)	NEMA 5-15P	GRN 6 lbs. (3 kg.) GRNH 6 lbs. (3 kg.) GRNM 8 lbs. (4 kg.)
	208		1.7		208		2.4		208		3.1		-	
	240		1.5		240		2.1		240		2.7		-	
	220	350	1.6		220	500	2.3		220	-	-		-	
	240		1.5		240		2.1		240		-		-	
	220-230 (CE)*		1.6-1.7		220-230 (CE)*		2.3-2.4		220-230		-		-	
	230-240 (CE)*	321-350	1.4-1.5		230-240 (CE)*	459-500	2.0-2.1		230-240	-	-		-	
GRN-30	120	450	3.8	GRNH-30	120	660	5.5	GRNM-30	120	825	6.9	30" x 4" x 2" (762 x 102 x 51 mm)	NEMA 5-15P	GRN 9 lbs. (5 kg.) GRNH 7 lbs. (4 kg.) GRNM 9 lbs. (5 kg.)
	208		2.2		208		3.2		208		4.0		-	
	240		1.9		240		2.8		240		3.4		-	
	220	450	2.1		220	660	3.0		220	-	-		-	
	240		1.9		240		2.8		240		-		-	
	220-230 (CE)*		2.1-2.2		220-230 (CE)*		3.0-3.1		220-230		-		-	
	230-240 (CE)*	413-450	1.8-1.9		230-240 (CE)*	606-660	2.6-2.8		230-240	-	-		-	
GRN-36	120	575	4.8	GRNH-36	120	800	6.7	GRNM-36	120	1000	8.3	36" x 4" x 2" (914 x 102 x 51 mm)	NEMA 5-15P	GRN 9 lbs. (5 kg.) GRNH 8 lbs. (4 kg.) GRNM 10 lbs. (5 kg.)
	208		2.8		208		3.8		208		4.8		-	
	240		2.4		240		3.3		240		4.2		-	
	220	575	2.6		220	800	3.6		220	-	-		-	
	240		2.4		240		3.3		240		-		-	
	220-230 (CE)*		2.6-2.7		220-230 (CE)*		3.6-3.8		220-230		-		-	
	230-240 (CE)*	528-575	2.3-2.4		230-240 (CE)*	735-800	3.2-3.3		230-240	-	-		-	
GRN-42	120	675	5.6	GRNH-42	120	950	7.9	GRNM-42	120	1175	9.8	42" x 4" x 2" (1067 x 102 x 51 mm)	NEMA 5-15P	GRN 9 lbs. (5 kg.) GRNH 9 lbs. (5 kg.) GRNM 11 lbs. (5 kg.)
	208		3.2		208		4.7		208		5.6		-	
	240		2.8		240		4.0		240		4.9		-	
	220	675	3.1		220	950	4.3		220	-	-		-	
	240		2.8		240		4.0		240		-		-	
	220-230 (CE)*		3.1-3.2		220-230 (CE)*		4.3-4.5		220-230		-		-	
	230-240 (CE)*	620-675	2.7-2.8		230-240 (CE)*	873-950	3.8-4.0		230-240	-	-		-	
GRN-48	120	800	6.7	GRNH-48	120	1100	9.2	GRNM-48	120	1300	10.8	48" x 4" x 2" (1219 x 102 x 51 mm)	NEMA 5-15P	GRN 11 lbs. (5 kg.) GRNH 11 lbs. (5 kg.) GRNM 13 lbs. (6 kg.)
	208		3.8		208		5.3		208		6.3		-	
	240		3.3		240		4.6		240		5.4		-	
	220	800	3.6		220	1100	5.0		220	-	-		-	
	240		3.3		240		4.6		240		-		-	
	220-230 (CE)*		3.6-3.8		220-230 (CE)*		5.0-5.2		220-230		-		-	
	230-240 (CE)*	735-800	3.2-3.3		230-240 (CE)*	1010-1100	4.4-4.6		230-240	-	-		-	
GRN-54	120	925	7.7	GRNH-54	120	1250	10.4	GRNM-54	120 [‡]	1500	12.5	54" x 4" x 2" (1372 x 102 x 51 mm)	NEMA 5-15P	GRN 12 lbs. (6 kg.) GRNH 12 lbs. (6 kg.) GRNM 13 lbs. (6 kg.)
	208		4.4		208		6.0		208		7.2		-	
	240		3.9		240		5.2		240		6.3		-	
	220	925	4.2		220	1250	5.7		220	-	-		-	
	240		3.9		240		5.2		240		-		-	
	220-230 (CE)*		4.2-4.4		220-230 (CE)*		5.7-5.9		220-230		-		-	
	230-240 (CE)*	850-925	3.7-3.9		230-240 (CE)*	1148-1250	5.0-5.2		230-240	-	-		-	
GRN-60	120	1050	8.8	GRNH-60	120	1400	11.7	GRNM-60	120 [‡]	1700	14.2	60" x 4" x 2" (1524 x 102 x 51 mm)	NEMA 5-15P	GRN 13 lbs. (6 kg.) GRNH 13 lbs. (6 kg.) GRNM 13 lbs. (6 kg.)
	208		5.0		208		6.7		208		8.2		-	
	240		4.4		240		5.8		240		7.1		-	
	220	1050	4.8		220	1400	6.4		220	-	-		-	
	240		4.4		240		5.8		240		-		-	
	220-230 (CE)*		4.8-5.0		220-230 (CE)*		6.4-6.7		220-230		-		-	
	230-240 (CE)*	964-1050	4.2-4.4		230-240 (CE)*	1286-1400	5.6-5.8		230-240	-	-		-	

[○] All GRNM units must use Remote Controls (no Built-Ins), cord & plug not available.

* Shipping weight includes packaging and does not include RMB.

[‡] CE approved units for 220-230V utilize a 220V heating system; 230-240V CE units utilize a 240V heating system.

[‡] Units not available with Infinite Switch in 120V. RMB2-1R or RMB2-2R series remote control box required.

HATCO CORPORATION

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Glo-Ray® Narrow Infrared Strip Heaters

Models: GRN-18, -24, -30, -36, -42, -48, -54, -60, -66, -72
 GRNH-18, -24, -30, -36, -42, -48, -54, -60, -66, -72
 GRNM-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

SPECIFICATIONS - Glo-Ray® Narrow Infrared Strip Heaters

Phase: Single

The shaded areas contain electrical information for international models

Standard Watt				High Watt				Max Watt				All Models		
Model	Volts	Watts	Amps	Model	Volts	Watts	Amps	Model [○]	Volts	Watts	Amps	Dimensions W x D x H	Optional Plug GRN, GRNH only	Ship Weight*
GRN-66	120	1160	9.7	GRNH-66	120 †	1560	13.0	GRNM-66	120	1875	15.6	66" x 4" x 2" (1676 x 102 x 51 mm)	NEMA 5-15P▶	GRN 16 lbs. (8 kg.)
	208		5.6		208		7.5		208		9.0		–	GRNH 16 lbs. (8 kg.)
	240		4.8		240		6.5		240		7.8		–	GRNM 16 lbs. (8 kg.)
	220	1160	5.3		220	1560	7.1		220	–	–		–	GRNM 16 lbs. (8 kg.)
	240		4.8		240		6.5		240	–	–			
	220-230 (CE)†		1160-1268		5.3-5.5		220-230 (CE)†		1560-1705	7.1-7.4	220-230			
	230-240 (CE)†	1066-1160	4.6-4.8		230-240 (CE)†	1433-1560	6.2-6.5		230-240	–	–			
GRN-72	120	1275	10.6	GRNH-72	120 †	1725	14.4	GRNM-72	120	2075	17.3	72" x 4" x 2" (1829 x 102 x 51 mm)	NEMA 5-15P▶	GRN 17 lbs. (8 kg.)
	208		6.1		208		8.3		208		10.0		–	GRNH 17 lbs. (8 kg.)
	240		5.3		240		7.2		240		8.6		–	GRNM 17 lbs. (8 kg.)
	220	1275	5.8		220	1725	7.8		220	–	–		–	GRNM 16 lbs. (8 kg.)
	240		5.3		240		7.2		240	–	–			
	220-230 (CE)†		1275-1394		5.8-6.1		220-230 (CE)†		1725-1886	7.8-8.2	220-230			
	230-240 (CE)†	1171-1275	5.1-5.3		230-240 (CE)†	1584-1725	6.9-7.2		230-240	–	–			

○ All GRNM units must use Remote Controls (no Built-Ins), and not available with cord and plug.

* Shipping weight includes packaging and does not include RMB.

♦ CE approved units for 220-230V utilize a 220V heating system; 230-240V CE units utilize a 240V heating system.

▶ GRNH-66 and GRNH-72 require NEMA 5-20P cord for Canada.

TOGGLE SWITCH

Toggle Switch: Max. 15 amps

Location: Chef's left side standard, other options available

GRNM units use remote control enclosures only (no built-ins)

INFINITE SWITCH

Max. 12.2 amps

LEADS

6" (152 mm) leads (on server's right)

PLUG CONFIGURATIONS

Please refer to electrical specifications shown in charts.



REMOTE CONTROL ENCLOSURES

RMB series uses one Control Box per Strip Heater - If RMB2 series is used, multiple warmers can be controlled from one box (U.S., Canada only). CE models require any remote switches be contained in a Remote Control Enclosure.

[Click here to download the RMB Choose Remote Box Excel Spreadsheet](#)

or follow this file path: www.hatcocorp.com > Resources > Choose Remote Box

Model	Volts	Width	Infinite/Toggle Switches
			U.S., Canada, Export U.S. Dollar
RMB-3A	120	5.5" (140 mm)	1 infinite
RMB-3B	208	5.5" (140 mm)	1 infinite
RMB-3C	240	5.5" (140 mm)	1 infinite
RMB-3D	120, 208, 240	5.5" (140 mm)	1 toggle
RMB-3F	120	5.5" (140 mm)	1 toggle, 1 indicator light
RMB-3G	208	5.5" (140 mm)	1 toggle, 1 indicator light
RMB-3H	240	5.5" (140 mm)	1 toggle, 1 indicator light
RMB-7F	120	9" (229 mm)	1 infinite, 1 indicator light
RMB-7G	208	9" (229 mm)	1 infinite, 1 indicator light
RMB-7H	240	9" (229 mm)	1 infinite, 1 indicator light
RMB2-1R	120, 208, 240	11" (280 mm)	1 toggle, 1 electronic infinite
RMB2-2R	120, 208, 240	14" (356 mm)	1 toggle, 1 electronic infinite

PRODUCT SPECS - Infrared Strip Heaters

The Narrow Infrared Strip Heater shall be a Glo-Ray®, manufactured by the Hatco Corporation, Milwaukee, WI 53234 U.S.A.

The Foodwarmer shall be a Glo-Ray Model ... , rated at ... watts, ... volts, single phase and be ... inches (millimeters) in overall width.

The Glo-Ray shall consist of Stainless Steel or Designer painted housing and include as standard equipment non-adjustable 1.5" (38 mm) angle brackets.

RECOMMENDED MOUNTING HEIGHTS

(For diagrams, refer to the Product Installation Manual on the Hatco website)

GRN, GRNH

Standard Watt: 8"-11" (203-279 mm) High Watt: 11"-14" (279-356 mm)

GRNM

Max Watt: 14"-18" (356-457 mm)

MINIMUM CLEARANCES

GRN, GRNH

Combustibles

Unit to surface below: 11" (279 mm)

Unit to back wall: 2" (51 mm)

Below overshelf: 1" (25 mm) clearance

Non-Combustibles

Corded Units with Built-In Switches:

Must be installed in a pass through area, not allowed with back wall installation

Unit to surface below: 7" (178 mm)

Unit to back wall: 2" (51 mm)

Below overshelf: 3" (76 mm) clearance

Hardwired Units with Built-In Switches:

Must be installed in a pass through area, not allowed with back wall installation

With Infinite Control or Indicator Light

Unit to surface below: 10" (254 mm)

Below overshelf: 1" (25 mm) clearance

With On/Off Toggle Switch

Unit to surface below: 8" (203 mm)

Below overshelf: 1" (25 mm) clearance

Hardwired Units with Remote Switches:

Unit to surface below: 8" (203 mm)

Unit to wall: 0" (0 mm)

Below overshelf: 0" (0 mm) clearance

GRNM

Combustibles

Must be installed in non-combustible surroundings only

Non-Combustibles

Unit to surface below: 12" (305 mm)

Unit to wall: 3" (76 mm)

Below overshelf: 1" (24 mm) clearance

Set back 10" (254 mm) maximum from front of an overshelf

The infrared heating element shall be tubular metal sheathed. The foodwarmer shall be factory assembled ready for electrical installation.

Options shall include choice of Stainless Steel or Designer color anti-microbial paint, extended electrical leads, remote control box, and non-adjustable tubular stands, and NEMA-15 P plug (GRN, GRNH 120V models only)

Warranty consists of 24/7 parts and service assistance (U.S. and Canada only).

HATCO CORPORATION

P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A. | (800) 558-0607 | (414) 671-6350



www.hatcocorp.com

support@hatcocorp.com

[Find a Hatco Rep](#)

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[Chat](#)

VIENNA GRAB & Go SQUARED

PROJECT: _____
ITEM: _____ QUANTITY: _____

MODEL # VIAS-SQ INS SQUARED GLASS

SPECIFICATIONS

The Vienna Series VIAS-SQ INS Slide-in with rear air ventilation kit is a self-service "Grab and Go" style refrigeration merchandiser, featuring a squared glass profile, with insulated glass side panels. Unit is available in choice of three heights with hinged see-through access doors. When being used as a "slide-in" please advise if counter height is 34" or 36". Optional 6" or 8" stainless steel adjustable legs or 6" casters are available for all slide-in style models.

Available lengths: ☐ 31 1/2" ☐ 44 1/4" ☐ 57 1/8" ☐ 69 7/8"

Available depths: ☐ 27 3/8"

Available heights: ☐ 21 5/8" ☐ 28 3/8" ☐ 35"



STANDARD FEATURES

- Squared Glass Profile
- 304 Stainless Steel Exterior
- Tempered Glass Top Panel, Insulated Glass Side Panels,
- Hinged Rear See-Through Access Doors
- Fully adjustable Tempered Glass Shelves (tiltable to 7 degrees)
- Easy Removable Deck Pans for Cleaning
- Programmable Digital Refrigeration Controller
- Self-Contained Refrigeration with Integrated Slide-In Base
- Rear Air Ventilation Kit
- Energy Efficient LED Lighting (Plug-In)
- Fan Assisted Cooling System
- Lift-Up Evaporator
- 5 Year Compressor Warranty
- ETL Listed in Accordance with UL 471 and NSF 7 Standards
- Environmentally Safe Refrigerant
- Designed for Floor Drain

OPTIONAL FEATURES

- ☐ Drop-In Style (Consult Factory for Additional Information)
- ☐ Remote Refrigeration
- ☐ Powder Coat Finish
- ☐ Front Air Vent with Solid Rear (for against the wall installation)
- ☐ Rear Cutting Board
- ☐ Mirrored Hinged Rear Access Doors
- ☐ Removable Acrylic Locking Night Cover
- ☐ Rear-Mounted Door Locks
- ☐ Integrations Modular Counter (Consult Factory)
- ☐ Adjustable Legs & Casters (Slide-In Units)
 - ☐ 6" Legs ☐ 8" Legs
 - ☐ 6" Casters
- ☐ Hot Gas Evaporation (self-contained only)
- ☐ Condensate Evaporator Pan (Consult Factory)



Conforms to UL Standard 471, and NSF Standard 7; Certified To CSA Standard C22.2 No.120

MODEL	L	D	H	HP	VOLT	AMPS	PLUG	WT	REFRIG.	DROP IN C/O SIZE	SLIDE IN C/O SIZE
VIAS2-20-R-SQ-SC INS	31 1/2	27 3/8	21 5/8	1/2	115	8.8	5-15P	462	R452A	29 1/4 x 26 3/8	29 1/4 x VARIES
VIAS3-20-R-SQ-SC INS	44 1/4	27 3/8	21 5/8	1/2	115	9.1	5-15P	506	R452A	42 1/8 x 26 3/8	42 1/8 x VARIES
VIAS4-20-R-SQ-SC INS	57 1/8	27 3/8	21 5/8	3/4	115/230	4.9	14-20P	572	R452A	54 7/8 x 26 3/8	54 7/8 x VARIES
VIAS5-20-R-SQ-SC INS	69 7/8	27 3/8	21 5/8	7/8	115/230	6.6	14-20P	638	R452A	67 5/8 x 26 3/8	67 5/8 x VARIES
VIAS2-27-R-SQ-SC INS	31 1/2	27 3/8	28 3/8	1/2	115	9.7	5-15P	484	R452A	29 1/4 x 26 3/8	29 1/4 x VARIES
VIAS3-27-R-SQ-SC INS	44 1/4	27 3/8	28 3/8	3/4	115/230	5.6	14-20P	528	R452A	42 1/8 x 26 3/8	42 1/8 x VARIES
VIAS4-27-R-SQ-SC INS	57 1/8	27 3/8	28 3/8	7/8	115/230	7.7	14-20P	594	R452A	54 7/8 x 26 3/8	54 7/8 x VARIES
VIAS5-27-R-SQ-SC INS	69 7/8	27 3/8	28 3/8	1 1/4	115/230	9.1	14-20P	660	R452A	67 5/8 x 26 3/8	67 5/8 x VARIES
VIAS2-34-R-SQ-SC INS	31 1/2	27 3/8	35	3/4	115/230	5.4	14-20P	528	R452A	29 1/4 x 26 3/8	29 1/4 x VARIES
VIAS3-34-R-SQ-SC INS	44 1/4	27 3/8	35	7/8	115/230	7.3	14-20P	572	R452A	42 1/8 x 26 3/8	42 1/8 x VARIES
VIAS4-34-R-SQ-SC INS	57 1/8	27 3/8	35	1 1/4	115/230	9.0	14-20P	638	R452A	54 7/8 x 26 3/8	54 7/8 x VARIES
VIAS5-34-R-SQ-SC INS	69 7/8	27 3/8	35	1 1/4	115/230	9.6	14-20P	704	R452A	67 5/8 x 26 3/8	67 5/8 x VARIES

CALL TOLL FREE: 800-525-3692 (609-714-2330)

FAX: 609-714-2331 www.rpiindustries.com

220 ROUTE 70 MEDFORD NJ 08055

2746 Girl Scouts-ny



Clevenger-Frable-LaVallee

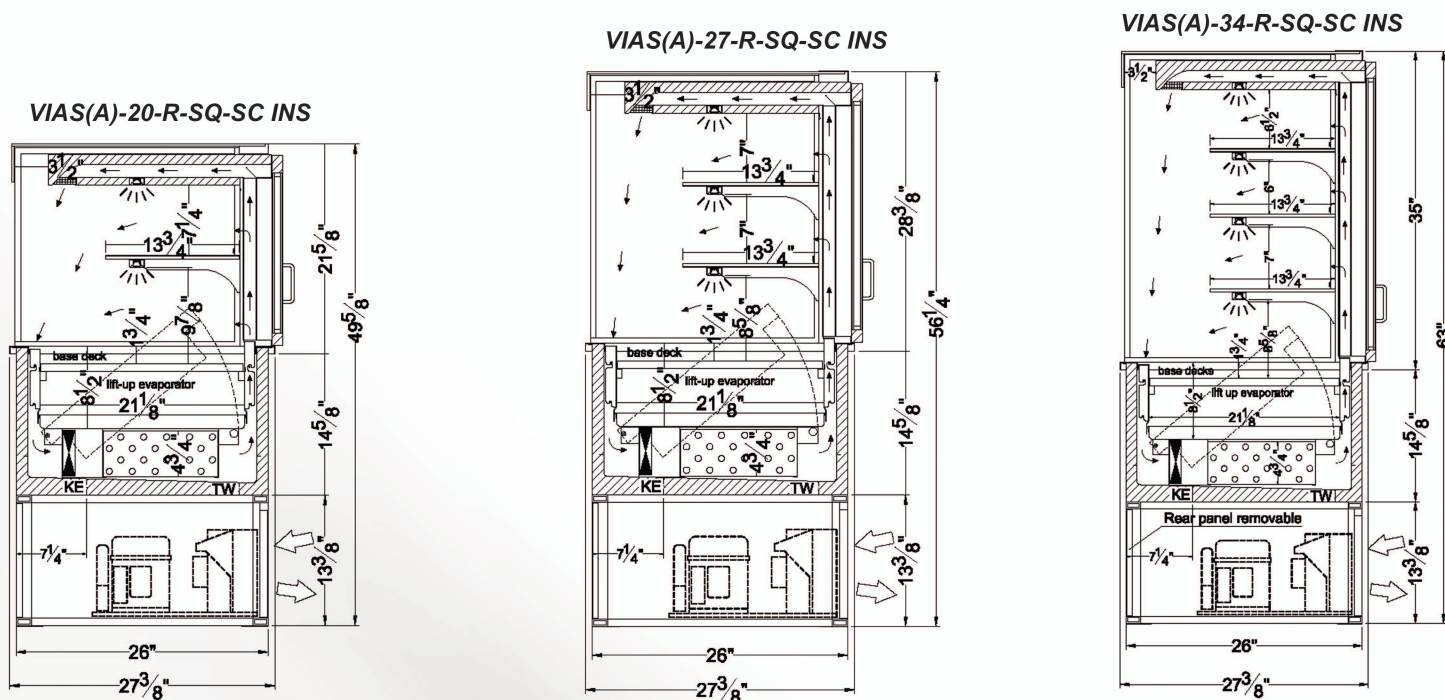
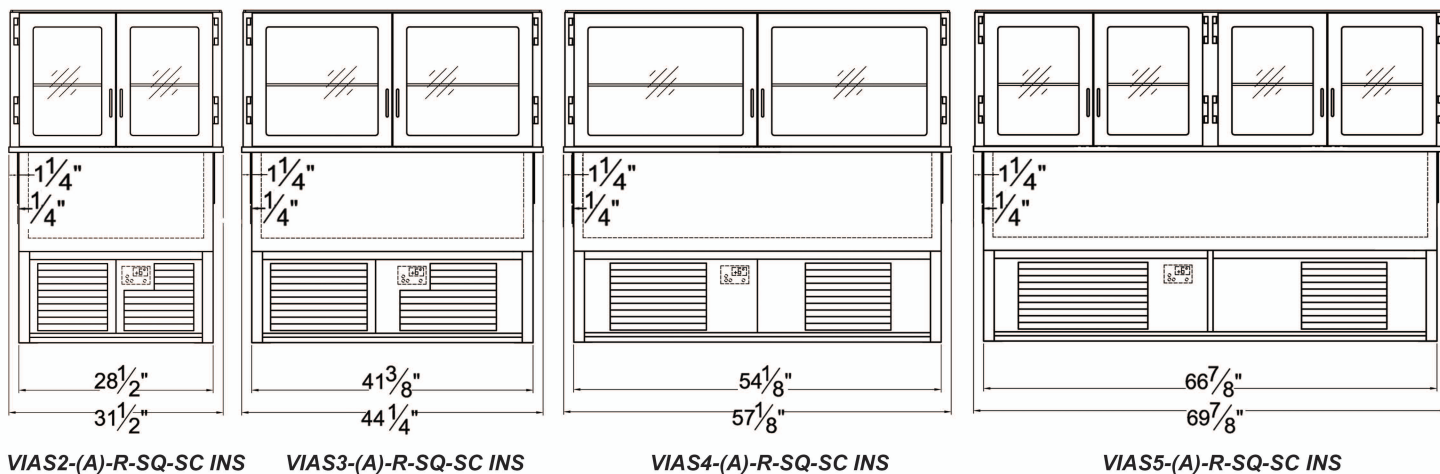
RPI INDUSTRIES, INC. v1 24 20

Page: 79

VIENNA GRAB & Go SQUARED

PROJECT: _____
TOLL FREE: 800-525-3692

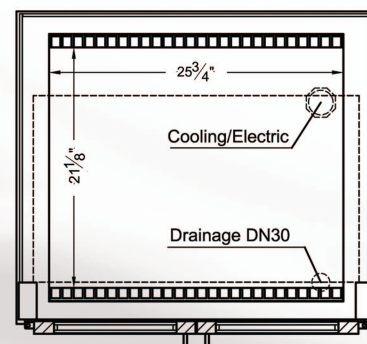
MODEL # VIAS-SQ INS SQUARED GLASS



LARGEST DIMENSION REPRESENTS OUTSIDE FLANGE

1. A 1" diameter drain is provided. The drain **MUST** be connected to a floor drain or storage container **AT TIME OF INSTALLATION**.
2. Ventilation louvers **MUST** be provided in the cabinet or counter and located so to provide full ventilation for the condensing unit.
3. The VIAS-SQ INS merchandiser is designed for use in locations where temperatures and humidity do not exceed 75 degrees and 55% R.H. Locate away from direct sunlight, rapid air currents and extreme temperature changes. Exposure to air currents from ceiling fans, air conditioners, ovens, etc. will disrupt the cases air current and refrigeration zone within. Any adverse field conditions stated above will void warranty.

RPI in line with it's policy to continually improve it's product reserves the right to change materials and specifications without notice.



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FAX: 609-714-2331 www.rpiindustries.com

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2746 Girl Scouts-ny



Cleveland-Frable-LaVallee

Electrical & Plumbing locations

RPI INDUSTRIES, INC. v1 24 20

Page: 80

Hot-Cold-Freeze Drop-Ins



Project: _____

Item: _____

Quantity: _____

Date: _____

Drop-in Models Pans

<input type="checkbox"/> DI-QSCHP-1	1
<input type="checkbox"/> DI-QSCHP-2	2
<input type="checkbox"/> DI-QSCHP-3	3
<input type="checkbox"/> DI-QSCHP-4	4

Standard Features

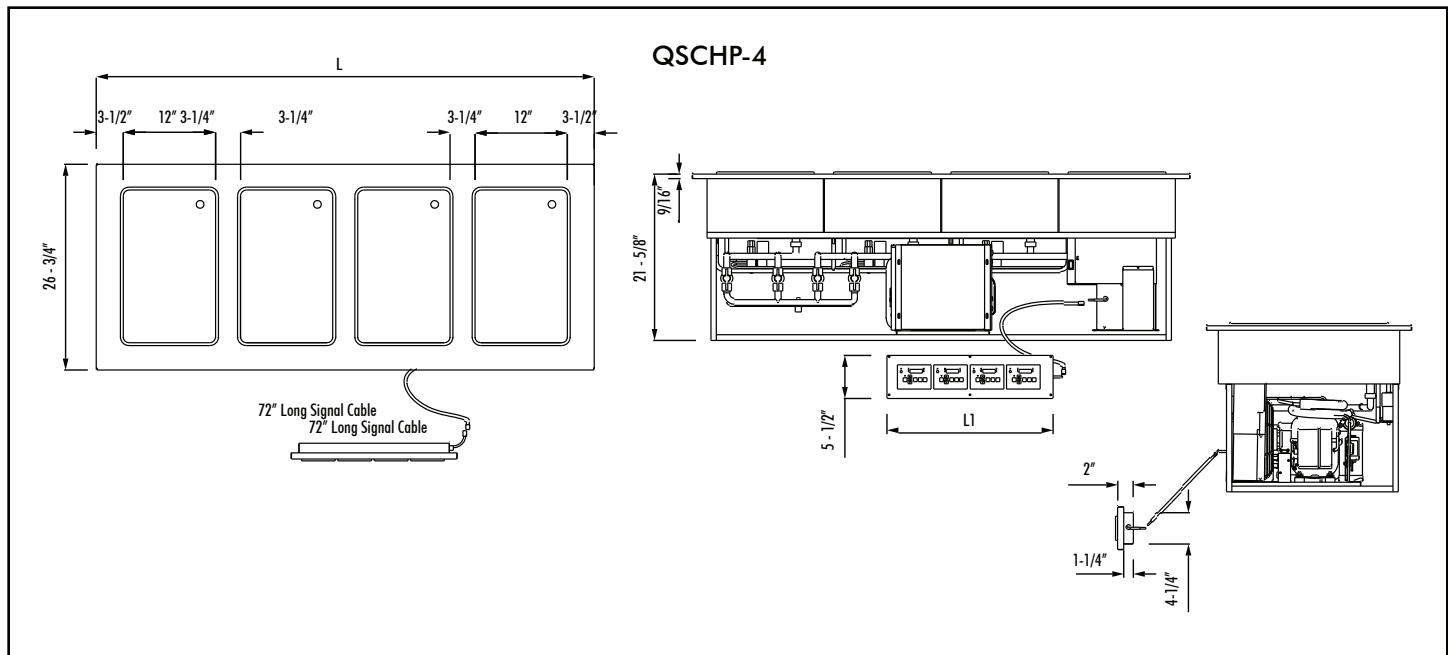
- ✓ Individual solid state digital controls
- ✓ Full sealing gasket
- ✓ 500 watts heat source(at 208V)
- ✓ Single power source
- ✓ Manifold drains

Optional Features (specify)

- ☐ Hugged edge (H)
- ☐ Slim line configuration
- ☐ Other voltage, phase, cycle
(specify_____)

- ▶ Switch from hot to cold in a matter of minutes!
- ▶ Individual well flexibility
- ▶ Fully insulated, for use in any counter
- ▶ Fast, easy installation
- ▶ Labor saving easy to clean design

Hot-Cold-Freeze Drop-Ins



Model #	L - Top	L - Frame	Cut-out size	Control Panel Cut-out size	120V/1		120/208V/1		120/240V/1	
					Amps	Plug	Amps	Plug	Amps	Plug
DI-QSCHP-1	17 1/4"	15"	15 3/8" x 24"	6 1/4" x 4 1/4"	7.2	5-15P	7.2	14-20P	7.2	14-20P
DI-QSCHP-2	34 1/4"	30 11/4"	30 5/8" x 24"	11" x 4 1/4"	12.7	5-20P	9.6	14-20P	10.0	14-20P
DI-QSCHP-3	49 1/2"	45 1/2"	45 7/8" x 24"	15 3/4" x 4 1/4"	18.2	5-30P	12.0	14-20P	12.7	14-20P
DI-QSCHP-4	64 3/4"	60 3/4"	61 1/8" x 24"	20 1/2" x 4 1/4"	23.7	5-30P	14.4	14-20P	15.5	14-20P

General Specifications

Top perimeter frame to be constructed of 14 gauge stainless steel, welded, ground and polished with a thermal break provided between the top and refrigerated interior. Interior pan to be 18 gauge stainless steel, fully welded, ground and polished with a 3/4" open drain. To be fully insulated with 1 1/2" to 2" urethane insulation. The exterior jacket to be constructed of heavy gauge galvanized steel.

Refrigeration system to be 1/3 hermetically sealed compressor operating on R-507 (HFC) refrigerant, and will include controls. New energy efficient hot food wells use digitally controlled, 500 watt heat source. All switches and controls are fully accessible and are provided with cord and plug.

Units to be UL listed and shall bear the UL classified EPH label for sanitation meeting all NSF4 and NSF7 requirements.

Note: To ensure proper operation, adequate airflow must be provided.

Approval/Submittal (signature required)

Model # _____

Flange Edge Detail:

Turned (T) _____ Hugged(H) _____

(T)= 1/2" 90° turn down
(H)= 14 gauge thickness

Voltage _____

Compressor standard location is right end (from control side).

Adherence to LTI installation instructions is required.

Failure to do so may void the warranty.

Signature _____

Date _____

We reserve the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacement for previously purchased equipment.

All equipment to be built in accordance with the Underwriters Laboratories, Inc. and the National Sanitation Foundation, Inc. standards and shall bear the Underwriters Laboratories, Inc. listing label for safety and the Underwriters Laboratories classification label for sanitation.



The VHB Series is CaptiveAire's Premier Type II, Exhaust Only hood to be used over equipment not producing grease laden vapors. Type II hoods are used for condensation or heat removal applications.

Advantages

- **Exhaust Flow Rates:** Superior exhaust flow rates.
- **Construction:** Single wall type hood fabricated of Type 304 stainless steel, #3 or #4 polish, on all exposed surfaces when used in condensate applications. Type 430 stainless steel, #3 or #4 polish available when used for heat applications. Pre-punched hanging angles on each end of hood. Additional set provided for hoods longer than 12'.
- **Condensate Applications:** Integral 4-sided perimeter gutter and one drain standard for high-moisture exhaust.
- **Reduced Lead Times and Shipping Costs:** Produced on a high volume assembly line at one of five manufacturing facilities to reduce lead times and shipping costs.
- **Optional REM Construction:** Two options available when removable condensation baffles are required for heavy condensate applications. Designs available for one baffle or two baffle configuration to collect and drain condensation into gutter.
- **Optional Double Wall Construction:** Double wall front used when switches are needed on the face of the hood and/or lights are desired. Mechanical baffle provides a built-in wiring chase for optimal positioning of electrical controls and outlets on the front face of the hood.
- **Optional Lights:** Incandescent, LED and fluorescent lights are available.
- **Optional Make-Up Air:** Make-up air can be supplied through optional front and/or side plenums (PSP Accessory).
- **Optional Enclosure Panels:** Constructed of stainless steel. Sized to extend from hood top to ceiling, enclosing pipe and hanging parts.

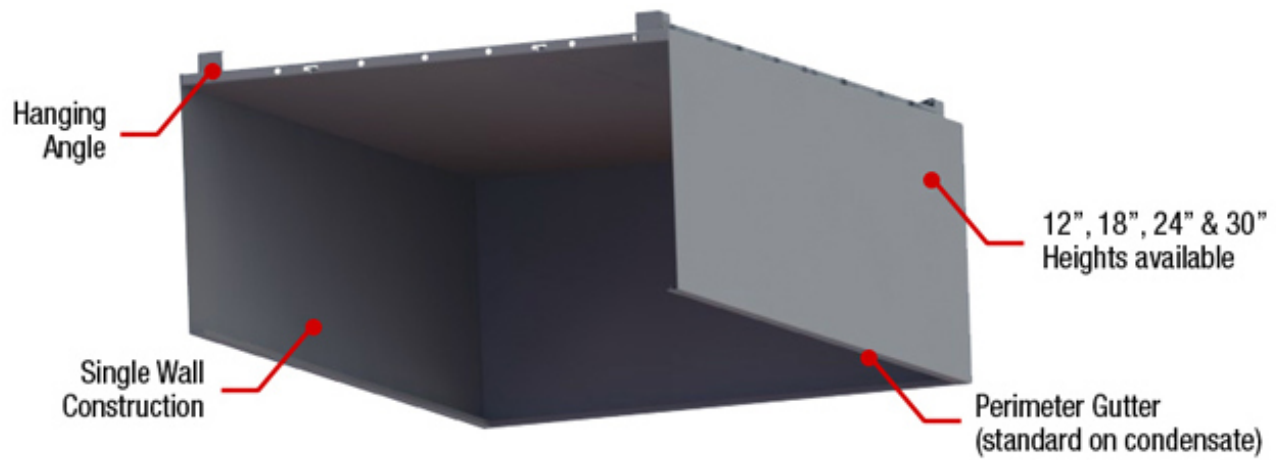
Performance

CONFIGURATION	LIGHT LOAD EXHAUST CFM / FT.	HEAVY LOAD EXHAUST CFM / FT.
Wall & 1-piece island	100	150

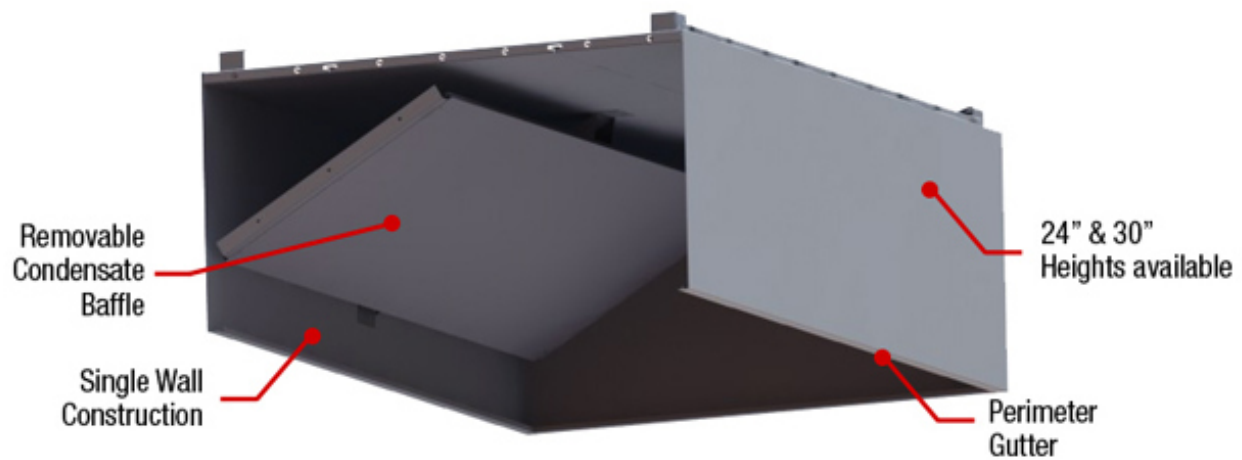
Recommended Duct Sizing: Exhaust - Based on 800 FPM

Features

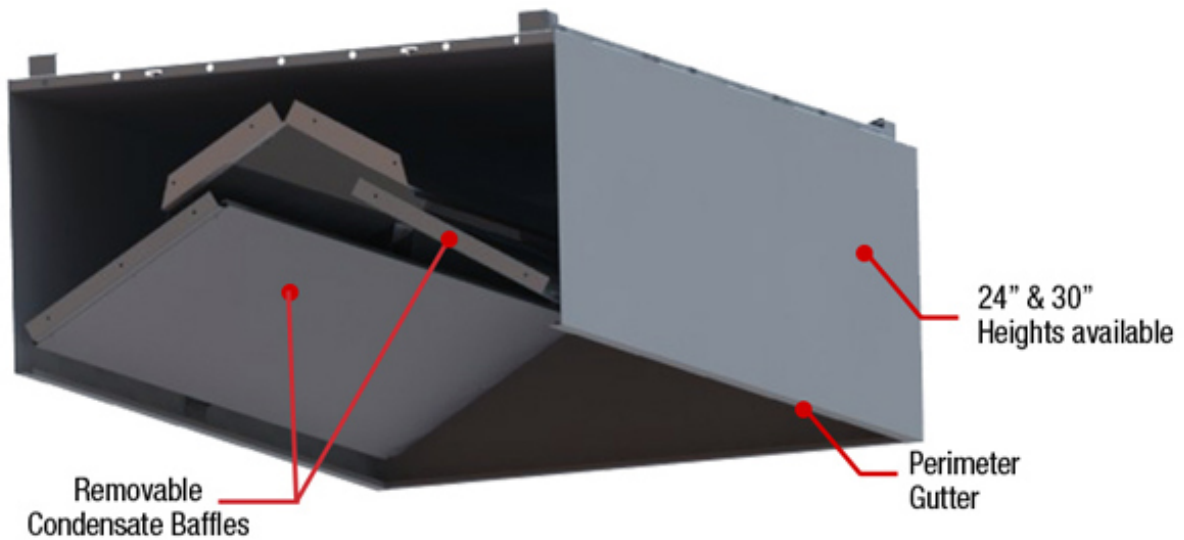
VHB Model



VHB Model with One REM Baffle



VHB Model with Two REM Baffles

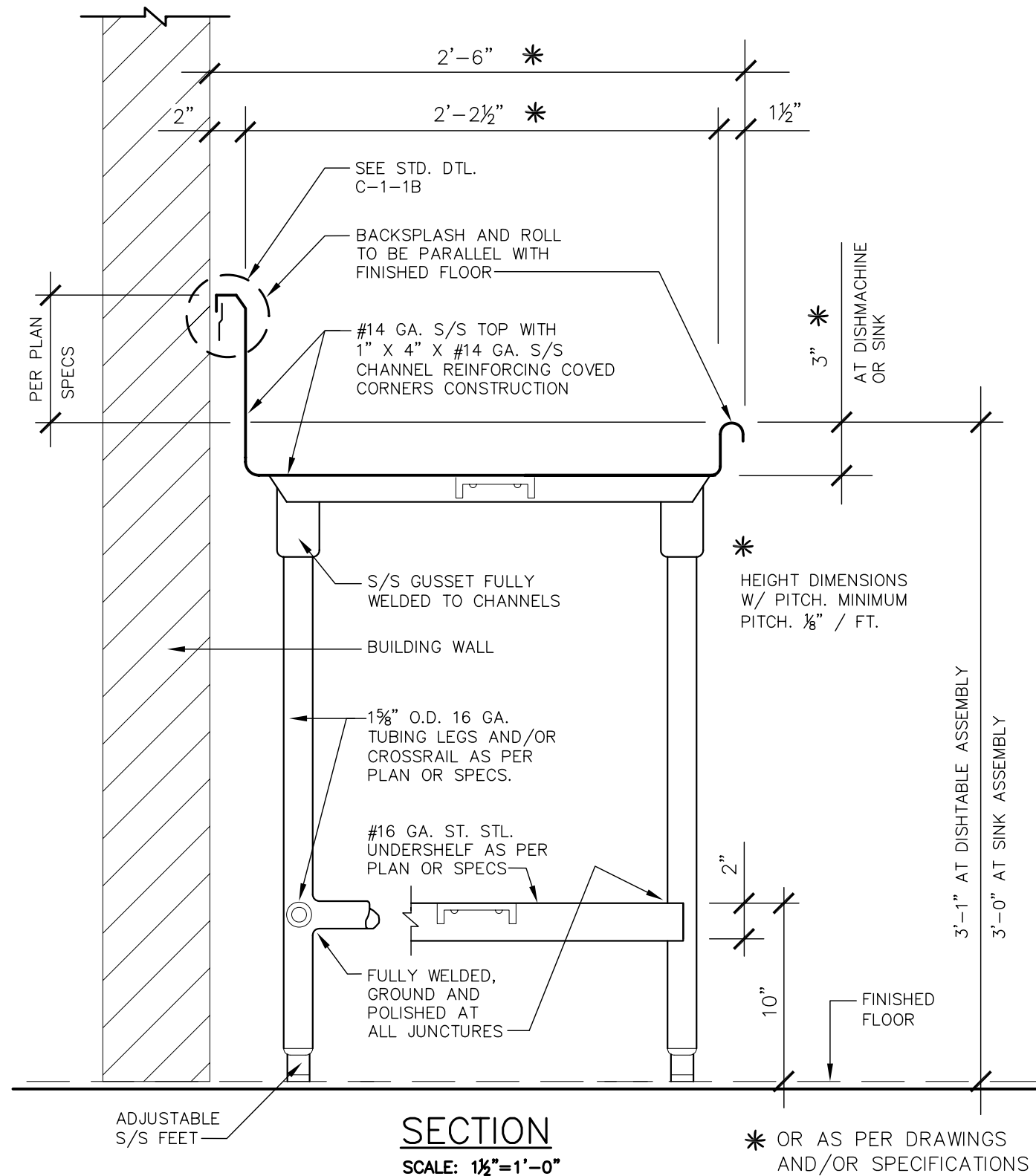


Certifications

The VHB Model has been certified by ITS. This certification mark indicates that the product has been tested to and has met the minimum requirements of a widely recognized (consensus) U.S. and Canadian products safety standard, that the manufacturing site has been audited, and that the applicant has agreed to a program of periodic factory follow-up inspections to verify continued performance.

Models VHB are ETL Listed under file number 3186625SAT-001 and complies with UL710, ULC710 and ULC-S646 Standards.





Clevenger Frable 
LaVallee
 FOODSERVICE & LAUNDRY
 CONSULTING & DESIGN
 39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
 TEL: 914/997-9660 FAX: 914/997-9671

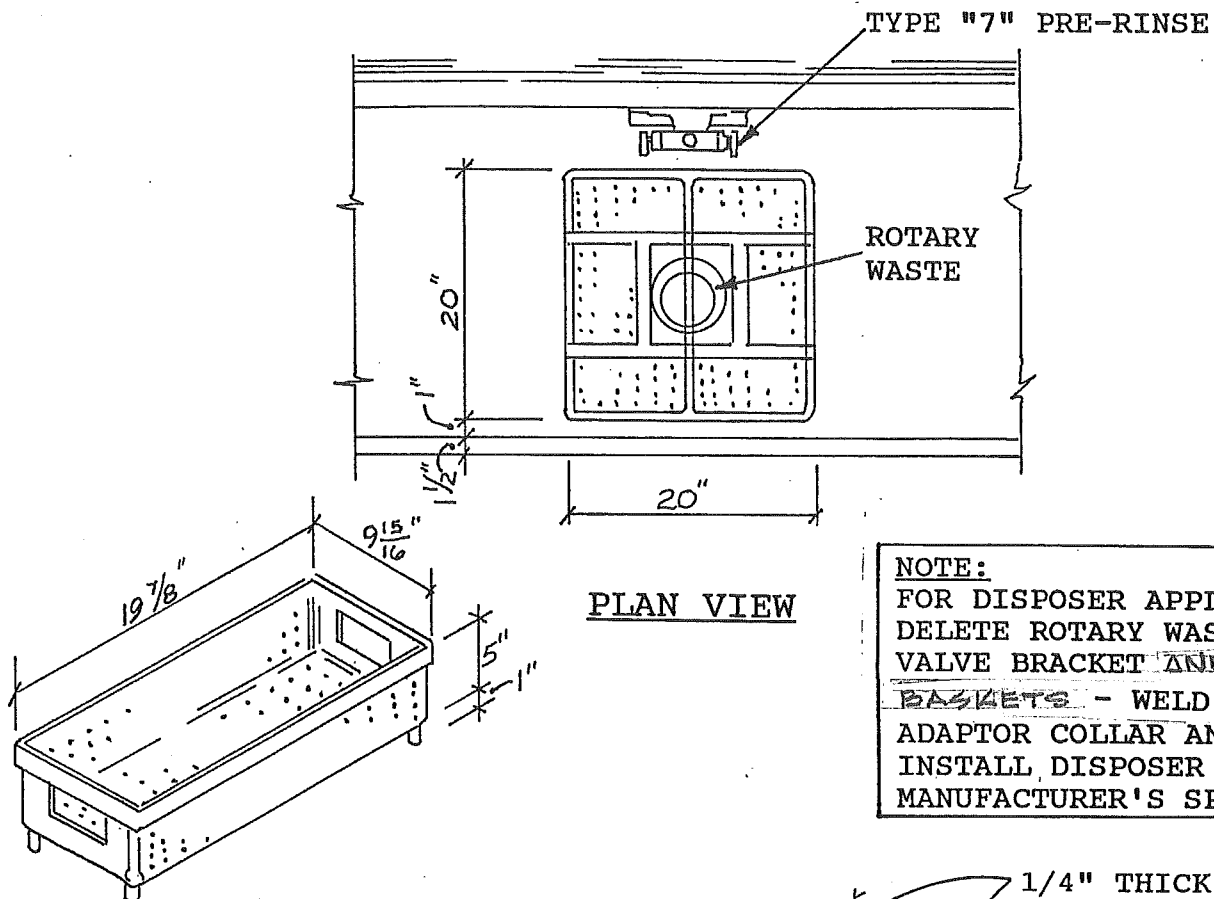
DISHTABLE-DRAINBOARD

05-16-12

C-8-1

145265

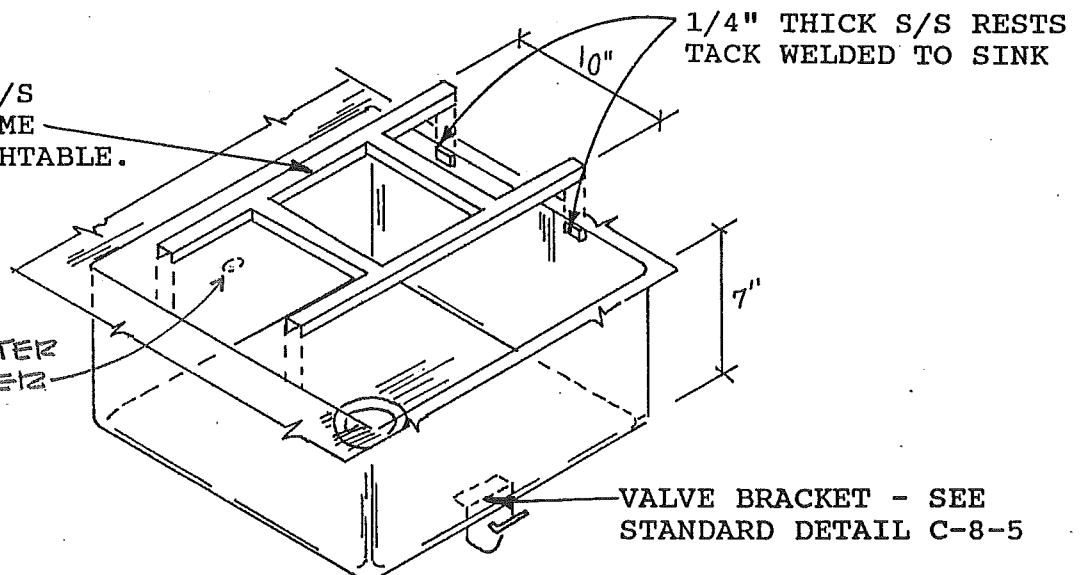
SCRAP BASKETS: (2) # 16 GA. STAINLESS STEEL BASKETS, COVED CORNERS, HEM TOP 1". PERFORATE SIDES AND BOTTOM WITH 5/16" HOLES 5/8 O.C. WELD 1/2 DIA. 1" HIGH S/S ROD FEET IN PLACE



NOTE:
FOR DISPOSER APPLICATION,
DELETE ROTARY WASTE AND
VALVE BRACKET AND SCRAP
BASKETS - WELD IN
ADAPTOR COLLAR AND
INSTALL DISPOSER AS PER
MANUFACTURER'S SPEC.

1" X 3/4" 14 GA. S/S
CHANNEL FRAME. FRAME
TO SET FLUSH W/DISHTABLE.

PROVISION FOR WATER
INLET WHEN DISPOSER
IS SPECIFIED



I S O M E T R I C

Champion®

The Dishwashing Machine Specialists

Project _____
 Item No. _____
 Quantity _____

STANDARD FEATURES

- **NEW Exclusive** Field convertible to single or three phase, 208 or 240 volt, corner or straight through operation
- Built-in booster configured for 70° Rise
- Rinse Sentry – ensures 180°F final rinse
- Auto start – starts unit when doors are closed
- High temperature
- Single point connection
- High efficiency 1 HP pump
- 55 racks per hour
- Self draining pump
- Automatic tank fill
- Detergent/chemical connections
- Interchangeable upper and lower arm
- Top mounted splash proof controls
- Automatic drain valve
- Vent fan control
- Pressure regulating valve
- Low water tank heat protection

DH2000

High Temperature
 Door-type
 Dishwashing Machine



Photo is for general visual representation only. Please refer to specifications for the latest detailed product information.



OPTIONS & ACCESSORIES

- ☐ Drain Tempering Kit
- ☐ Side Panels
- ☐ **NEW** Champion ION scale prevention system

SPECIFIER STATEMENT

Specified unit will be Champion model DH2000 high temperature door-type dishwashing machine.

Features top mounted splash proof controls, Rinse Sentry, Auto start, interchangeable stainless steel wash and rinse arms, 55 racks/hr., .90 US gals/rack.

1 year parts and labor warranty.

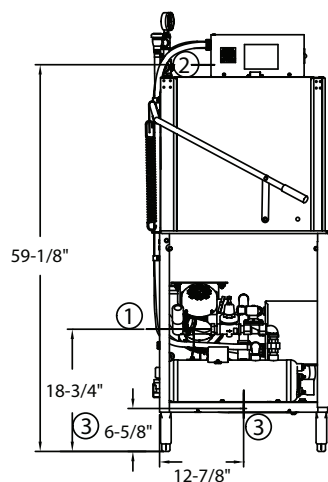
Champion Industries, Inc.
 3765 Champion Blvd., Winston-Salem, NC 27105
 Tel: 336/661-1556 Fax: 336/661-1979
www.championindustries.com

DH2000

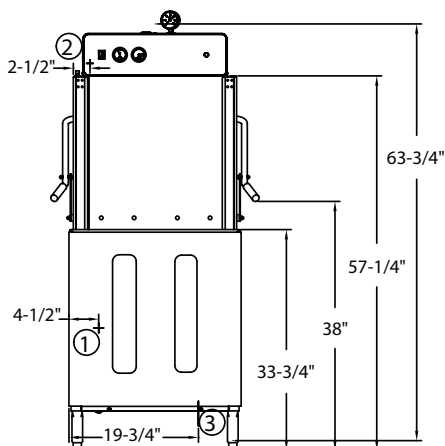
High Temperature
Door-type
Dishwashing Machine

Shipping weight crated: 300 lbs.

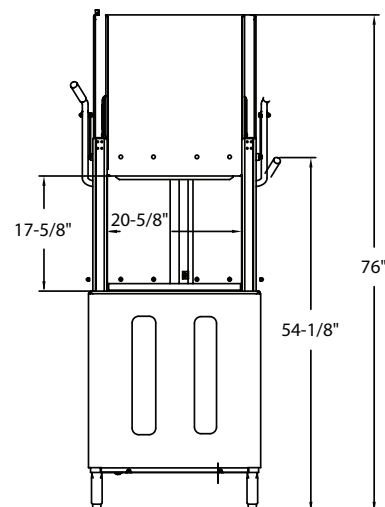
Dimensions shown in inches



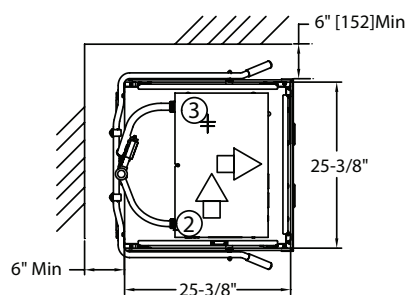
Side View



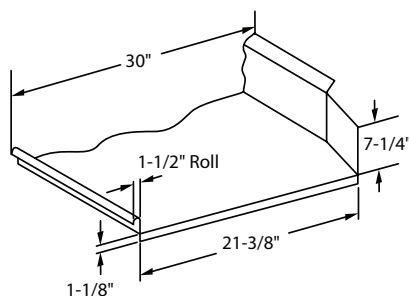
Front View



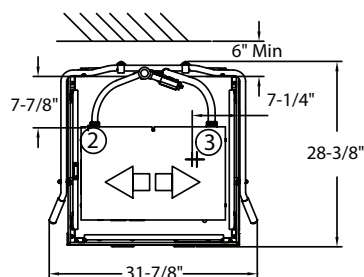
Door Clearance



Corner Configuration



Typical Table Construction



Straight Through

SPECIFICATIONS

Capacities

Racks per hr. (NSF rated)	55
Wash tank (gal.)	9.5

Motor horsepower

1 HP

Water consumption

Gal. per hr. (max. use)	49.5
Gal. per rack	0.9

Temperature °F

Wash	150
Rinse	180

Heating

Tank heat, electric	5.2 kW
Electric Booster	7.5 kW

Time cycle in seconds

Wash	40
Dwell	1
Rinse	12
Sanitary Dwell	7
Total cycle	60

Warning: Plumbing, electrical connections should be made by qualified personnel who will observe all the applicable plumbing, sanitary and safety codes and the National Electrical Code.

Utilities

- Water**
3/4" NPT Flow pressure 20-25 PSI
Hot water 110°F (43°C)
- Electrical 70° Booster**
A. 208-220/60/1 (See Box)
B. 208-220/60/3 (See Box)
- Drain**
A. 1" NPT Connection
Gravity flow, 15 GRM max flow

Machine and Electric 40°F/70°F OR 70°F Rise Booster

Voltage	Rated Amps	Min. Supply Ckt. Conductor Ampacity	Max. Overcurrent Protective Device
208/60/1	65	80	80
240/60/1	75	80	80
208/60/3	40	50	50
240/60/3	45	50	50

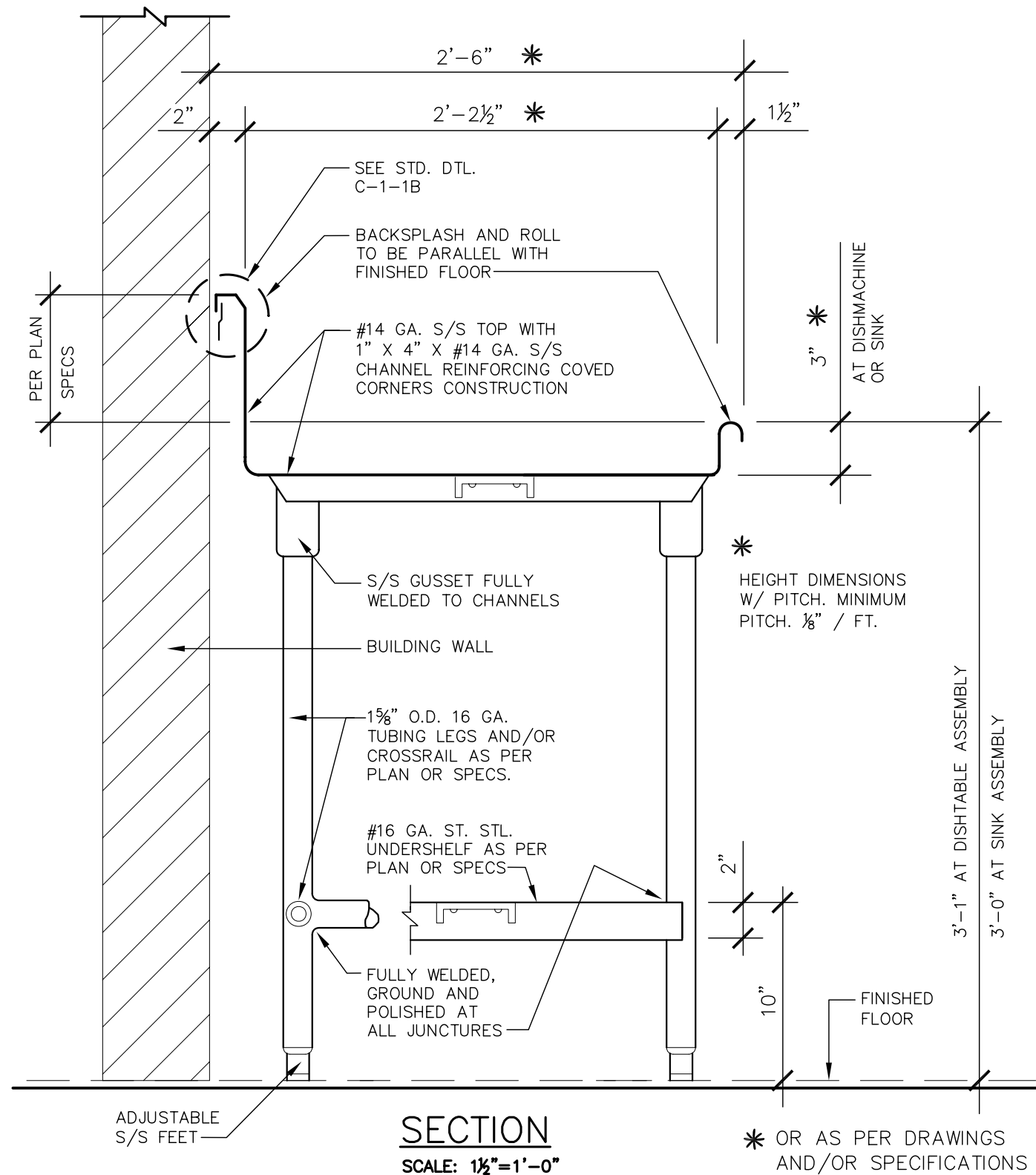
Due to an ongoing value analysis program at Champion, specifications contained in this catalog are subject to change without notice.

Champion Industries, Inc.,
3765 Champion Blvd., NC 27105
336/661-1556 • Fax: 336/661-1979
ChampionIndustries.com

an Ali Group Company



The Spirit of Excellence



Clevenger Frable 
LaVallee
 FOODSERVICE & LAUNDRY
 CONSULTING & DESIGN
 39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
 TEL: 914/997-9660 FAX: 914/997-9671

DISHTABLE-DRAINBOARD

05-16-12

C-8-1



Item # _____

Job _____

FIXED POLYMER “POKER CHIP” DISH DOLLY PCD SERIES

High Capacity:

- Metro's Fixed PCD's can handle dish sizes from 4¹/₄" (114mm) to 12⁵/₈" (320mm) in diameter.
- Unique 9-column units provide an additional column of dishes. Each column holds up to 60 dishes for a total capacity of up to 540 dishes.
- Four models of 4-column units and two models of 9-column units are available.

Maneuverable:

- Four recessed handles make it easy to maneuver in and out of tight areas and saves space. The compact design allows for maximum space utilization and convenient under counter storage.
- Four 5" (127mm) diameter swivel casters (two with brakes) with neoprene wheels provide for easy maneuverability and positioning.

Two-Handed Access:

- Unique design allows fast, safe and easy two-handed access to all dish columns. Minimize dish breakage and easily load and unload dishes.

Durable and Versatile Construction:

- One-piece, sturdy polymer construction is extremely safe for dishes, easy to clean, and is resistant to cracking, peeling or chipping.
- Unique design allows for transport of glass racks.

Sanitary:

- Smooth, rounded corners and seamless cart surfaces eliminate cracks and crevices and simplify cleaning.
- Built-in drain holes promote cleanability and eliminates the possibility of water build up.
- Dishes are stored 12" (305mm) above the floor surface, minimizing dust and water marks from floor dirt and splashing.
- Included translucent vinyl cover protects clean dishes from dust and water splashes while in storage and allows workers to view contents without removing the cover.
- NSF Listed.

Microban® Antimicrobial Product Protection:

- Cart body has built-in *Microban® Antimicrobial Product Protection which inhibits the growth of bacteria, mold, mildew, and fungi that cause odors, stains, and product degradation.



**9 Column Models —
PCD5 and PCD7**



**4 Column Models —
PCD8, PCD9, PCD11 and PCD12**

*MICROBAN® and the MICROBAN® symbol are registered trademarks of the Microban Products Company, Huntersville, NC.



InterMetro Industries Corporation
North Washington Street
Wilkes-Barre, PA 18705
www.metro.com



Fixed Polymer “Poker Chip” Dish Dolly PCD Series

16.23

Job _____

FIXED POLYMER "POKER CHIP" DISH DOLLY PCD SERIES



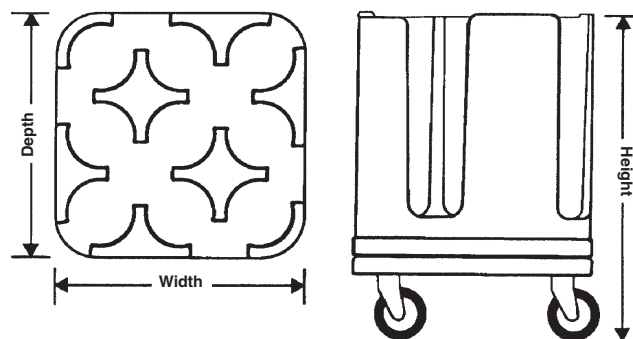
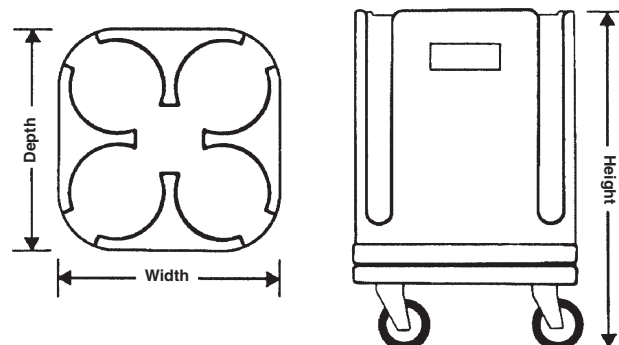
Specifications

Material: High-density polymer containing Microban Antimicrobial product protection.

Construction: Seamless, molded polymer construction, equipped with handgrips on all four sides.

Casters: Four B5DN swivel casters (two with brakes). Ball bearing swivel; ball bearing axle. Nickel-plated, pre-lubricated casters with neoprene tires. Casters are bolted to an internal metal support plate.

Protective Cover: Standard heavy-duty 6-mil vinyl cover.



Dimensions

Model No.	Height (in.) (mm)		Width (in.) (mm)		Depth (in.) (mm)		No. of Dish Columns	Approx. Dish Capacity Per Column*	Total Approx. Dish Capacity*	Maximum Dish Size (in.) (mm)		Approx. Pkd. Wt. (lbs.) (kg)	
PCD5	31 ¹⁵ / ₁₆	812	24 ¹ / ₁₆	612	24 ¹ / ₁₆	612	9	40-60	360-540	5 ⁵ / ₈	145	61	27.7
PCD7	31 ¹⁵ / ₁₆	812	27 ¹³ / ₁₆	707	27 ¹³ / ₁₆	707	9	40-60	360-540	6 ⁷ / ₈	175	72	32.7
PCD8	31 ¹⁵ / ₁₆	812	21 ¹ / ₂	547	21 ¹ / ₂	547	4	60	240	8 ¹ / ₄	210	51	23.1
PCD9	31 ¹⁵ / ₁₆	812	23 ¹⁵ / ₁₆	609	23 ¹⁵ / ₁₆	609	4	60	240	9 ¹ / ₂	240	56	25.4
PCD11	31 ¹⁵ / ₁₆	812	26 ¹⁵ / ₁₆	685	26 ¹⁵ / ₁₆	685	4	60	240	11	280	65	29.5
PCD12	31 ¹⁵ / ₁₆	812	30 ¹ / ₈	766	30 ¹ / ₈	766	4	60	240	12 ⁵ / ₈	320	70	31.9

*Loading capacity dependent upon china shapes and thickness.

Accessories

Model No.	Description
PCDV5	Additional Cover for PCD5
PCDV7	Additional Cover for PCD7
PCDV8	Additional Cover for PCD8
PCDV9	Additional Cover for PCD9
PCDV11	Additional Cover for PCD11
PCDV12	Additional Cover for PCD12

All Metro Catalog Sheets are available on our Web Site: www.metro.com



InterMetro Industries Corporation

North Washington Street, Wilkes-Barre, PA 18705
Phone: 570-825-2741 • Fax: 570-825-2852

For Product Information Call: 1-800-433-2232

L02-102
Printed in U.S.A. Rev. 4/08

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Item # _____

Job _____

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9 Column Models —
PCD5 and PCD7



4 Column Models —
PCD8, PCD9, PCD11 and PCD12

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North Washington Street
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www.metro.com



Fixed Polymer “Poker Chip” Dish Dolly PCD Series

16.23

Job _____

FIXED POLYMER "POKER CHIP" DISH DOLLY PCD SERIES



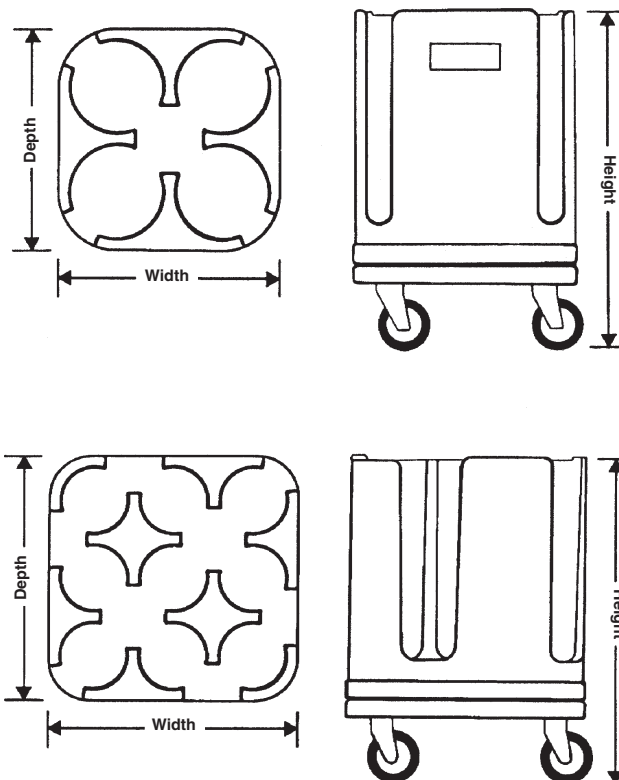
Specifications

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Construction: Seamless, molded polymer construction, equipped with handgrips on all four sides.

Casters: Four B5DN swivel casters (two with brakes). Ball bearing swivel; ball bearing axle. Nickel-plated, pre-lubricated casters with neoprene tires. Casters are bolted to an internal metal support plate.

Protective Cover: Standard heavy-duty 6-mil vinyl cover.



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PCD9	31 ¹⁵ / ₁₆	812	23 ¹⁵ / ₁₆	609	23 ¹⁵ / ₁₆	609	4	60	240	9 ¹ / ₂	240	56	25.4
PCD11	31 ¹⁵ / ₁₆	812	26 ¹⁵ / ₁₆	685	26 ¹⁵ / ₁₆	685	4	60	240	11	280	65	29.5
PCD12	31 ¹⁵ / ₁₆	812	30 ¹ / ₈	766	30 ¹ / ₈	766	4	60	240	12 ⁵ / ₈	320	70	31.9

*Loading capacity dependent upon china shapes and thickness.

Accessories

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Profit from the Eagle Advantage®

Specification Sheet

Short Form Specifications

Eagle RediPak® (EAGLEbrite® Zinc, Chrome, Valu-Master® Gray Epoxy, Valu-Gard® Green Epoxy, EAGLEgard® Green Epoxy) Wire Shelving Unit, model _____. Patented QuadTruss® design wire shelves, two-piece post assemblies, and tapered split sleeves packaged in one complete box.



four-shelf unit

Options / Accessories

- ☐ Dividers
- ☐ Ledges

EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our SpecFAB® Division.

Phone: 302-653-3000 • Fax: 302-653-3091 • e-mail: specfab@eaglegrp.com

Item No.: _____
Project No.: _____
S.I.S. No.: _____

RediPak® Wire Shelving Units

MODELS:

- | | |
|------------------------------------|------------------------------------|
| <input type="checkbox"/> 1836*63 | <input type="checkbox"/> 2436*63 |
| <input type="checkbox"/> 1836*63-5 | <input type="checkbox"/> 2436*63-5 |
| <input type="checkbox"/> 1836*74 | <input type="checkbox"/> 2436*74 |
| <input type="checkbox"/> 1836*74-5 | <input type="checkbox"/> 2436*74-5 |
| <input type="checkbox"/> 1848*63 | <input type="checkbox"/> 2448*63 |
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| <input type="checkbox"/> 1860*74-5 | <input type="checkbox"/> 2460*74-5 |

* See charts on back for complete model numbers.

Design and Construction Features

- Patented QuadTruss® design (patent #5,390,803) makes shelves up to 25% stronger and provides a retaining ledge for increased stability and product retention.
- Available in 18" and 24" (457 and 610mm) widths and 36", 48" and 60" (914, 1219 and 1524mm) lengths.
- Complete shelving unit in one box.
- The combination of numerically-calibrated posts, tapered split sleeves, and shelf collars makes assembling these units a simple, three-step exercise:
 - 1) assemble two-piece post by threading top half onto bolt in lower half;
 - 2) snap split sleeves onto post over number of your choice;
 - 3) and slide shelf collar over split sleeves.
- A positive lock between shelf and post is created without the use of any tools.
- Shelving units may be adjusted or completely changed just as easily.
- Offered in five finishes: EAGLEbrite® zinc, chrome, Valu-Master® gray epoxy, Valu-Gard® green epoxy, and EAGLEgard® green epoxy.

Certifications / Approvals



Spec sheets available for viewing, printing or downloading from our online literature library at www.eaglegrp.com

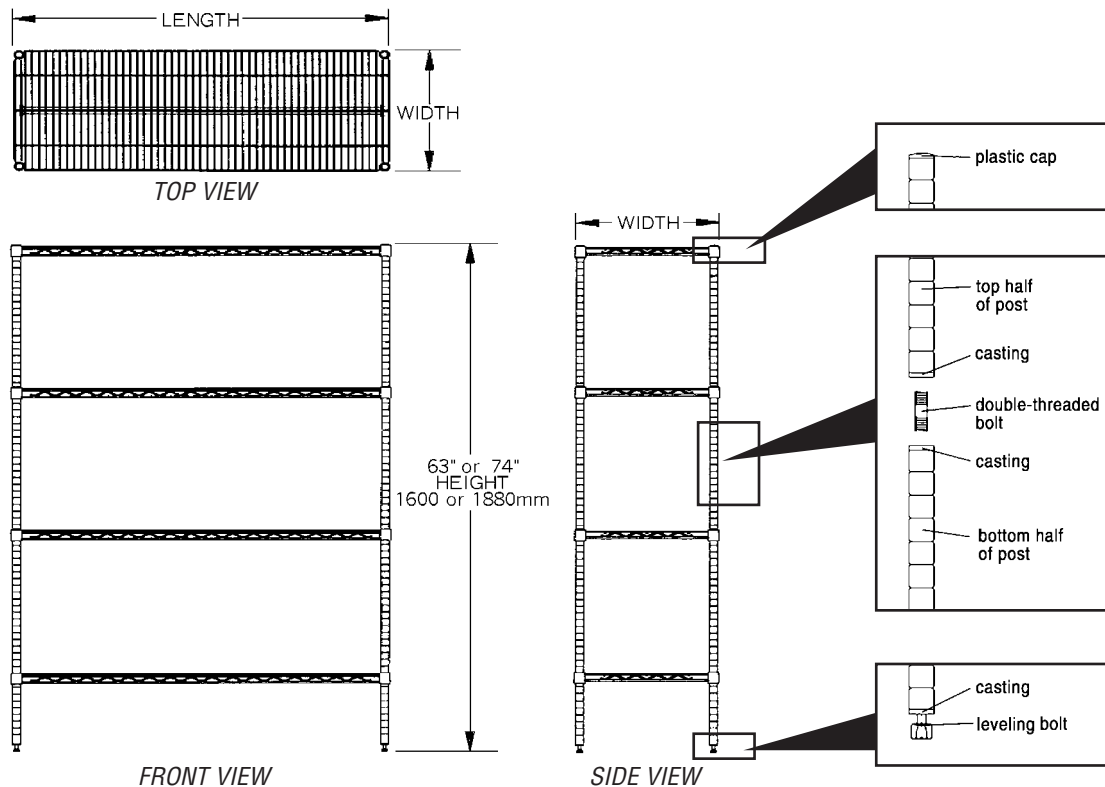
Eagle Foodservice Equipment, Eagle MHC, SpecFAB®, and Retail Display are divisions of Eagle Group. ©2008 by the Eagle Group



Profit from the Eagle Advantage®

Item No.: _____
 Project No.: _____
 S.I.S. No.: _____

RediPak® Wire Shelving Units



4-Shelf Units Includes four wire shelves and four two-piece posts.

with 63" (1600mm) height					with 74" (1880mm) height					width		length		weight	
EAGLEbrite® model #	chrome model #	Valu-Master® model #	Valu-Gard® model #	EAGLEgard® model #	EAGLEbrite® model #	chrome model #	Valu-Master® model #	Valu-Gard® model #	EAGLEgard® model #	in.	mm	in.	mm	lbs.	kg
1836Z63	1836C63	1836V63	1836VG63	1836E63	1836Z74	1836C74	1836V74	1836VG74	1836E74	18"	457	36"	914	52	23.6
1848Z63	1848C63	1848V63	1848VG63	1848E63	1848Z74	1848C74	1848V74	1848VG74	1848E74	18"	457	48"	1219	64	29.0
1860Z63	1860C63	1860V63	1860VG63	1860E63	1860Z74	1860C74	1860V74	1860VG74	1860E74	18"	457	60"	1524	84	38.1
2436Z63	2436C63	2436V63	2436VG63	2436E63	2436Z74	2436C74	2436V74	2436VG74	2436E74	24"	610	36"	914	68	30.8
2448Z63	2448C63	2448V63	2448VG63	2448E63	2448Z74	2448C74	2448V74	2448VG74	2448E74	24"	610	48"	1219	80	36.3
2460Z63	2460C63	2460V63	2460VG63	2460E63	2460Z74	2460C74	2460V74	2460VG74	2460E74	24"	610	60"	1524	100	45.4

5-Shelf Units Includes five wire shelves and four two-piece posts.

with 63" (1600mm) height					with 74" (1880mm) height					width		length		weight	
EAGLEbrite® model #	chrome model #	Valu-Master® model #	Valu-Gard® model #	EAGLEgard® model #	EAGLEbrite® model #	chrome model #	Valu-Master® model #	Valu-Gard® model #	EAGLEgard® model #	in.	mm	in.	mm	lbs.	kg
1836Z63-5	1836C63-5	1836V63-5	1836VG63-5	1836E63-5	1836Z74-5	1836C74-5	1836V74-5	1836VG74-5	1836E74-5	18"	457	36"	914	61	27.7
1848Z63-5	1848C63-5	1848V63-5	1848VG63-5	1848E63-5	1848Z74-5	1848C74-5	1848V74-5	1848VG74-5	1848E74-5	18"	457	48"	1219	76	34.5
1860Z63-5	1860C63-5	1860V63-5	1860VG63-5	1860E63-5	1860Z74-5	1860C74-5	1860V74-5	1860VG74-5	1860E74-5	18"	457	60"	1524	101	45.8
2436Z63-5	2436C63-5	2436V63-5	2436VG63-5	2436E63-5	2436Z74-5	2436C74-5	2436V74-5	2436VG74-5	2436E74-5	24"	610	36"	914	81	36.7
2448Z63-5	2448C63-5	2448V63-5	2448VG63-5	2448E63-5	2448Z74-5	2448C74-5	2448V74-5	2448VG74-5	2448E74-5	24"	610	48"	1219	96	43.6
2460Z63-5	2460C63-5	2460V63-5	2460VG63-5	2460E63-5	2460Z74-5	2460C74-5	2460V74-5	2460VG74-5	2460E74-5	24"	610	60"	1524	121	54.9

EAGLE GROUP

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www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

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KMD-860M_J

MODULAR CRESCENT CUBER



W x D x H
30" x 24^{5/8"} x 28"

KM Edge DESIGN

KMD-860MAJ

Air-Cooled

Shown on optional
Lancer 30" dispenser

KMD-860MWJ

Water-Cooled


KMD-860MRJ



Remote Air-Cooled



Item #: _____
Project: _____
Qty: _____
AIA#: _____

Features

- ▶ Individual crescent cube
- ▶ Stainless steel evaporator
- ▶ CycleSaver™ design 

- Up to 967 lbs. of ice production per 24 hours
- Durable stainless steel exterior
- Protected by H-Guard Plus  Antimicrobial Agent
- EverCheck™ alert system 
- Removable air filters
- R-404A Refrigerant

Available on Bins:

B-250PF B-700PF/SF B-900PF/SF B-1300SS B-1650SS*
BD-500PF/SF B-800PF/SF B-1150SS B-1500SS*

*Top kit may be required. See Bin Spec Sheets. *Two unit application only.*

Warranty:

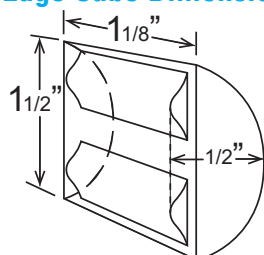
3 Year Parts & Labor on entire machine. 5 Year Parts & Labor on Evaporator. 5 Year Parts on Compressor; air-cooled condenser coil. Valid in United States, Canada, Puerto Rico and U.S. Territories. Contact factory for warranty in other countries.

Shipping: (LxWxH) 33^{1/2"} x 33^{1/4"} x 28" Volume: 18.05ft³

		ICE PRODUCTION		WATER USAGE		ELECTRICAL								
Condenser	Model	Air / Water Temp Lbs. per 24 hours 70°/ 50°F	90°/ 70°F	Potable Gal. per 100 lbs. 90°/ 70°F	Condenser Gal. per 100 lbs. 90°/ 70°F	kWh Used per 100 lbs. 90°/ 70°F	Max. Fuse Sz or HACR Circuit Bkr	Amperage	Voltage	Circuit Wires (including ground)	Heat Rejection BTU/hr.	Refrigerant Charge Amount	Net / Ship Weight (lbs.)	
	Air	KMD-860MAJ	855	665	30.0	N/A	5.16	20A	9.9A	208-230V/60/1	3	13,100	2 lbs. 6.8 oz.	218 / 248
	Water	KMD-860MWJ	940	862	20.5	139	3.90	20A	8.5A	208-230V/60/1	3	11,000	1 lb. 12.2 oz.	228 / 258
	Remote	KMD-860MRJ	967	850	18.2	N/A	5.05	20A	12.5A	208-230V/60/1	3	13,000	5 lbs. 15.9 oz. 9 lbs. 14.7 oz.*	226 / 256

*(with condenser)

KM Edge Cube Dimensions*



* approximate size in inches, image not to scale

Operating Limits

- Ambient Temp Range 45 - 100°F
- Water Temp Range 45 - 90°F
- Water Pressure 10 - 113 PSIG
- Voltage Range 187 - 253V

Service

- Panels easily removed and all components accessible for service.
- Allow 6" (15cm) clearance at rear, sides, and top for proper air circulation and ease of maintenance/service.

Plumbing

- Icemaker Water Supply Line: Min. 1/4" Nominal ID Copper Water Tubing or Equivalent
- Icemaker Drain Line: Min. 3/4" Nominal ID Hard Pipe or Equivalent
- Water-Cooled Model (Lines Must Be Independent of Icemaker)
- Condenser Water Supply Line: Minimum 1/4" Nominal ID Copper Water Tubing or Equivalent
- Condenser Drain/Return Line: Minimum 1/4" Nominal ID Hard Pipe (open drain system) or Copper Water Tubing (closed loop system) or Equivalent

Water Filter

Please refer to water filter specification sheet for recommendations.

Hoshizaki reserves the right to change specifications without notice.



Hoshizaki

KMD-860MAJ

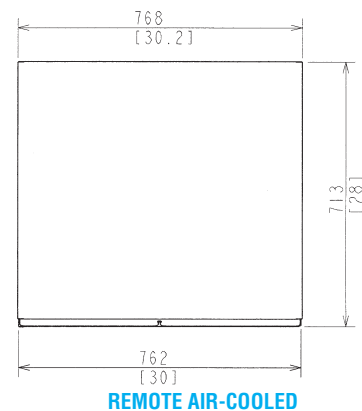
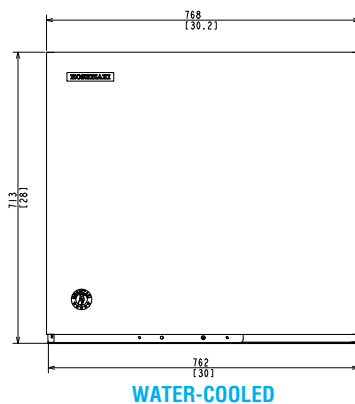
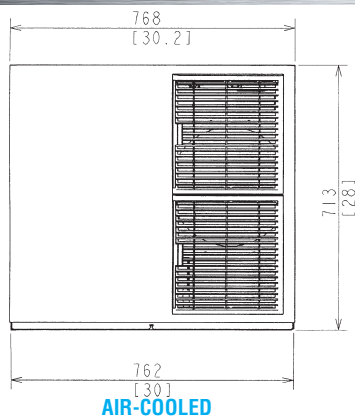
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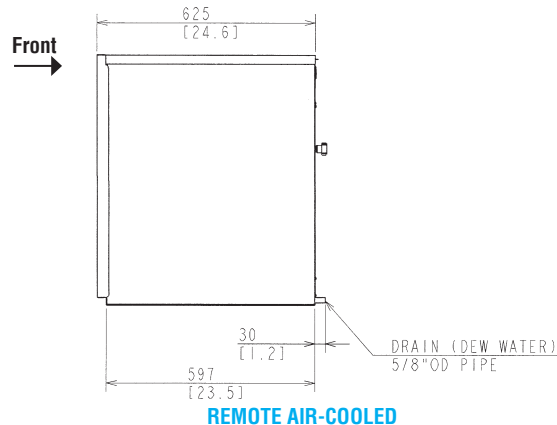
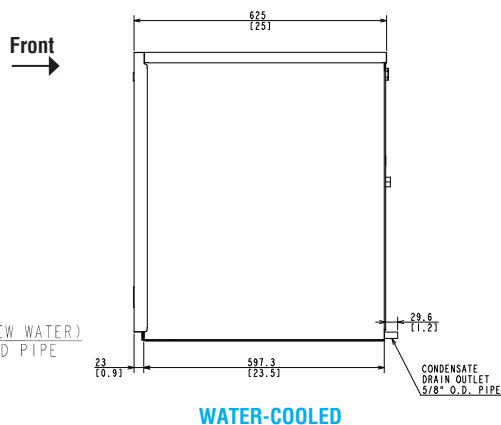
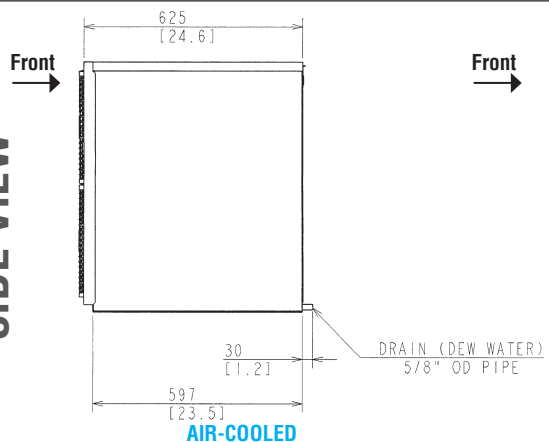
KMD-860M_J

MODULAR CRESCENT CUBER

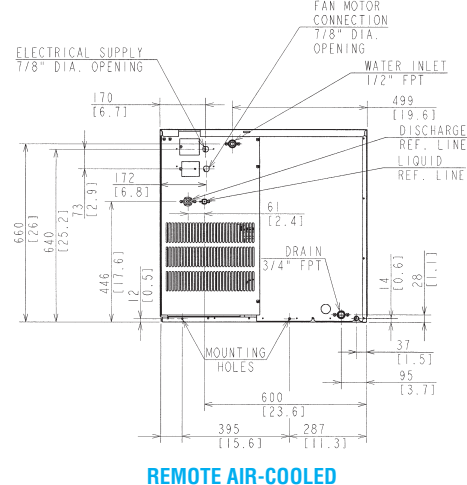
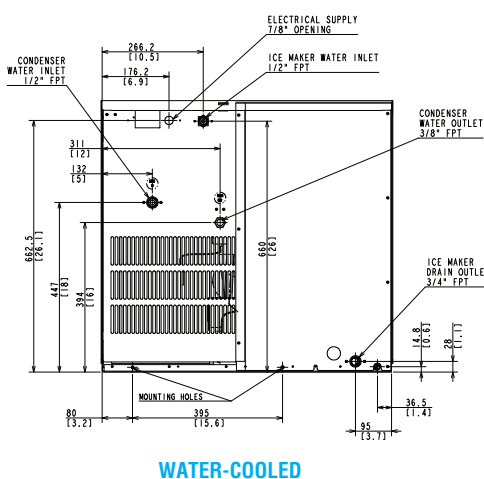
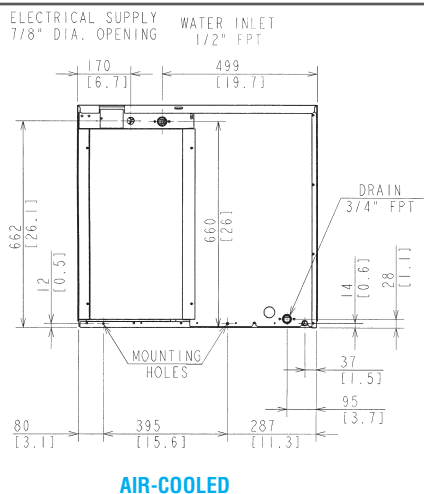
FRONT VIEW



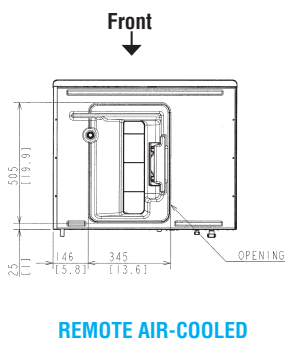
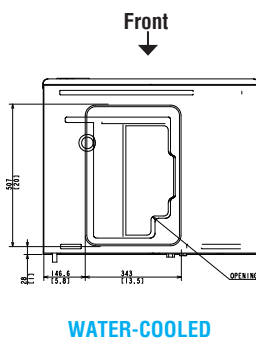
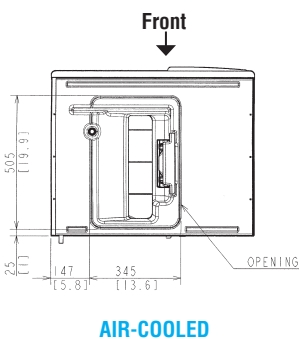
SIDE VIEW



REAR VIEW



BOTTOM VIEW

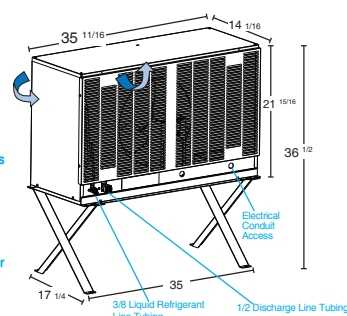


URC-9F Remote Condenser (Sold Separately)
(W x D x H) 35^{11/16} x 14^{1/16} x 36^{1/2}
For Use with KMD-860MRJ



Pre-Charged Tubing Kits
(Sold Separately)
20' R404-2068-2
35' R404-3568-2
55' R404-5568-2

Voltage supply for the URC Remote Condenser is supplied from the Ice Maker. No additional circuit is required.





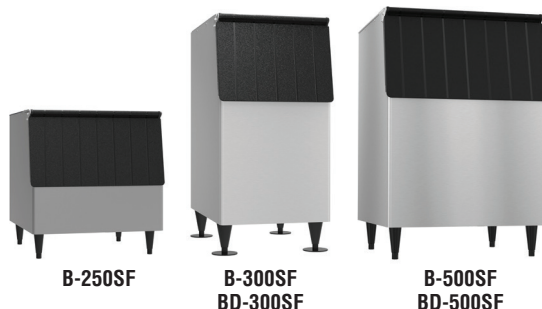
SF Bins

ICE STORAGE BIN SERIES




SF Bins
03/19/21
Item # 13163

SF - Stainless Steel Finish



Item #: _____
Project: _____
Qty: _____
AIA#: _____

Features

- ▶ Protected by H-GUARD Plus Antimicrobial Agent 
- ▶ Polyethylene bin liner for sanitary storage
- ▶ Sturdy construction for side-by-side or stacked ice machine installation

- Ice storage capacity from 250 lbs. up to 900 lbs.
- Both surfaces are designed for easy cleaning
- Long lasting attractive appearance
- Foamed-in-place polyurethane insulation, in all bin walls and bottom, provides dependable ice storage
- H-GUARD Plus Antimicrobial adds extra protection to the ice scoop (included)

SF - Stainless Steel Finish

BD Bins

- Fit 24" - 24 1/2" deep ice machine without top kit extension

Warranty:

2 Year Parts & Labor (Production prior to January 2012)
3 Year Parts & Labor (Production January 2012 and after)
Valid in United States, Canada, Puerto Rico and U.S. Territories. Contact factory for warranty in other countries.

Model Number	Exterior Dimensions W x D x H*	Interior Dimensions W x D x H	Application Storage Capacity†	Cubic Volume	Shipping Dimensions L x W x H	Shipping Weight (lbs.)
B-250SF	30" x 32.3" x 33.4"	27" x 27.7" x 23.7"	250 lbs.	10.30 ft³	35" x 32" x 32"	—
B-300SF	22" x 32.3" x 46"	19" x 27.7" x 37.6"	300 lbs.	11.51 ft³	35" x 24" x 45"	125
BD-300SF	22" x 32.3" x 46"	19" x 27.7" x 37.6"	300 lbs.	11.51 ft³	35" x 24" x 45"	130
B-500SF	30" x 32.3" x 46"	27" x 27.7" x 37.6"	500 lbs.	16.33 ft³	35" x 32" x 45"	140
BD-500SF	30" x 32.3" x 46"	27" x 27.7" x 37.6"	500 lbs.	16.33 ft³	35" x 32" x 45"	140
B-700SF	44" x 32.3" x 46"	41" x 27.7" x 37.6"	700 lbs.	24.77 ft³	46" x 35" x 45"	175
B-800SF	48" x 32.3" x 46"	45" x 27.7" x 37.6"	800 lbs.	26.90 ft³	50.25" x 35" x 45"	185
B-900SF	52" x 32.3" x 46"	49" x 27.7" x 37.6"	900 lbs.	29.59 ft³	54.5" x 35" x 45"	195

*Height includes 6" legs

† Capacity based on volume x 30 lb/ft³ average density of ice.

Hoshizaki reserves the right to change specifications without notice.



SF Bins

ICE STORAGE BIN SERIES



SF Bins
03/19/21
Item # 13163

Ice Machine Model Application

	22" Width	22" Width	30" Width	30" Width	44" Width	44" Width	48" Width
	KM-350M KM-520M KM-660M F-450M F-801M F-1002M	KMD-410M† KMS-822M FD-650M-C† FD-1002M-C	KM-901M KM-1340M KM-1601M KML Series F-1501M F-2001	KMD-460M‡ KMD-530M‡ KMD-860M‡ KMS-1402M* KMS-2000M*	2 KM-350M 2 KM-520M 2 KM-660M IM-500S 2 F-450M 2 F-801M 2 F-1002M	2 KMD-410M 2 FD-650M-C 2 FD-1002M-C	KM-1301S KM-1400S KM-1601S KM-1900S KM-2200S KM-2600S
Bins B-300SF DB-130H	— (DB-130H - KMD only)	NEED HS-5424 HS-2153 (KMD-410 on B-300 only)	N/A	N/A	N/A	N/A	N/A
Bins B-250SF B-500SF	NEED HS-2033	NEED HS-2033 & HS-2129	—	NEED HS-2129	N/A	N/A	N/A
Bins B-700SF	NEED HS-2035	NEED HS-2035 & HS-2130	NEED HS-2034	NEED HS-2130 & HS-2034	—	NEED HS-2130 (KMD-410 does not apply)	N/A
Bins B-800SF	NEED HS-2035 & HS-2032	NEED HS-2035, HS-2032 & HS-2131	NEED HS-2034 & HS-2032	NEED HS-2131, HS-2034 & 2032	NEED HS-2032	NEED HS-2032 & HS-2131	—
Bins B-900SF	NEED HS-2035 & HS-2033	NEED HS-2035, HS-2033 & HS-2132	NEED HS-2035	NEED HS-2132 & HS-2035	NEED HS-2033	NEED HS-2033 & HS-2132	NEED HS-2032
Bins DB-200H DM-200B	NEED HS-2036 (KM units only)	N/A	— (KML only)	N/A	N/A	N/A	N/A

— No top kit necessary | N/A Combination of ice maker and bin is not possible

BD Bins fit 24" - 24 1/2" deep ice machine without Top Kit extension.

† **BD-300SF:** KMD-410M, KMS-822M, FD-650M-C, FD-1002M-C

‡ **BD-500SF:** KMD-460M, KMD-530, KMD-860

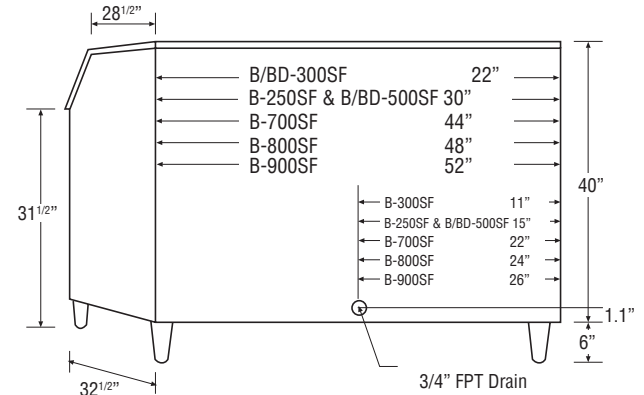
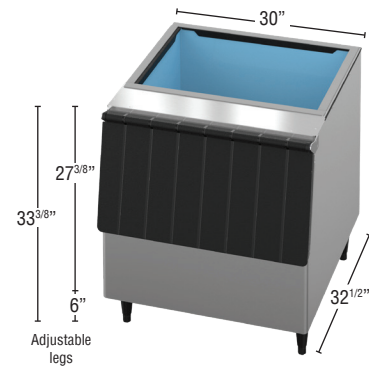
* Any KMS or FD on bin need Top Kit Extension:

- HS-2129 - for use with B-500 bins
- HS-2130 - for use with B-700 bins
- HS-2131 - for use with B-800 bins
- HS-2132 - for use with B-900 bins

Top Kits:

- HS-2032 - 4" ABS Top Kit
- HS-2033 - 8" ABS Top Kit
- HS-2034 - 14" ABS Top Kit
- HS-2035 - 22" ABS Top Kit
- HS-2036 - (2) 4" ABS Top Kits
- HS-2066 - Seismic Kit for SD 500 Stands
- HS-2071 - Anchored Leg Kit SD 500 Stands
- HS-2111 - 11.3" x 26.2" Stainless Cover/Separator
- HS-2148 - 30" x 3.1" Stainless Cover
- HS-2153 - KMD-410 on B-300 bin
- HS-2160 - 2 KM-901M

B-250SF



Ice Drop Area



B Bins



BD Bins



Bin Flanged Legs:
B/BD-300SF



Bin Legs:
B-250SF, B/BD-500SF
B-700SF, B-800SF
B-900SF



INSURICE[§] TRIPLE PF-i4000² SYSTEM

DELIVERS PREMIUM QUALITY WATER FOR ICE APPLICATIONS

Insurice Triple PF-i4000² System: EV9325-23
i4000² Replacement Cartridge: EV9612-32
EC210 Prefilter Cartridge: EV9534-26



APPLICATIONS

- ◆ Ice
 - Higher Volume, Higher Flow and Higher Capacity Ice Machines

FEATURES • BENEFITS

- ◆ Reduces ice machine problems caused by scale build-up* from dirt and dissolved minerals*
- ◆ Sanitary cartridge replacement is simple, quick and clean. Internal parts are never exposed to handling or contamination
- ◆ Reduces maintenance and service costs by reducing scale* and clogging of distribution lines, evaporator plate and pump
- ◆ Exclusive precoat filtration provides superior chlorine taste and odor reduction and micro-filters dirt and particles as small as 0.5 micron in size by mechanical means
- ◆ Proprietary Pentair[§] Everpure[§] Micro-Pure[§] II filtration media effectively inhibits the growth of bacteria on the filter media that can decrease product life
- ◆ Reduces chlorine taste and odor and other offensive contaminants
- ◆ Self-contained scale inhibitor feed keeps ice machines functioning at full capacity*
- ◆ Manifold features water shut-off, flushing valve and outlet pressure gauge
- ◆ 20" prefilter reduces dirt and particles.
- ◆ NSF/ANSI Standard 53 certified to reduce cysts such as *Cryptosporidium* and *Giardia* by mechanical means

*As tested by Pentair[§]

INSTALLATION TIPS

- ◆ Choose a mounting location suitable to support the full weight of the system when operating.
- ◆ Never use saddle valve for connection.
- ◆ Use 3/4" water line.
- ◆ Do not connect system to water-cooled condenser.
- ◆ Install vertically with cartridges hanging down and allow 2½" (6.35 cm) clearance below the cartridge for easy cartridge replacement.
- ◆ Flush cartridges by running water through system for five (5) minutes at full flow.

OPERATION TIPS

- ◆ Change cartridges on a regular six (6) month preventative maintenance program.
- ◆ Change cartridges when capacity is reached or when pressure falls below 10 psi (0.7 bar).
- ◆ Service flow rate must not exceed 5 gpm (18.9 Lpm).
- ◆ Always flush the filter cartridge at time of installation and cartridge change.
- ◆ Inspect Pentair Everpure EC210 cartridge periodically to determine dirt load.
- ◆ Replace EC210 cartridge when dirt has penetrated through to the inner core of the cartridge.

SIZING

- ◆ Service Flow Rate:
Maximum 5 gpm (18.9 Lpm)
- ◆ Rated Capacity:
36,000 gallons (136,274 L)

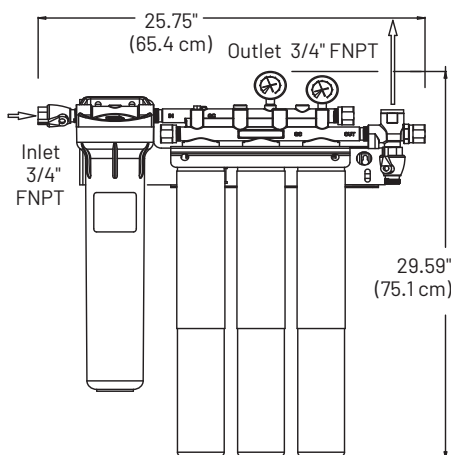
INSURICE TRIPLE PF-i4000² SYSTEM

EV9325-23

Insurice Triple PF-i4000² System: EV9325-23

i4000² Replacement Cartridge: EV9612-32

EC210 Prefilter Cartridge: EV9534-26



SPECIFICATIONS

- ◆ **Service Flow Rate**
Maximum 5 gpm (18.9 Lpm)
- ◆ **Rated Capacity**
36,000 gallons (136,274 L)
- ◆ **Pressure Requirements**
10 – 125 psi (0.7 – 8.6 bar), non-shock
- ◆ **Temperature Limits**
35 – 100°F (2 – 38°C)
- ◆ **Overall Dimensions**
29.59" H x 25.75" W x 6" D
(75.1 x 65.4 x 15.2 cm)
- ◆ **Inlet Connection** 3/4"
- ◆ **Outlet Connection** 3/4"
- ◆ **Electrical Connection**
None
- ◆ **Shipping Weight**
23 lb. (10.4 kgs)
- ◆ **Operating Weight**
35 lbs (15.8 kgs)



SYSTEM TESTED AND CERTIFIED BY NSF INTERNATIONAL AGAINST NSF/ANSI STANDARDS 42 AND 53 FOR THE REDUCTION OF:

STANDARD NO. 42 –
AESTHETIC EFFECTS

Chemical Reduction
Taste & Odor
Chlorine

Mechanical Filtration

Nominal Particulate Class I

STANDARD NO. 53 –
HEALTH EFFECTS

Mechanical
Filtration
Cyst

EPA Est. No. 002623-IL-002

WARRANTY

Everpure water treatment systems by Pentair (excluding replaceable elements) are covered by a limited warranty against defects in material and workmanship for a period of five years after date of purchase. Everpure replaceable elements (filter cartridges and water treatment cartridges) are covered by a limited warranty against defects in material and workmanship for a period of one year after date of purchase. See printed warranty for details. Pentair will provide a copy of the warranty upon request.

The contaminants or other substances removed or reduced by this drinking water system are not necessarily in your water. Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. Systems certified for cyst reduction may be used with disinfected water that may contain filterable cysts.

Since the conditions under which our products may be used are beyond our control, we cannot accept any liability with respect to the improper installation, application and/or use of our products.



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Project _____
 AIA # _____ SIS # _____
 Item # _____ Quantity _____ C.S.I. Section 114000



HL300 LEGACY+ 30-Quart Maximum Heavy-Duty Mixer



SPECIFIER STATEMENT

Specified mixer will be an NSF rated 30-quart maximum heavy-duty, all-purpose mixer with Hobart PLUS System, three fixed speeds plus a stir speed. Mixer has $\frac{3}{4}$ HP output at the planetary shaft and all-gear transmission. Features include automatic time recall, swing-out bowl, Shift-on-the-Fly™ controls and hand cranked bowl lift. Mixer finished with a metallic gray hybrid powder coat finish and has a stainless steel bowl guard.

MODEL

- ☐ **HL300** 30-Quart Maximum Heavy-Duty Mixer
- ☐ **HL300C** 30-Quart Maximum Heavy-Duty Mixer with Maximum Security Correctional Package

STANDARD FEATURES

Features in bold are exclusive to Hobart

- + **PLUS System**
 - **VFDadvantage** variable frequency drive
 - **Maximum capacity** overheat protection
 - **Reinforced planetary shaft system**
- + **Triple interlock system with MagnaLock technology**
- + Heavy-duty $\frac{3}{4}$ HP motor
- + Gear transmission
- + Three fixed speeds, plus stir speed
- + **Shift-on-the-Fly™ controls**
- + Soft start agitation technology
- + **15-minute SmartTimer™**
- + Automatic time recall
- + Large, easy-to-reach controls
- + **Single point bowl installation**
- + **Ergonomic swing-out bowl**
- + #12 taper attachment hub
- + Open base
- + Metallic gray hybrid powder coat finish
- + Stainless steel removable bowl guard
- + Rubber foot pads provided

ACCESSORY PACKAGE

Featuring Hobart Quick Release™ Agitators

- ☐ HL300-1STD Standard Accessory Package includes:
 - + 30-quart stainless steel bowl
 - + 30-quart "B" beater
 - + 30-quart "D" wire whip

HL300 LEGACY+ 30-QUART MAXIMUM HEAVY-DUTY MIXER

Approved by _____ Date _____ Approved by _____ Date _____



HL300 LEGACY+ 30-Quart Maximum Heavy-Duty Mixer

SOLUTIONS/BENEFITS

PERFORMANCE

VFDadvantage Variable Frequency Drive

- + All-gear, direct drive system
- + Ensures superior mixing consistency, motor protection and long life

Quick Release™ Agitators

- + Eliminates the up/down play of bayonet-style agitators
- + Consistent agitator-to-bowl ratio delivers superior mixing performance

Four Mixing Speeds

- + Can handle virtually any mixing job
- + Includes stir speed

Reinforced Planetary Shaft System

- + Rugged durability under the most challenging mixing conditions

Maximum Capacity Overheat Protection

- + Extreme-duty wiring and connections handle more power, reducing thermal cycling impact

EASE OF USE

Ergonomic Swing-Out Bowl

- + Easily swing bowl to the side to remove/add ingredients
- + Adds convenience and saves time

Single-Point Bowl Installation

- + Easy-to-mount bowl uses only one point to install
- + Reduces risk of spills, speeds up mixing process

Bowl Lift

- + Ergonomic, smoothly moves bowl into mixing position

Shift-on-the-Fly™ Controls

- + Allows safe, convenient speed changes while the motor is running
- + Pulse and jog as needed

15-Minute SmartTimer™

- + Automatic recall of time and speed

SANITATION & CLEANING

Stainless Steel Removable Bowl Guard

- + Easy to remove without tools for cleaning
- + Dishwasher-safe for easy cleaning and sanitizing

Soft Start Agitation Technology

- + Gradually delivers electricity to the mixer
- + Minimizes the risk of ingredient splash out

OPERATOR ASSURANCE

Triple Interlock System with MagnaLock Technology

- + Prevents mixer from operating unless the bowl is fully up and locked in place and the bowl guard is secured

HL300 MIXER CAPACITY CHART

Recommended Maximum Capacities – dough capacities based on 70°F water and 12% flour moisture.

Product	Agitators Suitable for Operation	HL300
Capacity of Bowl (Qt. Liquid)		30
Egg Whites	D	1½ qt.
Mashed Potatoes	B & C	23 lb.
Whipped Cream	D or C	6 qt.
Cakes		30 lb.
Cookies, Sugar		23 lb.
Dough, Bread or Roll ★ (Lt.-Med.) 60% AR	ED	45 lb. ●
Dough, Heavy Bread 55% AR ★	ED	30 lb. ●
Dough, Thin Pizza 40% AR ★ (max. mix time 5 min.)	ED	14 lb. ●
Dough, Thick Pizza 60% AR ★	ED	40 lb. ●
Dough, Whole Wheat 70% AR	ED	40 lb. ●
Icing, Fondant	B	18 lb.
Icing, Marshmallow	C or I	3 lb.
Pasta, Basic Egg Noodle (max. mix time 5 min.)	ED	8 lb. ●

Note: % AR (% Absorption Ratio) – Water weight divided by flour weight. Capacity depends on moisture content of dough. Above capacities based on 12% flour moisture at 70°F water temperature.

● 1st Speed

■ 2nd Speed

▲ 3rd Speed

★ If high gluten flour is used, reduce above dough batch size by 10%.

2nd speed should never be used on 50% AR or lower products.

Use of ice requires a 10% reduction in batch size.

1 gallon of water weighs 8.33 lbs.

Note: Attachment hub should not be used while mixing.



HL300 LEGACY+ 30-Quart Maximum Heavy-Duty Mixer

SPECIFICATIONS

Motor: ¾ HP high torque, 3-phase motor.

100-120/50/60/1 – 9.5 Amps

200-240/50/60/1 – 5.7 Amps

200-240/50/60/3 – 2.8 Amps

380-460/50/60/3 – 1.4 Amps

Electrical: 100-120/50/60/1, 200-240/50/60/1, 200-240/50/60/3 and 380-460/50/60/3 – UL Listed.

Controls: Magnetic contactor and thermal overload protection. Internally sealed “Start-Stop” push buttons. A 15-minute SmartTimer™ is standard. SmartTimer™ includes:

- **Automatic Time Recall**, which remembers the last time set for each speed.
- **Transmission:** Gear-driven. Gears are constant mesh heat-treated hardened alloy steel along with anti-friction ball bearings. Grease lubricants furnished to all gears and shafts.

Speeds	Agitator (RPM)	Attachment (RPM)
Stir	58	34
First (Low)	94	54
Second (Intermediate)	174	100
Third (High)	317	183

Bowl Guard: Heavy-duty stainless steel wire front and solid rear portion. Front portion of guard rotates easily to add ingredients and install or remove agitator. It detaches in seconds for cleaning in dishwasher or sink. Rear portion of guard can be quickly cleaned in position. Guard must be in closed position before mixer will operate. Bowl support interlock provides further protection.

Bowl Lift: Ergonomic style, manual operated, self-locking in top and bottom position.

Finish: Metallic gray hybrid powder coat finish.

Attachment Hub: Comes with front-mounted Hobart standard #12 taper attachment hub for use with Hobart #12 size attachments.

Warranty: Unit has full one-year warranty on parts, labor and mileage against manufacturer's defects. Service contracts are available.

Attachments and Accessories:

The following are available at extra cost:

Attachment / Accessory	Device #
Stainless Steel Bowl	BOWL-HL30
“B” Flat Beater	BBEATER-HL4030
“C” Wing Whip	CWHIP-HL4030
“D” Wire Whip	DWHIP-HL4030
“ED” Dough Hook	EDDOUGH-HL30AL
“P” Pastry Knife	PPASTRY-HL4030
“I” Heavy Duty Wire Whip	IWIRE-HL4030
Bowl Splash Cover (lexan)	SPLASH-LEX030
Bowl Scraper	SCRAPER-HL30
Ingredient Chute	CHUTE-HL4030
Bowl Truck	TRUCK-HL4030
Stainless Steel Feet	PADSST-HL4320
9" Vegetable Slicer	VS9
Meat Chopper Attachment	12TIN-C/EPAN

Plugs and Receptacles:

Dependent on local power codes

X - Cord and Plug Standard

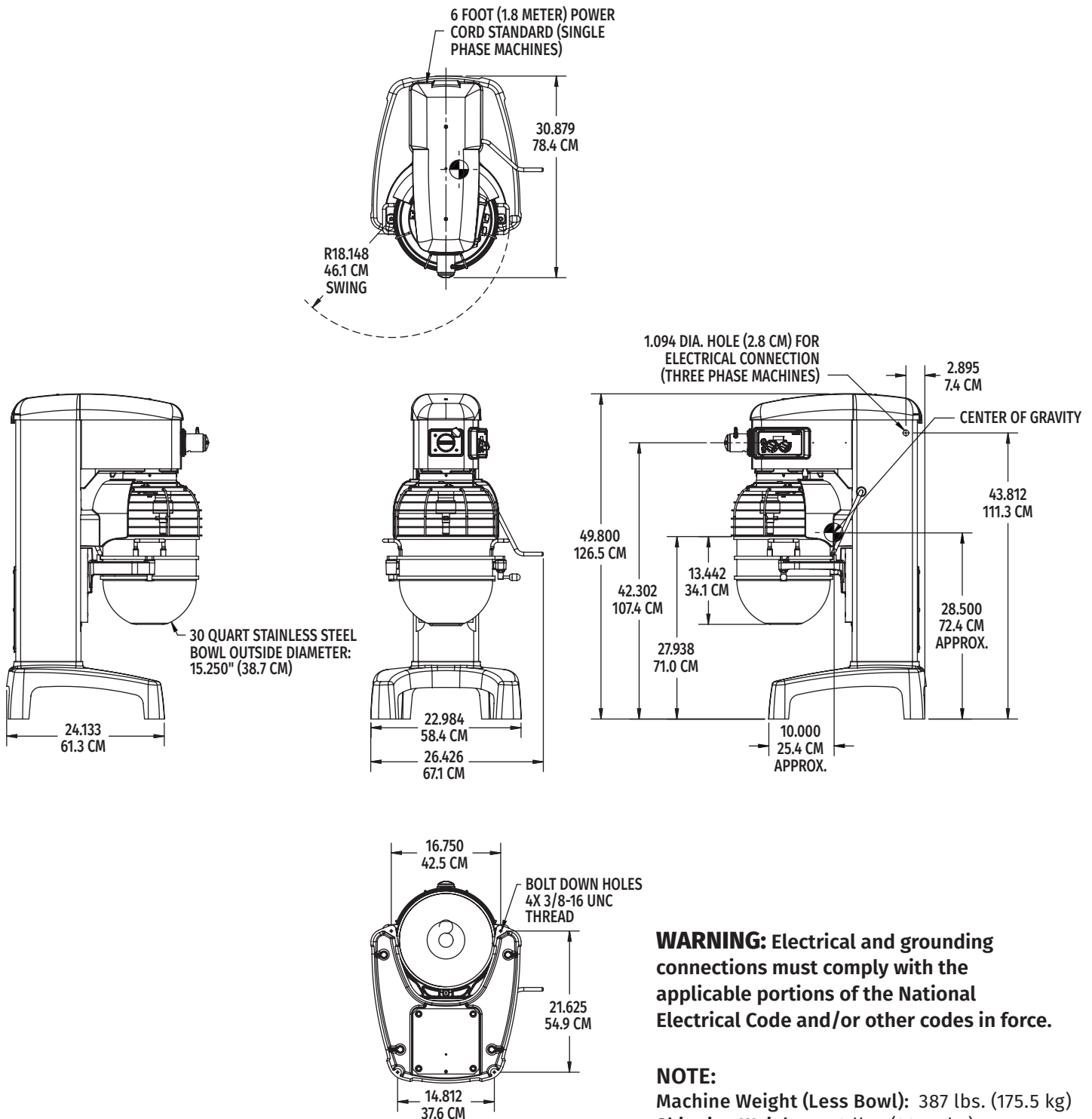
✓ - Available at specified voltage, no plug and cord required

Machine Voltages					
HL300	X	200-240	X	200-240	380-460
Service Current Requirement if Plug Connected	120/60/1	200/60/1 208/60/1	230/60/1	230/60/3	460/60/3
	15 Amp.		15 Amp.	20 Amp.	20 Amp.
Terminal Designation of Plug	2 Pole 3 Wire Grdg.		2 Pole 3 Wire Grdg.	3 Pole 4 Wire Grdg.	3 Pole 4 Wire Grdg.
NEMA Plug Configuration	5-15P		6-15P	L15-20P	L16-20P
Plug Configuration					
Molded Plug on Cord	Yes		Yes	No	No
Plug - Straight/Angle	Straight		Straight	Straight	Straight
NEMA Receptable or Connector Configuration	5-15R		6-15R	L15-20R	L16-20R



HL300 LEGACY+ 30-Quart Maximum Heavy-Duty Mixer

DETAILS AND DIMENSIONS





701 S Ridge Avenue, Troy, OH 45374
1-888-4HOBART • www.hobartcorp.com

HS7/HS7N SLICER

HOBART

STANDARD FEATURES

KNIFE

- 13" CleanCut™ Knife
- Removable Ring Guard Cover
- Zero Knife Exposure
- Heavy-Gauge Stainless Steel Knife Cover
- Top-Mounted Borazon Stone Sharpener

OPERATION

- ½ H.P. Knife Drive Motor
- Timing Belt for Automatic Drive System
- Variable Four-Speed Automatic Carriage with Front Mounted Controls
- Three Stroke Lengths

INTERLOCKS

- Home-Start Position
- No-Volt Release

HOUSING AND BASE

- Burnished Aluminum Base
- Machine Grooves on Gauge Plate and Knife Cover
- Exclusive Tilting, Removable Carriage System
- Electroless Nickel Plated Single Slide Rod with Reservoir Wick in Transport
- Double-Action Indexing Cam
- Lift Assist Cleaning Leg
- Ergonomic-Style Handle
- Rear-Mounted, Removable Meat/Vegetable Grip Arm

MODELS

- ☐ HS7 – Automatic Slicer/Burnished Finish
- ☐ HS7N – Automatic Slicer/Burnished Finish with Non-Removable Knife Feature

ACCESSORIES

- Full Fence (standard on automatic models)
- ☐ Food Chute
- ☐ Debris Deflector

Specifications, Details and Dimensions on Inside and Back.



HS7/HS7N SLICER

HS7/HS7N SLICER



701 S Ridge Avenue, Troy, OH 45374
1-888-4HOBART • www.hobartcorp.com

SOLUTIONS / BENEFITS

PRECISION SLICING

13" CleanCut™ Knife

- Super alloy edge stays sharp longer
- Lasts two to three times longer than carbon coated or stainless steel knives

Top Mounted Borazon Stone Sharpener

- Single-action sharpens and hones in just 15 seconds
- Removable and warewasher safe for easy cleaning and sanitation – can be used wet or dry
- Lifetime guaranteed Borazon sharpening stones provide maximum performance with reduced maintenance costs

Machined Grooves on Gauge Plate and Knife Cover

- Reduces drag for smoother slicing motion

Double-Action Indexing Cam

- The first full revolution of the indexing knob provides precise control of shaving, chipping and thin slicing
- The second revolution opens the gauge plate quickly for thicker slicing
- Gauge plate holds position for consistent, precision slicing

EASY TO USE

½ H.P. Knife Drive Motor

- Reserve power runs at 430 rpm for optimum results

Timing Belt Automatic Drive System

- Extends belt life while producing optimum slicing results
- Quieter operating slicer
- Four carriage speeds including 28, 38, 48 and 58 strokes per minute

Three Stroke Lengths

- Three stroke lengths ideal for a variety of products

Electroless Nickel Plated Single Slide Rod with Reservoir Wick in Transport

- Smooth operation with continuous lubrication of carriage rod

Zero Knife Exposure*

- Knife edge is covered when sharpener is both mounted and removed, making cleaning easier
- Gauge plate remains closed during operation of sharpener

Home Start Position

- Carriage must be in 'home position' before the slicer will start

No Volt Release

- Slicer must be restarted if power fails or slicer is unplugged

EASY TO CLEAN

Removable Knife Option* – HS7

- Knife easily removes with patented removal tool
- Area within ring guard is open for faster cleaning
- Knife and tool are warewasher safe for easy cleaning and sanitation

Removable Ring Guard Cover*

- Catches product debris around the knife for easy removal during cleaning
- Reduces time to 'floss' during cleaning

Exclusive Tilting, Removable Carriage System*

- Tilt design allows for ease of mid-day cleaning
- Removable for complete cleaning and sanitation

Rear-Mounted, Removable Meat Grip Arm

- Opens up front of product tray for unobstructed loading
- Removable meat grip allows for easy cleaning

Lift Assist Cleaning Leg

- Gas assisted leg helps operator easily lift machine for cleaning underneath

Sanitary Burnished Aluminum Base

- Limited cracks/crevices or bolt holes where product can lodge and bacteria may grow
- Easy clean up and durable finish

*Feature unique to Hobart



701 S Ridge Avenue, Troy, OH 45374
1-888-4HOBART • www.hobartcorp.com

HS7/HS7N SLICER

SPECIFICATIONS

KNIFE

13" CleanCut Knife: The knife is approximately 13 inches, constructed of 304L stainless steel and high performance Stellite alloy. Knife cover is retained magnetically, and is quickly removed by pulling straight back on the top cover knob.

Removable Knife Option HS7: The patented knife removal tool covers the knife edge and safely removes knife from gauge plate to allow for thorough cleaning.

Removable Ring Guard Cover: Fits on top of ring guard to catch food debris. When removed, reveals a 0.12" space between knife and guard for easier flossing. Ring guard is made with Zytel™ plastic and can be washed in warewasher or three compartment sink.

Zero Knife Exposure: Knife edge is not exposed during cleaning or sharpening procedures.

Top Mounted Borazon Stone Sharpener: Single action operation utilizing two Borazon stones to sharpen and hone in five seconds. Removable, top mounted and warewasher safe. When sharpener is removed for cleaning, knife edge is completely shielded. Borazon stones have a lifetime guarantee.

MOTOR

Poly V-Belt Knife Drive System: Knife is driven by a Hobart Poly V belt and runs at 430 rpm for optimal performance.

Four Stroke Speeds: Stroke speed can be set to 28, 38, 48 and 58 strokes per minute.

½ H.P. Knife Drive Motor: ½ H.P. permanently lubricated ball bearings. Single phase capacitor-start, induction run.

INTERLOCKS

Home Start Position: Home-start ensures carriage is in a convenient position before starting the slicer.

No Volt Release: In the event of a power loss, slicer must be restarted before operation can continue.

HOUSING AND BASE

Sanitary Burnished Aluminum Base: One-piece base has fewer places to harbor soil and is easier to clean. Limits holes or crevices in which food can lodge.

Finish: Stainless steel top cover, anodized aluminum product tray and gauge plate.

Exclusive Tilting, Removable Carriage System: Aluminum product tray tilts easily for mid-day cleaning and is removable for thorough cleaning and sanitation procedures. The carriage has 12.5" manual travel.

Electroless Nickel Plated Single Slide Rod with Reservoir Wick in Transport: Transport slide rod is E-Nickel electroless plated. Slide rod bearings feature an oil reservoir/oil wick.

Double-Action Indexing Cam: A solid construction index knob moves the gauge plate via a barrel cam ensuring consistent slice thickness across machine and over time. First revolution of index cam for precision slicing; second revolution for thicker slicing selection.

Lift Assist Cleaning Leg: Gas assisted leg helps operator easily lift machine for cleaning underneath.

Ergonomic Style Handle: Specially shaped and positioned for ease of use during manual operation.

Rear Mounted, Removable Meat Grip Arm: Rear mounted grip is high strength thermoplastic. Swings out of way when not in use.

Electrical Specification: 120/60/1; 5.6 Amps.

Switch: Moisture protected push button switch.

Cord & Plug: 6-foot, three-wire power supply cord and plug. Plug not furnished on export models.

Capacity: The carriage will take food up to 5¾" x 10¾" rectangle or 7.5" in diameter.

Gauge Plate: Gauge plate is a heavy aluminum extrusion with machined grooves for smooth feeding. Adjustable to cut any thickness of slice up to 1".

Warranty: All parts and service coverage for one year including knife. Lifetime guarantee on Borazon stones in the sharpening system.

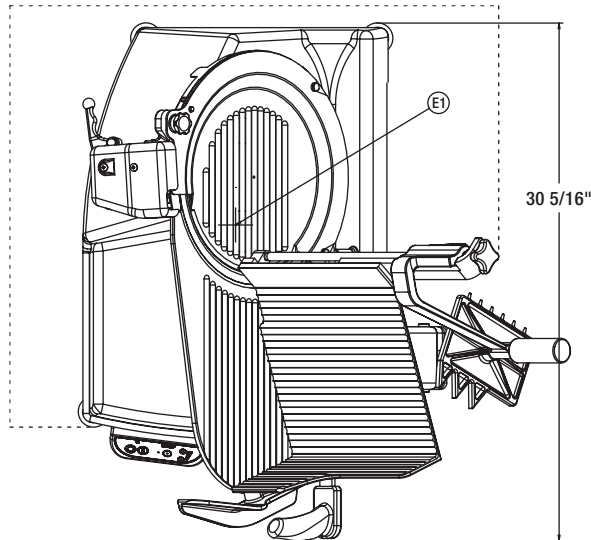
Shipping Weight: 138 lbs.

HS7/HS7N SLICER

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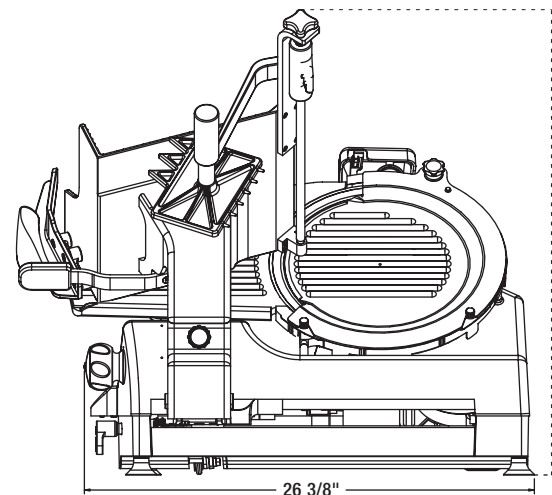
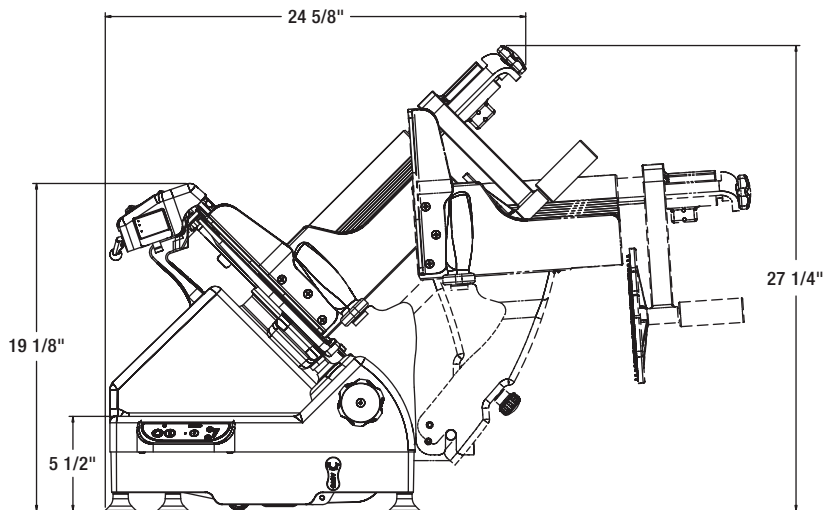
DETAILS AND DIMENSIONS



WARNING

ELECTRICAL AND GROUNDING CONNECTIONS MUST COMPLY WITH THE APPLICABLE PORTIONS OF THE NATIONAL ELECTRICAL CODE AND/OR OTHER LOCAL ELECTRICAL CODES.

E1 - ELECTRICAL CONNECTIONS



As continued product improvement is a policy of Hobart, specifications are subject to change without notice.

PROCESSING

Berkel**M3000**
CONTINUOUS FEED FOOD PROCESSOR

Model M3000

**FEATURES**

Berkel Model M3000 continuous feed food processor is a high-performance machine that quickly and conveniently, slices, dices, shreds, grates, and juliennes vegetables, fruits and cheese. The M3000 should not be used to dice or cube cheese or meat. Constructed of heavy-duty stainless steel and aluminum, the compact M3000 is easy to move from one location to another. The continuous feed attachment includes an automatic start/stop function, feed tube and design that allows the operator to load product with both hands for the fastest possible processing. The dual interlock boosts operator protection. The M3000 has a variety of cutting plates to optimize the versatility and productivity of this superior machine.

☐ **M3000** Continuous Feed Food Processor
STANDARD FEATURES

- Slices, dices, shreds, grates and juliennes fruit, vegetables, dry bread, cheese, nuts, etc.
- The M3000 should not be used to dice or cube cheese or meat.
- Prepares 800-950 lbs. per hour.
- 1-speed, ¾ HP, thermal motor protection.
- Furnished in 115/60/1, UL listed.
- Optimal speed setting and perfect cutting results for the required applications.
- Includes feed head and ejector plate.
- Model M3000 is furnished with a 1/8" (3 mm) shredder plate and 1/8" (3 mm) slicing plate.
- Stainless steel machine base and aluminum feed assembly for increased durability.

ACCESSORIES (Packaged & Sold Separately)

- ☐ Slicing Plates – 1/16" (2 mm), 1/8" (3 mm), 3/16" (5 mm), 5/16" (8 mm), 3/8" (11 mm), 1/2" (14 mm)
- ☐ Shredder Plates – 11/8" (3 mm), 3/16" (4 mm), 7/16" (7 mm)
- ☐ Julienne Plate – 3/32" x 3/32" (2 x 2 mm), 3/16" x 3/16" (4 x 4 mm)
- ☐ Dicing Grid – 3/8" (11 mm), 1/2" (14 mm), 7/8" (22 mm), 1/4" (8 mm)
- ☐ Special 6-pack of Accessories (see AQ or Price Book)
- ☐ Special 8-pack of Accessories (see AQ or Price Book)
- ☐ Storage Rack – 3 Plates
- ☐ Storage Rack – 6 Plates

Designed and Assembled in U.S.A.**Berkel**

a division of ITW Food Equipment Group LLC

www.berkelequipment.com

P.O. Box 696 ■ Louisville, KY 40201 ■ Toll-free: 1-800-814-2028 ■ Local: 502-778-2791 ■ Quote & Order Fax: 1-800-444-0602

PROCESSING



M3000

CONTINUOUS FEED FOOD PROCESSOR

SPECIFICATIONS

Motor: ¾ hp, 1-speed, thermal motor protection with automatic reset.

Electrical: Furnished in 115/60/1, 12.5 amps, UL Listed. All models are furnished with a 3-wire electrical cord and plug. Cord is 6' in length.

Finish/Construction: Machine base of stainless steel. Polished aluminum continuous feed attachment and either wiper blade or ejector plate depending on model. Cutting plates of stainless steel or aluminum. All blades of stainless steel.

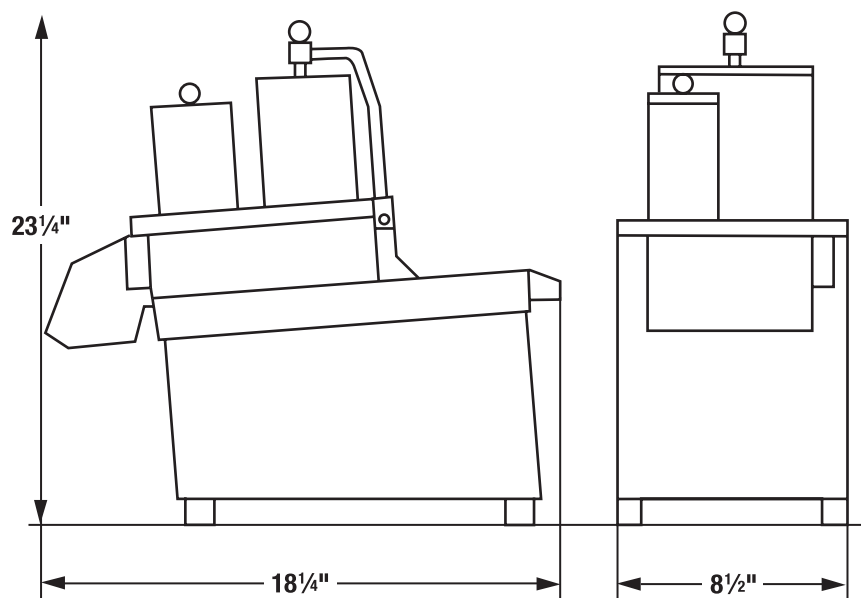
Controls: Rear mounted and shielded on/off switch.

Speeds: 1 speed (350 rpm) for slicing, dicing, shredding, crimping and grating.

Operator Protection: Feed hopper and "C" hopper interlocks keep machine from operating unless in the proper position.

Capacity: 800-950 lbs. per hour.

Warranty: Parts, labor and travel coverage for one year, exclusive of wear items, cutting edges and dicing grids.



Continuous Feed

MODEL NO.	CAPACITY	PRODUCT DIMENSIONS			WEIGHT
		WIDTH	DEPTH	HEIGHT	
M3000	800-950 lbs. per hour	8 ½" (216 mm)	18 ¼" (465 mm)	23 ¼" (590 mm)	Net 56 lbs. (25.5 kg) Ship 63 lbs. (29 kg)

MOTOR	ELECTRICAL	CUTTING SPEED	BOX DIMENSIONS		
			WIDTH A	DEPTH B	HEIGHT C
1 Speed ¾ HP	115/60/1	350 rpm	12 ½" (318 mm)	22" (559 mm)	25" (635 mm)



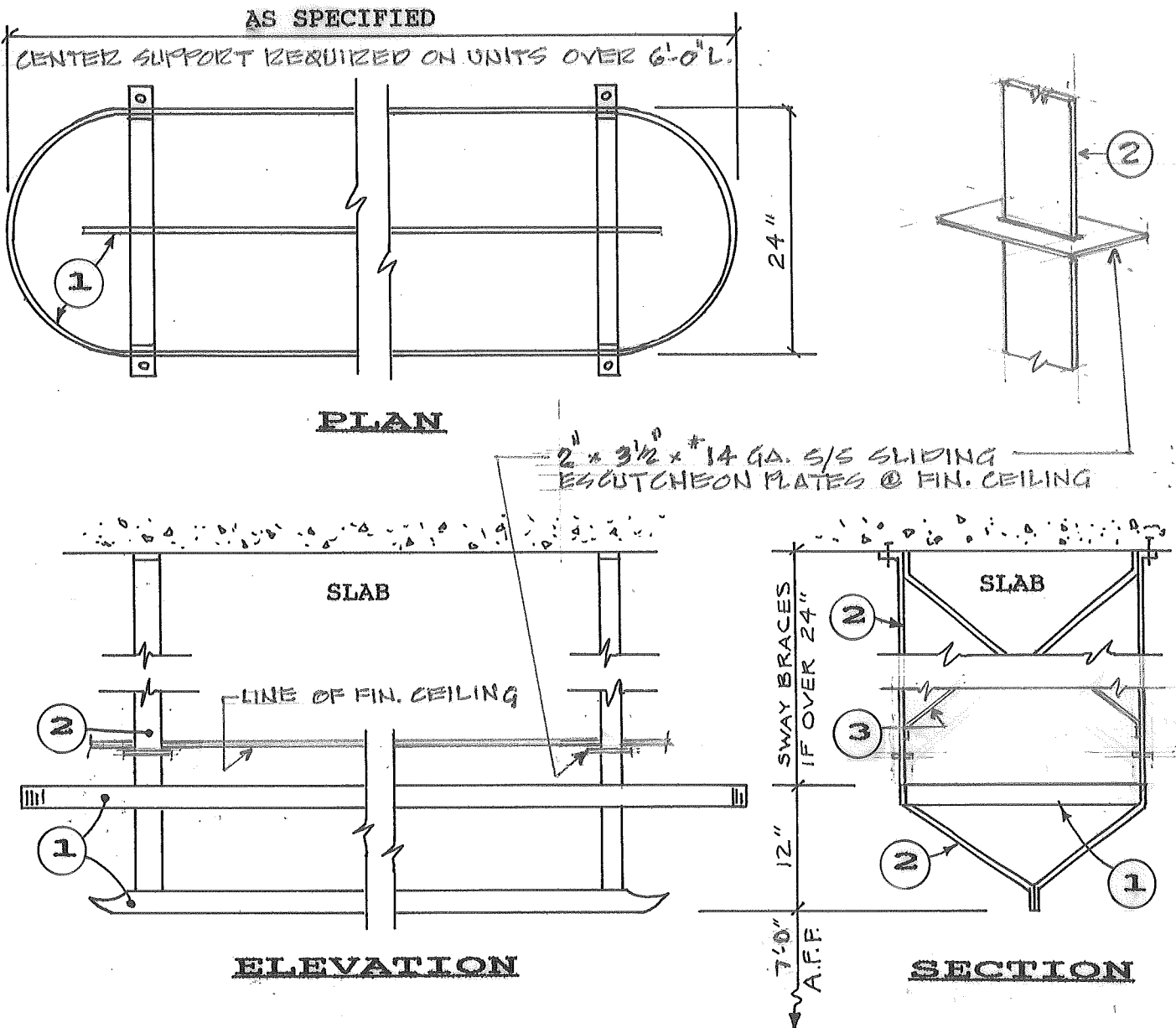
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NOTE: As we continually strive to improve our products, specifications are necessarily subject to change without notice.

145265



OVERHEAD POT RACK NO SCALE

- ① 2" X 1/4" S/S BANDS, CURVE ENDS, WELD CONTINUOUSLY
- ② 2" X 1/4" S/S BAND HANGERS. SECURE TO SLAB WITH DRIVEN STUDS. ALL WELDED CONSTRUCTION WITHOUT OVERLAPPING JOINTS.
- ③ 2" X 1/4" S/S SWAY BRACES. WELD IN PLACE.

WELD ALL JOINTS, GRIND SMOOTH AND POLISH.

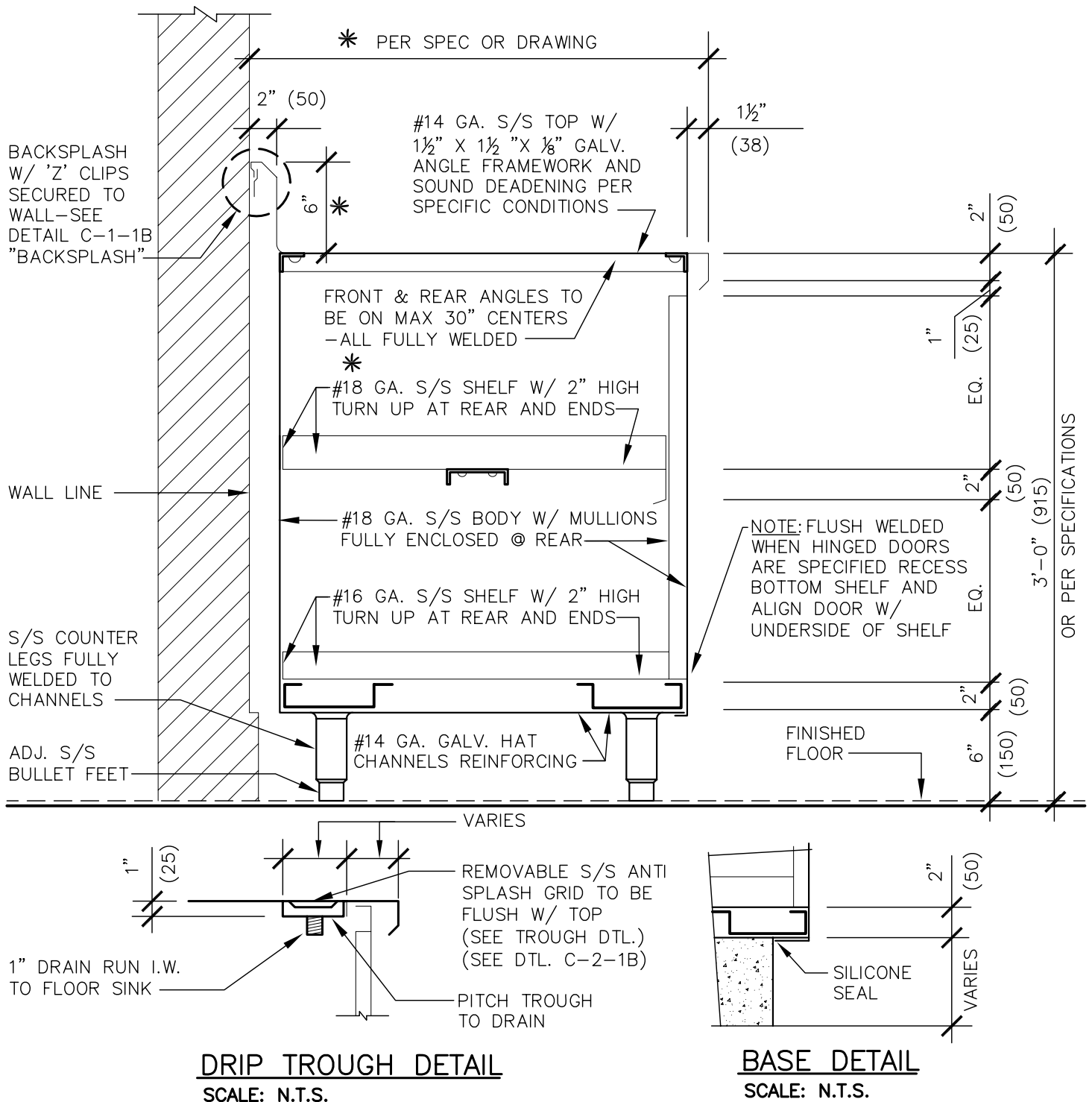
PROVIDE DOUBLE PRONG S/S SLIDING POT HOOKS FOR 1/4" S/S BARS EVERY 8" OF POT RACK. COMPONENT HARDWARE #J 77-4401 OR EQUAL

Clevenger Frable
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN **LaVallee**

**CEILING MOUNTED
POT & PAN RACK**

AUG 2001

C-7-4A



* OR AS PER DRAWINGS AND / OR SPECIFICATIONS

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 CONSULTING & DESIGN
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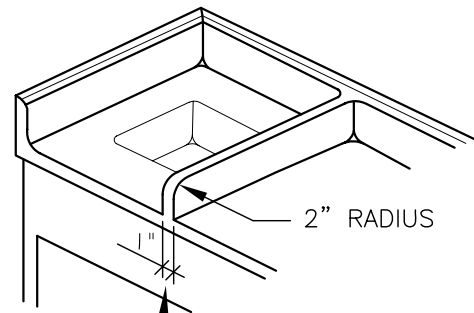
SEMI-ENCLOSED COUNTER

DEC 2011

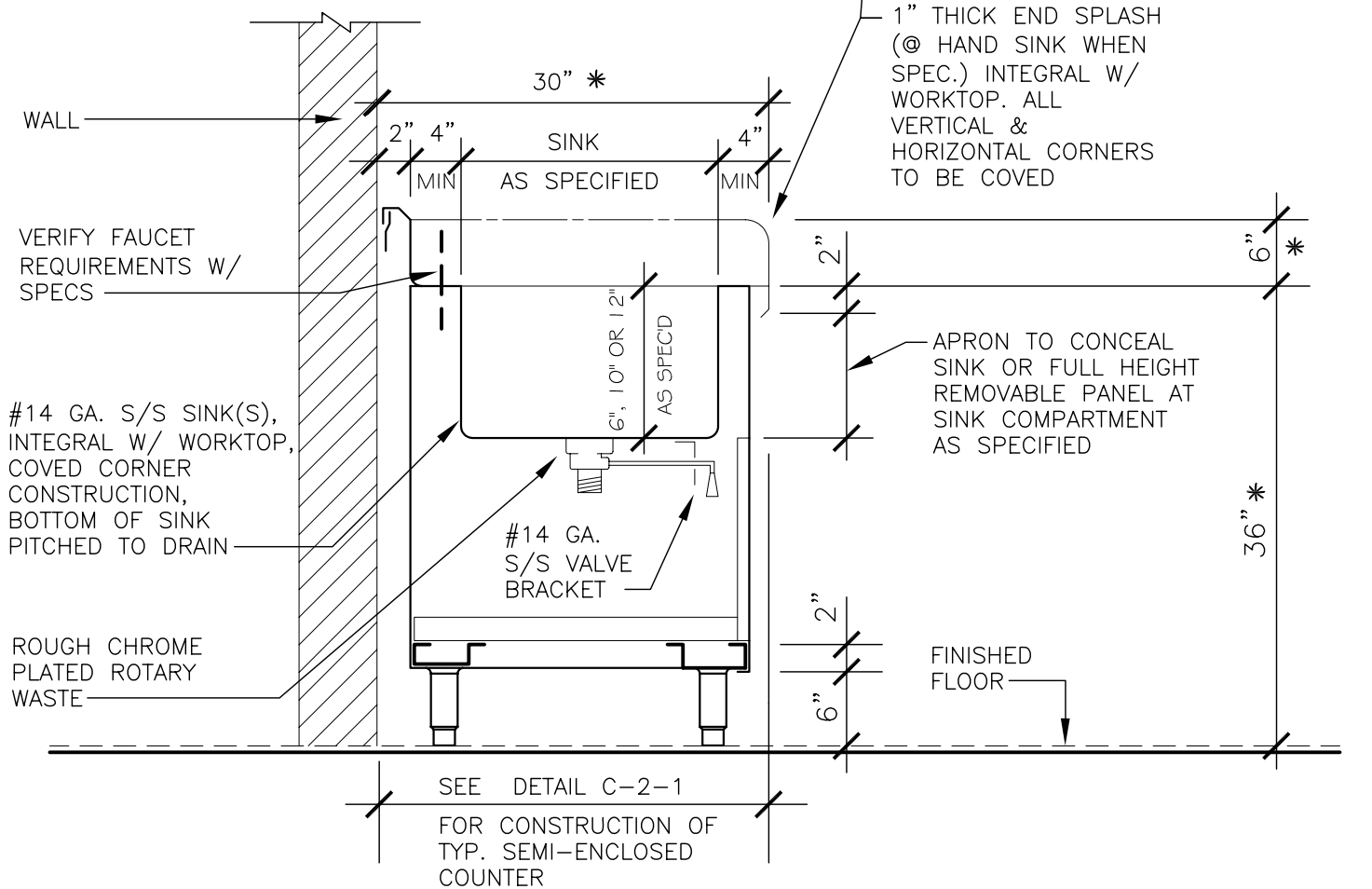
C-2-1

SCHEDULE OF SINKS UNLESS OTHERWISE SPECIFIED

1. HAND SINK 9" X 12" OR
12" X 14" X 6" DEEP
2. BEVERAGE COUNTER 14" X 16" OR
16" X 20" X 10" OR 12" DEEP
3. PREPARATION COUNTER 16" X 20",
18" X 18" OR 20" X 20" X 10" OR 12" DEEP



ISOMETRIC VIEW AT HAND SINK



SECTION

SCALE: N.T.S.

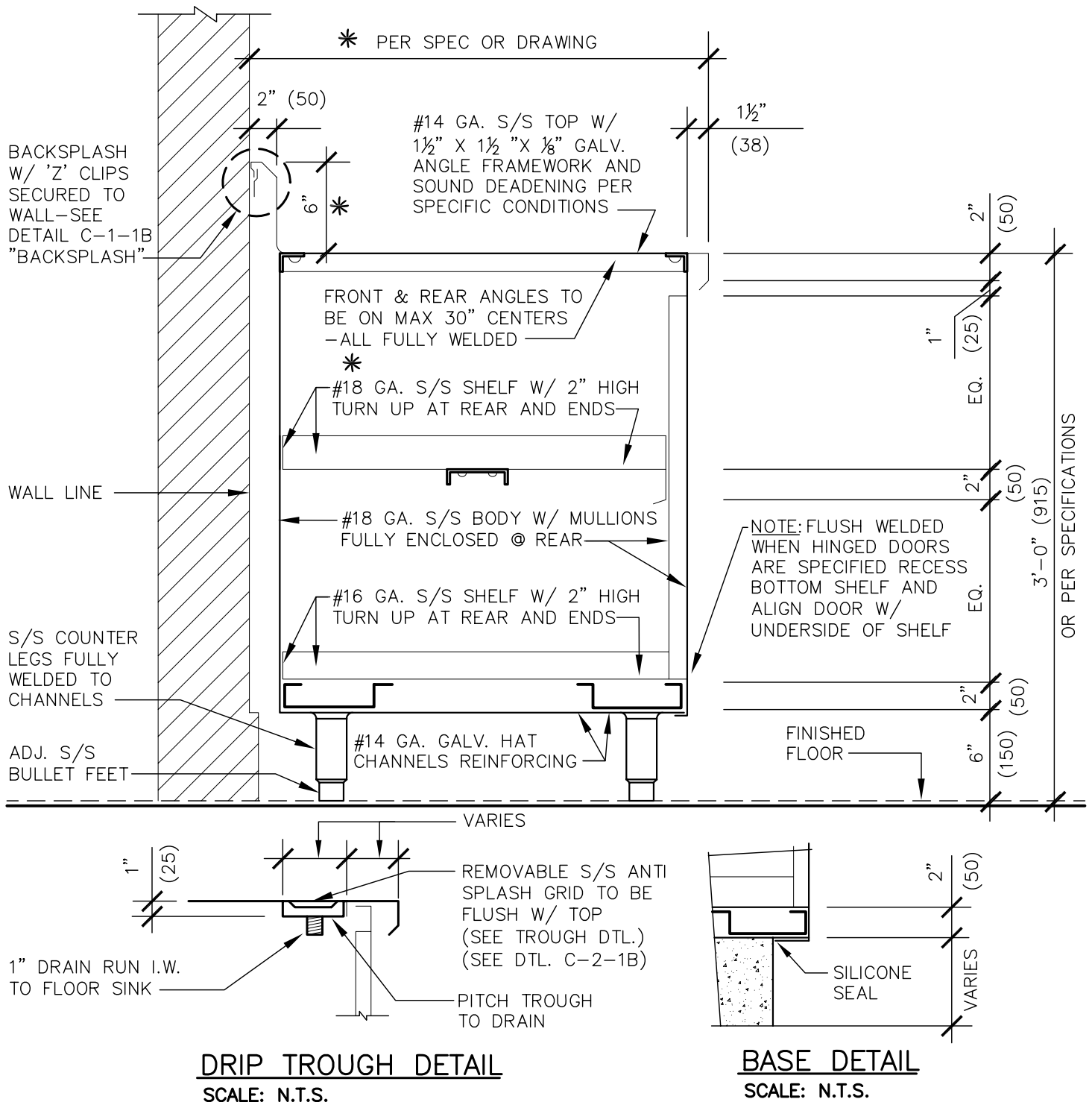
* OR AS PER DRAWINGS AND / OR SPECIFICATIONS

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SEMI-ENCLOSED COUNTER
W/ SINK(S)

03-26-13

C-2-1E



* OR AS PER DRAWINGS AND / OR SPECIFICATIONS

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SEMI-ENCLOSED COUNTER

DEC 2011

C-2-1



CVAP® HOLDING CABINETS

HOV5

HOV5 SERIES

HOV5-04HP | HOV5-04UV | HOV5-05SP | HOV5-05UV | HOV5-14SP | HOV5-14UV

CVap Holding Cabinet: Includes C-Touch Control, HACCP Temperature Downloads, and Convection Holding.

SHORT FORM SPECS

Shall be Winston CVap Holding Cabinet, model _____. Unit to utilize a C-Touch control with processor to control calibration-free thermistors to adjust evaporator and air temperatures in 1°F increments. Features must include a minimum of eight programmable channels which are lockable, USB HACCP download for temperature monitoring and convection fan.

CONFIGURATIONS

Countertop: Shallow depth to allow placement on standard 30" countertop. Also can be fitted with 1" wheels for under counter use.

Half-Sized: Easily mobile versions, allowing operator to see over cabinet when transporting. Most half-sized units are also stackable for increased versatility. Some versions available for under counter use with 1" wheels.

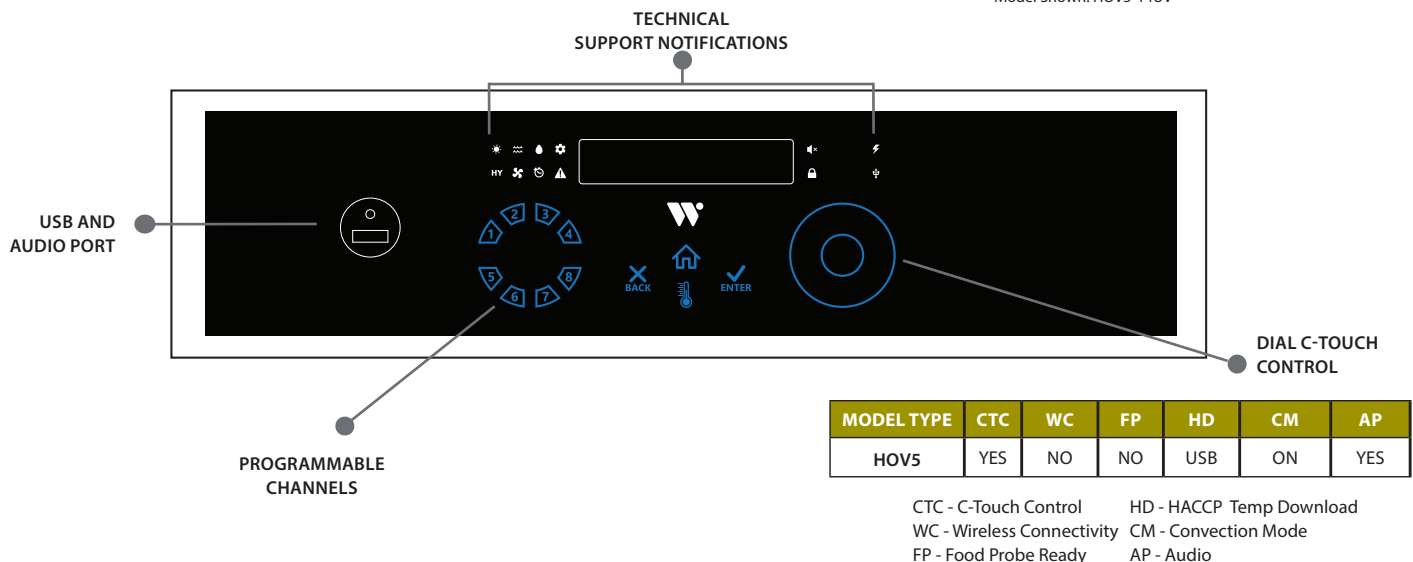
Full-Sized: Provides maximum capacity for high volume operators.

CVAP ADVANTAGE

The original humidified holding cabinet is still the best. CVap technology uses dry and vapor heat, in tandem, to control food temperature, and maintain it as moist or crisp as you want. Learn more at winstonfoodservice.com.



Model Shown: HOV5-14UV



WINSTON FOODSERVICE

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Specifications subject to change without notice.

JOB

ITEM#

QTY/MODEL#



CVAP® HOLDING CABINETS

HOV5

Cabinet Specifications

HOV5-04HP | HOV5-04UV | HOV5-05SP | HOV5-05UV | HOV5-14SP | HOV5-14UV

MODEL NUMBER DESCRIPTIONS

SERIES

PAN CONFIGURATION

EQUIPMENT TYPES

HO = HOLDING
CH = COOK/HOLD
RT = RETHERM
UB = UNIVERSAL BIN

EQUIPMENT TYPE

TECHNOLOGY

PAN CAPACITY

PAN CONFIGURATIONS

HP = HALF PAN
SP = SHEET PAN
UV = UNIVERSAL

MODEL #	CAPACITY			EXTERIOR DIMENSIONS **									INT'L	SHIP WEIGHT LBS(KG)
	SHEET PAN (18" x 26")	HALF SHEET PAN (18" x 13")	HOTEL PAN (12" x 20" x 2.5")	STANDARD CASTER SIZE	HEIGHT IN.(MM)	DEPTH IN.(MM)	WIDTH IN.(MM)	VOLTS	PHASE	WATTS	AMPS	NEMA***		
HOV5-04HP	N/A	4	4	3"	36.54(928)	26.45(672)	20(508)	120	1	1824	15.20	5-20P	Call Factory	160 (73)
HOV5-04UV	4	8	8	3"	35.91(912)	34.23(869)	27.70(704)	120	1	2292	19.1	5-20P	Call Factory	198(90)
HOV5-05SP	5	10	5	3"	39.41(1001)	34.23(869)	24.70(627)	120	1	2292	19.1	5-20P	Call Factory	235(107)
HOV5-05UV	5	10	10	3"	39.41(1001)	34.23(869)	27.70(704)	120	1	2292	19.1	5-20P	Call Factory	250(113)
HOV5-14SP	14	28	14	5"	75.66(1922)	34.23(869)	24.70(627)	120	1	2292	19.1	5-20P	Call Factory	394(179)
HOV5-14UV	14	28	28	5"	75.66(1922)	34.23(869)	27.70(704)	120	1	2292	19.1	5-20P	Call Factory	420(190)

*Capacity- Determined by 3.5" (89mm) adjustable spacing, with a load limit of 65lb (29.25kg) per rack. | **Exterior Dimensions- Cabinet height is calculated with standard caster size. If 3" caster is standard, subtract 2.48" (63mm) for 1.5" wheels, add 2.31" (59mm) for 5" casters, subtract .25" (6mm) for 4" legs, and add 1.63" (41mm) for 6" legs. If 5" caster is standard, subtract 2.31" (59mm) for 3" casters, and subtract .69" (18mm) for 6" legs. | ***NEMA- Supplied with 84" (2134mm) (minimum) power cord and plug. The input average of current did not exceed the allowable amperage for the circuit listed.

CONTROL: C-Touch control with vapor and air temperatures to be adjusted in 1°F increments. Processor controlled calibration-free thermistors, accurate within +/- 2°F. Control allows for eight programmable (and lockable) channels, accommodates software updates via USB.

MATERIALS: To be commercial and institutional grade stainless steel interior and exterior.

DOORS: Insulated field-reversible door with magnetic handles. Full-sized units to include two dutch doors. Doors may be specified with windows, pass-through, or a combination of both.

WATER FILL: Operated manually with low water detection. Auto-fill optional. Low mineral potable water recommended, otherwise use deionizer/demineralizer to minimize corrosion damage.

INSTALLATION REQUIREMENTS: Units to be installed with 2" (51mm) clearance on sides and may not be installed within proximity to anything emitting heat that would allow the exterior of the Winston cabinet to exceed surface temperatures of >200°F. Refer to owner's manual for specific installation requirements.

INDUSTRY COMPLIANT: Equipment complies with domestic and most international requirements; such as UL, C-UL, UL Sanitation, CE, MEA, EPA202, and others.

WARRANTY: Limited one-year warranty (excludes gaskets, lamps/lights, hoses, power cord, glass panels, and evaporator). Warranty disclaimer for improper cleaning, installation, and/or maintenance. Ask for complete warranty disclosure.

SPECIFY THE FOLLOWING WHEN ORDERING:

Standard (No additional cost):

- Hinge Preference: Left or right hinge
- Casters: See table above for standard caster size, additional options include 1.5" wheels (04 models only), 3" caster, 5" caster, 4" legs (04 models only), and 6" legs.

Optional (Additional cost):

- Locking Door**
- Pass Through
- Bumper Guard Base ***
- Extended Warranty
- Transport Package***
- Reinforced Top****
- Glass Door
- Pass Through - Glass
- Auto Water Fill
- Cord Wrap
- Flip Up Door *****

** Quantity of 1 for reach in. Quantity of 2 for pass through
Customer to provide padlock(s). (per door)

*** Not available for 04-HP models.

**** Available for 04UV & 05UV only.

***** Available for 05UV & 14UV only.

Accessories & Supplies (Additional cost):

- PS2206-4 Wire rack-chrome (4-pack) (UV only)
- PS2206-5 Wire rack-chrome (5-pack) (UV only)
- PS2938-4 Wire rack-stainless steel (4-pack) (UV only)
- PS2980-2 Wire rail (2-pack)
- PS2935-2 Wire rail - 04HP (2-pack)
- PS2429 External water filter for auto water fill
- PS2696 Mobile water removal system
- PS3171 Leg and shelf kit for 04UV and 05UV
- PS3174 Stacking kit for 04UV and 05UV
- PS3167 Drain kit for stacked pair
- AC1008 Cover, Rear Fan (UV models only)
- AC1006 8.125" top extension (14UV model only)

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Project	Quantity	Item #
Model Specified:		CSI Section 11400

Roll-In Refrigerator Models For 72" High Racks/Self-Contained



Model Shown Three Section

One, Two & Three Section Models, 32" Deep



Stainless Exterior
& Interior

1-Section Solid Door Model
2-Section Solid Door Model
3-Section Solid Door Model

RRI132HUT-FHS
RRI232HUT-FHS
RRI332HUT-FHS



Stainless Exterior,
Anodized Alumi-
num Interior

1-Section Solid Door Model
2-Section Solid Door Model
3-Section Solid Door Model

ARI132HUT-FHS
ARI232HUT-FHS
ARI332HUT-FHS

The "H-Height" roll-in refrigerator models are all designed to offer convenient interior storage for 72" high racks. Each is supplied standard with such high quality features as easy to operate microprocessor controls, balanced refrigeration systems and stainless steel exteriors. Additionally, they offer the widest range of optional accessories to choose from, and can be specified for use with many different applications, including: Foodservice, Correctional, Institutional, Export, etc.

Standard Product Features

- Traulsen's Smart Control With LED Display
- StayClear™ Condenser
- R-Series: Stainless Steel Exterior & Interior
- A-Series: Stainless Steel Exterior/Anodized Aluminum Interior
- Balanced, Self-Contained Refrigeration System Using R-450A
- Rear Biased Return Air Duct
- Full Length Stainless Steel Doors With Locks
- Self-Closing Doors With Stay Open Feature At 120°F
- Guaranteed For Life Cam-Lift Hinges
- Guaranteed For Life Horizontal Work Flow Door Handle(s)
- Standard Door Hinging: 132H = Right, 232H = Left/Right, 332H = Left/Right/Right (other hings available)
- Automatically Activated LED Lights
- Stainless Steel Breaker Caps
- Accommodates Roll-In Racks Up To 72" High (provided by others)
- Automatic Non-Electric Condensate Evaporator
- Thermostatic Expansion Valve Metering Device
- Stainless Steel One-Piece Louver Assembly
- Stainless Steel Interior Rack Guides & Threshold Ramp(s)
- 9' Cord & Plug Attached
- Three Year Parts And Labor Warranty
- Five Year Compressor Warranty

Options & Accessories

- Stainless Steel Finished Back With Rear Louvers
- Re-Hinging Feature For Door(s)
- Wire Shelf Package For Roll-In Models (includes three wire shelves per section)
- Additional Wire Shelves For Above
- Stainless Steel Shelf Package For Roll-In Models (includes three stainless steel shelves per section)
- Additional Stainless Steel Shelves For Above
- Locking Hasps (padlocks supplied by others)
- Export 220/50/1 Voltage
- Kool Klad Exterior Laminate Decor
- Clear Glass Door(s) In Place Of One Or More Solid Door(s)
- Remote Applications (see form TR35837 for more details)²
- Remote For Use With 20°F Glycol System
- Recessed Installation
- Prison/Correctional Facilities Options



* Noted models are **ENERGY STAR®** listed. Please refer to www.energystar.gov to view the most up-to-date product listing and performance data.



Listed by Underwriters Laboratories Inc., to U.S. and Canadian safety standards and Listed by NSF International.

3-YEAR
PARTS & LABOR WARRANTY

Approval: _____

TRAULSEN
4401 BLUE MOUND RD.
PHONE 1 (800) 825-8220
Website: www.traulsen.com

FT. WORTH, TX 76106
FAX-MKTG. 1 (817) 624-4302

Traulsen

Project	Quantity	Item #
Model Specified:		CSI Section 11400

Specifications

Construction, Hardware and Insulation

Cabinet exterior front, one piece sides, louver assembly and doors are constructed of 20 gauge stainless steel with #4 finish. Cabinet interior and door liners are constructed of stainless steel (anodized aluminum in the A-Series). The exterior cabinet top, back and bottom are constructed of heavy gauge galvanized steel. The interior floor is constructed of stainless steel and insulated with ¾" of resilient cork. A readily attachable stainless steel ramp is provided to facilitate loading/unloading.

Doors are equipped with a heavy-duty, extruded wiper gasket for sealing to bottom ramp, removable plug cylinder locks and guaranteed for life cam-lift, gravity action, self-closing metal, glide hinges with stay open feature at 120°F. Hinges include a concealed switch to automatically activate the interior LED lighting. Guaranteed for life, work flow door handles are mounted horizontally over recess in door which limits protrusion from door face into aislesways. Doors have seamless, polished metal corners.

Gasket profile and Santoprene® material simplify cleaning and increase overall gasket life. Both the cabinet and door(s) are insulated with an average of 2" thick high density, non-CFC, foamed in place polyurethane.

DIMENSIONAL DATA	R/ARI132HUT	R/ARI232HUT	R/ARI332HUT
Net capacity cu. ft.	39.0 (1104 cu l)	79.5 (2252 cu l)	120.5 (3414 cu l)
Length - overall in.	35½ (90.2 cm)	68 (172.7 cm)	100½ (255.3 cm)
Depth - overall in.	35⅝ (90.3 cm)	35⅝ (90.3 cm)	35⅝ (90.3 cm)
Depth - over body in.	32 (81.3 cm)	32 (81.3 cm)	32 (81.3 cm)
Depth - door open 90° in.	63¼ (160.7 cm)	63¼ (160.7 cm)	63¼ (160.7 cm)
Clear door width in.	27⅞ (68.8 cm)	27⅞ (68.8 cm)	27⅞ (68.8 cm)
Clear door height in.	72⅝ (183.4 cm)	72⅝ (183.4 cm)	72⅝ (183.4 cm)
Height - overall in. ³	89⅞ (226.4 cm)	89⅞ (226.4 cm)	89⅞ (226.4 cm)
RRI Net Wt. lbs.	480 (218 kg)	785 (356 kg)	1075 (488 kg)
ARI Net Wt. lbs.	410 (186 kg)	685 (311 kg)	1000 (454 kg)
Rack Capacity - 72" High	1	2	3
ELECTRICAL DATA			
Voltage	115/60/1	115/60/1	115/60/1
Feed wires with Ground	3	3	3
Full load amperes	10.6	11.4	12.8
REFRIGERATION DATA			
Refrigerant	R-450A	R-450A	R-450A
Refrigerant Charge Amount 18 oz		27 oz	30 oz
BTU/HR H.P. ¹	2220 (⅓ HP)	4200 (⅓ HP)	5120 (¾ HP)

NOTES

NOTE: Figures in parentheses reflect metric equivalents.

1= Based on a 90°F ambient and 20°F evaporator.

2= For approximate remote weights deduct 40 lbs. from respective net or gross weight. For other information on remote models, please refer to form TR35837.

3= 12" Top clearance preferred for optimum performance and service access.

Refrigeration System

A top mounted, self-contained, balanced refrigeration system using environmentally friendly, non-flammable R-450A refrigerant is conveniently located behind the one piece louver assembly. It features a finless StayClear™ condenser, thermostatic expansion valve, air-cooled hermetic compressor, large, high humidity evaporator coil located outside the food zone and a top mounted non-electric condensate evaporator. Biased return air duct protects against introduction of warm kitchen air, promoting even temperature maintenance and efficient operation. A 9' cord and plug is provided. Standard operating temperature is 34 to 38°F.

Controller

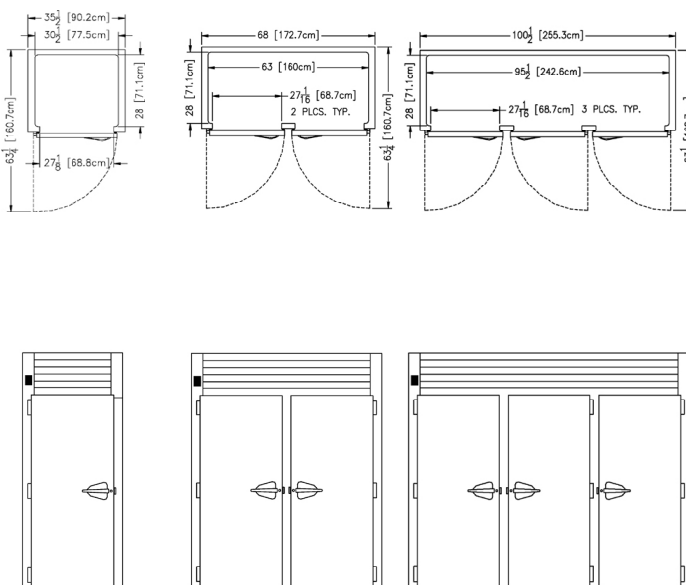
Traulsen's Smart Control features advanced control algorithms and sophisticated diagnostic capabilities. Smart sensors will adapt the operation of the refrigeration system to a variety of environments and usage patterns. The Smart Control offers a complete set of visual alarms designed to alert the user to critical events. In the event of an alarm, a dedicated Alarm LED will illuminate, informing the user of the critical event and describing the event in the large, easy to read full text display.

Interior

Readily removable, interior-mounted, stainless steel guides for rack are provided for protection. Maximum rack size with wheels inboard of frame is 27" wide by 29" deep by 72" high. Racks supplied by others.

Warranties

Both a three year parts and labor warranty and a five year compressor warranty (self-contained models only) are provided standard.



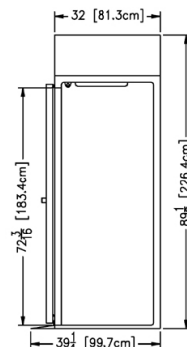
1 & 2 Section Models Equipped With One NEMA 5-15P Plug



3 Section Models Equipped With One NEMA 5-20P Plug

NOTE: Full load amps and plug style may vary depending on electrical options chosen and condensing unit employed.

Section - All Models



NOTE: When ordering please specify: Voltage, Hinging, Door Size, Options and any additional warranties.

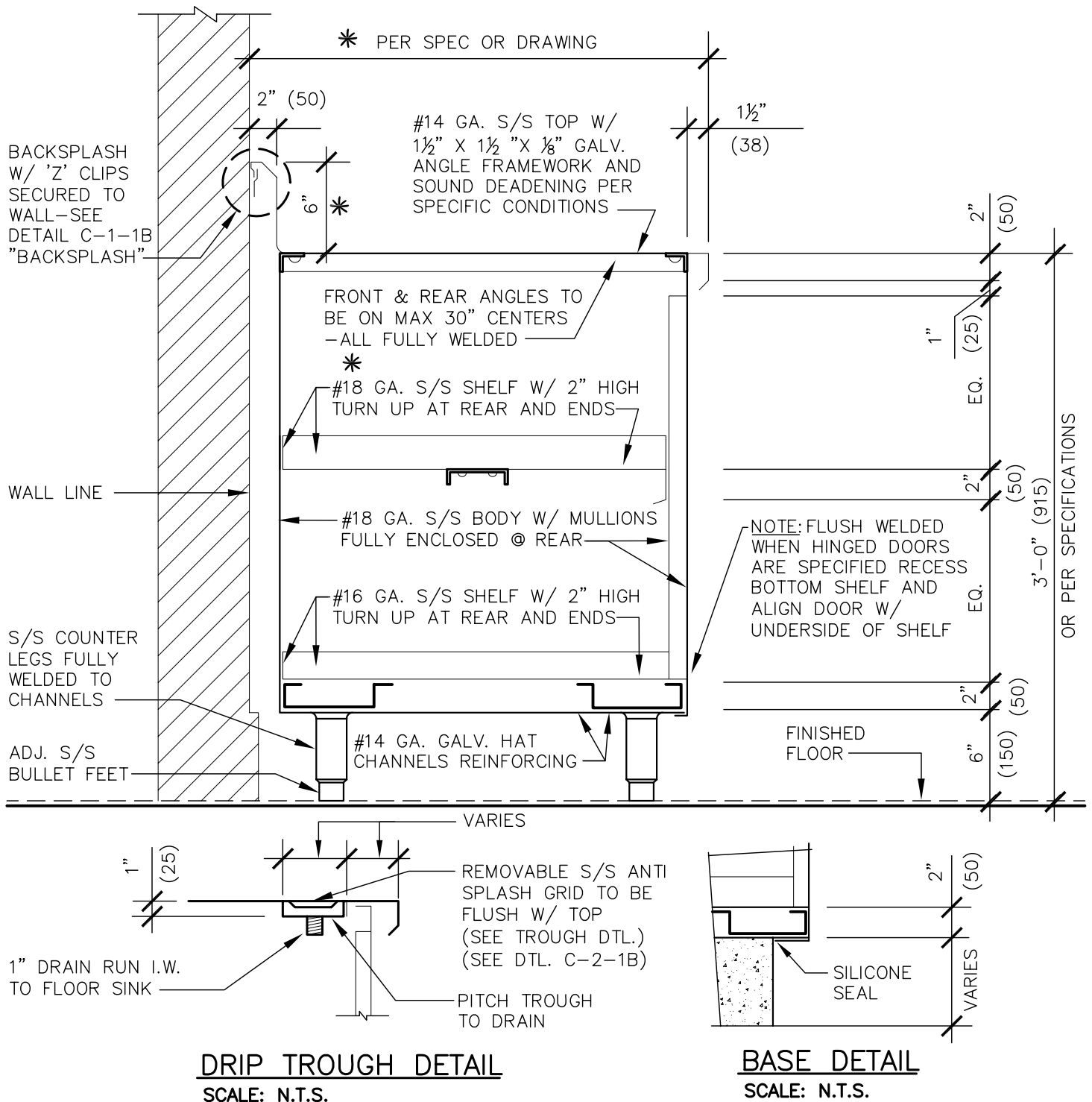
Continued product development may necessitate specification changes without notice.

Part No. TR35768 (REV. 01-21-19)

TRAULSEN
4401 BLUE MOUND RD.
PHONE 1 (800) 825-8220
Website: www.traulsen.com

FT. WORTH, TX 76106
FAX-MKTG. 1 (817) 624-4302

Traulsen



* OR AS PER DRAWINGS AND / OR SPECIFICATIONS

Clevenger Frable 
LaVallee
 FOODSERVICE & LAUNDRY
 CONSULTING & DESIGN
 39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
 TEL: 914/997-9660 FAX: 914/997-9671

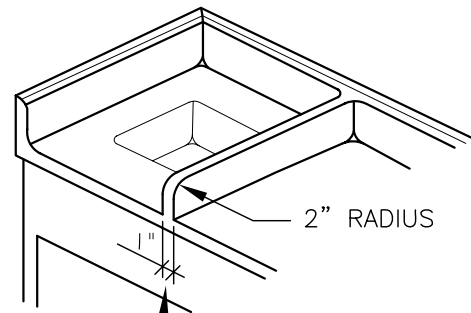
SEMI-ENCLOSED COUNTER

DEC 2011

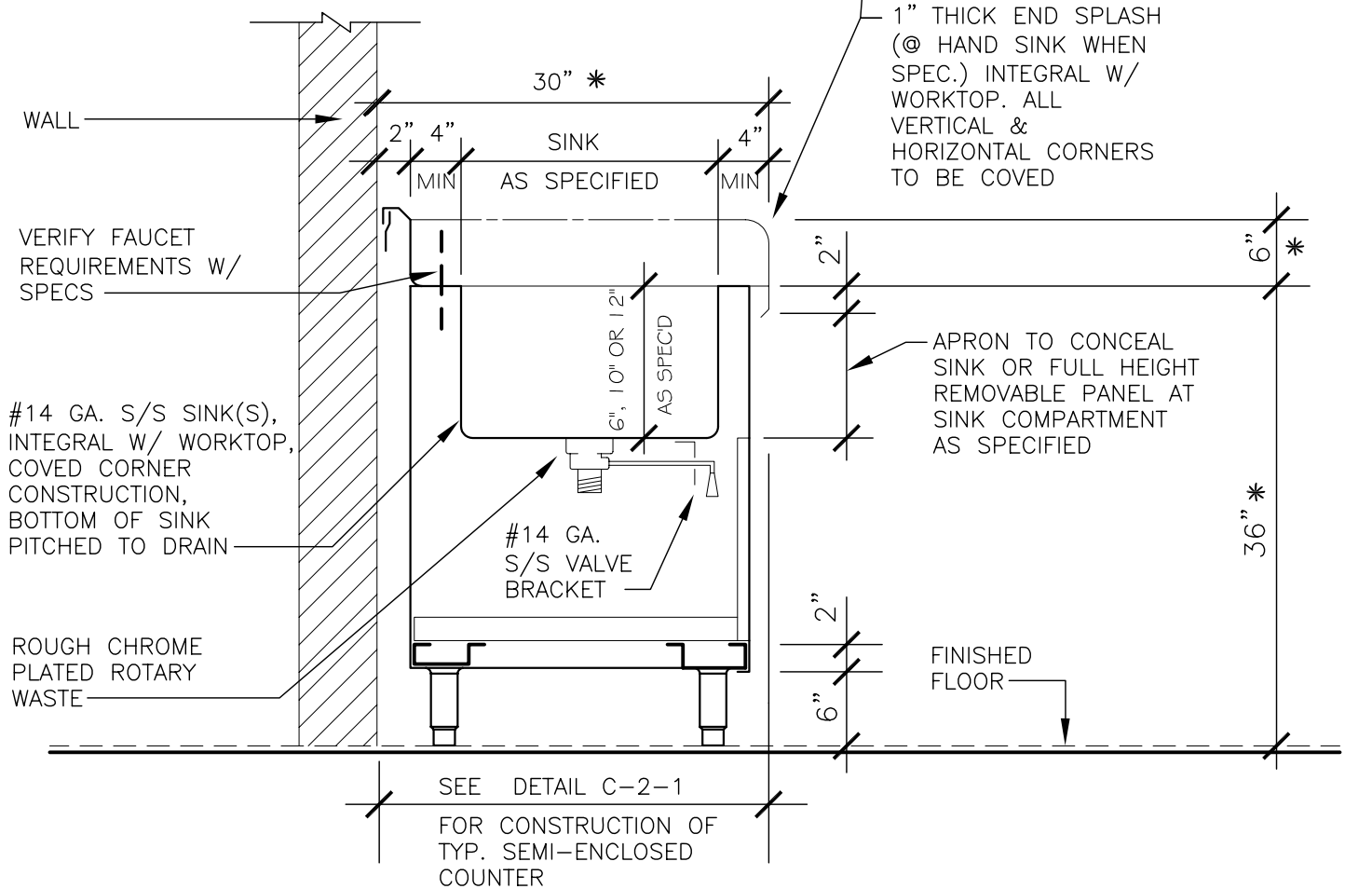
C-2-1

SCHEDULE OF SINKS UNLESS OTHERWISE SPECIFIED

1. HAND SINK 9" X 12" OR
12" X 14" X 6" DEEP
2. BEVERAGE COUNTER 14" X 16" OR
16" X 20" X 10" OR 12" DEEP
3. PREPARATION COUNTER 16" X 20",
18" X 18" OR 20" X 20" X 10" OR 12" DEEP



ISOMETRIC VIEW AT HAND SINK



SECTION

SCALE: N.T.S.

* OR AS PER DRAWINGS AND / OR SPECIFICATIONS

Clevenger Frable 
FOODSERVICE & LAUNDRY
CONSULTING & DESIGN **LaVallee**
39 WESTMORELAND AVE., WHITE PLAINS, NY 10606
TEL: 914/997-9660 FAX: 914/997-9671

SEMI-ENCLOSED COUNTER
W/ SINK(S)

03-26-13

C-2-1E



Majestic Series Milk Dispensers

Models: SKMAJ1, SKMAJ2, SKMAJ3 115V/60HZ



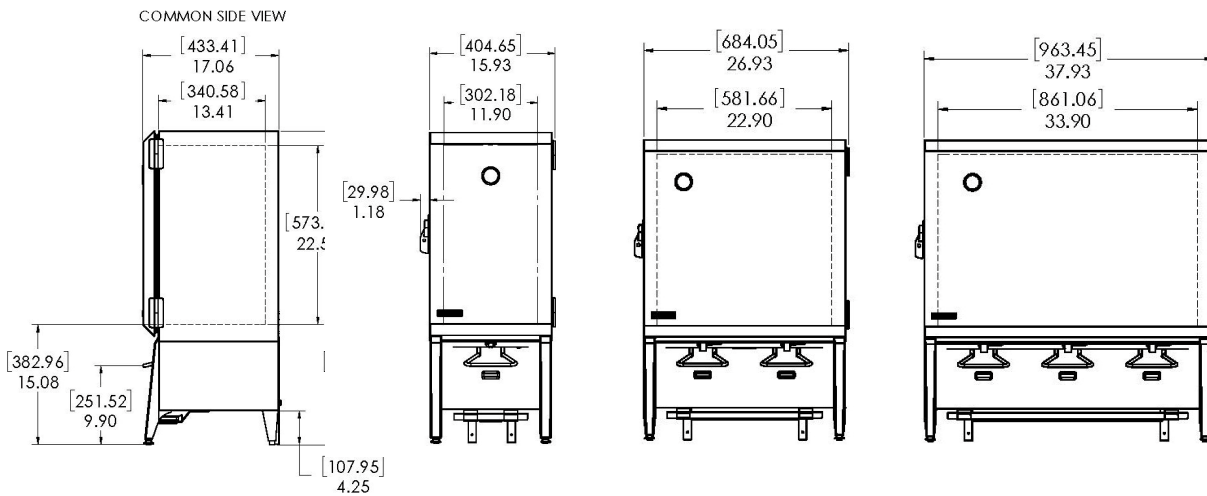
Silver King® is the leader in reliable and energy efficient refrigeration solutions. Our sleek, stainless steel milk dispensers are made with the highest quality materials to guarantee everything is kept fresh and meets temperature standards. Our milk dispensers have polyurethane insulation for maximum strength and durability, and minimal energy waste.

Standard Features

- Exterior stainless steel with galvanized bottom reduces risk of corrosion.
- Interior stainless steel, coved corners and finished edges for easy cleaning.
- Environmentally friendly polyurethane foamed-in-place insulation for maximum strength and durability.
- Standard 8 foot 3 wire power cord NEMA 5-15P plug.
- Door has heavy duty hinges and has a removable gasket for ease of cleaning.
- Spring loaded lift type valve for dripless operation and optimum sanitation.
- CFC-free, 134A refrigerant, hermetically sealed, high efficiency, self contained refrigeration system.
- Limited Warranty: 1-year labor, 1-year parts, 5-year compressor (part only), 90-days replacement parts. Warranty is determined by the original equipment manufacturing date for general market.*



Specifications



DIMENSIONS

C3 SERIES: Includes 6 gallon Krate(s), Platform(s), and Shipboard Legs

Model Number	Capacity	Width in (mm)	Height in (mm)	Depth in (mm)	Gross Shipping Weight lb (kg)	Unit Net Weight lb (kg)	Shipping cu ft (cu m)
SKMAJ1-C3	Single valve	15.93	39.50	17.06	120	110	18.06
	6 gallons	(404.65)	(1003.31)	(433.41)	(54.0)	(49.9)	(.51)
SKMAJ2-C3	Double valve	26.93	39.50	17.06	160	145	26
	12 gallons	(684.05)	(1003.31)	(433.41)	(73.0)	(65.77)	(.74)
SKMAJ3-C3	Triple valve	37.93	39.50	17.06	200	180	33.91
	18 gallons	(963.45)	(1003.31)	(433.41)	(90.72)	(81.65)	(.96)

C4 SERIES: Includes 6 gallon Krate(s) and Platform(s)

Model Number	Capacity	Width in (mm)	Height in (mm)	Depth in (mm)	Gross Shipping Weight lb (kg)	Unit Net Weight lb (kg)	Shipping cu ft (cu m)
SKMAJ1-C4	Single valve	15.93	39.50	17.06	120	110	18.06
	6 gallons	(404.65)	(1003.31)	(433.41)	(54.0)	(49.9)	(.51)
SKMAJ2-C4	Double valve	26.93	39.50	17.06	160	145	26
	12 gallons	(684.05)	(1003.31)	(433.41)	(73.0)	(65.77)	(.74)
SKMAJ3-C4	Triple valve	37.93	39.50	17.06	200	180	33.91
	18 gallons	(963.45)	(1003.31)	(433.41)	(90.72)	(81.65)	(.96)



Electrical

Model Number	Country of Origin	Amps	Voltage	Hz	Plug	Refrigerant
SKMAJ1-C3	USA	1.5	120 VAC	60	NEMA 5-15P	134a
SKMAJ2-C3	USA	1.4	120 VAC	60	NEMA 5-15P	134a
SKMAJ3-C3	USA	1.9	120 VAC	60	NEMA 5-15P	134a

Model Number	Country of Origin	Amps	Voltage	Hz	Plug	Refrigerant
SKMAJ1-C4	USA	1.5	120 VAC	60	NEMA 5-15P	134a
SKMAJ2-C4	USA	1.4	120 VAC	60	NEMA 5-15P	134a
SKMAJ3-C4	USA	1.9	120 VAC	60	NEMA 5-15P	134a

Accessories



**Milk Crate for
3, 5, or
6 Gallon bags
Item #35904**



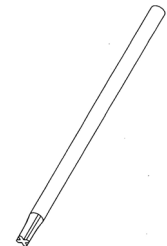
**3 Gallon
Milk Can
Item #62642**



**5 Gallon
Milk Can
Item #60224**



**Platform for
bag-in-box
Item #63959**



**Milk tubes
Item #20323**

Certifications



**Shipboard Legs
Item #10314-96**



JDF-4S Lit Door

33.1" x 25.5" x 15.7"
(84.1cm x 64.8cm x 39.9cm)



 Servers and airpots sold separately

- Patented High Intensity Mixing System delivers consistent quality in the cup --- cup after cup, from the top of the cup to the bottom
- 7" (17.8cm) cup clearance accommodates most juice containers
- Both push-and-hold dispense and optional single size portion control dispense available in the same machine
- Quick dispense with 1.0 to 1.5oz (29.6 to 44.4ml) per second flow rate
- One dispenser delivers both frozen and ambient products, to maximize profitability by providing greater flexibility in product offerings
- 18lb (8.2 kg) ice bank provides superior cold drink capacity
- Door lock standard
- Service friendly design makes set up and maintenance simple
- LED lighted door graphics bring high visibility to front-of-house applications

Agency:



Specifications

Product #: 37300.0004

Flavors: 4 Flavors

Water Access: Plumbed

Finish: Black

Door: Lit

Refrigerant: R-134A

Ice Bank: 18.00 lbs (8.165 kgs)

Dispense: Push Button

Dispense: Single Size Portion Control

Additional Features

Electrical & Capacity

Volts	Amps	Watts	Cord Attached	Plug Type	8oz cups/hr 236ml cups/hr	Input H ₂ O Temp.	Phase	# Wires plus Ground	Hertz
120	6	720	Yes	NEMA 5-15P	-	60°F (15.5°C)	1	2	60

Plumbing Requirements

PSI	kPa	Fitting Supplied	Water Flow Required (GPM)
20-100	138-689	3/8" Male Flare Fitting	-

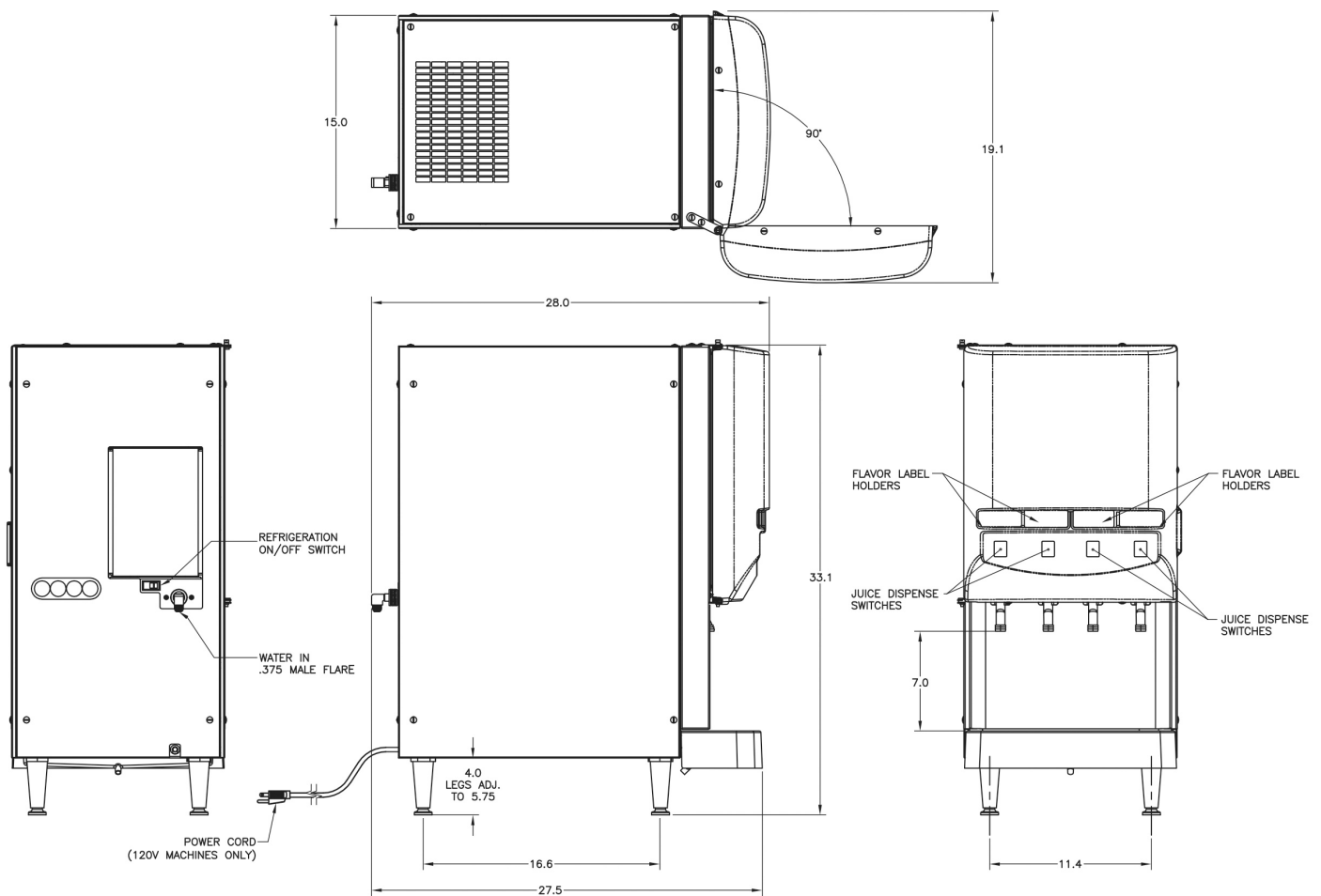
CAD Drawings

2D	Revit	KLC
●		



BUNN® reserves the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacements for previously purchased equipment. For most current specifications and other info visit bunn.com.

Created on:
06/15/2017



Unit				Shipping				
	Width	Height	Depth	Width	Height	Depth	Weight	Volume
English	15.7 in.	33.1 in.	25.5 in.	-	-	-	145.610 lbs	-
Metric	39.9 cm	84.1 cm	64.8 cm	-	-	-	66.049 kgs	-



BUNN® reserves the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacements for previously purchased equipment. For most current specifications and other info visit bunn.com.

Created on:
06/15/2017


Related Products & Accessories: JDF-4S Lit Door(37300.0004)

 <p>KIT, AMBIENT CONC CVRSN JDF-4</p> <hr/> Product #: 33699.0001	 <p>WATER FILTER, EQHP-10</p> <hr/> Product #: 39000.0004	 <p>CARTRIDGE, EQHP-10CRTG</p> <hr/> Product #: 39000.1004	 <p>CONTAINER ASSY, REFILLABLE</p> <hr/> Product #: 39302.0000	 <p>WIRE GRILL, DRIP TRAY (JDF-4S)</p> <hr/> Product #: 39613.0000
 <p>KIT, HOSE ASSY-PUMP JDF-2S/4S</p> <hr/> Product #: 39690.0000	 <p>TRAY, EXTENDED DRIP JDF-4S</p> <hr/> Product #: 40789.1000	 <p>KIT, SWITCH COVER-4 VLV PUSH & HOLD ONLY</p> <hr/> Product #: 45541.1000	 <p>KIT, SW COVER-4 VLV W/ WTR PUSH&HOLD ONLY</p> <hr/> Product #: 45541.1001	

H5X Element SST

28.5" x 17.6" x 7.4"
(72.4cm x 44.7cm x 18.8cm)



 Servers and airpots sold separately

Agency:



Specifications

Product #: 43600.0002

Water Access: Plumbed

Finish: Stainless

Faucet: Upper

Temp. Setting: 212°F (100.000°C)

Additional Features

- LED display provides simple temperature adjustment
- Thinsulate® tank insulation provides increased energy efficiency
- Programmable "Energy Saver Mode" reduces operating cost during idle periods
- The perfect tool for added control over quality coffee and tea
- Contemporary, space-saving design
- Digital thermostat provides constant and accurate temperatures of 60°- 212°F (15.6°-100°C)

Electrical & Capacity

Volts	Amps	Watts	Cord Attached	Plug Type	8oz cups/hr 236ml cups/hr	Input H ₂ O Temp.	Phase	# Wires plus Ground	Hertz
208	19.5	4050	No	-	-	60°F (15.5°C)	1	2	60

Plumbing Requirements

PSI	kPa	Fitting Supplied	Water Flow Required (GPM)
20-90	138-621	1/4" Male Flare Fitting	-

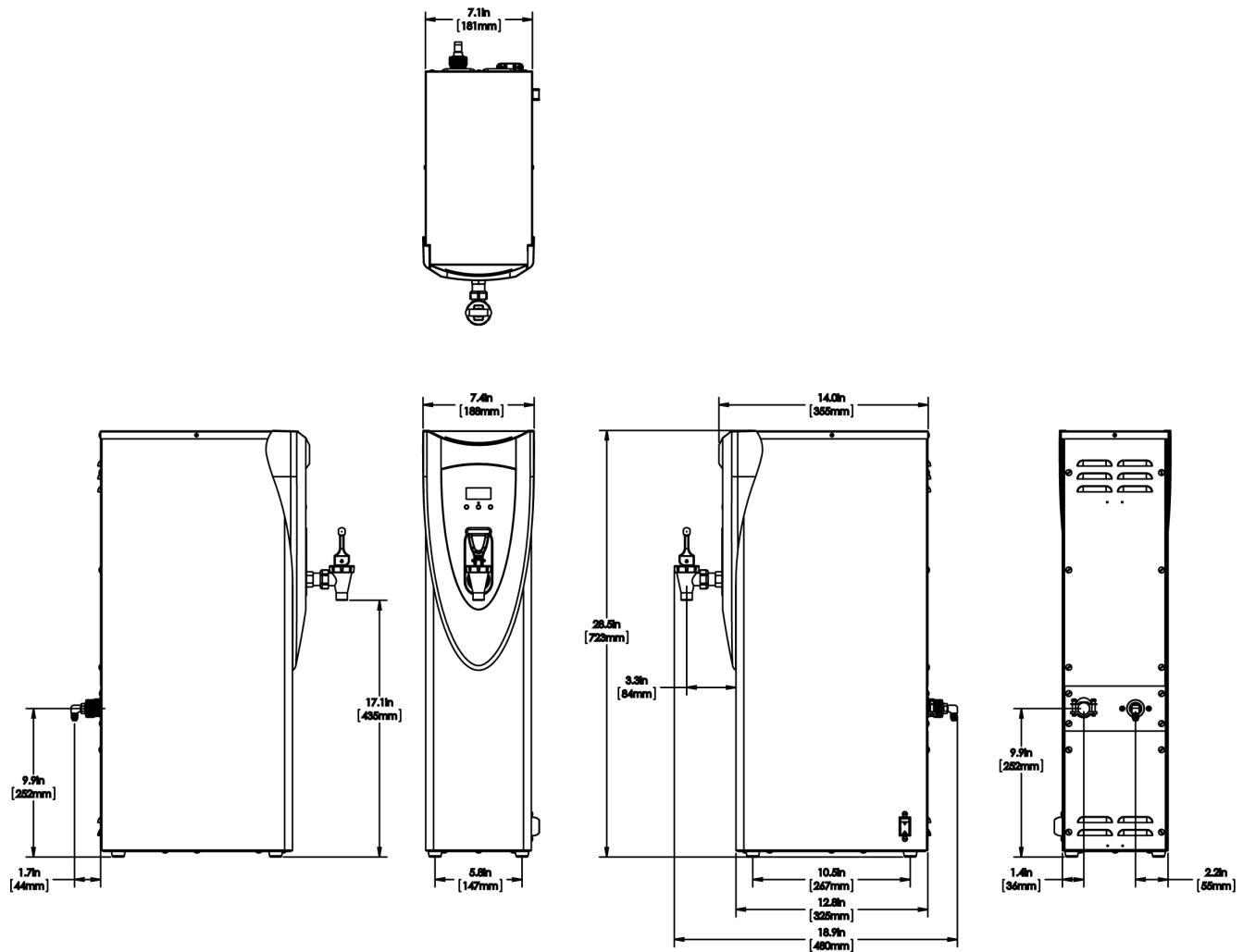
CAD Drawings

2D	Revit	KLC
●		



BUNN® reserves the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacements for previously purchased equipment. For most current specifications and other info visit bunn.com.

Created on:
09/13/2017



Unit				Shipping				
	Width	Height	Depth	Width	Height	Depth	Weight	Volume
English	7.4 in.	28.5 in.	17.6 in.	-	-	-	32.500 lbs	3.670 ft ³
Metric	18.8 cm	72.4 cm	44.7 cm	-	-	-	14.742 kgs	0.104 m ³



BUNN® reserves the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacements for previously purchased equipment. For most current specifications and other info visit bunn.com.

Created on:
09/13/2017

Related Products & Accessories:H5X Element SST(43600.0002)



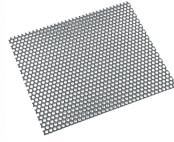
DRIP TRAY KIT (2.5"HT-
HW2)

Product #: 02497.0000



DRIP TRAY

Product #: 02545.0000



COVER, DRIP TRAY-
PERFORATED

Product #: 02546.0000

FOOT, RUBBER

Product #: 02547.0000

PATAS

Product #: 02547.0000



WATER FILTER,
EQHP-10L

Product #: 39000.0001



WATER FILTER,
EQHP-10

Product #: 39000.0004



ATLAS METAL

1135 N.W. 159th DRIVE, MIAMI, FLORIDA 33169

TEL 305.625.2451

TOLL FREE 800.762.7565

FAX 305.623.0475

WWW.ATLASFOODSERV.COM

SALES@ATLASFOODSERV.COM

Project: _____
Item No.: _____
Quantity: _____

MODULAR UNITS BL SERIES



COLD FOOD UNIT

Refrigerated Cold Pan
with 3" Recessed Top
Buffet Style

- ☐ BLC-2-RM-BU
- ☐ BLC-3-RM-BU
- ☐ BLC-4-RM-BU
- ☐ BLC-5-RM-BU
- ☐ BLC-6-RM-BU

SPECIFICATIONS

TOP: Constructed of 16 gauge, type 304 stainless steel, die-formed, welded, ground and polished to a uniform finish. The top includes a rolled front and rear edge.

BODY: Frame construction shall be of hi-tensile aluminum square tubing, 1-1/4", with 3-3/4" extruded, vertical radius corners on the front and rear. Frame sections are all welded construction, ground and polished to a uniform finish. Body is complete with front and end panels of .050 aluminum, and an 8-5/8" rear apron of .090 aluminum, all covered with plastic laminate, with stainless steel sliding rear doors covered in plastic laminate. Owner to specify laminate selection. A cam-lock locking system is included with each unit to align and retain cart positioning when two or more units are joined.

REFRIGERATED COLD PAN: The cart includes a refrigerated cold pan, with 3" recess, 9" deep overall, built into the top, constructed of 18 gauge, type 304 stainless steel. The pan is fully insulated with high density polystyrene, 1" thick on all sides, 2" thick on the bottom, and enclosed with a 22 gauge galvanized steel outer case. The interior liner is fabricated with 1/4" radius coved corners. The liner has copper tubing firmly soldered to the top 3" on all sides. A 3/4" dia. drain with strainer, 4" PVC nipple and valve is provided. Separator channels & inserts to hold 12" x 20" food pans are included.

REFRIGERATION SYSTEM: The compressor housing shall be fabricated from formed 14 gauge galvanized and bolted to the base of the unit. A fully self-contained condensing unit is provided with a hermetically sealed compressor and a digital electronic thermostat/thermometer. The system is fully charged with CFC free refrigerant and ready to operate.

ELECTRICAL: The unit will be wired for 15 amps., 120 volt, single phase operation, with an on/off thermostat switch and pilot light. A 6' long, 3-wire cord and plug (NEMA-5-15P) will be provided.

CASTERS: N.S.F. approved, 5" diameter, non-marking rubber tired, swivel plate casters with grease fittings. Both casters on operator's side have toe activated brakes.

Specifications subject to change without notice.

STANDARD FEATURES

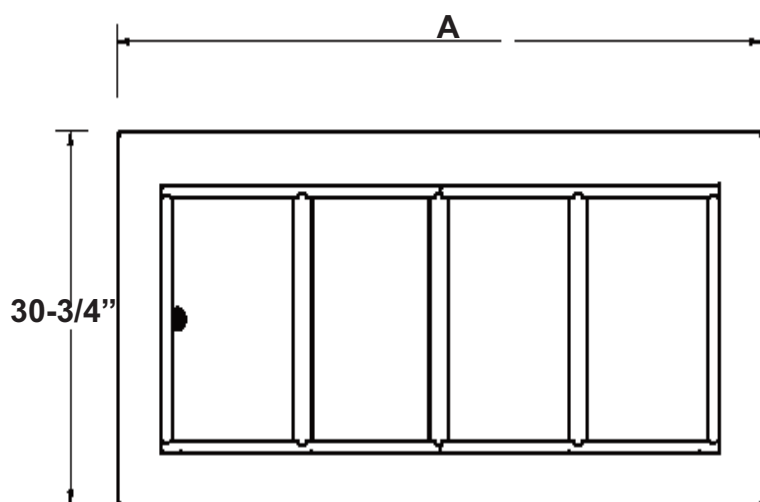
- Fully insulated for maximum efficiency and energy savings
- Self contained refrigeration system - just plug it in and turn it on
- Front and End Skirts with recessed casters
- Cam-Lock locking device - keeps tops level and equipment in place
- Fully mobile - each unit is provided with 5" dia. swivel casters, two with brakes
- Available in a wide range of plastic laminate panels, polyurethane enamel & powder coated frames and panels to blend with any decor.
- Total versatility - available in variety of lengths
- Rear Sliding Doors, S/S, removable, w/ laminate
- 1-Year Parts & Labor Warranty
- UL Listed

ACCESSORIES

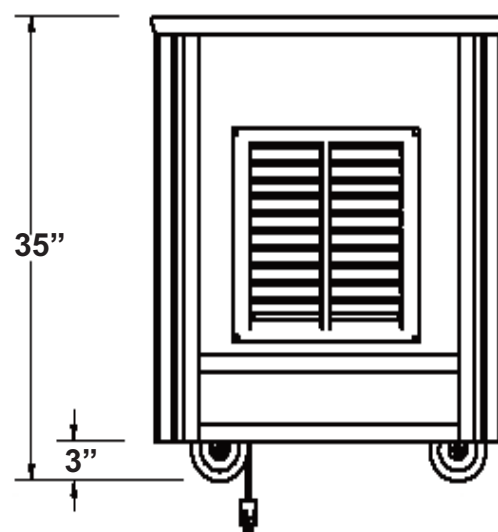
- **TS** - Tray Slide, 12" wide, S/S, solid, ribbed, fold-down
- **SL** - Tray Slide, 11-1/4" wide, S/S, 2-rail, fold-down
- **SLT** - Tray Slide, 11-1/4" wide, S/S, 3-rail, fold-down
- **SLF** - Tray Slide, 11-1/4" wide, plastic laminate w/ S/S runners, fold-down
- **SH** - Work Shelf, 8" wide, S/S, flat, fold-down
- **CB** - Work Shelf, 8" wide, hardwood maple, fold-down
- **CR** - Work Shelf, 8" wide, Richlite, fold-down
- **ES** - End Shelf, 18" wide, S/S, fold-down
- **CBE** - End Shelf, 16" wide, hardwood maple, fold-down
- **REVERSA PANEL** - Front
- **REVERSA PANEL** - Ends (set)
- **BLSF** - S/S Front Panel
- **BLSE** - S/S End Panel (each)
- **PP** - Painted Panels, polyurethane enamel, in lieu of laminate
- **USB** - Bottom Shelf, S/S, removable
- **HD** - Hinged Doors, S/S, w/ plastic laminate
- **DL** - Door Locks (set)
- **Sneeze Guards** - various styles available (see sneeze guard section of catalog)
- **CO** - Convenience Outlet (specify base or apron mount)
- **CO-DUP** - Convenience Outlet, Duplex receptacle
- **JBC** - Outlet Box in base, 4x4 (120V) with cord
- **ERS** - Electrical Raceway System
- **PCS** - 7 to 10 ft. Power Cord
- **CW** - Cord Wrap
- **P-CAST** - Polyurethane Casters, 2-W/Brakes
- **SL-BL** - Legs with adjustable feet, in lieu of casters
- **REM-COMP** - Remote Compressor on base of unit w/ louvered S/S compartment and remote on/off switch in apron
- **5YW** - 5-Year Compressor Warranty
- **WFB** - Stainless Steel Perforated false bottom
- Adapter Plates & Adapter Bars (pgs. DI-51 - DI-52)
- **CP** - Cover Plate with handles, S/S
- **2060-1** - Condensate Evaporator
- **RS** - Remote On/Off Switch
- **RDVE** - Rear Drain Valve Extension
- ***220 Volt-50 Cycle Compressor**

***Units with these accessories are not currently UL listed.**

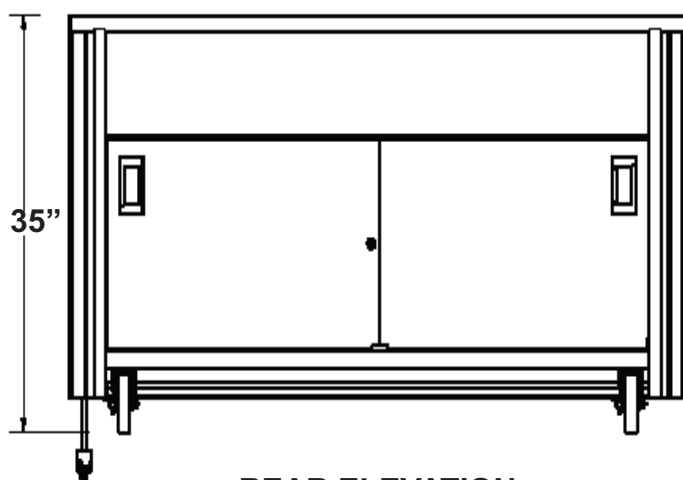
BL-19



PLAN VIEW



END VIEW



REAR ELEVATION

MODEL	"A"	REFRIGERATED PAN DIMENSIONS	ELECTRICAL CHARACTERISTICS	SHIP WT. (lbs.)
BLC-2-RM-BU	36-1/4" (92cm)	25-5/8" X 19-7/8" X 9" (65 X 50.4 X 22.8cm)	6.0 amps. - 120V - 1/4 HP	285 (129.3kg)
BLC-3-RM-BU	50" (127cm)	39-3/8" X 19-7/8" X 9" (99.9 X 50.4 X 22.8cm)	6.0 amps. - 120V - 1/4 HP	335 (152kg)
BLC-4-RM-BU	63-3/4" (161.9cm)	53-1/8" X 19-7/8" X 9" (134.9 X 50.4 X 22.8cm)	7.8 amps. - 120V - 1/3 HP	395 (179.2kg)
BLC-5-RM-BU	77-1/2" (196.8cm)	66-7/8" X 19-7/8" X 9" (169.8 X 50.4 X 22.8cm)	10.7 amps. - 120V - 1/2 HP	445 (201.8kg)
BLC-6-RM-BU	91-1/4" (231.7cm)	80-5/8" X 19-7/8" X 9" (204.7 X 50.4 X 22.8cm)	10.7 amps. - 120V - 1/2 HP	575 (260.8kg)

AT SERIES FOOD SHIELDS

Self-Service Food Protector

Model AT4D

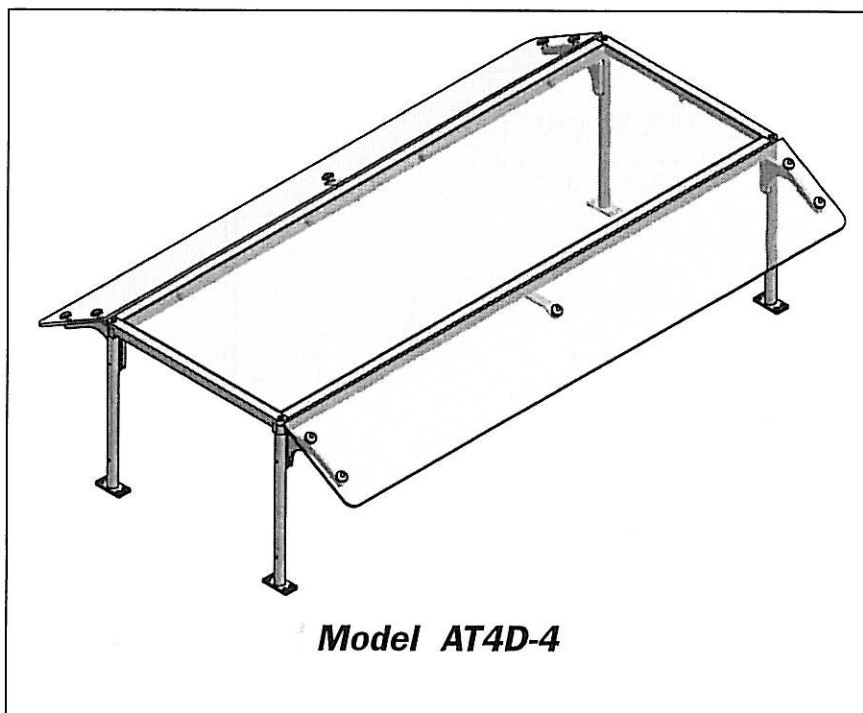
Quantity: _____ Item No: _____



- Finish: ☐ Brushed & Anodized Aluminum
☐ Black Matte Powder Coat
☐ Silver Powder Coat
☐ Brushed Stainless Steel
☐ _____

End Panels: (from customer side)

- ☐ Left ☐ Right



Model AT4D-4

VERSA-GARD®
Copyright © Versa-Gard, 2010



DESCRIPTION

Self-service food protector for double-sided counters.

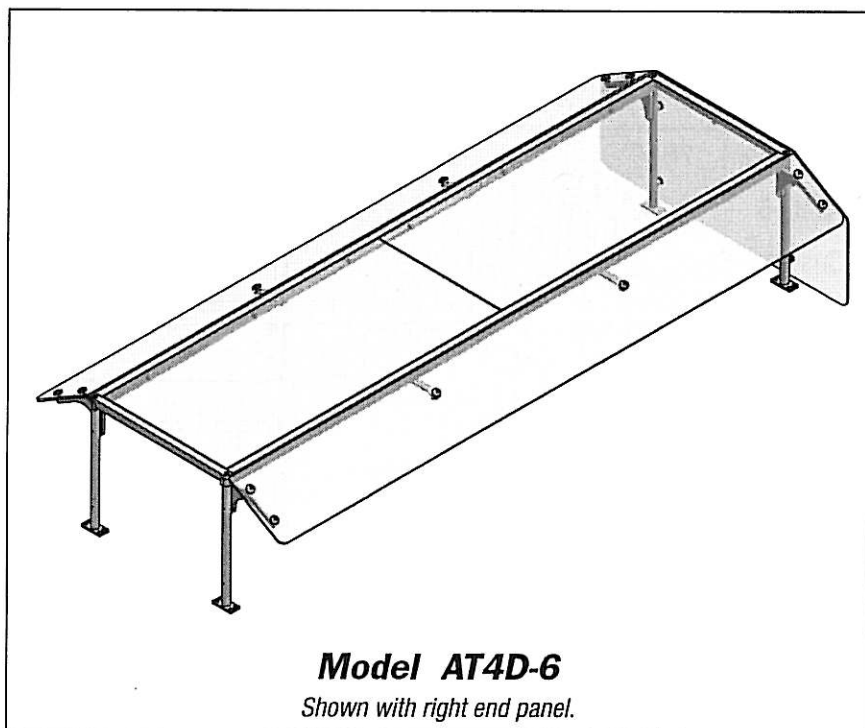
1"Ø CNC machined solid supports

Clear tempered glass panels that meet or exceed ANSI Z97.1 standards.

A wide range of finish options are available to match any décor.

Exceptional construction — all components CNC machined in the USA for years of service. Modular design and machined componentry allows for changes or additions at a later date.

Produced, finished and assembled in the USA.



Model AT4D-6

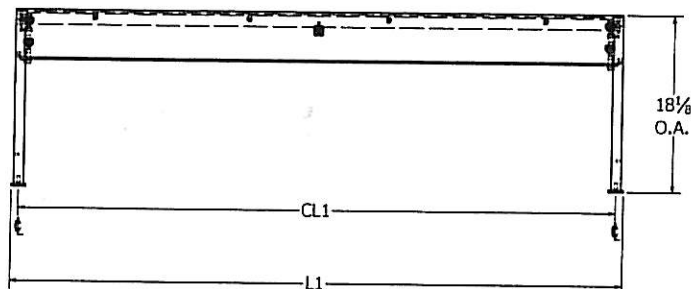
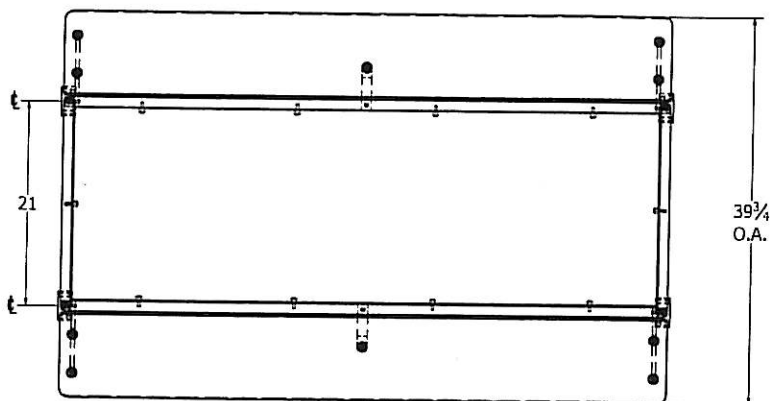
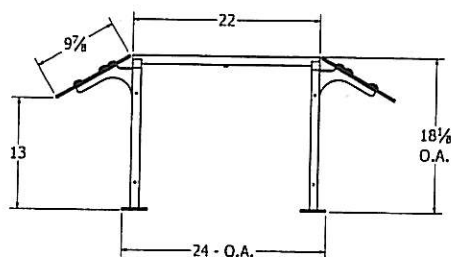
Shown with right end panel.



Self-Service Food Protector

Model OA length (L1)

<input type="checkbox"/> AT4D-2	35 1/4"
<input type="checkbox"/> AT4D-3	49"
<input type="checkbox"/> AT4D-4	62 3/4"
<input type="checkbox"/> Custom	_____

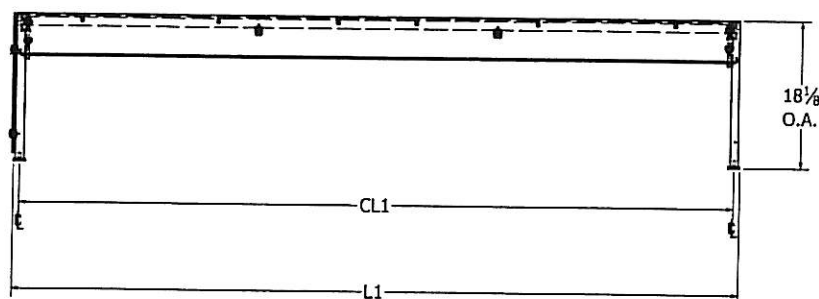
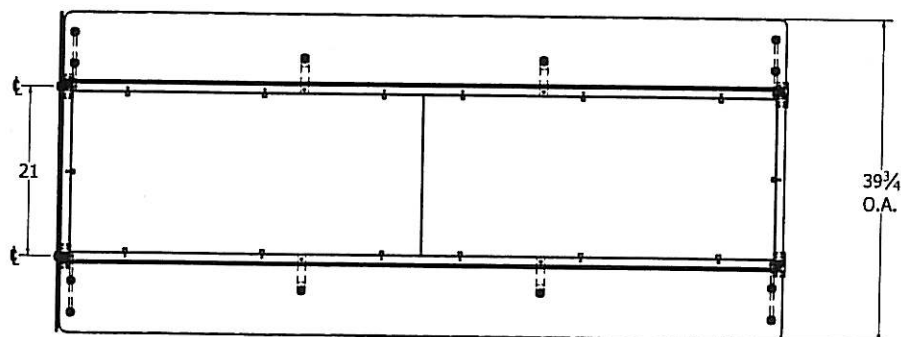
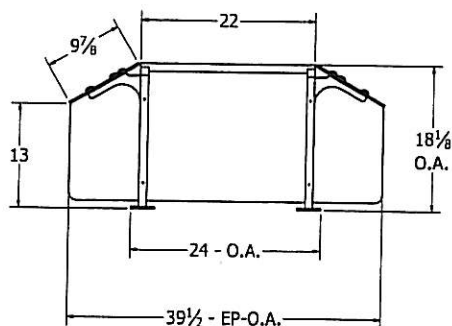


VERSA-GARD®
Copyright © Versa-Gard, 2010



Model OA length (L1)

<input type="checkbox"/> AT4D-5	76 1/2"
<input type="checkbox"/> AT4D-6	90 1/4"
<input type="checkbox"/> Custom	_____



Shown with right end panel.



2746 Girl Scouts-ny

Clevenger-Frable-LaVallee

a subsidiary of Mercury Aircraft

1135 NW 159 Dr., Miami, Florida 33169

Tel: (305) 625-2451 or (800) 762-7565 • Fax: (305) 623-0475

Page: 135

AT SERIES FOOD SHIELDS

Self-Service Food Protector with single light Model AT4D-L

Quantity: _____ Item No: _____

- Finish: ☐ Brushed & Anodized Aluminum
☐ Black Matte Powder Coat
☐ Silver Powder Coat
☐ Brushed Stainless Steel
☐ _____

End Panels: (from customer side)

- ☐ Left ☐ Right

Light Options:

- ☐ T8 fluorescent light fixture
☐ LED light fixture

DESCRIPTION

Self-service food protector with single light fixture for double-sided counters.

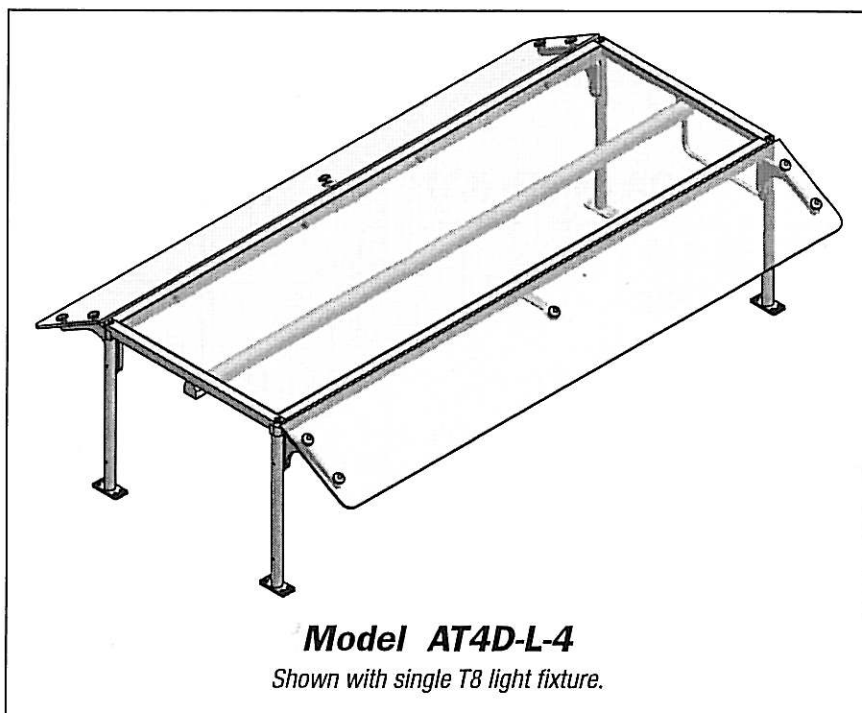
1"Ø CNC machined solid supports

Clear tempered glass panels that meet or exceed ANSI Z97.1 standards.

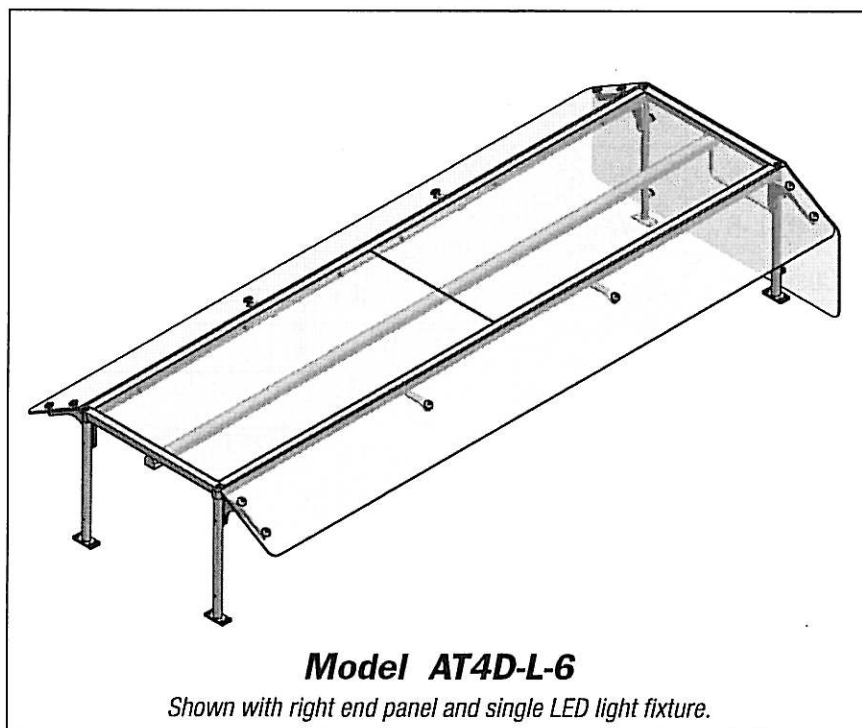
A wide range of finish options are available to match any décor.

Exceptional construction – all components CNC machined in the USA for years of service. Modular design and machined componentry allows for changes or additions at a later date.

Produced, finished and assembled in the USA.



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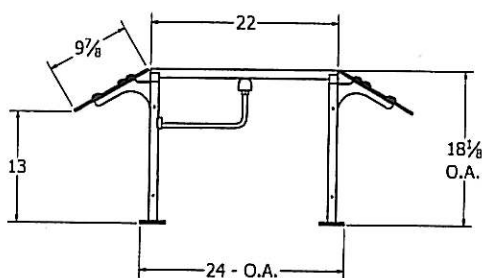


Self-Service Food Protector

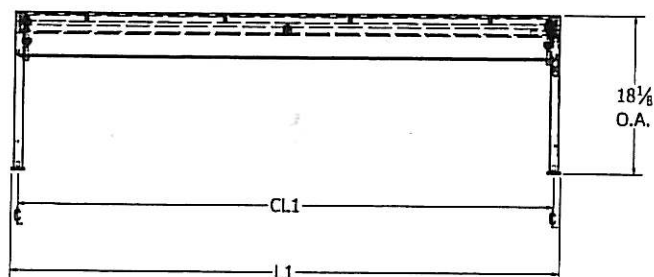
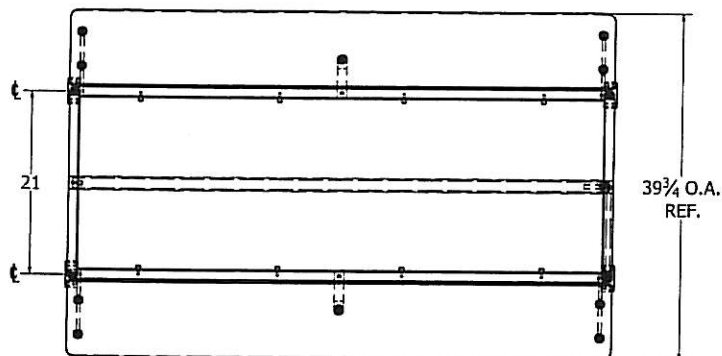
with single light

Model OA length (L1)

- | | |
|-----------------------------------|---------|
| <input type="checkbox"/> AT4D-L-2 | 35 1/4" |
| <input type="checkbox"/> AT4D-L-3 | 49" |
| <input type="checkbox"/> AT4D-L-4 | 62 3/4" |
| <input type="checkbox"/> Custom | |



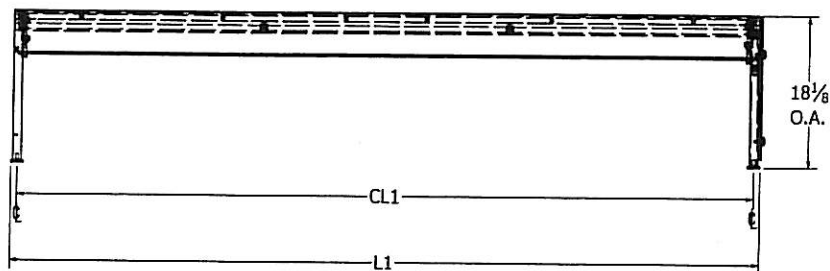
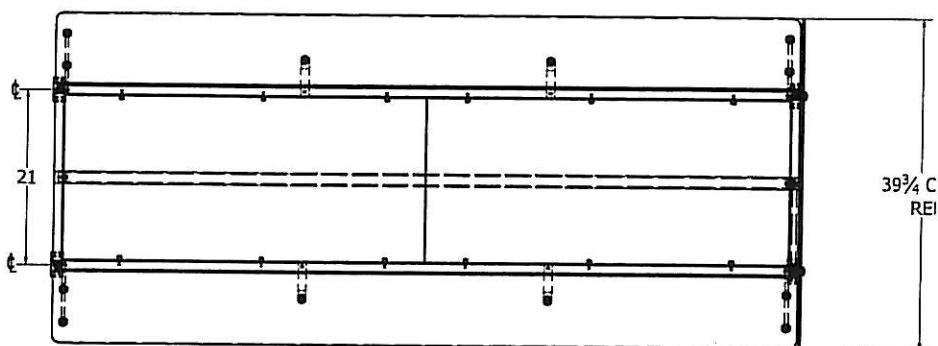
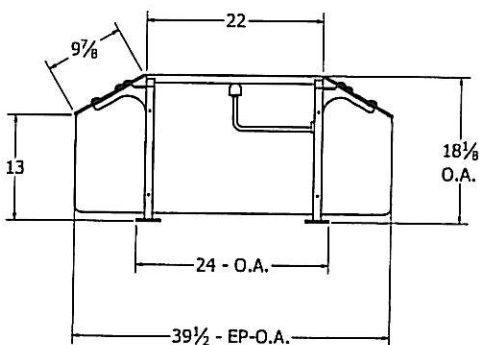
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Shown with single T8 light fixture.

Model OA length (L1)

- | | |
|-----------------------------------|---------|
| <input type="checkbox"/> AT4D-L-5 | 76 1/2" |
| <input type="checkbox"/> AT4D-L-6 | 90 1/4" |
| <input type="checkbox"/> Custom | |



Shown with right end panel and single LED light fixture.



2746 Girl Scouts-ny

Clevenger-Frable-LaVallee

a subsidiary of Mercury Aircraft

1135 NW 159 Dr., Miami, Florida 33169

Tel: (305) 625-2451 or (800) 762-7565 • Fax: (305) 623-0475

Page: 137

AT SERIES FOOD SHIELDS

Self-Service Food Protector with dual lights Model AT4D-2L

Quantity: _____ Item No: _____

- Finish: ☐ Brushed & Anodized Aluminum
☐ Black Matte Powder Coat
☐ Silver Powder Coat
☐ Brushed Stainless Steel
☐ _____

End Panels: (from customer side)

- ☐ Left ☐ Right

Light Options:

- ☐ T8 fluorescent light fixture
☐ LED light fixture

DESCRIPTION

Self-service food protector with (2) light fixtures for double-sided counters.

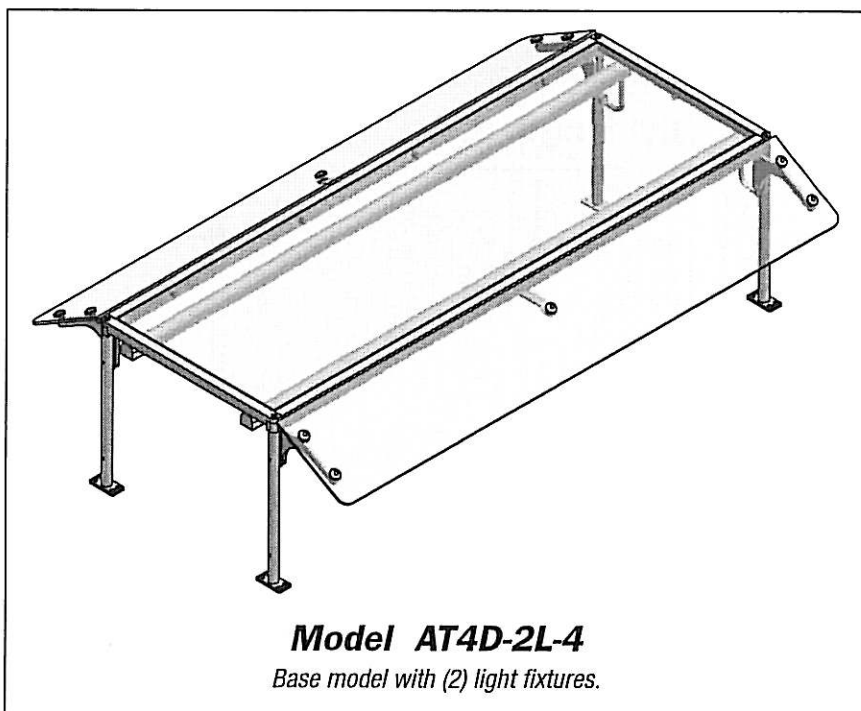
1"Ø CNC machined solid supports

Clear tempered glass panels that meet or exceed ANSI Z97.1 standards.

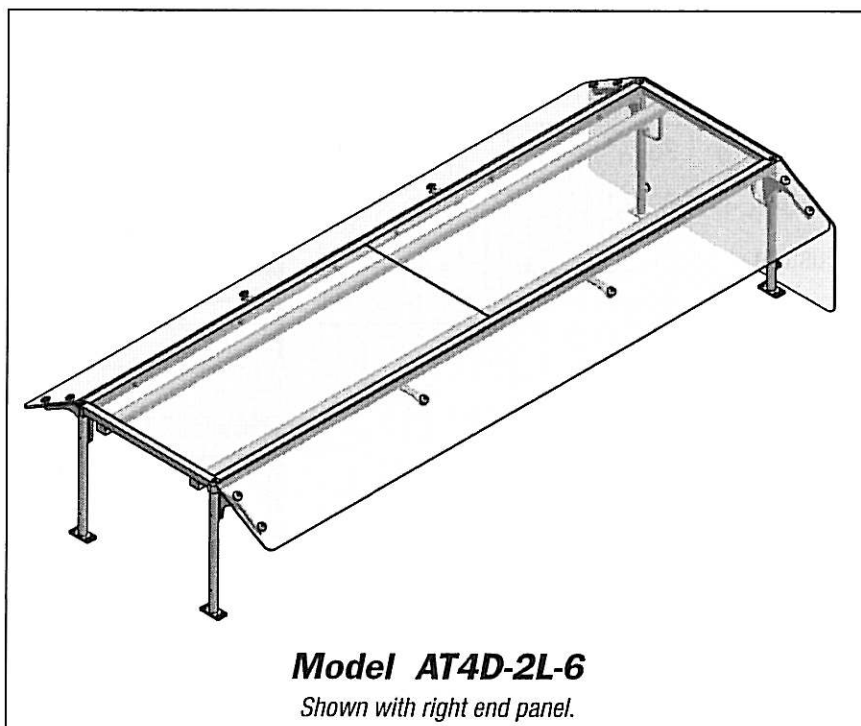
A wide range of finish options are available to match any décor.

Exceptional construction – all components CNC machined in the USA for years of service. Modular design and machined componentry allows for changes or additions at a later date.

Produced, finished and assembled in the USA.



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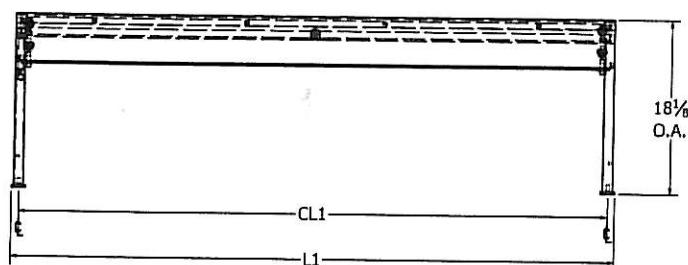
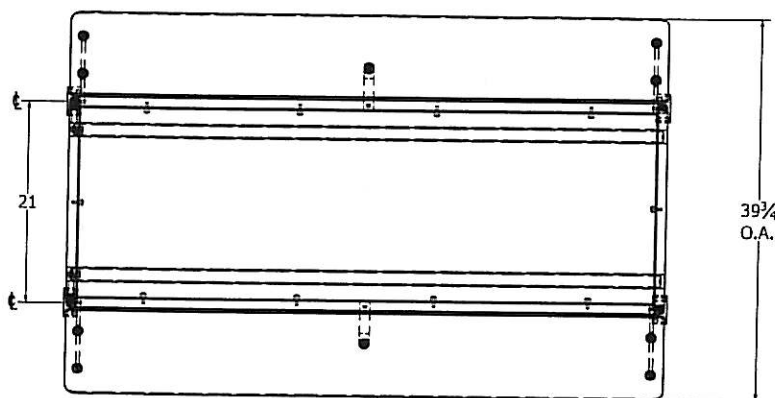
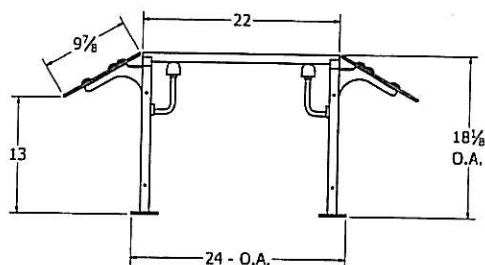


Self-Service Food Protector

with dual lights

Model OA length (L1)

- ☐ AT4D-2L-2 35 1/4"
- ☐ AT4D-2L-3 49"
- ☐ AT4D-2L-4 62 3/4"
- ☐ Custom _____



Base model with (2) light fixtures.

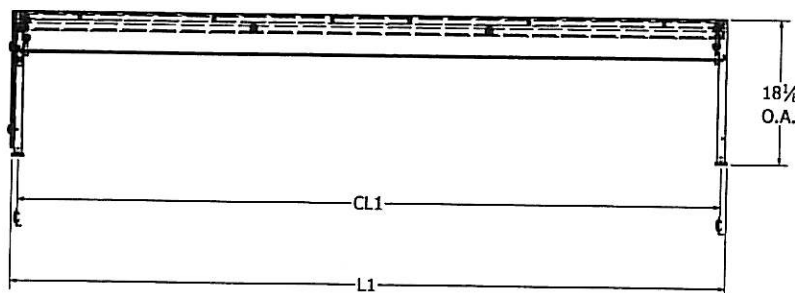
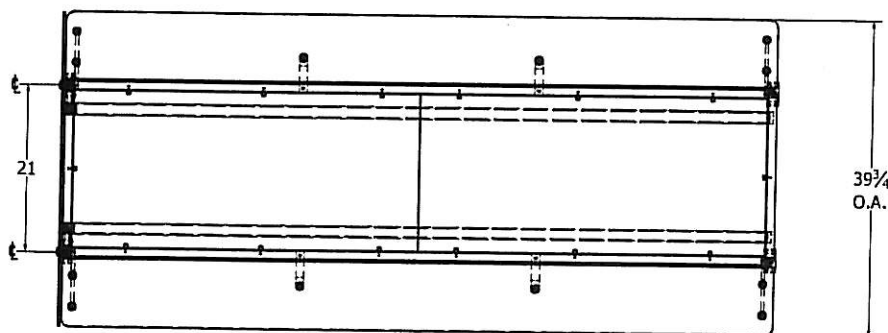
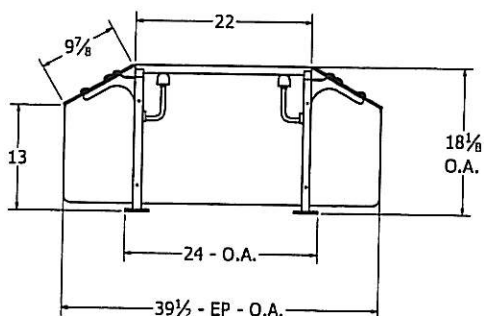
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Model OA length (L1)

- ☐ AT4D-2L-5 76 1/2"
- ☐ AT4D-2L-6 90 1/4"
- ☐ Custom _____



Shown with left end panel.



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Page: 139



Symphony Plus™ ice and water dispenser

manual fill 110 CM series countertop

Features

110 lb (49.9 kg) ice storage capacity

Manual load dispenser reliably dispenses Follett® Chewblet® ice and most small cube ice up to 1.00" (2.54 cm) square

Durable, attractive dispenser

- stainless steel cabinet with accent trim
- smooth contours for aesthetically appealing appearance
- corrosion-resistant plastic drain pan and dispenser lid

Designed with sanitation in mind

- Agion® silver-based antimicrobial product protection of key ice and water contact components¹
- one-hand lever or SensorSAFE infrared ice dispense reduces the chance of cross-contamination

Easy installation

- comes fully assembled and installs with three easy connections – electric, water and drain

Warranty

- 3 years parts and labor, 5 years compressor parts

SensorSAFE™ infrared dispense (optional)



SensorSAFE not recommended for use with clear containers or for applications in direct sunlight

Model configurations		
Ice storage capacity	Dispense	Item number
110 lb (49.9 kg)	lever	110CM-NI-L
	SensorSAFE	110CM-NI-S

Ice-only available, add -I
Example: 110CM-NI-LI

Accessories

Base stand with or without factory installed water filter (refer to form# 7010)

Chilled water option (item# AFH20CHIL110)

Pressurized water sanitizing kits (refer to form# 6830)

SafeCLEAN Plus™ ice machine cleaner

1 x 8 oz (237 ml) bottle (item# 01147826)

6 x 8 oz (237 ml) bottles (item# 01149954)

Carton of 24 x 8 oz (237 ml) bottles (item# 01149962)

Nu-Calgon® IMS-III sanitizer, 16 oz (0.5 L) bottle (item# 00979674)

Additional filters (refer to form# 9905 and 8320)

Additional Symphony Plus accessories (refer to price list)

Job

Item

801 Church Lane | Easton, PA 18040, USA
1.800.523.9361 | 1.610.252.7301 | follettice.com

FOLLETT®

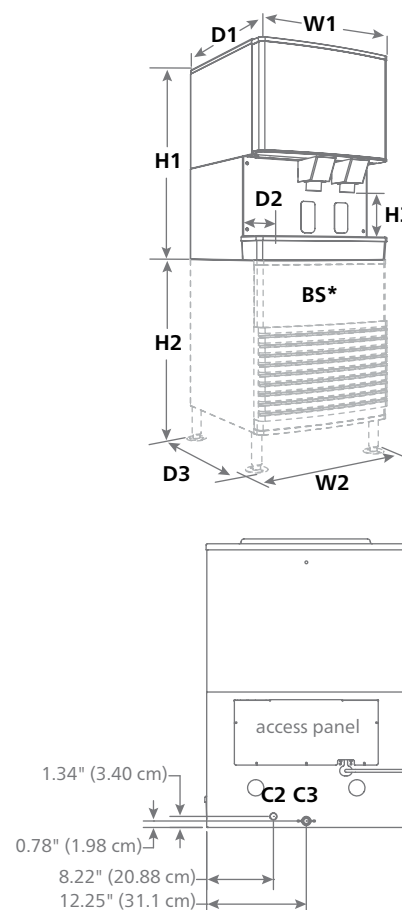
Specification

Ice storage capacity	110 lb (49.9 kg)
W1 Width, dispenser	25.00" (63.5 cm)
W2 Width, base stand accessory	26.25" (66.7 cm)
D1 Depth, entire dispenser	28.25" (71.8 cm)
D2 Depth, drain pan	7.00" (17.78 cm)
D3 Depth, base stand accessory	29.00" (73.7 cm)
H1 Height, dispenser	34.75" (88.3 cm)
H2 Height, base stand accessory	33.00" (83.8 cm)
H3 Dispense height clearance	7.75" (19.68 cm)
Service clearance	18.00" (45.7 cm) top for manual filling and cleaning
C1 115 V/60/1 electrical	4 amps, 0.8 kW 7' (2.1 m) cord, NEMA 5-15 90° hospital-grade plug
C2 Potable water inlet	3/8" FPT internal connection – 1.5" (3.81 cm) knockout provided
C3 Drain	3/4" MPT
Utility connection location	back or bottom
Approximate net weight	103 lb (47 kg)
Approximate ship weight	138 lb (63 kg)
Approximate ship weight, base stand accessory	140 lb (64 kg)

NOTE: For indoor use only

SHORT FORM SPECIFICATION: (Choose one) ___ Ice and water or ___ ice-only dispenser to be Follett® model 110CM manual load unit with integral drain pan. Dispenser to hold up to 110 lb (49.9 kg) of ice depending on ice type used. Storage area insulated with CARB compliant non-HFC foam. 7' (2.1 m) cord and NEMA 5-15 90° hospital-grade plug provided. NSF and ETL listed.

Dimensional drawing



BS* – Base stand sold separately; measurements shown are with base stand legs at lowest position.
See dispenser detail sheet, form# 6675, for counter cut outs.

¹ Disclaimer: Antimicrobial protection is limited to the treated components and does not treat water or ice.

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Follett reserves the right to change specifications at any time without obligation. Certifications may vary depending on country of origin.



F



G



F. PORTLAND BEVERAGE DISPENSER

3 Gallon Capacity.
Includes Chamber and Drip Tray.

Specify Color: Black (13), White (15) **NEW**.

ITEM 4102-3 | 8Wx8Dx25H | Ice Chamber

ITEM 4102-3INF | 8Wx8Dx25H | Infusion Chamber

G. EMPIRE BEVERAGE DISPENSER **NEW**

3 Gallon Capacity.
Includes Chamber and Drip Tray.

ITEM 22090-3-90 | 8½Wx10Dx24¾H | Ice Chamber

ITEM 22090-3INF-90 | 8½Wx10Dx24¾H | Infusion Chamber

H



I



H. ASHWOOD BEVERAGE DISPENSER

3 Gallon Capacity.
Includes Chamber and Drip Tray.

ITEM 3804-3-83 | 8Wx8Dx26H | Ice Chamber

ITEM 3804-3INF-83 | 8Wx8Dx26H | Infusion Chamber

I. MONTEREY BEVERAGE DISPENSER **NEW**

3 Gallon Capacity.
Includes Chamber and Drip Tray.

ITEM 22117-3-15 | 8½Wx10Dx25½H | Ice Chamber

ITEM 22117-3INF-15 | 8½Wx10Dx25½H | Infusion Chamber

J



J. CINDERWOOD BEVERAGE DISPENSER

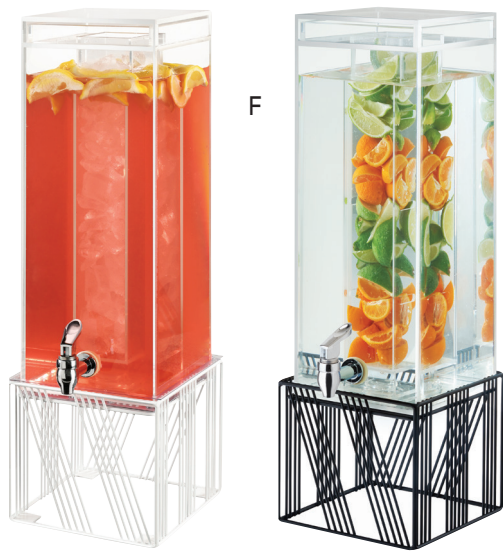
3 Gallon Capacity.
Includes Chamber and Drip Tray.

ITEM 3804-3-87 | 8Wx8Dx26H | Ice Chamber

ITEM 3804-3INF-87 | 8Wx8Dx26H | Infusion Chamber

Please visit www.calmil.com/legal for a complete list of California Proposition 65 related items.

CAL•MIL | visit us online at: www.calmil.com | call toll-free 800-321-9069
Clevenger-Frable-LaVallee



F

G

F. PORTLAND BEVERAGE DISPENSER

3 Gallon Capacity.
Includes Chamber and Drip Tray.

Specify Color: Black (13), White (15) **NEW**.

ITEM 4102-3 | 8Wx8Dx25H | Ice Chamber

ITEM 4102-3INF | 8Wx8Dx25H | Infusion Chamber

G. EMPIRE BEVERAGE DISPENSER **NEW**

3 Gallon Capacity.
Includes Chamber and Drip Tray.

ITEM 22090-3-90 | 8½Wx10Dx24¾H | Ice Chamber

ITEM 22090-3INF-90 | 8½Wx10Dx24¾H | Infusion Chamber

H. ASHWOOD BEVERAGE DISPENSER

3 Gallon Capacity.
Includes Chamber and Drip Tray.

ITEM 3804-3-83 | 8Wx8Dx26H | Ice Chamber

ITEM 3804-3INF-83 | 8Wx8Dx26H | Infusion Chamber

I. MONTEREY BEVERAGE DISPENSER **NEW**

3 Gallon Capacity.
Includes Chamber and Drip Tray.

ITEM 22117-3-15 | 8½Wx10Dx25½H | Ice Chamber

ITEM 22117-3INF-15 | 8½Wx10Dx25½H | Infusion Chamber

J. CINDERWOOD BEVERAGE DISPENSER

3 Gallon Capacity.
Includes Chamber and Drip Tray.

ITEM 3804-3-87 | 8Wx8Dx26H | Ice Chamber

ITEM 3804-3INF-87 | 8Wx8Dx26H | Infusion Chamber

H

I

J

beverage dispensers

Please visit www.calmil.com/legal for a complete list of California Proposition 65 related items.

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Clevenger-Frable-LaVallee



QC7I TWIN 4FC5-S

System Part Number: EV9202-62



APPLICATIONS

- ◆ Ice machines
- ◆ Coffee brewers

SYSTEM DESCRIPTION

The **QC7I Twin 4FC5-S** water filtration system features exclusive Fibredyne™ II bacteriostatic media that filters sediment down to 5 microns and provides chlorine taste & odor reduction at a flow rate of 5 gpm for 30,000 gallons. The 5 micron mechanical filtration supports lasting, balanced performance with high turbidity water supplies. Integrated scale inhibitor media helps protect against the formation of scale* on equipment surfaces. This system is certified under NSF/ANSI Standard 42.

FEATURES • BENEFITS

- ◆ Integrated scale inhibitor minimizes the potential for scale formation* to ensure reliable, efficient equipment operation
- ◆ Proprietary Fibredyne II media reduces chlorine taste & odor while providing particulate reduction down to 5 microns
- ◆ Fibredyne II media inhibits the growth of bacteria within the filter to guard against media fouling and optimize performance
- ◆ Inlet shutoff valve, flush valve, and pressure gauges simplify service and monitor operating performance
- ◆ Quick-change (QC) cartridges make changing cartridges simple and sanitary
- ◆ Reduces a range of contaminants to help ensure clearer, fresher water for consistently great-tasting beverages
- ◆ Helps protect equipment to help ensure reliable and efficient operation resulting in reduced maintenance and downtime
- ◆ NSF/ANSI Standard 42 certified for Bacteriostatic Effects and the reduction of Chlorine Taste & Odor, and Particulate Class III

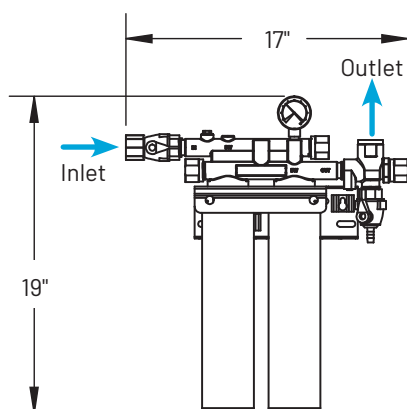
INSTALLATION TIPS

- ◆ Choose a mounting location suitable to support the weight of the system while operating.
- ◆ Install vertically and allow 2½" (6.35 cm) clearance below the cartridge for easy removal and replacement.
- ◆ Feed water temperature must not exceed 100°F (38°C).
- ◆ Do not install where the system could be exposed to freezing temperatures.
- ◆ Feed water supply pressure must not exceed 125 psi (non-shock). When pressure exceeds 85 psi, a pressure reducing valve is recommended.
- ◆ Flush cartridges by running water through the system for five (5) minutes.
- ◆ For more details, see the installation, operation, and maintenance guide included with the system.

*As tested by Pentair.
EPA Est. 002623-IL-002

QC7I TWIN 4FC5-S

EV9202-62



SPECIFICATIONS

System	Performance
Overall Dimensions 19" H x 17" W x 5.75" D (48.3 cm x 43.2 cm x 14.6 cm)	Service Flow Rate 5 gpm (18.93 lpm)
Connections Inlet Connection: 3/4" FNPT Outlet Connection: 3/4" FNPT	Rated Capacity 30,000 gallons (113.562 L)
Operating Pressure 10 – 125 psi (0.7 – 8.6 bar)	Chlorine Taste & Odor Reduction Yes
Water Temperature 35 – 100°F (2 – 38°C)	Particulate Reduction Yes
Operating Weight 17 lbs (7.7 kgs)	Bacteriostatic Effects Yes
Shipping Weight 8 lbs (3.7 kgs)	
Electrical Connection None required	

REPLACEMENT CARTRIDGE

Model	Qty	Description	Part No
4FC5-S	2	Primary filter	EV9693-31

For Pentair Everpure Product Warranties visit:
<http://pentair.com/assets/foodservice-warranty>

It is recommended that filter cartridges be replaced every six (6) months on a regular scheduled program, or when capacity is reached or if water pressure or flow to equipment becomes inadequate.

Always replace filter cartridges at least once per year.

The contaminants or other substances removed or reduced by this drinking water system are not necessarily in your water. Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

Systems certified for cyst reduction may be used on disinfected water that may contain filterable cysts.

Since the conditions under which our products may be used are beyond our control, we cannot accept any liability with respect to the improper installation, application and/or use of our products.



System Tested and Certified by NSF International against NSF/ANSI Standard 42 for the reduction of:

STANDARD NO. 42 –
 AESTHETIC EFFECTS
 Bacteriostatic Effects
 Chemical Reduction
 Taste & Odor
 Chlorine
 Mechanical Filtration
 Nominal Particulate Class III



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India | Boulevard, B-9/A, 7th Floor - Tower B Sector 62 | Noida - 201301 | 91.120.419.9444 Tel | indiacustomer@pentair.com
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EV9202-62 FE22