

April 15, 2024

PROJECT MANUAL

VOLUME 2 OF 4: Divisions 03 - 18

Newburgh Enlarged City School District New CTE Building

CTE Building

SED No. 44-16-00-01-0-053-001

CSArch Project # 108-2303.00



REGISTRATION EXPIRATION DATE: 12/31/2026

The design of this project conforms to applicable provisions of the New York State Uniform Fire Prevention and Building Code the New York State Energy Conservation Construction Code and the Manual of Planning Standards of the New York State Education Department

CSARCH

DOCUMENT 000114 - TABLE OF CONTENTS

VOLUME 01

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

Introductory Information

000010	Certification Page
000114	Table of Contents
000115	List of Drawing Sheets

Procurement Requirements

001116	Advertisement for Bidders
002113	Instructions to Bidders

Project Information

003100.1	Available Project Information
003100.2	Geotech Report
003100.3	CTE Building Geotech Report
003113	Preliminary Schedules
003113.01	Milestone Schedule

Procurement Forms and Supplements

004116.01	BID FORM CONTRACT NO. 01 – General Construction / Sitework (GC-01)
004116.02	BID FORM CONTRACT MC-02 – Mechanical Contractor (MC-01)
004116.03	BID FORM CONTRACT NO. 03 – Plumbing Contractor (PC-01)
004116.04	BID FORM CONTRACT NO. 04 – Electrical Contractor (EC-01)
004116.05	BID FORM CONTRACT NO. 05 – Fire Protection Contractor (FP-01)
004313	Bid Bond – AIA Document A310, 2010 Edition
004325	Substitution Request Form
004333	Proposed Product Form
004336	Proposed Subcontractors Form
004513	Contractors Qualification Statement
004519	Certificate of Non-Collusion
004520	Iran Divestment Act Certification
004543	Corporate Resolutions

Contracting Requirements & Supplements

005216	Standard Form of Agreement Between Owner and Contractor, AIA Document A101, 2017 Edition
--------	---

006112	Payment Bond – AIA Document A312, 2010 Edition
006113	Performance Bond – AIA Document A312, 2010 Edition
006114	Digital Data Licensing Agreement - AIA Document C106, 2013 Edition
006276	Application for Payment– AIA Document G702, 1992 Edition
006276.01	Schedule of Values Continuation Sheet – AIA Document G703, 1992 Edition

Closeout Forms

006519	Contractor's Affidavit of Payment of Debts and Claims - AIA Document G706, 1994 Edition
006520	Contractor's Affidavit of Release of Liens - AIA Document G706A, 1994 Edition
006521	Consent of Surety to Final Payment - AIA Document G707, 1994 Edition.

Conditions of the Contract & Supplementary Conditions

007216	General Conditions of the Contract for Construction, AIA Document A232, 2019 Edition
007216.01	Project Labor Agreement
007343	Prevailing Rate of Wages

DIVISION 01 – GENERAL REQUIREMENTS

011200	Summary – Multiple Contract Summary
011200.01	Appendix A – Responsibility Matrix
011400	Work Restrictions
011410	NYSED 155.5 Uniform Safety Standards for School Construction and Maintenance Projects

Price and Payment Procedures

011210	Allowances
012200	Unit Prices
012500	Substitution Procedures
012519	Equivalents
012600	Contract Modification Procedures
012900	Payment Procedures
012973	Schedule of Values

Administrative Requirements

013100	Project Management and Coordination
013150	Safety and Health
013200	Construction Progress Documentation
013233	Photographic Documentation
013300	Submittal Procedures

Quality Requirements

014000	Quality Requirements
014200	References
014533	Code Required Special Inspections and Procedures

Temporary Facilities and Controls

015001	Temporary Facilities Controls – Multiple Prime Contracts
015002	Proposed Site Logistics Plan

Product Requirements

016000	Product Requirements
--------	----------------------

Execution and Closeout requirements

017300	Execution
017329	Cutting and Patching
017700	Closeout Procedures
017823	Operation and Maintenance Data
017836	Warranties
017839	Project Record Documents
017900	Demonstration and Training

Life Cycle Activities

019113	General Commissioning Requirements
--------	------------------------------------

DIVISION 02 – EXISTING CONDITIONS

023313	Underground Utility Locator Service
--------	-------------------------------------

DIVISION 03 – CONCRETE

031000	Concrete Forming and Accessories
032000	Concrete Reinforcing
033000	Cast in Place Concrete
033100	Cast in Place Concrete Site Work
033543	Polished Concrete

DIVISION 04 – MASONRY

042000	Unit Masonry
042200	Structural Unit Masonry

047200	Cast Stone Masonry
047300	Manufactured Stone Masonry

DIVISION 05 – METALS

051200	Structural Steel Framing
052100	Steel Joist Framing
053100	Steel Decking
054000	Cold-Formed Metal Framing
055000	Metal Fabrications
055100	Metal Stairs
055133	Metal Ladders
055213	Pipe and Tube Railings
057300	Decorative Metal Railings
057500	Decorative Formed Metal

DIVISION 06 – WOODS, PLASTICS, AND COMPOSITES

061000	Rough Carpentry
061053	Miscellaneous Rough Carpentry
064100	Architectural Wood Casework
068316	Fiberglass Reinforced Paneling

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

071400	Fluid Applied Waterproofing
071616	Crystalline Waterproofing
072100	Thermal Insulation
072119	Foamed in Place Insulation
072700	Air Barriers
075323	Ethylene-Propylene-Diene-Monomer Roofing
076200	Sheet Metal Flashing and Trim
077200	Roof Accessories
078100	Applied Fire Protection
078123	Intumescent Fire Protection
078413	Penetrations Firestopping
078443	Joint Firestopping
079200	Joint Sealants
079219	Acoustical Joint Sealants
079513	Expansion Joint Cover Assemblies

DIVISION 08 – OPENINGS

081113	Hollow Metal Doors and Frames
081416	Flush Wood Doors
081613	Fiberglass Doors
083100	Access Doors and Panels

083324	Overhead Coiling Doors
083343	Smoke Curtains
083473	Sound Control Door Assemblies
083613	Sectional Doors
084313	Aluminum Framed Storefronts
084413	Glazed Aluminum Curtain Walls
085113	Aluminum Windows
085113.10	Sound Control Window System
085659	Service and Teller Window Units
086200	Unit Skylights
087100	Door Hardware
088000	Glazing
088813	Fire-Rated Glazing
088859	Attack-Resistant Glazed Assemblies
089100	Louvers

DIVISION 09 – FINISHES

092116	Gypsum Board Assemblies
092216	Non Structural Metal Framing
093000	Tiling
095100	Acoustical Ceiling Tiles
096466	Wood Athletic Flooring
096500	Resilient Flooring
096700	Fluid-Applied Flooring
098316	Spray Acoustic Treatment
099000	Painting and Coating

DIVISION 10 – SPECIALTIES

101100	Visual Display Boards
101419	Dimensional Letter Signage
101423	Panel Signage
101430	Illuminated Signage
101453	Traffic Signage
102113.19	Plastic Toilet Compartments
102123	Cubicle Curtains and Track
102800	Toilet, Bath, and Laundry Accessories
104400	Fire Protection Specialties
105113	Metal Lockers
105300	Pre-Manufactured Canopies
105500	Postal Specialties
107501	Flagpoles
108213	Roof Screens

DIVISION 11 – EQUIPMENT

113013	Residential Appliances
--------	------------------------

114000	Food Service Equipment
115001	Educational Laboratories Equipment
116623	Gymnasium Equipment

DIVISION 12 – FURNISHINGS

122400	Window Shades
123200	Manufactured Wood Casework
123553.13	Metal Laboratory Casework
123600	Countertops
125713	Welding Equipment
126613	Telescoping Bleachers

DIVISION 13 – NOT USED

DIVISION 14 – CONVEYING EQUIPMENT

142100	Electric Traction Elevators
--------	-----------------------------

DIVISION 19 – AUDIO VISUAL

191000	Performance Sound & Video Systems
192000	Studio Lighting Systems
193000	Studio Rigging & Curtains

DIVISION 21 – FIRE SUPPRESSION

210523	Valves
210553	Fire Protection Identification
211010	Piping System and Accessories
211300	Fire Suppression Sprinkler System

DIVISION 22 – PLUMBING

220523	Valves
220553	Plumbing Identification
220593	Adjusting and Balancing
220700	Insulation
221010	Piping System and Accessories
221020	Underground Piping and Accessories
221030	Pumps
221100	Water Supply
223010	Equipment
223200	Compressed Air and Vacuum Equipment
223400	Water Heaters
224000	Plumbing Fixtures and Trim
227010	Natural Gas System

DIVISION 23 – HEATING, VENTILATION, AND AIR-CONDITIONING (HVAC)

230500	Common HVAC Requirements
230513	Common Motor Requirements for HVAC Equipment
230516	Expansion Fittings HVAC Piping
230517	Sleeves and Sleeve Seals for HVAC Piping
230519	Meters and Gauges for HVAC Piping
230523.12	Ball Valves for HVAC Piping
230523.13	Butterfly Valves for HVAC Piping
230523.14	Check Valves for HVAC Piping
230529	Hanger and Supports for HVAC Piping and Equipment
230553	Identification for HVAC Piping and Equipment
230593	Testing, Adjusting, and Balancing
230713	Duct Insulation
230719	HVAC Piping Insulation
230800	Commissioning of HVAC Systems
232113	Hydronic Piping
232116	Hydronic Piping Specialties
232123	Hydronic Pumps
232300	Refrigerant Piping
232513	Water Treatment for Closed Loop Hydronic System
233113	Metal Ducts
233300	Air Duct Accessories
233346	Flexible Ducts
233423	HVAC Power Ventilators
233500	Paint Booth
233505	Welding Fume Exhaust
233713.13	Air Diffusers
233713.23	Registers and Grilles
233723	HVAC Gravity Ventilators
234101	Dust Collection System
234200	Vehicle Exhaust Removal System
235123	Gas Vents
235216	Condensing Boilers
235700	Heat Exchangers for HVAC
237416	Packaged Roof Top and Energy Recovery Units
237423	Make-Up Air Units
238126	Split System Air Conditioners
238129	Variable Refrigerant Flow Systems
238216.11	Hydronic Air Coils
238229	Radiators
238236	Finned Tube Radiation Heaters
238239.13	Cabinet Unit Heaters
238239.16	Propeller Unit Heaters

DIVISION 25 – INTEGRATED AUTOMATION

- 250923 Building Automation System (BMS) for HVAC
- 250993.11 Sequence of Operations (BMS) for HVAC

DIVISION 26 – ELECTRICAL

- 260500 General Electrical Requirements
- 260501 Basic Materials and Methods
- 260519 Low Voltage Electrical Power Conductors and Cables
- 260526 Grounding and Bonding for Electrical Systems
- 260529 Hanger and Supports for Electrical Systems
- 260533 Raceways and Boxes for Electrical Systems
- 260534 Manholes and Handholes
- 260543 Underground Ducts and Raceways for Electrical Systems
- 260544 Sleeves and Sleeve Seals for Electrical Raceways and Cabling
- 260533 Identification for Electrical Systems
- 260573 Electrical Power System Study
- 260923 Lighting Control Devices
- 260943 Performance Lighting Controls
- 262213 Low Voltage Transformers
- 262413 Switchboards
- 262416 Panelboards
- 262726 Wiring Devices
- 262813 Fuses
- 262816 Enclosed Switches and Circuit Breakers
- 263213 Engine Generator System
- 263600 Transfer Switches
- 264313 Surge Protection for Low Voltage Electrical Power Circuits
- 265119 LED Interior Lighting
- 265219 Emergency and Exit Lighting

DIVISION 27 – COMMUNICATIONS

- 270510 Communications General
- 272100 Local Area Network System
- 273100 Telephone System
- 275113 Public Address System
- 275313 Clock Systems

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

- 281300 Door Access Control System
- 281301 Audio Visual Entry System
- 281600 Intrusion Detection System
- 282300 Closed Circuit Television Surveillance System
- 283100 Fire Detection and Alarm

DIVISION 31 – SITEWORK

310000	Site Clearing
310100	Selective Tree Removal
312000	Excavation and Fill
312316	Rock Removals
312319	Dewatering
312513	Erosion and Sediment Control

DIVISION 32 – EXTERIOR IMPROVEMENTS

321216	Asphalt Paving
321723	Pavement Marking
321824	Synthetic Grass Surfaces
323113	Chain Link Fencing
323300	Exterior Lighting
329200	Topsoil and Seeding
329300	Plants

DIVISION 33 – UTILITIES

334100	Storm Drainage Piping
334900	Storm Drainage Structures
335900	Sanitary Sewer Piping
335903	Sanitary Sewer Structures
339000	Stormwater Pollution Prevention Plan

END OF DOCUMENT 000114

SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.2 RELATED REQUIREMENTS

- A. Section 032000 - Concrete Reinforcing.
- B. Section 033000 - Cast-in-Place Concrete.
- C. Section 042000 - Unit Masonry: Reinforcement for masonry.
- D. Section 051200 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.
- E. Section 053100 - Steel Decking: Placement of steel anchors in composite decking.

1.3 REFERENCE STANDARDS

- A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
- B. ACI PRC-347 - Guide to Formwork for Concrete; 2014 (Reapproved 2021).
- C. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
- D. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
- E. ASME A17.1 - Safety Code for Elevators and Escalators Includes Requirements for Elevators, Escalators, Dumbwaiters, Moving Walks, Material Lifts, and Dumbwaiters with Automatic Transfer Devices; 2022.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on void form materials and installation requirements.
- C. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with relevant portions of ACI 347R, ACI 301, and ACI 318.

PART 2 PRODUCTS

2.1 FORMWORK - GENERAL

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.
- C. Chamfer outside corners of beams, joists, columns, and walls.
- D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.
- E. Comply with relevant portions of ACI CODE-318, ACI PRC-347, and ACI SPEC-301.
- F. Use the following form types:
 - 1. Foundation Walls: Site fabricated plywood.
 - 2. Foundation Walls Exposed To View: Site fabricated rough sawn lumber.

2.2 WOOD FORM MATERIALS

- A. All other concrete:

1. Plywood: Douglas Fir species; solid one side grade; sound undamaged sheets with clean, true edges.
 2. Provide forms to suit final installed concrete finish.
- B. Form Support Lumber: SPF, SYP or Hem Fir species; No. 2 grade; with grade stamp clearly visible.

2.3 FORMWORK ACCESSORIES

- A. Form Ties: Removable type, galvanized metal, fixed length, cone type, 3/4" break-back dimension, free of defects that could leave holes larger than 1 inch in concrete surface.
- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
- C. Dovetail Anchor Slot: Galvanized steel, at least 22 gauge, 0.0299 inch thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork. Provide _____ manufactured by _____ .
- D. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 051200.
- E. Waterstops: Bentonite and butyl rubber.
1. Configuration: As indicated on drawings.
 2. Size: As indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

- A. Earth forms are permitted for footing excavations only.

- B. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.3 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI SPEC-301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Obtain approval before framing openings in structural members that are not indicated on drawings.
- D. Coordinate this section with other sections of work that require attachment of components to formwork.
- E. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.4 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

- D. Position recessed anchor slots for brick veneer masonry anchors to spacing and intervals specified in Section 042613.
- E. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- F. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement.
- G. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- H. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
 - 1. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI SPEC-117, unless otherwise indicated.
- B. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.

3.8 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items

are secure.

3.9 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Mass Concrete: Concrete maturity shall be measured in accordance with methods established/required in ACI 301. Do not removed forms until concrete has reached appropriate maturity and thermal levels. Keep formwork in place as long as practicable to aid in moisture retention.
- C. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- D. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION 031000

SECTION 032000 - CONCRETE REINFORCING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.2 RELATED REQUIREMENTS

- A. Section 031000 - Concrete Forming and Accessories.
- B. Section 033000 - Cast-in-Place Concrete.
- C. Section 042000 - Unit Masonry: Reinforcement for masonry.
- D. Section 260526 - Grounding and Bonding for Electrical Systems: Grounding connection to concrete reinforcement.
- E. Section 316329 - Drilled Concrete Piers and Shafts: Reinforcement for drilled pier foundations.

1.3 REFERENCE STANDARDS

- A. ACI MNL-66 - ACI Detailing Manual; 2020.
- B. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.
- D. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement; 2016.
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.
- F. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.

- G. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; 2018.
- H. CRSI (DA4) - Manual of Standard Practice; 2018, with Errata (2019).
- I. CRSI (P1) - Placing Reinforcing Bars, 10th Edition; 2019.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI MNL-66 Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
- D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- E. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI SPEC-301.
 - 1. Maintain one copy of each document on project site.
- B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.4/D1.4M and no more than 12 months before start of scheduled welding work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed steel bars.
 - 1. Plain billet-steel bars.
 - 2. Unfinished.

- B. Weldable Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars.
 - 1. Unfinished.
- C. Steel Welded Wire Reinforcement (WWR): Galvanized, deformed type; ASTM A1064/A1064M.
 - 1. Form: Flat Sheets.
- D. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
 - 3. Provide stainless steel components for placement within 1-1/2 inches of weathering surfaces.

2.2 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is permitted only as indicated on the contract drawings. Perform welding in accordance with AWS D1.4/D1.4M.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
 - 1. Review locations of splices with Structural Engineer.

PART 3 EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.

D. Maintain concrete cover around reinforcing as indicated on the contract drawings.

E. Bond and ground all reinforcement to requirements of Section 260526.

3.2 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 01 45 33 - Code-Required Special Inspections, will inspect installed reinforcement for compliance with contract documents before concrete placement.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete for composite floor construction.
- B. Floors and slabs on grade.
- C. Concrete foundation walls and Piers.
- D. Joint devices associated with concrete work.
- E. Miscellaneous concrete elements, including equipment pads, equipment pits, light pole bases, flagpole bases, thrust blocks, and manholes.
- F. Concrete curing.

1.2 RELATED REQUIREMENTS

- A. Section 031000 - Concrete Forming and Accessories: Forms and accessories for formwork.
- B. Section 032000 - Concrete Reinforcing.
- C. Section 079200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.
- D. Section 079513 - Expansion Joint Cover Assemblies.

1.3 REFERENCE STANDARDS

- A. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; 1998 (Reapproved 2004).
- B. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
- C. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.

- D. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.
- E. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- F. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.
- G. ACI PRC-308 - Guide to External Curing of Concrete; 2016.
- H. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
- I. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2023.
- J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2023.
- K. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2023.
- L. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens); 2021.
- M. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.
- N. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- O. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2020.
- P. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2023.
- Q. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- R. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2023.
- S. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019, with Editorial Revision (2022).

- T. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2023, with Editorial Revision.
- U. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2020a.
- V. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.
- W. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2018.
- X. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types); 2023.
- Y. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers; 2020.
- Z. ASTM E1155M - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers (Metric); 2014.
- AA. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2018a.
- BB. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017 (Reapproved 2023).

1.4 PREINSTALLATION MEETING

- A. Preinstallation Conference: Conduct conference at Project Site.
- B. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - 1. Contractor's superintendent.
 - 2. Independent testing agency responsible for concrete design mixtures.

3. Ready-mix concrete manufacturer.
4. Concrete Subcontractor.
5. Retain first subparagraph below if special concrete finishes are included in Project.
6. Special concrete finish Subcontractor.
7. Structural Engineer

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
 1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
- C. Mix Design: Submit proposed concrete mix design.
 1. Indicate proposed mix design complies with requirements of ACI SPEC-301, Section 4 - Concrete Mixtures.
 2. Indicated amounts of mixing water to be withheld for later addition at Project Site.
- D. Material Test Reports: For the following, from a qualified testing agency:
 1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- E. Test Reports: Submit report for each test or series of tests specified.
- F. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 1. Location of construction joints is subject to approval of the Structural Engineer.
- G. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

- H. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
- I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Perform work of this section in accordance with ACI SPEC-301 and ACI CODE-318.
- D. Follow recommendations of ACI 207.1R when placing Mass Concrete.
- E. Follow recommendations of ACI PRC-305 when concreting during hot weather.
- F. Follow recommendations of ACI PRC-306 when concreting during cold weather.
- G. For slabs required to include moisture vapor reducing admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for every day of placement.

1.7 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Slabs with Porosity Inhibiting Admixture (PIA) or Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of the concrete.

1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
2. Provide warranty by admixture manufacturer matching terms of flooring adhesive or primer manufacturer's material defect warranty.

1.8 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete Subcontractor.
 - e. Special Inspection and Testing Agency
 - f. Special concrete finish Subcontractor.
 - g. Structural Engineer
2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, methods for achieving specified floor and slab flatness and levelness concrete repair procedures, and concrete protection.

1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301M).
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows:
 - 1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 PRODUCTS

2.1 FORMWORK

- A. Comply with requirements of Section 031000.

2.2 REINFORCEMENT MATERIALS

- A. Comply with requirements of Section 032000.

2.3 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

1. Acquire cement for entire project from same source.
- B. Fine and Coarse Normal-Weight Aggregates: ASTM C33/C33M.
 1. Acquire aggregates for entire project from same source.
 2. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Lightweight Aggregate: ASTM C330/C330M.
- D. Fly Ash: ASTM C618, Class F.
- E. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.4 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.
- C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
- F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
- G. Accelerating Admixture: ASTM C494/C494M Type C.
- H. Retarding Admixture: ASTM C494/C494M Type B.
- I. Water Reducing Admixture: ASTM C494/C494M Type A.

2.5 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with {rs#1}, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use

of single ply polyethylene is prohibited.

1. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single-ply polyethylene is prohibited.
 2. Installation: Comply with ASTM E1643.
 - a. Single layer, 15 mil minimum.
 3. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
 4. Products:
 - a. Stego Industries, LLC; ____: www.stegoindustries.com/#sle.
 - b. W. R. Meadows, Inc; PERMINATOR Class A - 15 mils (0.38 mm): www.wrmeadows.com/#sle.
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of nonmetallic aggregate, cement, water reducing and plasticizing agents.
1. Grout: Comply with ASTM C1107/C1107M.
 2. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7,000 pounds per square inch.
 3. Products containing aluminum powder are not permitted.
 4. Flowable Products:
 - a. Five Star Products, Inc; Five Star Fluid Grout 100: www.fivestarproducts.com/#sle.
 - b. W. R. Meadows, Inc; CG-86: www.wrmeadows.com/#sle.
 - c. Substitutions: See Section 016000 - Product Requirements.

2.6 BONDING AND JOINTING PRODUCTS

A. Epoxy Bonding System:

1. Complying with ASTM C881/C881M and of Type required for specific application.
- B. Waterstops: Self-expanding rubber strip or butyl strip; swells to 1000 percent of original size in clean water. Size 3/4 by 1 inch, minimum.
- C. Slab Isolation Joint Filler: 1/2-inch thick, height equal to slab thickness, with removable top section forming 1/2-inch deep sealant pocket after removal.
 1. Material: ASTM D1751, cellulose fiber.
- D. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.

2.7 CURING MATERIALS

- A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Sheet: ASTM C171.
 1. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
 2. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.
- D. Water: Potable, not detrimental to concrete.

2.8 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.
- B. Proportioning Structural Lightweight Concrete: Comply with ACI 211.2 recommendations.

- C. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI SPEC-301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- D. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.
- E. Normal Weight Concrete:
 - 1. Exterior Slab-on-Grade, Foundations Walls, and Piers:
 - a. Minimum Compressive Strength: 4500 psi at 28 days.
 - b. Maximum W/C Ratio: 0.45.
 - c. Total Air Content: 6 percent, plus or minus 1.5 percent. Do not allow air content of trowel-finished floors to exceed 3 percent.
 - d. Slump Limit: 4 inches, 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
 - 2. Interior Slab-on-Grade and Footings:
 - a. Minimum Compressive Strength: 4000 psi at 28 days.
 - b. Maximum W/C Ratio: 0.50.
 - c. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
 - d. Slump Limit: 4 inches, 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
 - 3. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.
 - 4. Maximum Aggregate Size: 3/4 inch.

F. Structural Lightweight Concrete:

1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 pounds per square inch.
2. Maximum Water-Cement Ratio: 0.50.
3. Total Air Content: 5 percent, determined in accordance with ASTM C173/C173M.
4. Maximum Slump: 3 inches.
5. Maximum Aggregate Size: 5/8 inch.
6. Maximum dry unit weight: 115 pound per cubic foot.
7. Maximum wet unit weight: 125 pounds per cubic foot.

2.9 MIXING

- A. Transit Mixers: Comply with ASTM C94/C94M.
- B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.2 PREPARATION

- A. Install temperature gauges and thermal monitoring devices in accordance with Contractor's thermal control plan.
- B. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.

- C. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.
- D. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- E. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
 - 1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.

3.3 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

- A. Comply with requirements of ACI SPEC-301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.4 PLACING CONCRETE

- A. Place concrete in accordance with ACI PRC-304.
- B. Place concrete for floor slabs in accordance with ACI PRC-302.1.
- C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

- D. Monitor thermal/temperature of mass concrete in accordance with ACI 301.
- E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- G. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.5 SLAB JOINTING

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
 - 1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.
- D. Saw Cut Contraction/Control Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.
- E. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

3.6 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. An independent testing agency, as specified in Section 014000, will inspect finished slabs for compliance with specified tolerances.
- B. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:

1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.
 2. Under Thick-Bed Tile: F(F) of 20; F(L) of 15, on-grade only.
 3. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
 4. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.
- C. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.
- D. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.
- E. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.7 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Comply with requirements listed in ACI 301 and 117.
- C. Exposed Form Finish: Comply with requirements listed in ACI 301 and 117.
1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- D. Concrete Slabs: Finish to requirements of ACI PRC-302.1 and as follows:
1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in {\rs\#1}; thick floor coverings include quarry tile and ceramic tile with full bed setting system.
 2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in {\rs\#1}; thin floor coverings include carpeting, resilient flooring, seamless flooring, thin set quarry tile, and thin set ceramic tile.

3. Other Surfaces to Be Left Exposed: Trowel as described in ACI PRC-302.1, minimizing burnish marks and other appearance defects.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on drawings.

3.8 CURING AND PROTECTION

- A. Comply with requirements of ACI PRC-308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 1. Normal concrete: Not less than seven days.
 2. High early strength concrete: Not less than four days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. Surfaces Not in Contact with Forms:
 1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
 2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
 - a. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
 3. Final Curing: Begin after initial curing but before surface is dry.
 - a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.

3.9 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure Five concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed per day.
- F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.10 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.11 PROTECTION

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION 033000

SECTION 033100– CAST-IN-PLACE CONCRETE SITE WORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Concrete formwork, reinforcing steel, and cast-in-place concrete, for steps, concrete sidewalks, curbs, pavement, and miscellaneous site concrete.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 312000: Excavation and Fill.

1.3 REFERENCES

A. American Concrete Institute (ACI) documents

1. ACI 117-10: Specifications for Tolerances in Concrete Construction and Materials
2. ACI 212.3R-10: Report on Chemical Admixtures for Concrete; Chapter 15 Permeability Reducing Admixtures
3. ACI 302.2R-06: Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
4. ACI 304.2R-96: Placing Concrete by Pumping Methods
5. ACI 305R-10: Guide for Hot Weather Concreting
6. ACI 306R-10: Guide to Cold Weather Concreting
7. ACI 308.1-11: Standard Specification for Curing Concrete
8. ACI 360R-10: Guide to Design of Slabs on Grade
9. ACI 317: Reinforced Concrete Design
10. ACI 318: Building Code Requirements for Structural Concrete

B. American Society for Testing and Materials (ASTM)

1. ASTM C 94/C 94M – 11b: Standard Specification for Ready- Mixed Concrete.
2. ASTM C 494/C 494M - 11: Standard Specification for Chemical Admixtures for Concrete.

C. New York State Department of Transportation Standard Specifications for Construction and Materials, Latest Edition.

1.4 SUBMITTALS

A. Product Data: Manufacturer's name, specifications, and installation instructions, for each item specified including:

1. Portland Cement: Brand, manufacturer's name and material certificates
2. Fly Ash: Name, location of source, DOT test numbers and material certificates.

3. Air-entraining Admixture: Brand, manufacturer's name and material certificates.
 4. Water-reducing Admixture: Brand, manufacturer's name and material certificates.
 5. High Range Water-reducing Admixture (Superplasticizer): Brand, manufacturer's name and material certificates.
 6. Corrosion Inhibitor Admixture: Brand, manufacturer's name and material certificates.
 7. Accelerating Admixture: Brand, manufacturer's name and material certificates.
 8. Aggregates: Name, location of source, DOT test numbers, and material certificates.
 9. Lightweight Coarse Aggregates: Brand, manufacturer's name and material certificates.
 10. Chemical Hardener (Dustproofing): Brand and manufacturer's name, and application instructions.
 11. Chemical Curing and Anti-Spalling Compound: Brand and manufacturer's name, and application instructions.
 12. Bonding Agent (Adhesive): Brand and manufacturer's name, and preparation and application instructions.
 13. Expansion Joint Fillers: Brand, manufacturer's name, and material certificates.
 14. Waterstop: Brand and manufacturer's name, and installation instructions.
 15. Integral Water-Repellent Admixture: Brand, manufacturer name, specifications, application instructions and material certificates.
- B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
1. Include test results of proposed concrete proportions based on previous field experience or laboratory trial batches in accordance with ACI 301, Section 4.
 2. Pumped Concrete: Include test results of proposed design mix(es) tested under actual field conditions with the maximum horizontal run and vertical lift required for this project.
 3. Indicate amounts of mix water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Design and engineering of formwork are Contractor's responsibility.
- 1.5 QUALITY ASSURANCE
- A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

1. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 2. Personnel conducting field tests shall be qualified as ACI Concrete Field-Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 3. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
- C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- D. Sealant Container Labels: Include manufacturer's name, trade name of product, kind of material, federal specification number (if applicable), expiration date (if applicable) and packaging date or batch number.
- E. Fly ash supplier shall be on the New York State Department of Transportation's current "Approved List of Suppliers of Fly Ash".
- F. Source Quality Control: The Director reserves the right to inspect and approve the following items, at his own discretion, either with his own forces or with a designated inspection agency:
1. Batching and mixing facilities and equipment.
 2. Sources of materials.
- G. ACI 301, Section 1.4 Reference standards and cited publications:
1. ASTM C 311-11a Standard Methods of Sampling and Testing Fly Ash or Natural Pozzolans For Use As A Mineral Admixture in Portland Cement Concrete.

1.6 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

C. Environmental Conditions:

1. Temperature: Unless otherwise approved or recommended in writing by the sealant manufacturer, do not install sealants at temperatures below 40 or above 85 degrees F.
2. Humidity and Moisture: Do not install the Work under this Section under conditions that are detrimental to the application, curing and performance of the specified materials.

D. Protection:

1. Protect all surfaces adjacent to sealants with non-staining removable tape or other approved covering to prevent soiling or staining.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.
- C. ASTM C 94/C 94M, Article 14 - Batch Ticket Information: In addition to the information required by Paragraph 14.1, also include the following:
- D. Batch Ticket shall include the following:
 1. Type and brand, and amount of cement.
 2. Weights of fine and coarse aggregates.
 3. Class and brand, and amount of fly ash (if any).

PART 2 - PRODUCTS

2.1 CONCRETE

- A. Cast-In-Place Concrete: Normal weight, air entrained concrete with a minimum compressive strength of 4,500 PSI at the end of 28 days.
 1. Design Air Content: ASTM C-260, and on the NYSDOT's current "Approved List"; 6% by volume, 1.5% +/- . Entrained air shall be provided by use of an approved air-entraining admixture.
 2. Cement: ASTM C-150 Type I or II Portland cement.
 3. Normal-Weight Aggregates: ASTM C 33, uniformly graded. Provide aggregates from a single source.
 - a. Maximum Coarse-Aggregate Size: $\frac{3}{4}$ " walls. Slabs 1-1/2 inches nominal.
 - b. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement
 4. Water: Potable.
 5. Slump: Between 2 and 4 inches; except when a water-reducing admixture is used maximum slump shall be 6 inches and when a high range water reducing admixture is used maximum slump shall be 8 inches.

6. Water-reducing Admixture: ASTM C-494 Type A and on the NYSDOT's current "Approved List".
7. High Range Water-reducing Admixture: ASTM C-494 Type F and on the NYSDOT's current "Approved List".
8. Corrosion-Inhibiting Admixture: ASTM C 494/C 494M, for use in resisting corrosion of steel reinforcement.
 - a. DCI Corrosion Inhibitor by W. R. Grace & Co., - Conn., 62 Whittemore Ave., Cambridge, MA 02140, (617) 876-1400 and MasterLife CNI by Master Builders/BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.
 - b. DCI - S Corrosion Inhibitor by W. R. Grace & Co., - Conn., 62 Whittemore Ave., Cambridge, MA 02140, (617) 876-1400.
9. Fly Ash: ASTM C 618, including Table 1 (except for footnote A), Class F except that loss on ignition shall not exceed 4.0 percent.

2.2 CONTROLLED LOW STRENGTH MATERIAL (CLSM) FILL

- A. Also known as Flowable Fill, Controlled Density Fill, Flowable Fill, Controlled Density Fill, Flowable Fly Ash and Fly Ash Slurry.
- B. CLSM, Hand Tool Excavatable: Provide mix with compressive strength of 100 psi or less when measured 28 days from placement. Minimum air content at time of placement shall be 20%.
- C. In the absence of one year strength data, the cementitious content shall be a minimum of 150 lbs./cy, the minimum air content shall be 20%, and fresh unit weight shall be a maximum of 115 lbs./ft³, except where specified.

2.3 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- G. Concrete Sealer:
 1. Surebond/Safebond SB-7000 - clear concrete sealer for sidewalks.
 2. Specco Cure & Seal 350 - clear acrylic, copolymer, solvent-based, curing, sealing, hardening and dust proofing compound for curing and sealing concrete.
 3. Approved equivalents for non-water based penetrating type protective sealer which is on the NYSDOT Material List for concrete pavement.

- H. Concrete Hardener and Dustproofer: Magnesium-fluorosilicate concrete hardener and dustproofer that bonds chemically with the concrete.
 - 1. Lapidolith by Sonneborn Building Products, Chemrex, Inc., 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517, or
 - 2. Approved equivalent.

2.4 FORM-FACING MATERIALS

- A. Prefabricated metal-framed plywood matched, tight fitting, stiffened to support weight of concrete.
- B. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials.
 - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- C. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit. Only acceptable for footings and foundations that are not visible in the completed structure.
- D. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- E. Chamfer Strips: Wood, metal, PVC or rubber; one-inch chamfer, unless stated otherwise in Construction Documents.
- F. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- G. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- H. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that leave no corrodible metal closer than 1-inch the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, leave holes no larger than 1-inch diameter in concrete surface.

2.5 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615, Grade 60 deformed.
- B. Epoxy-Coated Reinforcing Bars: ASTM A 615 deformed bars, ASTM A 775 epoxy coated, with less than 2 percent damaged coating in each 12-inch length.

- C. Steel Bar Mats: ASTM A 184, fabricated from ASTM A 615, deformed bars, assembled with clips.
- D. Plain-Steel Wire: ASTM A 1064.
- E. Deformed-Steel Wire: ASTM A 1064.
- F. Epoxy-Coated Wire: ASTM A 884, Class A, Type 1 coated, plain-steel wire, with less than 2 percent damaged coating in each 12-inch length.
- G. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064, plain, fabricated from as-drawn steel wire into flat sheets. 6-inch x 6-inch – W2.9 x W2.9, ASTM A-185, welded wire fabric.
- H. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064, flat sheet.
- I. Epoxy-Coated Welded-Wire Reinforcement: ASTM A 884, Class A coated, Type 1, plain steel.

2.6 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615, Grade 60 plain-steel bars, cut true to length with ends square and free of burrs.
- B. Smooth Stainless-Steel Joint Dowel Bars
- C. Epoxy-Coated Joint Dowel Bars: ASTM A 615, Grade 60 plain-steel bars, ASTM A 775 epoxy coated.
- D. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775.
- E. Zinc Repair Material: ASTM A 780.
- F. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

2.7 SEALANT

- A. Type 1B Sealant:
 - 1. For Horizontal Joints: One-part, self-leveling silicone or polyurethane sealant for traffic bearing construction; Bostik Chem-Calk 955-SL, Tremco Vulkem 45, Pecora Urexpan NR-201, Pecora 300-SL, Pecora 310-SL, Sika Sikaflex-1CSL, Dow Corning CCS.
 - 2. For Vertical Joints: One-part, non-sag silicone or polyurethane sealant; Tremco Vulkem 116, Pecora Dynatrol I, Sika Sikaflex Textured Sealant, Dow Corning CCS or CWS, Pecora 301-NS, Pecora 311-NS.

2.8 JOINT MATERIALS

- A. Closed Cell Polyethylene Foam Joint Filler: For use around penetrations. Flexible, chemical resistant, non-bleeding, non-staining, "strip-off" edge, by A.H. Harris & Sons, Inc. or approved equivalent.
- B. Fiber Expansion Joint Filler: Resilient, flexible, non-extruding joint compound composed of cellular fibers securely bonded together and uniformly saturated with asphalt, by A.H. Harris & Sons, Inc. or approved equivalent.
- C. Joint Primer/Sealer/Conditioner: As recommended by the sealant manufacturer for the particular joint surface materials and conditions.
- D. Backer Rod: Compressible rod stock or expanded, extruded polyethylene.
- E. Bond Breaker Tape: Polyethylene or other plastic tape as recommended by the sealant manufacturer; non-bonding to sealant.
- F. Cleaning Solvents: Oil free solvents as recommended by the sealant manufacturer. Do not use re-claimed solvents.
- G. Masking Tape: Removable paper or fiber tape, self-adhesive, non-staining.

2.9 DETECTABLE WARNING SURFACE

- A. Units shall be composed of cementitious materials, steel, iron, plastics, polymeric materials, resins, pigments, or as approved by the Engineer.
- B. Owner/Architect to select final color.
- C. Units shall provide the required contrast (light-on-dark or dark-on-light) with the adjacent curb ramp or other applicable walkway. The units shall be uniform in color and texture, be free of cracks or other defects, and have clean-cut and well-defined edges.
- D. Units shall adhere to hot mix asphalt (HMA) or Portland cement concrete (PCC) surfaces at a minimum air temperature of 60°F, and a minimum surface substrate temperature of 70°C. They shall be weather resistant and durable to normal pedestrian wear and maintenance activities, and show no appreciable fading, lifting or shrinkage. The unit shall be capable of molding or fitting itself to the contours, breaks, and faults of HMA or PCC surfaces, and show no significant tearing, rollback, lifting, or other signs of poor adhesions. The units shall have friction characteristics similar to a broomed PCC surface.
- E. The detectable warnings shall meet the following physical properties:

Standard	Property	Results
ASTM C-501	Wear Resistance	Wear Index ≥ 15
ASTM C1028	Slip Resistance	Dry Coefficient of friction 0.8 minimum
ASTM E-96	Water Vapor Transmission	100 grams/sq. meter/24 hours
Various	Adhesion/Bonding Strength	See Note*

*Note: Due to the various types of materials available, the Manufacturer shall certify, through independent laboratory testing, that the type of material used for detectable warnings will bond to a prepared surface.

F. Construction Methods

1. Preformed, surface applied, detectable warning units shall be shipped and packaged in accordance with commercially accepted standards. The following information shall be marked on each package or on the shipping invoice: the name of the product, the name and address of the manufacturer, and the quantity of material.
2. Detectable warnings shall consist of raised truncated domes with a diameter of nominal 0.9 in-1.41 in, a height of nominal 0.2 in and a center-to-center spacing of nominal 1.625-2.41 in and shall contrast visually with adjoining surfaces, either light-on-dark, or dark-on-light.
3. The material used to provide contrast shall be an integral part of the walking surface. Detectable warnings used on interior surfaces shall differ from adjoining walking surfaced in resiliency or sound-on-cane contact.
4. Detectable warnings must have a visual contrast of 70% or more to the surrounding surface.
5. Detectable warnings must be 24 inches for the full width of the ramp.
6. A protective sealer shall be applied over the entire ramp to produce a durable wearing surface.

2.10 PRODUCTION (Amendments to ACI 301, Chapter 7):

A. Provide ready-mixed concrete, either central-mixed or truck-mixed.

1. When air temperature is between 85 and 90 deg. Reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F reduce mixing and delivery time to 60 minutes.
2. Provide adequate controls to insure that the temperature of the concrete when placed does not exceed 90 degrees F., and make every effort to place it at a lower temperature. The temperature of the concrete as placed shall not be so high as to cause difficulty from loss of slump, flash set or cold joints. Ingredients may be cooled before mixing by shading the aggregates, fog spraying the coarse aggregate, chilling the mixing water or other approved means. Mixing water may be chilled with flake ice or well-crushed ice of a size that will melt completely during mixing, providing the water equivalent of the ice is calculated into the total amount of mixing water.
3. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement and curing.
4. In cold weather, comply with ACI 306R.
 - a. When air temperature is below 40 degrees F (4 degrees C) heat the mixing water and, if necessary, the aggregates to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C) and not more than 80 degrees F (27 degrees C) at point of placement. If the mixing water is heated, do not exceed a temperature of 140 degrees F at the time it is added to the cement and aggregates.
5. In hot weather, comply with ACI 305R.
 - a. When air temperature is between 85 degrees F (30 degrees C) and 90 degrees F (32 degrees C), reduce mixing and delivery time from 1 1/2 hours to 75 minutes, and when air temperature is above 90 degrees F (32 degrees C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Do not use items of aluminum for mixing, chuting, conveying, forming or finishing concrete, except magnesium alloy tools may be used for finishing.
- B. Check items of aluminum required to be embedded in the concrete and insure that they are coated, painted or otherwise isolated in an approved manner.
- C. Install waterstops in accordance with manufacturer's printed instructions.
- D. Hardened concrete, reinforcement, forms, and earth which will be in contact with fresh concrete shall be free from frost at the time of concrete placement.
- E. Do not deposit concrete in water. Keep excavations free of water by pumping or by other approved methods.
- F. Prior to placement of concrete, remove all hardened concrete spillage and foreign materials from the space to be occupied by the concrete.

3.2 FORMWORK INSTALLATION

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301 to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads. As deemed necessary by the Contractor, the contractor shall engage the services of a licensed design professional to oversee the design of the formwork system.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class B, 1/4 inch for rough-formed finished surfaces.
- C. Construct forms tight enough to prevent loss of concrete mortar.
- D. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

- G. Chamfer exterior corners and edges of permanently exposed concrete. Chamfer shall be $\frac{3}{4}$ " minimum, unless otherwise noted on the project documents.
- H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.3 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

3.4 STEEL REINFORCEMENT INSTALLATION

- A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations identified on the contract drawings and/or on submittal approved by Engineer.

1. Continue reinforcement across construction joints unless otherwise indicated.
 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 5. Space vertical joints in walls as indicated on the project documents. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible. All proposed joint locations shall be submitted to the Engineer for approval during the submittal process.
 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 2. Terminate full-width joint-filler strips not less than 1/2 inches more than 1 inches below finished concrete surface where joint sealants.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.
- 3.6 CONCRETE PLACEMENT
- A. Comply with ACI 301 for placing concrete.
 - B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - C. Consolidate concrete with mechanical vibrating equipment according to ACI 301.

3.7 APPLICATION OF CLSM

- A. Examine conditions of substrates and other conditions under which work is to be performed and notify the Engineer in writing, of circumstances detrimental to the proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
- B. Keep excavations free of water. Do not deposit CLSM in water.
- C. Hardened CLSM, forms, and earth which will be in contact with fresh CLSM shall be free from frost at the time of CLSM placement.
- D. Prior to placement of CLSM, remove all foreign materials from the space to be occupied by the CLSM.

3.8 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections exceeding 1/2 inch.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.
 - 1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish.
- C. Rubbed Finish: Apply the following rubbed finish, defined in ACI 301, to smooth-formed-finished as-cast concrete where indicated:
 - 1. Smooth-rubbed finish.
 - 2. Cork-floated finish.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.9 FINISHING UNFORMED SURFACES

- A. General: Comply with ACI 302.1R for screening, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- C. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

- D. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix 1-part portland cement to 1-1/2 parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix 1-part portland cement and 1-part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Floated Finish: Slabs and fill over which waterproofing, roofing, vapor barrier, insulation, terrazzo, or resin bound flooring is required.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance.
- D. Broom Finish

3.11 MISCELLANEOUS CONCRETE ITEM INSTALLATION

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.12 CONCRETE PROTECTING AND CURING

- A. Hot Weather Concreting: Comply with ACI 305R whenever the atmospheric temperature or the form surface temperature is at or above 90 degrees F., or climatic conditions of wind and/or low humidity will cause premature drying of the concrete.
- B. Curing Temperature: Maintain the temperature of the concrete at 50 degrees F. or above during the curing period. Keep the concrete temperature as uniform as possible and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete which exceeds 5 degrees F. in any one hour and 50 degrees F. in any 24-hour period.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.13 JOINT PREPARATION

- A. Clean joint surfaces immediately before installation of sealant and other materials specified in this Section.
 - 1. Remove all loose materials, dirt, dust, rust, oils and other foreign matter that will impair the performance of materials installed under this Section. When necessary or when directed, wire brush, grind, or acid etch to thoroughly clean joint surfaces.
- B. Joint Filler Installation
 - 1. Set joint fillers at proper depth and position as required for installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between the ends of joint filler units.
 - a. Smooth Edged Joints: For joints between two concrete slabs or where new concrete abuts smooth edged materials use either filler as specified.

- b. Irregular Edged Joints: For joints where new concrete abuts granite curbs or other irregular edges use closed cell polyurethane joint filler.

C. Backer Rod and Bond Breaker Tape Installation

1. Install bond breaker tape in relaxed condition as it comes off the roll. Do not stretch the tape. Lap individual lengths.
2. Provide backer rod of sufficient size to fill the joint width at all points in a compressed state. Compress backer rod at the widest part of the joint by a minimum of 25 percent. Do not cut or puncture the surface skin of the rod.

D. Sealant installation

1. Except as shown or specified otherwise, install sealants in accordance with the manufacturer's printed instructions.
2. Prime joint surfaces which are to receive Type 1A Sealant. Do not allow the primer to spill or migrate onto adjoining surfaces.
3. Apply sealant with ratchet hand gun or other approved mechanical gun. Where gun application is impractical, apply sealant by knife or by pouring as applicable.
4. Finishing: Tool all vertical, non-sag sealants so as to compress the sealant and eliminate air voids. Provide a neat smoothly finished joint with a slightly concave surface unless otherwise indicated or recommended by the manufacturer.
 - a. Use tool wetting agents as recommended by the sealant manufacturer.

E. Cleaning

1. Immediately remove misapplied sealant and drippings from metal surfaces with solvents and wiping cloths. On other materials, remove misapplied sealant and droppings by methods and materials recommended in writing by the manufacturer of the sealant material.
2. After sealants are applied and before skin begins to form on sealant, remove all masking and other protection and clean up any remaining defacement caused by the Work.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by the Engineer. Remove and replace concrete that cannot be repaired and patched to the Engineer's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1-part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by the Engineer.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to the Engineer's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to the Engineer's approval.

3.15 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Inspections:

1. Steel reinforcement placement in accordance with ACI 318 Sections 3.5 and 7.1-7.7.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing in accordance with ACI 318 Sections 5.9 and 5.10
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms in accordance with ASTM C39.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31.
 - a. Cast and laboratory cure cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39; at a minimum test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
8. Test results shall be reported in writing to Owner and Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.

10. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by the Engineer. The cost for the additional testing shall be borne by the Contractor. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by the Engineer.
11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 033100

This page intentionally left blank

SECTION 033543 - POLISHED CONCRETE - PROSOCO

PART 1 GENERAL

1.1 Section Includes

- A. Polished concrete system.
- B. Surface treatments for concrete floors and slabs.
- C. Densifiers and hardeners.
- D. Coatings.

1.2 Reference Standards

- A. ANSI/NFSI B101.1 - Test Method for Measuring the Wet SCOF of Hard-Surface Walkways; 2020.
- B. ANSI/NFSI B101.3 - Test Method for Measuring the Wet DCOF of Hard Surface Walkways; 2020.
- C. ASTM C1353/C1353M - Standard Test Method for Abrasion Resistance of Dimension Stone Subjected to Foot Traffic Using a Rotary Platform Abraser; 2020, with Editorial Revision.
- D. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Coating Systems; 2020.
- E. ASTM D4039 - Standard Test Method for Reflection Haze of High-Gloss Surfaces; 2009 (Reapproved 2020).
- F. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers; 2022.
- G. ASTM D5767 - Standard Test Method for Instrumental Measurement of Distinctness-of-Image (DOI) Gloss of Coated Surfaces; 2018.
- H. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).
- I. ASTM G154 - Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials; 2023.

1.3 Administrative Requirements

- A. Coordinate work of this section with concrete floor placement and concrete floor curing.
- B. Preinstallation Meeting: Conduct a preinstallation meeting 10 days prior to start of work of this section.
 - 1. Items for Review:
 - a. Physical requirements of completed concrete slab and slab finish.
 - b. Location and timing of test areas.
 - c. Protection of surfaces not scheduled for finish application.
 - d. Surface preparation.
 - e. Application procedure and quality control.
 - f. Cleaning and protection of finish.
 - g. Coordination with other work.
 - 2. Require attendance of parties directly affecting work of this section, including:
 - a. Concrete installer.
 - b. Finish installer.
 - c. Contractor's representative.
 - d. Architect.
 - e. Owner's representative.
 - 3. Notify parties one week in advance of date and time of meeting.

1.4 Submittals

- A. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.
- B. Product Data: Manufacturer's published data and installation instructions for concrete polishing system and finishing products, including manufacturer's installation instructions, information on compatibility of different products, and limitations.
- C. Product Data: Submit certification that products comply with regulations controlling use of volatile organic compounds.
- D. Maintenance Data: Provide data on maintenance and renewal of applied finishes.
- E. Installer's qualification statement.
- F. Executed warranty.
- G. Floor protection plan.

1.5 Quality Assurance

- A. Comply with national, state, and local VOC regulations.
- B. Installer Qualifications:

1. Company specializing in installing products specified in this section, having completed minimum of five projects of similar size and complexity.

1.6 Mock-Up

- A. For coatings, construct mock-up area under conditions similar to those that will exist during application, with joints and coatings applied.
- B. Mock-Up Size: 50 sq ft.
- C. Locate on site where directed.
- D. Accepted mock-up panel is considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work.
- E. Mock-up may remain as part of work.

1.7 Delivery, Storage, and Handling

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.
- B. Store materials per manufacturer's product data sheets:
 1. Store containers upright in cool, dry, well-ventilated place, out of the sun, at temperature between 40 degrees F and 100 degrees F.
 2. Protect from freezing.
 3. Store away from other chemicals and potential sources of contamination.
 4. Keep containers tightly closed when not in use.

1.8 Field Conditions

- A. Ambient Conditions:
 1. Apply treatments and coatings when surface and air temperature is between 40 degrees F and 95 degrees F.
 2. Apply treatments and coatings when surface and air temperature is expected to remain above 40 degrees F for a minimum of eight hours after application.
 3. Maintain ambient temperature of 50 degrees F minimum.
 4. Apply treatments and coatings during calm wind conditions; provide adequate ventilation of enclosed or confined area.
 5. Apply treatments and coatings minimum 24 hours after rain exposure; suspend application when rain is anticipated within 8 hours of application.
 6. Do not apply to frozen substrate.

1.9 Warranty

- A. Correct defective work within a two-year period commencing on the mm-dd-yyyy.

- B. Installer Warranty: Provide two-year manufacturer warranty.

PART 2 PRODUCTS

2.1 Polished Concrete System

- A. Polished Concrete System: Materials, equipment, and procedures designed and furnished by a single manufacturer to produce dense polished concrete of the specified sheen.
 - 1. Manufacturer: PROSOCO, Inc; Consolideck Polished Concrete System:
www.prosoco.com/consolideck/#sle.

2.2 Surface Treatments

- A. Cutting Aid: Clear, water-based blended surfactant treatment spray-applied to wet concrete.
 - 1. VOC Content: 0.5 g/L or less.
 - 2. Product: PROSOCO, Inc; Consolideck First Cut:
www.prosoco.com/consolideck/#sle.
- B. Repair Material: Low-odor, liquid fill material.
 - 1. VOC Content: 100 g/L or less.
 - 2. Product: PROSOCO, Inc; Consolideck Grind-N-Fill:
www.prosoco.com/consolideck/#sle.
- C. Cleaner: Pre-densifier concrete cleaner for new slab surfaces.
 - 1. Product: PROSOCO, Inc; Consolideck PreKlean:
www.prosoco.com/product/preklean/.

2.3 Densifiers and Hardeners

- A. Liquid Densifier and Hardener: Penetrating chemical compound, reacts with concrete, filling pores, hardening, and dustproofing.
 - 1. Composition: Lithium silicate.
 - 2. VOC Content: 50 g/L or less.
 - 3. Abrasion Resistance: Greater than 50 percent improvement compared to untreated sample in accordance with ASTM C1353/C1353M.
 - 4. Treated Material Slip Resistance: High traction range when tested according to ANSI/NFSI B101.1 and ANSI/NFSI B101.3.
 - 5. Adhesion: Greater than 10 percent increase in pull-off strength compared to untreated sample when tested according to ASTM D4541.
 - 6. Water Vapor Transmission: Zero perms compared to untreated sample when tested according to ASTM E96/E96M Method B.

7. UV Stability: No degradation or yellowing when tested in accordance with ASTM G154.
8. Product: PROSOCO, Inc; Consolideck LS: www.prosoco.com/consolideck/#sle.

2.4 Decorative Color

- A. Liquid Color Hardener: Penetrating chemical compound, reacts with concrete, enhancing color, and improved stain protection.
 1. Composition: Liquid Color.
 2. VOC Content: 100 g/L or less.
 3. pH: 6.5 to 9.5.
 4. UV Stability: No degradation or yellowing when tested in accordance with ASTM G154.
 5. Product: PROSOCO, Inc; Consolideck ColorHard:
www.prosoco.com/product/colorhard.

2.5 Coatings

- A. Coatings, General:
 1. Treated Material Slip Resistance: High traction range when tested according to ANSI/NFSI B101.1 and ANSI/NFSI B101.3.
 2. Stain Resistance: No adverse effect when tested according to ASTM D1308.
 3. UV Stability: No degradation or yellowing when tested according to ASTM G154.
- B. Clear Coating:
 1. Medium Gloss: Film forming protective treatment.
 - a. Product: PROSOCO, Inc; Consolideck PolishGuard:
www.prosoco.com/consolideck/#sle.
- C. Penetrating Sealer:
 1. Low Gloss: Solvent-based penetrating clear protective treatment.
 - a. VOC Content: 100 g/L or less.
 - b. Product: PROSOCO, Inc; Consolideck Concrete Protector SB:
www.prosoco.com/consolideck/#sle.

PART 3 EXECUTION

3.1 Installers

- A. Execute using manufacturer-approved installer:

3.2 Examination

- A. Verify that floor surfaces are clean and free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes and allow complete curing before application of concrete hardener and densifier. See Section 079200.

3.3 General

- A. Apply materials in accordance with manufacturer's instructions.

3.4 Curing of Concrete Slab

- A. See Section 033000.

3.5 Preparation

- A. Protect adjacent non-coated areas from drips, overflow, and overspray; avoid contact with metal, glass, and painted surfaces; immediately remove excess material.
- B. Correct variations in slab texture and color prior to application of hardener-densifier.

3.6 Concrete Polishing

- A. Grind and polish in multiple passes with each full pass in direction perpendicular to previous pass.
- B. Fill gaps, voids, and pop-outs during grinding operation.
- C. Apply densifier and hardener at specified rates and intervals.
- D. Final Polished Concrete Aggregate Exposure: Not to exceed CPC Class A - Cement Fines; cement fines, 85 to 95 percent; fine aggregates, 5 to 15 percent based on visual observation of overall area of polished floor versus Polished Concrete Aggregate Exposure Chart.
- E. Final Polished Concrete Appearance: CPC Level 2 - Satin, image clarity value 10 to 39 percent with haze index less than 10.

3.7 Protective Treatment

- A. Apply coatings in accordance with manufacturer's instructions. Match approved mock-ups for color, texture, sealing, and workmanship.

- B. Apply manufacturer's recommended protective treatment material to clean, dry slab after mechanically polishing.
 - 1. Medium gloss protective treatment:
 - a. Stop spreading treatment material when drying begins.
 - b. Avoid overlapping treatment material.
 - c. Repeat treatment up to two coats.
 - d. For increased gloss, allow final coat to dry before burnishing slab surface in accordance with manufacturer's recommendations.
- C. Clean spills on slab surfaces immediately, with manufacturer's recommended chemicals and absorptive materials.
- D. No haze, white residue, streaking, or burnish marks permitted.

3.8 Field Quality Control

- A. Defective Concrete: Repair or replace concrete not complying with required lines, details, dimensions, tolerances, or specified requirements at no additional cost to Owner.
- B. Final Polished Concrete Appearance: Test image clarity value and haze index prior to application of sealer at a rate of three tests per 1000 sq ft of polished concrete.
 - 1. Image clarity: Test with Image Clarity Meter in accordance with ASTM D5767.
 - 2. Haze index: Test with Glossmeter in accordance with ASTM D4039.
 - 3. Match approved mock-ups for texture, appearance, and workmanship.
- C. Prior to owner occupancy of the space, the contractor shall have the floor surface certified for slip resistance with NFSI complying with standard B101.1-2009 high traction with a 'wet' floor Static Coefficient of Friction (SCOF) greater than 0.6

3.9 Protection

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.
- B. Wash and rinse surfaces according to manufacturer's recommendations.
 - 1. Protect other work from staining or damage due to cleaning operations
 - 2. Do not use cleaning materials or processes that could change appearance of concrete finishes.

3.10 Schedule

	CUTTING AID	REPAIR MATERIAL	CLEANER	DENSIFIER	COLOR	COATING	SEALER
PCON-1	FIRST CUT	GRIND-N-FILL	PREKLEAN	LS	COLOR HARD	POLISH GUARD	CONCRETE PROTECTOR SB

PCON-2	FIRST CUT	GRIND-N-FILL	PREKLEAN	LS		POLISH GUARD	CONCRETE PROTECTOR SB
PCON-3	FIRST CUT	GRIND-N-FILL	PREKLEAN	LS	COLOR HARD	POLISH GUARD	CONCRETE PROTECTOR SB

END OF SECTION

SECTION 042000 - UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete block.
- B. Brick veneer.
- C. Mortar.
- D. Reinforcement and anchorage.
- E. Flashings.
- F. Accessories.

1.2 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2022.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
- D. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019.
- E. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2016, with Editorial Revision (2018).
- F. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.
- G. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2021.
- H. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2022.
- I. ASTM C91/C91M - Standard Specification for Masonry Cement; 2018.

- J. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2017.
- K. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2022b.
- L. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- M. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- N. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- O. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); 2022.
- P. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- Q. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
- R. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2020.
- S. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- T. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2019a.
- U. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- V. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls; 2017.
- W. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.
- X. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.
- Y. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

1.4 SUBMITTALS

- A. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

- B. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
- C. Samples: Submit in the form of straps of five or more samples of facing brick units to illustrate color, texture, and extremes of color range.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- E. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 MOCK-UPS

- A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.
- B. Locate where directed.
- C. Mock-up may remain as part of work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
 - 2. Special Shapes: Provide nonstandard blocks configured for corners.

3. Nonloadbearing Units: ASTM C129.
 - a. Hollow block, as indicated.
 - b. Lightweight.

2.2 BRICK UNITS

- A. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
 1. Products, both used see drawings for locations:
 - a. Brick Type 1: Belden Brick; Seal Brown Velour
 - b. Brick Type 2: Belden Brick; Concord Blend.
 2. Color and texture to match Architect's sample.
 3. Actual size: 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long..
 4. Special shapes: For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 5. Compressive strength: 3000 psi (20.7 MPa) , measured in accordance with ASTM C67/C67M.
 6. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67.
 7. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 8. Where shown to "match existing," provide face brick matching color range, texture, and size of existing adjacent brickwork.

2.3 MORTAR MATERIALS

- A. Types and Use Locations:
 1. Masonry below grade and in contact with earth: Type S.
 2. Exterior Cavity Walls: Type S mortar with Type N pointing mortar.
 3. Exterior, Non-loadbearing Masonry: Type N.
 4. Interior, Non-loadbearing Masonry: Type O.
- B. Masonry Cement: ASTM C91/C91M, Type N.
 1. Colored Mortar: Premixed cement as required to match Architect's color sample.
- C. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
 1. Not more than 0.60 percent alkali.
- D. Hydrated Lime: ASTM C207, Type S.
- E. Mortar Aggregate: ASTM C144.
- F. Grout Aggregate: ASTM C404.

- G. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
 - 1. Color(s): As selected by Architect from manufacturer's full range.
 - 2. Manufacturers:
 - a. Davis Colors, a division of Venator Materials PLC:
www.daviscolors.com/#sle.
 - b. Lambert Corporation: www.lambertusa.com/#sle.
 - c. Solomon Colors, Inc: www.solomoncolors.com/#sle.
- H. Water: Clean and potable.
- I. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
 - 1. Type: Type S.
 - 2. Color: Standard gray.

2.4 REINFORCEMENT AND ANCHORAGE

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed billet bars; galvanized.
- B. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- C. Single Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Truss or ladder.
 - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
 - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
- D. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Truss, with adjustable ties or tabs spaced at 16 in on center.
 - 2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M Class B.
 - 3. Size: 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire, width of components as required to provide not less than 5/8 inch of mortar coverage from each masonry face.
 - 4. Vertical adjustment: Not more than 1 1/4 inches.
 - 5. Basis of Design: Hohmann & Barnard 270-2X Ladder Eye-Wire Adjustable Reinforcement with 2X Hook.

- E. Strap Anchors: Bent steel shapes, 1-1/2 inch width, 0.105 inch thick, 24 inch length, with 1-1/2 inch long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M Class B.
- F. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.
 - 1. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
- G. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
 - 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
 - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
 - 3. Vertical adjustment: Not less than 3-1/2 inches.
 - 4. Basis of Design: Hohmann & Barnard, Inc. BL-407-w/VBT-Vee Byna-Tie.
- H. Metal-to-Metal Fasteners: Self-drilling, self-tapping screws; corrosion resistant finish or hot dip galvanized to ASTM A153/A153M.
 - 1. Manufacturers:
 - a. ITW Commercial Construction North America; Teks Select Series; _____: www.ITWBuildex.com/#sle.

2.5 FLASHINGS

- A. Combination Non-Asphaltic Flashing Materials - Stainless Steel:
 - 1. Stainless Steel/Polymer Fabric Flashing: ASTM A240/A240M; 2 mil type 304 stainless steel sheet bonded on one side to one sheet of polymer fabric.
 - a. Manufacturers:
 - 1) Hohmann & Barnard, Inc; Mighty-Flash Stainless Flashing: www.h-b.com/#sle.
 - 2) WIRE-BOND: www.wirebond.com/#sle.
 - 3) York Manufacturing, Inc; Multi-Flash SS: www.yorkmfg.com/#sle.
 - 4) Substitutions: See Section 016000 - Product Requirements.
- B. Termination Bars: Stainless steel; compatible with membrane and adhesives.
 - 1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - b. Mortar Net Solutions; Termination Bars: www.mortarnet.com/#sle.
 - c. York Manufacturing, Inc; Termination Bar: www.yorkmfg.com/#sle.

- d. Substitutions: See Section 016000 - Product Requirements.
- C. Drip Edge: Stainless steel; angled drip with hemmed edge; compatible with membrane and adhesives.
 - 1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - b. Mortar Net Solutions; Metal Drip Edges: www.mortarnet.com/#sle.
 - c. Substitutions: See Section 016000 - Product Requirements.
- D. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

2.6 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 - 1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
 - a. Manufacturers:
 - 1) Advanced Building Products, Inc; Mortar Break DT: www.advancedbuildingproducts.com/#sle.
 - 2) Mortar Net Solutions; MortarNet: www.mortarnet.com/#sle.
 - 3) York Manufacturing, Inc: www.yorkmfg.com/#sle.
 - 4) Substitutions: See Section 016000 - Product Requirements.
- C. Weeps:
 - 1. Type: Extruded propylene with honeycomb design.
 - 2. Color(s): As selected by Architect from manufacturer's full range.
 - 3. Manufacturers:
 - a. Advanced Building Products, Inc: www.advancedbuildingproducts.com/#sle.
 - b. Blok-Lok Limited: www.blok-lok.com/#sle.
 - c. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.

2.7 MORTAR MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 - 1. Masonry below grade and in contact with earth: Type S.
 - 2. Exterior, non-loadbearing masonry: Type N.
 - 3. Interior, non-loadbearing masonry: Type N.

- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.4 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.
- D. Brick Units:
 - 1. Bond: Running.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches.
 - 3. Mortar Joints: Concave.

3.5 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- F. Interlock intersections and external corners.
- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.6 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 32 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

3.7 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.8 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, and CAVITY WALL MASONRY

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Lap joint reinforcement ends minimum 6 inches.
- D. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.
- E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.
- F. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches with at least 5/8 inch mortar cover to the outside face of the anchor.

3.9 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 36 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.10 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at nonmasonry construction.
 - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Terminate flashing up 8 inches minimum on vertical surface of backing:
 - 1. Install vertical leg of flashing behind water-resistive barrier sheet over backing.
 - 2. Terminate vertical leg of flashing into bed joint in masonry or reglet in concrete.
 - 3. Anchor vertical leg of flashing into backing with a termination bar and sealant.
- C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.
- D. Extend metal flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.

- E. Support flexible flashings across gaps and openings.
- F. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.11 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joints as indicated on drawings; if not indicated, 3/4 inch wide and deep.
- D. Form expansion joint as detailed on drawings.

3.12 TOLERANCES

- A. Install masonry within the site tolerances found in TMS 402/602.

3.13 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

3.14 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.
- B. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C67/C67M requirements, sampling 5 randomly chosen units for each 50,000 installed.
- C. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.
- D. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.15 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

- D. Use non-metallic tools in cleaning operations.

3.16 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 042200 – STRUCTURAL UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mortar and grout.
- B. Reinforcement and anchorage.

1.2 RELATED REQUIREMENTS

- A. Section 079200 - Joint Sealants: Sealing control and expansion joints.

1.3 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.
- C. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2023.
- D. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- E. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- F. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- G. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- H. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
- I. ASTM C476 - Standard Specification for Grout for Masonry; 2023.
- J. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2019a.
- K. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, mortar, and masonry accessories.
- C. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. 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.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 FIELD 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 of walls, and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 PRODUCTS

2.1 UNIT MASONRY, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed work.
- B. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
- C. Materials
 - 1. Portland Cement: ASTM C 150, Type I or III. White and/or gray as required to match specified color.
 - 2. Coarse Aggregates: ASTM C 33, except for gradation. Granite, quartz, or limestone.
 - 3. Fine Aggregates: ASTM C 33, except for gradation. Manufactured or natural sands.

4. Pigments: ASTM C 979, except do not use carbon black pigments. Inorganic iron oxide pigments.
5. Water Reducing, Retarding, and Accelerating Admixtures: ASTM C 494.
6. Other admixtures: integral water repellents and other chemicals, for which no ASTM Standard exists, shall be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
7. Water: Potable.

2.2 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
 1. Not more than 0.60 percent alkali.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Mortar Aggregate: ASTM C144.
- D. Grout Aggregate: ASTM C404.
- E. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
 1. Color(s): To match existing, as selected by Architect from manufacturer's full range.
- F. Water: Clean and potable.
- G. Accelerating Admixture: Nonchloride type for use in cold weather.
- H. Integral Water Repellent Admixture for Mortar: Polymeric liquid admixture added to mortar at the time of manufacture.
 1. Use only in combination with masonry units manufactured with integral water repellent admixture.

2. Use only water repellent admixture for mortar from the same manufacturer as water repellent admixture in masonry units.
 3. Meet or exceed performance specified for water repellent admixture used in masonry units.
- I. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and as recommended by manufacturer for use in masonry mortar of composition indicated.
- J. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
1. Type: Types as scheduled in this section.
 2. Color: Mineral pigments added as required to produce approved color sample.
 3. Water-repellent mortar for use with water repellent masonry units.
- K. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.

2.3 REINFORCEMENT AND ANCHORAGE

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed billet bars; uncoated.
- B. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.

2.4 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
1. Manufacturers:

- a. Blok-Lok Limited: www.blok-lok.com.
 - b. Hohmann & Barnard, Inc: www.h-b.com/sle.
 - c. WIRE-BOND: www.wirebond.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.
- B. Joint Filler: Closed cell polyethylene; oversized 50 percent to joint width; self expanding; in maximum lengths available.
1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/sle.
 - b. WIRE-BOND: www.wirebond.com/#sle.
 - c. Substitutions: See Section 016000 - Product Requirements.

2.5 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
1. Masonry below grade and in contact with earth: Type M.
 2. Exterior, loadbearing masonry: Type S.
 3. Exterior, non-loadbearing masonry: Type S.
 4. Interior, loadbearing masonry: Type N.
 5. Interior, non-loadbearing masonry: Type O.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

- D. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.
- E. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.4 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.

3. Mortar Joints: Concave.

3.5 PLACING AND BONDING

- A. Lay hollow masonry units with face shell bedding on head and bed joints.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar and mortar smears as work progresses.
- D. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- E. Interlock intersections and external corners.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.6 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joints as indicated on drawings; if not indicated, 3/4 inch wide and deep.
- D. Form expansion joint as detailed on drawings.

3.7 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and anchor bolts and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout.

1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.8 TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- E. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

3.9 CUTTING AND FITTING

- A. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.10 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

3.11 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

3.12 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION 042200

SECTION 047200 - CAST STONE MASONRY

PART 1 GENERAL

1.1 Section Includes

- A. Architectural cast stone.
- B. Units required are:
 - 1. Exterior wall units, including wall caps, coping, sills, and headers and bases.

1.2 Reference Standards

- A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
- B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
- C. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2019.
- D. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2019, with Editorial Revision (2020).
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.
- F. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- G. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- H. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- I. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019, with Editorial Revision (2022).
- J. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 2021.
- K. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2023.

1.3 Submittals

- A. Product Data: Test results of cast stone components made previously by the manufacturer.
- B. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
- C. Mortar Color Selection Samples.
- D. Verification Samples: Pieces of actual cast stone components not less than 6 inches square, illustrating range of color and texture to be anticipated in components furnished for the project.
- E. Source Quality Control Test Reports.
- F. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.

1.4 Quality Assurance

- A. Manufacturer Qualifications:
 - 1. A firm with a minimum of 5 years experience producing cast stone of types required for project.
 - 2. Current producer member of the Cast Stone Institute or the Architectural Precast Association.
 - 3. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.

1.5 Delivery, Storage, and Handling

- A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.
- B. Number each piece individually to match shop drawings and schedule.
- C. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- D. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- E. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- F. Store mortar materials where contamination can be avoided.

- G. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

PART 2 PRODUCTS

2.1 Architectural Cast Stone

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural granite, complying with ASTM C1364.
 - 1. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.
 - 2. Freeze-Thaw Resistance: Demonstrated by laboratory testing in accordance with ASTM C1364.
 - 3. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet.
 - 4. Color: Match sample on file at Architect 's office.
 - 5. Remove cement film from exposed surfaces before packaging for shipment.
- B. Shapes: Provide shapes indicated on drawings.
 - 1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
 - 2. Unless otherwise indicated on drawings, provide:
 - a. Wash or slope of 1:12 on exterior horizontal surfaces.
 - b. Drips on projecting components, wherever possible.
 - c. Raised fillets at back of sills and at ends to be built in.
- C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI CODE-318.
 - 1. Pieces More than 24 inches in Any Dimension: Provide full length two-way reinforcement of cross-sectional area not less than 0.25 percent of unit cross-sectional area.

2.2 Materials

- A. Portland Cement: ASTM C150/C150M.
 - 1. For Mortar: Type I or II, except Type III may be used in cold weather.
- B. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.
- C. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.

- D. Admixtures: ASTM C494/C494M.
- E. Water: Potable.
- F. Reinforcing Bars: ASTM A615/A615M, Grade 40 (40,000 psi), deformed bars, galvanized.
 - 1. Galvanized in accordance with ASTM A767/A767M, Class I.
- G. Steel Welded Wire Reinforcement: ASTM A1064/A1064M, galvanized or ASTM A884/A884M, epoxy coated.
- H. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.
- I. Mortar: Portland cement-lime, as specified in Section 040511 ; do not use masonry cement.
- J. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

2.3 Source Quality Control

- A. Test compressive strength and absorption of specimens selected at random from plant production.
 - 1. Test in accordance with ASTM C642.
 - 2. Select specimens at rate of 3 per 500 cubic feet, with a minimum of 3 per production week.
 - 3. Submit reports of tests by independent testing agency, showing compliance with requirements.

PART 3 EXECUTION

3.1 Examination

- A. Examine construction to receive cast stone components. Notify Architect if construction is not acceptable.
- B. Do not begin installation until unacceptable conditions have been corrected.

3.2 Installation

- A. Install cast stone components in conjunction with masonry, complying with requirements of Section 042000.

- B. Mechanically anchor cast stone units indicated; set remainder in mortar.
- C. Setting:
 - 1. Drench cast stone components with clear, running water immediately before installation.
 - 2. Set units in a full bed of mortar unless otherwise indicated.
 - 3. Fill vertical joints with mortar.
 - 4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.

3.3 Tolerances

- A. Joints: Make all joints 3/8 inch, except as otherwise detailed.
 - 1. Rake mortar joints 3/4 inch for pointing.
 - 2. Remove excess mortar from face of stone before pointing joints.
 - 3. Point joints with mortar in layers 3/8 inch thick and tool to a slight concave profile.
 - 4. Leave the following joints open for sealant:
 - a. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
 - b. Joints in projecting units.
 - c. Joints between rigidly anchored units, including soffits, panels, and column covers.
 - d. Joints below lugged sills and stair treads.
 - e. Joints below ledge and relieving angles.
 - f. Joints labeled "expansion joint".
- B. Installation Tolerances:
 - 1. Variation from Plumb: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
 - 2. Variation from Level: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet, or 3/8 inch maximum.
 - 3. Variation in Joint Width: Not more than 1/8 inch in 36 inches or 1/4 of nominal joint width, whichever is less.
 - 4. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

3.4 Repair

- A. Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet.
- B. Repair with matching touch-up material provided by the manufacturer and in accordance with manufacturer's instructions.

- C. Repair methods and results subject to Architect 's approval.

3.5 Cleaning

- A. Keep cast stone components clean as work progresses.
- B. Clean completed exposed cast stone after mortar is thoroughly set and cured.
 - 1. Wet surfaces with water before applying cleaner.
 - 2. Apply cleaner to cast stone in accordance with manufacturer's instructions.
 - 3. Remove cleaner promptly by rinsing thoroughly with clear water.
 - 4. Do not use acidic cleaners.

3.6 Protection

- A. Protect completed work from damage.
- B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

END OF SECTION

SECTION 047300 - MANUFACTURED STONE MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mechanically attached lightweight synthetic stone veneer. Indicated on drawings as 'Stone Veneer'.
- B. Installation materials.
- C. Accessories.

1.2 REFERENCE STANDARDS

- A. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- B. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2019a.
- C. ASTM C1780 - Standard Practice for Installation Methods for Cement-Cased Adhered Masonry Veneer; 2020.
- D. ICC-ES AC51 - Acceptance Criteria for Adhered Manufactured Stone Masonry Veneer; 2018, with Editorial Revision (2021).
- E. NCMA (AMSV) - Installation Guide and Detailing Options for Compliance with ASTM C1780 for Adhered Manufactured Stone Veneer; Current Edition, Including All Revisions.
- F. NCMA TEK 20-01 - Key Installation Checkpoints for Manufactured Stone Veneer; 2014.
- G. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.4 SUBMITTALS

- A. Product Data: Provide data for AMSMV units, lightweight synthetic stone veneer, mortar, lath, rainscreen drainage material, and water-resistive barrier, including:
 - 1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.
 3. Color charts.
 4. Installation methods.
 - B. Shop Drawings: Submit detail drawings depicting proper installation and flashing techniques. Coordinate locations with those found on drawings.
 - C. Samples: Submit four samples of AMSMV units to illustrate color, texture, and extremes of color range.
 - D. Installer's Qualification Statement.
 - E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
 - F. Specimen Warranty.
- 1.5 QUALITY ASSURANCE
- A. Installer Qualifications: Company specializing in performing work of type specified, with at least five years of documented experience.
- 1.6 MOCK-UPS
- A. Construct mock-up panel 8 feet long by 6 feet high; include AMSMV, lightweight synthetic stone veneer, mortar, accessories, substrate, and representative wall openings.
 - B. Locate where directed.
 - C. Mock-up may remain as part of the work.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Store products in manufacturer's unopened packaging until ready for installation.
 - B. Prevent mechanical damage and contamination by other materials.
 - C. Protect products from precipitation combined with freezing temperatures. Do not install products with visible frozen moisture.
 - D. Protect Portland cement based materials from moisture and humidity. Store under cover off the ground in a dry location.
- 1.8 FIELD CONDITIONS
- A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Mechanically Attached Lightweight Synthetic Stone Veneer:
 - 1. Oldcastle Echelon; Franklin Stone Masonry Units.

2.2 MECHANICALLY ATTACHED LIGHTWEIGHT SYNTHETIC STONE VENEER

- A. Individual cast masonry units using mixture of polymers, lightweight aggregates, and color pigments to replicate appearance of dry stacked natural stone and designed to be face nailed to backing surface or adhered to cementitious substrate.
 - 1. Color, Texture, Range, Special Shapes: Smooth Face, Liberty Gray color.
 - 2. Anchors:
 - a. HB #433 Stone Anchor; stainless steel.
 - b. HB #435 Stone Anchor; stainless steel.
 - c. HB #444 Stone Anchor; stainless steel.

2.3 MORTAR APPLICATIONS

- A. Use only factory premixed packaged dry materials for mortar, with addition of water only at project site.
 - 1. Exception: If a specified mix design is not available in a premixed dry package, provide equivalent mix design using standard non-premixed materials.
- B. Mortar Color: Color to be selected by Architect.

2.4 MORTAR MIXES

- A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
 - 1. Type: Type S.
 - 2. Color: Standard gray.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. Mixing: Use mechanical batch mixer and comply with referenced standards.

2.5 ACCESSORIES

- A. Cleaning Solution: Non-acidic, not harmful to AMSMV work or adjacent materials, approved by AMSMV manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that backup wall system construction complies with AMSMV manufacturer's instructions, NCMA (AMSV), NCMA TEK 20-01, ASTM C1780 and ICC-ES AC51.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for installation of AMSMV.

3.2 PREPARATION

- A. Clean concrete surfaces of foreign matter using approved acid solutions, solvents, or detergents, and then rinse surfaces thoroughly with clean water.

3.3 INSTALLATION - MECHANICALLY ATTACHED LIGHTWEIGHT SYNTHETIC STONE VENEER

- A. Install mechanically attached lightweight synthetic stone veneer in accordance with manufacturer's instructions, subject to conditions of ICC-ES Evaluation Report ESR-2859.
- B. Windows, Doors and Wall Openings: Butt lightweight synthetic stone veneer units to wall opening.
- C. Sills: Install sills where located on drawings.
- D. Caps: Install capstones where located on drawings.
- E. Seal joints at wall openings and penetrations with sealant approved for use with lightweight synthetic stone veneer.

3.4 INSTALLATION - MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
- B. Extend metal flashings through exterior face of AMSMV and terminate in an angled drip with hemmed edge.
- C. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.5 CONTROL AND EXPANSION JOINTS

- A. Form joints as detailed on drawings.

3.6 TOLERANCES

- A. Maximum Variation from Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.
- C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet.
- E. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

3.7 CUTTING AND FITTING

- A. Cut and fit for pipes and conduit. Coordinate with other sections of work to provide correct size, shape, and location.

3.8 CLEANING

- A. Remove excess mortar and mortar smears as work progresses.
- B. Replace defective mortar. Match adjacent work.
- C. Clean AMSMV in accordance with manufacturer's installation instructions.
- D. Clean soiled surfaces with cleaning solution.
- E. Use non-metallic tools in cleaning operations.

3.9 PROTECTION

- A. Protect finished work from rain during and for 48 hours following installation.
- B. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

This page intentionally left blank

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural steel framing members.
- B. Structural steel support members and struts.
- C. Base plates, shear stud connectors and expansion joint plates.
- D. Grouting under base plates.
- E. Structural Cast components
- F. Thermal break pads and coatings

1.2 RELATED REQUIREMENTS

- A. Section 053100 - Steel Decking: Support framing for small openings in deck.
- B. Section 055000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.3 REFERENCE STANDARDS

- A. AISC (MAN) - Steel Construction Manual; 2023.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2022.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- E. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2018.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- G. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2021a.

- H. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2021a.
- I. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2021, with Editorial Revision.
- J. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2022.
- K. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.
- L. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2019.
- M. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2023.
- N. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2019.
- O. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.
- P. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- Q. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.
- R. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- S. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- T. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2020.
- U. SSPC-SP 3 - Power Tool Cleaning; 2018.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
 - 2. Connections not detailed.
 - 3. Indicate cambers and loads.
 - 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Shop Drawings for custom designed castings: Provide project specific, scaled, stamped engineered shop drawings and calculations including:
 - 1. Design, detail and engineer castings including establishing interior and exterior dimensions and the preparation of casting specifications including material selection, non-destructive examination requirements, and all casting production parameters.
- D. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
- E. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.
- F. Fabricator Test Reports: Comply with ASTM A1011/A1011M.
- G. Materials Test Reports: Submit independent test results or engineered performance analysis of structural thermal-break pad performance in bearing or slip-critical connections where shear and moment loads are applied.
- H. Product Test Reports:
 - 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 2. Direct-tension indicators.

3. Tension-control, high-strength, bolt-nut-washer assemblies.
 4. Shear stud connectors.
 5. Shop primers.
 6. Nonshrink grout.
 7. Post-Installed Anchors
 8. Thermal break material
- I. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- J. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:
1. Power source (constant current or constant voltage).
 2. Electrode manufacturer and trade name, for demand critical welds.
- K. Designer's Qualification Statement.
- L. Fabricator's Qualification Statement.

1.5 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
- B. Fabricator: Company specializing in performing the work of this section with minimum 20 years of documented experience.
- C. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.

1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.
- D. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
- E. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Angles and Plates: ASTM A36/A36M.
- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. Rolled Steel Structural Shapes: ASTM A992/A992M.
- D. Steel Plates and Bars: ASTM A572/A572M, Grade 50 (345) high-strength, columbium-vanadium steel.
- E. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade C.
- F. Pipe: ASTM A53/A53M, Grade B, Finish black.
- G. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.
- H. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.
- I. Tension Control Bolts: Twist-off type; ASTM F3125/F3125M.
- J. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563 or ASTM A563M nuts and ASTM F436/F436M Type 1 washers.
- K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

- L. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
 - 2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
- M. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
- N. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
- O. TNEMEC Aerolon 971 Thermal Break Paint: Apply to steel at all locations where steel framing breaks the plane of the thermal envelope.

2.2 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- C. Fabricate connections for bolt, nut, and washer connectors.

2.3 FINISH

- A. Prepare structural component surfaces in accordance with SSPC-SP 3, unless noted otherwise as AESS thus requiring more stringent surface preparation.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or coated with TNEMEC Aerolon thermal break paint.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.2 ERECTION

- A. Erect structural steel in compliance with AISC 303.
- B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Field weld components and shear studs indicated on shop drawings.
- D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".
- E. Do not field cut or alter structural members without approval of Architect.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.3 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.
- B. Welded Connections: Visually inspect all field-welded connections per Statement of Special Inspections, and physically test all complete joint penetration groove welds (CJP), using the following:
 - 1. Ultrasonic testing performed in accordance with ASTM E164.

END OF SECTION 051200

SECTION 052100 - STEEL JOIST FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Open web steel joists, with bridging, attached seats and anchors.

1.2 RELATED REQUIREMENTS

- A. Section 051200 - Structural Steel Framing: Grouting base plates and bearing plates. Superstructure framing.
- B. Section 053100 - Steel Decking: Bearing plates and angles.
- C. Section 055000 - Metal Fabrications: Non-framing steel fabrications attached to joists.
- D. Section 078100 - Applied Fire Protection: Fireproof protection of joist framing and metal deck systems.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2018.
- C. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014, with Editorial Revision (2017).
- D. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.
- E. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).
- F. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019.

- G. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2019.
- H. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).
- I. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- J. FM (AG) - FM Approval Guide; current edition.
- K. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2018.
- L. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2014, with Errata (2015).
- M. SJI 100 - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2011.
- N. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders; 2008.
- O. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- P. SSPC-SP 2 - Hand Tool Cleaning; 2018.
- Q. SSPC-SP 3 - Power Tool Cleaning; 2018.
- R. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, and attachments.
- C. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

- D. Designer's Qualification Statement.
- E. Manufacturer's Qualification Statement.
- F. Fabricator's Qualification Statement.
- G. Erector's Qualification Statement.

1.5 QUALITY ASSURANCE

- A. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Perform Work, including that for headers and other supplementary framing, in accordance with SJI 100 Standard Specifications Load Tables and SJI Technical Digest No. 9.
- C. Design and Installation Requirements: Comply with UL Assembly Design No. P710 where indicated on drawings.
- D. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.
- E. Erector Qualifications: Company specializing in performing the work of this section with minimum 10 years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Transport, handle, store, and protect products to SJI requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Steel Joists:
 - 1. Canam Group Inc
 - 2. Nucor-Vulcraft Group

3. New Millennium Building Systems
4. Substitutions: See Section 016000 - Product Requirements.

2.2 MATERIALS

- A. Open Web Joists: SJI Type K Joists:
 1. Provide bottom chord extensions as indicated.
 2. Minimum End Bearing on Steel Supports: Comply with referenced SJI standard.
 3. Minimum End Bearing on Concrete or Masonry Supports: Comply with referenced SJI standard.
- B. Open Web Joists: SJI 100 Type LH Joists:
 1. Provide bottom chord extensions as indicated.
 2. Minimum End Bearing on Steel Supports: Comply with referenced SJI standards.
- C. Open Web Joists: SJI 100 Type DLH Joists:
 1. Minimum End Bearing on Masonry or Concrete Supports: Comply with referenced SJI standards.
- D. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.
- E. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A36/A36M.
- F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.3 FABRICATION

- A. Frame special sized openings in joist web framing as detailed.

2.4 FINISH

- A. Shop prime joists as specified.
 - 1. Do not prime surfaces that will be fireproofed.
- B. Prepare surfaces to be finished in accordance with SSPC-SP 2.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.2 ERECTION

- A. Erect joists with correct bearing on supports.
- B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.
- C. Coordinate the placement of anchors for securing loose bearing members furnished as part of the work of this section.
- D. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.
- E. Install supplementary framing for floor and roof openings greater than 18 inches.
- F. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.
- G. Do not field cut or alter structural members without approval of joist manufacturer.
- H. After erection, prime welds, damaged shop primer, damaged galvanizing, and surfaces not shop primed , except surfaces specified not to be primed.

3.3 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

END OF SECTION 052100

SECTION 053100 - STEEL DECKING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof deck.
- B. Composite floor deck.
- C. Supplementary framing for openings up to and including 18 inches.
- D. Bearing plates and angles.
- E. Acoustical insulation in roof deck flutes.

1.2 RELATED REQUIREMENTS

- A. Section 032000 - Concrete Reinforcing.
- B. Section 033000 - Cast-in-Place Concrete: Concrete topping over metal deck.
- C. Section 042000 - Unit Masonry: Placement of anchors for bearing plates embedded in unit masonry assemblies.
- D. Section 051200 - Structural Steel Framing: Support framing for openings larger than 18 inches and shear stud connectors.
- E. Section 051200 - Structural Steel Framing: Placement of embedded steel anchors for bearing plates in cast-in-place concrete.
- F. Section 052100 - Steel Joist Framing: Support framing for openings larger than 18 inches and shear stud connectors.
- G. Section 052100 - Steel Joist Framing: Placement of embedded steel anchors for bearing plates and joist seats in cast-in-place concrete.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- C. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- D. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- E. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- F. ICC-ES AC70 - Acceptance Criteria for Power-Actuated Fasteners Driven into Concrete, Steel and Masonry Elements; 2019, with Editorial Revision (2021).
- G. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.
- H. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- I. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- C. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
- D. Certificates: Certify that products furnished meet or exceed specified requirements.
- E. Submit manufacturer's installation instructions.
- F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
- G. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Cut plastic wrap to encourage ventilation.
- B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Steel Deck:
 - 1. Nucor-Vulcraft Group; ____: www.vulcraft.com/#sle.
 - 2. New Millennium Building Systems: www.newmill.com/.
 - 3. Substitutions: See Section 016000 - Product Requirements.

2.2 STEEL DECK

- A. Acoustic Roof Deck: Non-composite type, fluted steel sheet:
 - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 40/275, with G90/Z275 galvanized coating.
 - 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
 - 3. Structural Properties: As Indicated.
 - a. Span Design: Multiple.
 - 4. Minimum Base Metal Thickness: 18 gauge, .0474 inch.
 - 5. Nominal Height: 2 inch.

6. Profile: Fluted, Dovetail.
 7. Formed Sheet Width: 24 inch.
 8. Side Joints: Lapped, mechanically fastened.
 9. End Joints: Lapped, welded.
- B. Composite Dovetail Floor Deck: Fluted steel sheet embossed to interlock with concrete:
1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 50/340, Class 1, 2, or 4, with G60/Z180 galvanized coating.
 - a. 50 ksi yield strength.
 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
 3. Structural Properties: As Indicated.
 4. Span Design: Triple.
 5. Minimum Base Metal Thickness: 18 gauge, .0474 inch.
 6. Nominal Height: 3 1/2 inches.
 7. Profile: Fluted, Dovetail.
 8. Formed Sheet Width: 24 inch.
 9. Side Joints: Lapped, mechanically fastened.
 10. End Joints: Lapped, welded.
- C. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 50/340, Class 1, 2, or 4, with G60/Z180 galvanized coating.
 - a. 50 ksi yield strength.

2. Structural Properties: As Indicated.
3. Span Design: Triple.
4. Minimum Base Metal Thickness: 18 gauge, .0474 inch.
5. Nominal Height: 2 inches.
6. Profile: Fluted, SDI WR.
7. Formed Sheet Width: 36 inch.
8. Side Joints: Lapped, mechanically fastened.
9. End Joints: Lapped, welded.

2.3 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A36/A36M steel, galvanized per ASTM A123/A123M.
- B. Stud Shear Connectors: Made from ASTM A108 Grade 1015 bars.
- C. Welding Materials: AWS D1.1/D1.1M.
- D. Fasteners: Galvanized hardened steel, self tapping.
- E. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
- F. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
 1. Design Requirements for Sidelap Connections: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and ICC-ES AC43.
- G. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.
- H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

- J. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft density; profiled to suit deck.

2.4 FABRICATED DECK ACCESSORIES

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gauge, 0.0299 inch thick sheet steel; of profile and size as indicated; finished same as deck.
- B. Valley and ridge plates, gauge and location as indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On concrete and masonry surfaces provide minimum 4 inch bearing.
- C. All steel deck has been designed to be continuous over three spans minimum, and shall bear at least 1 ½ inches on steel supports. For one or two span conditions, the Contractor shall provide shoring as required, or furnish higher gage deck as required to support all the applicable loads. Contractor shall submit alternate for approval. Contractor shall ensure that construction loads on steel deck do not exceed SDI published construction load criteria.
- D. At mechanically fastened male/female side laps fasten at 24 inches on center maximum.
- E. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.
- F. Weld deck in accordance with AWS D1.3/D1.3M.
- G. Locate deck bundles to prevent overloading of supporting members.

- H. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- I. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- J. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- K. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- L. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- M. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. mechanically fasten to substrate to provide a complete deck installation.
 - 1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.
- N. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.
- O. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.
- P. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.
- Q. Install piercing hanger tabs at 14 inches apart in both directions, within 9 inches of walls at ends, and not more than 12 inches from walls at sides unless otherwise indicated.

- R. At deck openings from 6 inches to 18 inches in size, provide 2 by 2 by 1/4 inch steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.
- S. At deck openings greater than 18 inches in size, provide steel angle reinforcement. as specified in Section 051200.
- T. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.
- U. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.
- V. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.
- W. Weld stud shear connectors through steel deck to structural members below.
- X. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

END OF SECTION 053100

SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Formed steel stud exterior wall and interior wall framing.
- B. Formed steel stud soffits, fascias, and ceiling assemblies.

1.2 RELATED REQUIREMENTS

- A. Section 053100 - Steel Decking.

1.3 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2012.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- D. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members; 2018, with Editorial Revision.
- E. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- F. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.

- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- C. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
- D. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
 - 1. Indicate stud and ceiling joist layout.
 - 2. Describe method for securing studs to tracks and for bolted framing connections.
 - 3. Design data:
 - a. Design Calculations and Shop drawings signed and sealed by a professional structural engineer.
 - 4. Calculations for loadings and stresses of specially fabricated framing, signed and sealed by a professional structural engineer.
 - 5. Details and calculations for factory-made framing connectors, signed and sealed by a professional structural engineer.
- E. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention .
- F. Designer's Qualification Statement.
- G. Manufacturer's Qualification Statement.
- H. SSMA Manufacturer Qualification: Submit documentation of manufacturer association membership.

1.6 QUALITY ASSURANCE

- A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.
- C. Manufacturer Qualifications: Member of Steel Stud Manufacturers Association (SSMA): www.ssma.com/#sle.
- D. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Metal Framing:
 - 1. ClarkDietrich; ____: www.clarkdietrich.com/#sle.
 - 2. Marino; ____: www.marinoware.com/#sle.
 - 3. The Steel Network, Inc; ____: www.SteelNetwork.com/#sle.
 - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Framing Connectors and Accessories:
 - 1. Same manufacturer as metal framing.

2.2 FRAMING SYSTEM

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Design Requirements: Provide completed framing system having the following characteristics:
 - 1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100-12.

2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
3. Design Loads: In accordance with applicable codes.
 - a. Wind Loads: As indicated.
4. Live load deflection meeting the following, unless otherwise indicated:
 - a. Exterior Walls: Maximum horizontal deflection under wind load of 1/240 of span, or 1/600 for walls with brick/stone veneer or EIFS.
 - b. Design non-axial loadbearing framing to accommodate not less than 1 vertical deflection.
5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

2.3 FRAMING MATERIALS

- A. Studs and Track: ASTM C955; studs formed to channel, C- or Sigma-shaped with punched web; U-shaped track in matching nominal width and compatible height.
 1. Gauge and Depth: As indicate on drawings, or if not indicated, as required to meet specified performance levels.
 2. Galvanized in accordance with ASTM A653/A653M, G90/Z275 coating.
- B. Jamb Studs: Engineered, C-shaped with wide flanges, designed to replace conventional double-stud framing at openings.
- C. Header: Engineered one-member or two-member assembly, with wide flanges, designed to replace conventional box or nested header framing at openings.
 1. Jamb Mounting Clips: Manufacturer's standard.
- D. Framing Connectors: Factory-made, formed steel sheet.

1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gauge, 0.1345 inch, and factory punched holes and slots.
2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
3. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
 - a. Where continuous studs bypass elevated floor slab, connect stud to slab in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1 inch.
 - b. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1 inch.
 - c. Provide top track with long leg track and head of wall movement connectors; minimum track length of 10 feet.
4. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.
5. Wall Stud Bridging Connections: Provide mechanical load-transferring devices that accommodate wind load torsion and weak axis buckling induced by axial compression loads. Provide bridging connections where indicated on the drawings.

2.4 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
- B. Anchorage Devices: Powder actuated.

- C. Welding: Comply with AWS D1.1/D1.1M.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify field measurements and adjust installation as required.

3.2 INSTALLATION OF STUDS

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using clip and tie method.
- D. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- E. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- F. Install intermediate studs above and below openings to align with wall stud spacing.
- G. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- H. Attach cross studs to studs for attachment of fixtures anchored to walls.
- I. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- J. Touch-up field welds and damaged galvanized surfaces with primer.

END OF SECTION 054000

SECTION 055000 - METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop fabricated steel items.
- B. Steel Bollards.
- C. Miscellaneous item fabricated.

1.2 REFERENCE STANDARDS

- A. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- H. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing; 2021.
- I. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- J. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
- K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

- L. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.
- M. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).
- N. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).
- O. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- P. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- B. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

1.4 QUALITY ASSURANCE

- A. Design _____ under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Stainless Steel, General: ASTM A666, Type 304.

- F. Stainless Steel Tubing: ASTM A554, Type 304, 16 gauge, 0.0625 inch minimum metal thickness, 1-1/2 inch diameter.
- G. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.
- H. Slotted Channel Fittings: ASTM A1011/A1011M.
- I. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- J. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- L. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- M. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FABRICATED ITEMS

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; galvanized finish.
- C. Lintels: As detailed; galvanized finish.
- D. Door Frames for Overhead Door Openings and Wall Openings: Channel sections; prime paint finish.
- E. Elevator Hoistway Divider Beams: Beam sections; prime paint finish.

- F. Slotted Channel Framing: Fabricate channels and fittings from structural steel complying with the referenced standards; factory-applied, rust-inhibiting thermoset acrylic enamel finish.

2.4 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry, or as indicated.
- B. Prime Painting: One coat.
- C. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- D. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.
- E. Slotted Channel Framing: ASTM A653/A653M, Grade 33.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

This page intentionally left blank

SECTION 055100 - METAL STAIRS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Stairs with concrete treads.
- B. Structural steel stair framing and supports.
- C. Shop primed, field painted.

1.2 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Include the design engineer's seal and signature on each sheet of shop drawings.
- B. Design Data: As required by authorities having jurisdiction.
- C. Design Data, Seismic Performance: Submit documentation that stairs meet performance requirements specified.
- D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- E. Designer's Qualification Statement.
- F. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is certified under AISC 201, or
- G. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.3 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.

- B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and dated no more than 12 months before start of scheduled welding work.
- C. Fabricator Qualifications:
 - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201, or
 - 2. A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.

PART 2 PRODUCTS

2.1 METAL STAIRS - GENERAL

- A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
 - 1. Regulatory Requirements: Provide stairs and railings that comply with most stringent requirements of local, state, and federal regulations; where requirements of Contract Documents exceed those of regulations, comply with Contract Documents.
 - 2. Handrails: Comply with applicable accessibility requirements of ADA Standards.
 - 3. Structural Design: Provide complete stair and railing assemblies that comply with the applicable local code.
 - 4. Dimensions: As indicated on drawings.
 - 5. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
 - 6. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
 - 7. Separate dissimilar metals using paint or permanent tape.
- B. Metal Jointing and Finish Quality Levels:
 - 1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
 - a. Welded Joints: Continuously welded and ground smooth and flush.
 - b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
 - c. Exposed Edges and Corners: Eased to small uniform radius.
 - d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.

- C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.2 METAL STAIRS WITH CONCRETE TREADS

- A. Jointing and Finish Quality Level: Architectural, as defined above.
- B. Risers: Closed.
- C. Treads: Metal pan with field-installed concrete fill.
 - 1. Concrete Depth: 1-1/2 inches, minimum.
 - 2. Precast Concrete Treads:
 - a. Concrete Strength: 5,000 psi at 28 days, minimum.
 - b. Air Content: 4 to 6 percent.
 - c. Cement Color: Natural gray.
 - 3. Tread Pan Material: Steel sheet.
 - 4. Tread Pan Thickness: As required by design; 14 gauge, 0.075 inch minimum.
 - 5. Concrete Reinforcement: Welded wire mesh.
 - 6. Concrete Finish: Steel troweled.
- D. Risers: Same material and thickness as tread pans.
 - 1. Nosing Depth: Not more than 1-1/2 inch overhang.
 - 2. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch wide.
- E. Stringers: Rolled steel channels.
 - 1. Stringer Depth: as indicated.
 - 2. End Closure: Sheet steel of same thickness as risers welded across ends.
- F. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.
- G. Finish: Shop- or factory-prime painted.
- H. Under Side of Stair: Exposed to view, to be finished same as specified for other exposed to view surfaces.

2.3 MATERIALS

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Plates: ASTM A6/A6M or ASTM A283/A283M.

- C. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
 - 1. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Designation CS (commercial steel).
 - 2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel).
- D. Concrete Fill: Portland cement Type I, 3000 psi 28 day strength, 2 to 3 inch slump, unless otherwise specified.
- E. Concrete Reinforcement: Mesh type as detailed, galvanized.

2.4 ACCESSORIES

- A. Steel Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, and galvanized to ASTM A153/A153M where connecting galvanized components.
- B. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- C. Shop and Touch-Up Primer: SSPC-Paint 15, and comply with VOC limitations of authorities having jurisdiction.

2.5 SHOP FINISHING

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime Painting: Use specified shop- and touch-up primer.
 - 1. Preparation of Steel: In accordance with SSPC-SP 2 Hand Tool Cleaning.
 - 2. Number of Coats: One.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. When field welding is required, clean and strip primed steel items to bare metal.
- B. Supply items required to be cast into concrete and embedded in masonry with setting templates.

3.3 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.
- C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
- F. Obtain approval prior to site cutting or creating adjustments not scheduled.
- G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

This page intentionally left blank

SECTION 055133 - METAL LADDERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop-fabricated metal ladders, galvanized including all components.

1.2 REFERENCE STANDARDS

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008 (Reaffirmed 2018).
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- H. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- I. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).
- K. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).
- L. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- M. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- N. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

- O. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- B. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- C. Designer's Qualification Statement.
- D. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.4 QUALITY ASSURANCE

- A. Design ladder under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.
- C. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Mechanical Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

- F. Bolts, Nuts, and Washers: ASTM A307, plain.
- G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by intermittent welds and plastic filler.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FABRICATED LADDERS

- A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish. Provide as follows unless otherwise detailed.
 - 1. Side Rails: 3/8 by 2 inches members spaced at 20 inches.
 - 2. Rungs: One inch diameter solid round bar spaced 12 inches on center.
 - 3. Space rungs 7 inches from wall surface.
 - 4. Steel safety change, as detailed and indicated.

2.4 FINISHES - STEEL

- A. Prime paint steel items.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.

- E. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.5 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

This page intentionally left blank

SECTION 055213 - PIPE AND TUBE RAILINGS

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. Steel pipe and tube railings for interior.
 - 2. Stainless-steel pipe and tube handrails for interior.
 - 3. Including but not limited to miscellaneous steel components for Decorative Railing System.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for 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.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Manufacturer's product lines of mechanically connected railings.
 - 2. Railing brackets.
 - 3. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
 2. Fittings and brackets.
 3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.
 - a. Show method of connecting and finishing members at intersections.
- D. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Welding certificates.
- C. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.
- E. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.
- F. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Steel Source: All steel specified in the Section shall be produced or made in North America.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."
- C. Welded Joint Finish Guidelines:
 1. NOMMA Standards, "Finish #1" required for all railings.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of railing from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
 - b. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C, material surfaces).

2.3 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
 - 1. Provide type of bracket with predrilled hole for exposed bolt anchorage and that provides 1-1/2-inch (38-mm) clearance from inside face of handrail to finished wall surface.

2.4 STEEL AND IRON

- A. Tubing: ASTM A 500 (cold formed) or ASTM A 513.
- B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- C. Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.5 STAINLESS STEEL

- A. Tubing: ASTM A 554, Grade MT 304.
- B. Pipe: ASTM A 312/A 312M, Grade TP 304.
- C. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.
- D. Plate and Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.

2.6 FASTENERS

- A. General: Provide the following:
 - 1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5 for zinc coating.
 - 2. Stainless-Steel Railings: Type 304 stainless-steel fasteners.
 - 3. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
 - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
 - 2. Provide Phillips square or hex socket flat-head machine screws for exposed fasteners.
- D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
 - 1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.

2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.7 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
 1. For stainless-steel railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- B. Shop Primers: Provide primers that comply with finish paint system.
- C. Intermediate Coats and Topcoats: Provide products that comply with Section 099600 "High-Performance Coatings."
- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.8 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings 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.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

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.
 - a. Finish welds per NOMMA standard Finish #1.
- I. Form Changes in Direction as Follows:
1. By bending or by inserting prefabricated elbow fittings.
- J. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- 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 rail and wall is 1/4 inch (6 mm) or less.
- M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- O. For railing posts set in concrete, provide stainless-steel sleeves not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (13 mm) greater than outside dimensions of post, with metal plate forming bottom closure.
- P. Woven-Wire Mesh Infill Panels: Fabricate infill panels from woven-wire mesh crimped into 1-by-1/2-by-1/8-inch (25-by-13-by-3-mm) metal channel frames. Make wire mesh and frames from same metal as railings in which they are installed.
1. Orient wire mesh with wires perpendicular and parallel to top rail.
- Q. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.9 STEEL AND IRON FINISHES

- A. For nongalvanized-steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves; however, galvanize anchors to be embedded in exterior concrete or masonry.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 1. Railings Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- C. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
 - 1. Shop prime uncoated railings with primers compatible with finish paint system.

2.10 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines, or blend into finish.
- B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- C. Directional Satin Finish: No. 4.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that are 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 (2 mm in 1 m).

3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (6 mm in 3.5 m).
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

3.4 ANCHORING POSTS

- A. Form or core-drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Cover anchorage joint with flange of same metal as post, attached to post with set screws.
- C. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
 1. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.

3.5 ATTACHING RAILINGS

- A. Anchor railing ends at walls with round flanges anchored to wall construction and welded to railing ends or connected to railing ends using nonwelded connections.
- B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends or connected to railing ends using nonwelded connections.
- C. Attach railings to wall with wall brackets, except where end flanges are used. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

- D. Secure wall brackets and railing end flanges to building construction as follows:
 - 1. For concrete and 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 partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.

3.6 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 requirements for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099600 "High-Performance Coatings."

3.7 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION

This page intentionally left blank

SECTION 057300 - DECORATIVE METAL RAILINGS

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. Steel decorative railings with punched steel sheet forming railings.
 - 2. Stainless Steel handrail, brackets and fasteners specified in Section 055213 Pipe and Tube Railing.
 - 3. Steel support brackets, vertical supports, welding of supports specified in Section 055213 Pipe and Tube Railing.

1.3 DEFINITIONS

- A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas and for pedestrian guidance and support, visual separation, or wall protection.

1.4 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for 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 items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not meet structural performance requirements.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Manufacturer's product lines of railings assembled from standard components.

- B. Shop Drawings: Include plans, elevations, sections, and attachment details.
- C. Samples for Verification: For each type of exposed finish required.

1.7 QUALITY ASSURANCE

- A. Steel Source: All steel specified in the Section shall be produced or made in North America, excluding the decorative punched steel sheet.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockups for each form and finish of railing consisting of two vertical support posts, handrailing, perforated guardrailing, and anchorage system components that are full height and are not less than 24 inches (600 mm) in length.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 PRODUCTS

- A. Steel Decorative Railings System:
 - 1. McNichols; Circle pattern 1/2" oc, staggered, 3/8" diameter, 16 gage, cold rolled steel.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for system's 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 structural analysis, 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.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Refer to Section 055213 Pipe and Tube Railing.
- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
 - 1. Steel: 72 percent of minimum yield strength.
- C. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior railings by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.3 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

2.4 STEEL AND IRON FOR RAILING SYSTEM

- A. Perforated Metal: Cold-rolled steel sheet, ASTM A 1008/A 1008M, or hot-rolled steel sheet, ASTM A 1011/A 1011M, commercial steel Type B, 0.074 inch thick, with custom design perforations.

2.5 FASTENERS

- A. Fastener Materials: Unless otherwise indicated, provide the following:
 - 1. Type 304 stainless-steel fasteners.

2.6 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form work true to line and level with accurate angles and surfaces.
- D. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- E. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- F. Connections: Fabricate railings with nonwelded connections unless otherwise indicated.

2.7 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 STEEL AND IRON FINISHES

- A. Powder-Coat Finish: Prepare, treat, and coat nongalvanized ferrous metal to comply with resin manufacturer's written instructions and as follows:
 - 1. Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Treat prepared metal with iron-phosphate pretreatment, rinse, and seal surfaces.
 - 3. Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils (0.04 mm).
 - 4. Color: Match Architect's sample.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.

- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of 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.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

3.2 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

3.3 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at 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 the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

This page intentionally left blank

SECTION 057500 - DECORATIVE FORMED METAL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior fabrications made of formed metal sheet, secondary supports, and anchors to structure, including:
 - 1. Factory fabricated column covers.

1.2 REFERENCE STANDARDS

- A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- D. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- E. ASTM D523 - Standard Test Method for Specular Gloss; 2014 (Reapproved 2018).
- F. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2023.
- G. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2023.
- H. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).
- I. AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel; 2017, with Amendment (2021).
- J. NAAMM AMP 500-06 - Metal Finishes Manual; 2006.

1.3 SUBMITTALS

- A. Product Data - Sheet Metal Material: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.
 3. Installation methods.
 4. Specimen warranty.
- B. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, number of anchors, supports, reinforcement, trim, flashings, and accessories.
1. Differentiate between shop and field fabrication.
 2. Indicate substrates and adjacent work with which the fabrications must be coordinated.
 3. Include large-scale details of anchorages and connecting elements.
- C. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- D. Installer's Qualification Statement.
- E. Maintenance Data: Care of finishes and warranty requirements.
- F. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating products specified in this section.
1. With not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section.
1. With minimum 3 years of documented experience.
- C. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.6/D1.6M no more than 12 months before start of scheduled welding work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
1. Protect finishes by applying heavy duty removable plastic film during production.
 2. Package for protection against transportation damage.
 3. Provide markings to identify components consistently with drawings.
 4. Exercise care in unloading, storing and installing panels to prevent bending, warping, twisting and surface damage.

- B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
 - 1. Store in well-ventilated space out of direct sunlight.
 - 2. Protect from moisture and condensation with tarpaulins or other suitable weathertight covering installed to provide ventilation.
 - 3. Store at a slope to ensure positive drainage of accumulated water.
 - 4. Do not store in enclosed space where ambient temperature can exceed 120 degrees F.
 - 5. Avoid contact with other materials that might cause staining, denting, or other surface damage.

1.6 WARRANTY

- A. Manufacturer's Finish Warranty: Provide manufacturer's written warranty stating that the finish will perform as follows for minimum of 5 years:
 - 1. Chalking: No more than that represented by a No.8 rating based on ASTM D4214.
 - 2. Color Retention: No fading or color change in excess of 5 Hunter color difference units, calculated in accordance with ASTM D2244.
 - 3. Gloss Retention: Minimum of 30 percent gloss retention, when tested in accordance with ASTM D523.

PART 2 PRODUCTS

2.1 FORMED METAL FABRICATIONS - GENERAL

- A. Shop Assembly: Preassemble items to greatest extent possible. Minimize field splices and field assembly. Disassemble only as necessary for transportation and handling. Mark items clearly for assembly and installation.
- B. Coordination: Match dimensions and attachment of formed metal items to adjacent construction. Produce integrated assemblies. Closely fit joints; align edges and flat surfaces unless indicated otherwise.
- C. Forming: Profiles indicated. Maximize lengths. Fold exposed edges to form hem indicated or ease edges to radius indicated with concealed stiffener. Provide flat, flush surfaces without cracking or grain separation at bends.
- D. Reinforcement: Increase metal thickness; use concealed stiffeners, backing materials or both. Provide stretcher leveled standard of flatness and stiffness required to maintain flatness and hold adjacent items in flush alignment.
- E. Anchors: Straps, plates and anchors as required to support and anchor items to adjacent construction.

- F. Supports: Miscellaneous framing, mounting, clips, sleeves, fasteners and accessories required for installation.

2.2 FACTORY FABRICATED COLUMN COVERS

- A. Factory Fabricated Column Covers: Factory fabricated and factory finished, sheet metal column covers, mechanically fastened to structural support.
 - 1. Material: Aluminum sheet, ASTM B209/B209M alloy 3003 or 5005.
 - 2. Aluminum Finish: Manufacturer's standard factory applied PVDF coating.
 - 3. Color: To be selected by Architect from manufacturer's standard range.
 - 4. Manufacturers:
 - a. Fry Reglet Column Covers; KSR Key Slot Reveal. .
 - 1) 1/2 inch reveal.
 - 2) 16 inch diameter.

2.3 MATERIALS

- A. General: Provide sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections exposed to view on finished units.
- B. Aluminum Sheet: ASTM B209/B209M, 5005-H32 minimum; alloy and temper recommended by aluminum producer and finisher for use and finish indicated.
- C. Gaskets: As required to seal joints in decorative formed metal; as recommended in writing by decorative formed metal manufacturer.

2.4 FINISHES

- A. Finishes, General: Comply with NAAMM AMP 500-06.
 - 1. Complete mechanical finishes before fabrication. After fabrication, finish joints, bends, abrasions and surface blemishes to match sheet.
 - 2. Protect mechanical finishes on exposed surfaces from damage.
 - 3. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.
 - 4. Appearance: Limit variations in appearance of adjacent pieces to one-half of range represented in approved samples. Noticeable variations in same piece are not acceptable. Install components within range of approved samples to minimize contrast.
- B. Aluminum Finishes:
 - 1. High Performance Organic Coatings: AAMA 2604; multiple coats, thermally cured fluoropolymer system.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and interfaces with other work.
- B. Verify substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Notify Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect adjacent work areas and finish surfaces from damage during installation.
- B. Deliver anchorage items to be cast into concrete or built into masonry to appropriate installer(s) together with setting templates.
- C. Coat concrete and masonry surfaces that will be in contact with metal surfaces with bituminous coating.

3.3 INSTALLATION - SHEET METAL AND PLATE FABRICATIONS

- A. Locate and place decorative formed sheet metal items level and plumb; align with adjacent construction. Cut, drill and fit as required to install.
- B. Do not cut or abrade sheet metal finishes that cannot be completely restored in the field. Return such items to manufacturer or fabricator for required alterations and refinishing or provide new items.
- C. Use concealed anchorages where possible. Provide washers where needed on bolts or screws to protect metal surfaces and make weathertight connection.
- D. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers indicated.
- E. Install gaskets, joint fillers, insulation, sealants, and flashings as work progresses.

3.4 CLEANING

- A. Restore finishes damaged during installation and construction period. Return items that cannot be refinished in the field to manufacturer or fabricator. Refinish entire unit or provide new units.

- B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- C. Remove temporary coverings and protection of adjacent work areas.
- D. Clean installed products in accordance with manufacturer's instructions.

3.5 PROTECTION

- A. Protect installed products from damage during construction.

END OF SECTION

SECTION 061000 - ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sheathing.
- B. Preservative treated wood materials.
- C. Fire retardant treated wood materials.
- D. Wall sheathing with factory applied water-resistive and air barrier sheet.

1.2 RELATED REQUIREMENTS

- A. Section 076200 - Sheet Metal Flashing and Trim: Sill flashings.

1.3 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.
- B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
- C. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing 2010 (Reapproved 2017).
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.
- E. AWPA U1 - Use Category System: User Specification for Treated Wood 2023.
- F. PS 1 - Structural Plywood 2019.

1.4 SUBMITTALS

- A. Product Data: Provide technical data on Exterior Sheathing.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 PRODUCTS

2.1 CONSTRUCTION PANELS

- A. Plywood, PS 1, Grade C-D, Exposure I.
- B. Wall Sheathing, noted at Gypsum Sheathing: Glass mat faced gypsum, ASTM C1177/C1177M, 1/2 inch.
 - 1. Products:
 - a. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gpgypsum.com/#sle.
 - b. Gold Bond Building Products, LLC provided by National Gypsum Company: www.goldbondbuilding.com/#sle.
 - c. USG Corporation; Securock Brand Glass-Mat Sheathing Regular 1/2 in. (12.7 mm): www.usg.com/#sle.

2.2 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
- B. Sill Flashing: See Section 076200.

2.3 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Fire Retardant Treatment:
 - 1. Exterior Type: AWWA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with

ASTM D2898.

- a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Do not use treated wood in direct contact with the ground.
 2. Interior Type A: AWP A U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat rough carpentry items as indicated .
 - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
 1. Preservative Pressure Treatment of Plywood Above Grade: AWP A U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
 - a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
 - b. Treat plywood in contact with roofing, flashing, or waterproofing.
 - c. Treat plywood in contact with masonry or concrete.
 - d. Treat plywood less than 18 inches above grade.
 - e. Treat plywood in other locations as indicated.

PART 3 EXECUTION

3.1 PREPARATION

- A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.
- B. Coordinate installation of rough carpentry members specified in other sections.

3.2 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.3 INSTALLATION OF CONSTRUCTION PANELS

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.

3.4 CLEANING

- A. Waste Disposal:
 - 1. Comply with applicable regulations.
 - 2. Do not burn scrap on project site.
 - 3. Do not burn scraps that have been pressure treated.
 - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roofing nailers.
- B. Preservative treated wood materials.
- C. Fire retardant treated wood materials.
- D. Communications and electrical room mounting boards.
- E. Concealed wood blocking, nailers, and supports.
- F. Miscellaneous wood nailers, furring, and grounds.

1.2 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.
- B. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2017).
- C. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing 2010 (Reapproved 2017).
- D. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing 2019a.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.
- F. AWPA U1 - Use Category System: User Specification for Treated Wood 2023.
- G. PS 1 - Structural Plywood 2019.
- H. PS 20 - American Softwood Lumber Standard 2021.

1.3 SUBMITTALS

- A. Product Data: Provide technical data on wood preservative materials and application instructions.

1.4 QUALITY ASSURANCE

- A. Steel Source: All steel specified in the Section shall be produced or made in North America, for the following items:
 - 1. All types of Bolts.
 - 2. All types of Anchors.
- B. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Douglas Fir-Larch, unless otherwise indicated.
 - 2. Factory mark each piece of lumber with grade stamp of grading agency.
 - 3. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
 - 4. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
 - 5. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
 - 6. Provide dressed lumber, S4S, unless otherwise indicated.
 - 7. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.2 DIMENSION LUMBER

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Stud Framing for sizes 2 by 2 through 2 by 10:
 - 1. Grade: No.3 or Stud.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No.2 or Standard Grade.
 - 2. Boards: Standard or No.3.

2.3 CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: PS 1, A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.4 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Stainless steel for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 - 2. Anchors: Toggle bolt type for anchorage to hollow masonry.
 - 3. Nails, Brads, and Staples: ASTM F 1667.
 - 4. Power-Driven Fasteners: NES NER-272.
 - 5. Wood Screws: ASME B18.6.1.
 - 6. Screws for Fastening to Metal Framing: ASTM C 1002, length as recommended by screw manufacturer for material being fastened.
 - 7. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
 - 8. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
 - 9. 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.
 - a. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

B. METAL FRAMING ANCHORS

1. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 - a. Use for interior locations unless otherwise indicated.
 2. Hot-Dip Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.
 - a. Use for wood-preserved-treated lumber and where indicated.
 3. Stainless-Steel Sheet: ASTM A 666, Type 304.
 - a. Use for exterior locations and where indicated.
- C. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.
- D. Construction Adhesives: Adhesives complying with ASTM C557 or ASTM D3498.

2.5 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Fire Retardant Treatment:
1. Exterior Type: AWWA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat exterior rough carpentry items.
 - c. Do not use treated wood in direct contact with ground.
 2. Interior Type A: AWWA U1, Use Category UCFA, Commodity Specification H, low temperature, low hygroscopic type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.

- a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Interior rough carpentry items are to be fire retardant treated.
 - c. Treat rough carpentry items as indicated.
 - d. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
 - 1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - b. Treat lumber exposed to weather.
 - c. Treat lumber in contact with roofing, flashing, or waterproofing.
 - d. Treat lumber in contact with masonry or concrete.
 - e. Treat lumber less than 18 inches above grade.
 - f. Treat lumber in other locations as indicated.
 - 2. Preservative Pressure Treatment of Plywood Above Grade: AWWA U1, Use Category UC2 and UC3B, Commodity Specification F to 0.25 lb/cu ft retention.
 - a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
 - b. Treat plywood in contact with roofing, flashing, or waterproofing.
 - c. Treat plywood in contact with masonry or concrete.
 - d. Treat plywood less than 18 inches above grade.
 - e. Treat plywood in other locations as indicated.

PART 3 EXECUTION

3.1 PREPARATION

- A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.
- B. Install sill gasket under sill plate bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.
- C. Coordinate installation of rough carpentry members specified in other sections.

3.2 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.3 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- F. Provide the following specific nonstructural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Wall-mounted door stops.
 - 7. Chalkboards and marker boards.
 - 8. Wall paneling and trim.
 - 9. Joints of rigid wall coverings that occur between studs.

3.4 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

3.5 INSTALLATION OF CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.
 - 4. Size: 48 by 96 inches, installed horizontally at ceiling height.

3.6 CLEANING

- A. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- B. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

This page intentionally left blank

SECTION 064100 - ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Hardware.
- C. Factory finishing.
- D. Preparation for installing utilities.

1.2 REFERENCE STANDARDS

- A. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).
- B. ANSI A208.1 - American National Standard for Particleboard; 2022.
- C. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications; 2022.
- D. AWI (QCP) - Quality Certification Program; Current Edition.
- E. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- F. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- G. BHMA A156.9 - Cabinet Hardware; 2020.
- H. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2020.
- I. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
 2. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
 3. Include certification program label.
- B. Product Data: Provide data for hardware accessories.
- C. Samples: Submit actual samples of architectural cabinet construction, minimum 8 inches square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
- D. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.
- E. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Quality Certification:
1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.
 2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
 3. Provide designated labels on shop drawings as required by certification program.
 4. Provide designated labels on installed products as required by certification program.
 5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
 6. Replace, repair, or rework all work for which certification is refused.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.
- B. Field Measurements: Where interior architectural woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being concealed by construction, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where interior architectural woodwork is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. 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 architectural woodwork can be supported and installed as indicated.

PART 2 PRODUCTS

2.1 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.
- B. Hardwood Edgebanding: Use solid hardwood edgebanding matching species, color, grain, and grade for exposed portions of cabinetry.

2.2 Panel Core Materials

- A. Particleboard: Composite panel composed of cellulosic particles, additives, and bonding system; comply with ANSI A208.1.
 - 1. Grade: M-2; moisture resistance: MR10.
 - 2. Panel Thickness: 3/4 inch.
- B. Medium Density Fiberboard (MDF): Composite panel composed of cellulosic fibers, additives, and bonding system; cured under heat and pressure; comply with ANSI A208.2.
 - 1. Grade: 115; moisture resistance: MR10.

- C. Basic Hardboard: Panel manufactured from inter-felted lignocellulosic fibers consolidated under heat and pressure; comply with ANSI A135.4.
 - 1. Class: Tempered.
 - 2. Surface: Smooth one side (S1S).
 - 3. Nominal Thickness: 1/4 inch.

2.3 Hardwood Plywood Panels

- A. Hardwood Plywood: Plywood manufactured for nonstructural decorative applications; consisting of faces and backs applied to a variety of core types; comply with HPVA HP-1.
 - 1. Woodwork Quality Standard: Panels complying with specified woodwork quality standard.

2.4 LAMINATE MATERIALS

- A. Manufacturers:
 - 1. Formica Corporation: www.formica.com/#sle.
 - 2. Wilsonart LLC: www.wilsonart.com/#sle.
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- C. Provide specific types as indicated.
 - 1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, finish as indicated.
 - 2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, finish as indicated.
 - 3. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color, White color, finish as indicated.
 - 4. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

2.5 GLASS MATERIALS

- A. Glass doors:
 - 1. Basis of Design: CR Laurence Co; CRL-Blumcraft Sating Anodized 1301 Series Display Case Door.
 - 2. 1/2" thick tempered clear glass door
 - 3. Surface mounted pivots for door operation.
- B. Glass shelves:
 - 1. 3/8" thick tempered clear shelves

2.6 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Plastic Edge Banding: Extruded PVC, flat shaped; smooth finish; self locking serrated tongue; of width to match component thickness.
 - 1. Color: As selected by Architect from manufacturer's standard range.
- C. Fasteners: Size and type to suit application.
- D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- E. Concealed Joint Fasteners: Threaded steel.
- F. Adjustable Drawer Organization Systems: Drawer trays, dividers, and connectors.
- G. Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface.

2.7 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Metal Z-Shaped Wall Cabinet Support Clips: Paired, cleated, structural anchorage components applied to back of cabinets and walls for wall cabinet mounting.
 - 1. Material: Extruded Aluminum.
- C. Adjustable Shelf Supports: Standard side-mounted system using 2-pin locking plastic shelf rests complying with BHMA A156.9, Type B04013, rated for 300 lbs per clip. and coordinated self rests, satin chrome finish, for nominal 1 inch spacing adjustments.
- D. Shelf Support Brackets: Fixed, L-shaped, corner reinforced, face-of-stud mounting.
 - 1. Materials: Formed steel shapes.
 - a. Finish: Manufacturer's standard, factory-applied, textured powder coat.
 - b. Color: Black.
- E. Countertop Support Brackets: Fixed, L-shaped, face-of-stud mounting. Type CB2
 - 1. Materials: Steel; L cross-section.
 - a. Finish: Manufacturer's standard, factory-applied, powder coat.
 - b. Color: Black.
 - c. Height: 12 inches.
 - d. Support Length: 28 inches.
 - 2. Products:

- a. Origanl Granite Bracket.coom.
 - F. Countertop Brackets: Fixed, concealed vertical leg, side-of-stud mounting. Type CB1.
 - 1. Materials: Steel L-shapes.
 - a. Finish: Manufacturer's standard, factory-applied, powder coat.
 - b. Color: Black.
 - c. Vertical Leg: 18 inches.
 - d. Support Member Length: 21 inches.
 - 2. Products:
 - a. Rakks/Rangine Corporation; Inside Wall Flush Mount Brackets:
www.rakks.com/#sle.
 - G. Drawer and Door Pulls: "U" shaped wire pull, Stainless-steel, 4 inch centers.
 - 1. Basis of Design: Richelieu; Model #9898.
 - H. Cabinet Locks: Cylindrical (cam) type, 5-pin tumbler, brass with chrome-plated finish, and complying with BHMA A156.11, Grade 1.
 - 1. Recessed Catch.
 - 2. Provide a minimum of two keys per lock and six master keys. Keyed alike per room.
 - 3. **Provide locks on all doors and drawers .**
 - I. Cabinet Catches:
 - 1. Type: Magnetic catch.
 - 2. Provide 2 catches on doors more than 48 inches (1220 mm) high.
 - J. Drawer Slides:
 - 1. Type: BHMA A156.9, Type B05091, Full extension.
 - 2. Heay Duty: Grade 1HD-100,100 lb. rated, full -extension type; zinc-plated, steel ball-bearing slides.
 - 3. File Drawer Slides: Grade 1HD-150, 150 lb. rated, for drawers more than 6 inches (150 mm) high or 24 inches (600 mm) wide.
 - 4. Pencil Drawer Slides: Grade 2, 30 lb. rated, , for drawers not more than 3 inches (75 mm) high and 24 inches (600 mm) wide.
 - 5. Mounting: Side mounted.
 - 6. Stops: Integral type.
 - K. Hinges: European style concealed self-closing type, steel with satin finish.
- 2.8 FABRICATION
- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

- B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
 - 1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

2.9 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- F. Secure cabinets to floor using appropriate angles and anchorages.

3.3 ADJUSTING

- A. Adjust installed work.

- B. Adjust moving or operating parts to function smoothly and correctly.
- C. Lubricate operating hardware as recommended by manufacturer.

3.4 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 068316 - FIBERGLASS REINFORCED PANELING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fiberglass reinforced plastic panels.
 - 1. Locations: Typical at all Custodian sinks, provide 4' high around all sides.
- B. Trim.

1.2 REFERENCE STANDARDS

- A. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels 2017.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.

1.3 SUBMITTALS

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fiberglass Reinforced Plastic Panels:
 - 1. Crane Composites, Inc: www.cranecomposites.com/#sle.
 - 2. Marlite, Inc: www.marlite.com/#sle.
 - 3. Nudo Products, Inc: www.nudo.com/#sle.
 - 4. Panolam Industries International, Inc: www.panolam.com/#sle.

2.2 PANEL SYSTEMS

- A. Wall Panels:

1. Panel Size: 4 by 8 feet.
2. Panel Thickness: 0.10 inch.
3. Surface Design: Embossed.
4. Color: White.
5. Attachment Method: Adhesive only, sealant joints, no trim.

2.3 MATERIALS

- A. Panels: Fiberglass reinforced plastic (FRP), complying with ASTM D5319.
 1. Surface Burning Characteristics: Maximum flame spread index of 25 and smoke developed index of 450; when system tested in accordance with ASTM E84.
- B. Trim: Vinyl; color coordinating with panel.
- C. Fasteners: Nylon rivets.
- D. Adhesive: Type recommended by panel manufacturer.
- E. Sealant: Type recommended by panel manufacturer; white.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions and substrate flatness before starting work.
- B. Verify that substrate conditions are ready to receive the work of this section.

3.2 INSTALLATION - WALLS

- A. Install panels in accordance with manufacturer's instructions.
- B. Cut and drill panels with carbide tipped saw blades, drill bits, or snips.
- C. Pre-drill fastener holes in panels, 1/8 inch greater in diameter than fastener, spaced as indicated by panel manufacturer.
- D. Apply adhesive to the back side of the panel using trowel as recommended by adhesive manufacturer.
- E. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.
- F. Install panels with manufacturer's recommended gap for panel field and corner joints.
- G. Drive fasteners to provide snug fit, and do not over-tighten.
- H. Place trim on panel before fastening edges, as required.

- I. Fill channels in trim with sealant before attaching to panel.
- J. Install trim with adhesive and screws or nails, as required.
- K. Seal gaps at floor, ceiling, and between panels with applicable sealant to prevent moisture intrusion.
- L. Remove excess sealant after paneling is installed and prior to curing.

END OF SECTION

This page intentionally left blank

SECTION 071400 - FLUID-APPLIED WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Modified polymer elastomeric fluid-applied waterproofing.

1.2 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).
- B. ASTM C836/C836M - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course; 2018 (Reapproved 2022).
- C. ASTM D2370 - Standard Test Method for Tensile Properties of Organic Coatings; 2016 (Reapproved 2021).
- D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).

1.3 SUBMITTALS

- A. Product Data: Provide data for membrane, surface conditioner, flexible flashings, joint cover sheet, and joint and crack sealants.
- B. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- C. Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and acceptable installation temperatures.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.
- G. Warranty:
 - 1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
 - 2. Submit installer's certification that installation complies with warranty conditions for the waterproofing membrane.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.5 MOCK-UPS

- A. Construct mock-up consisting of 100 sq ft of horizontal waterproofed panel to represent finished work including internal and external corners, drainage panel, base flashings, control joints, expansion joints, counterflashings, and protective cover.
- B. Locate where directed.
- C. Mock-up may remain as part of work.

1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until cured.

1.7 WARRANTY

- A. Contractor to correct defective work within a five-year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no cost to Owner.
- B. Provide five year manufacturer warranty against failure of waterproofing to resist penetration of water, except where such failures are the result of structural failures of building.
 - 1. Hairline cracking of concrete due to temperature change or concrete shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Fluid-Applied Waterproofing:
 - 1. Carlisle Coatings & Waterproofing: www.carlisleccw.com/#sle.

2.2 PRODUCT TYPES

- A. Modified Polymer Elastomeric Fluid-Applied Waterproofing:

1. Vertical Surfaces: Apply directly to concrete substrate.
2. Cover with protection board.

2.3 MATERIALS

- A. Modified Polymer Elastomeric Fluid-Applied Waterproofing: Fluid-applied, single-component, moisture-reacted, elastomeric, modified polymer waterproof membrane complying with ASTM C836/C836M
1. Product:
 - a. Carlisle Coatings & Waterproofing Inc; MiraSEAL.
 2. Cured Thickness: 60 mil, 0.060 inch, minimum.
 3. Suitable for installation over concrete substrates.
 4. Tensile Strength: 95 psi, minimum, measured in accordance with ASTM D2370.
 5. Ultimate Elongation: 350 percent, minimum, measured in accordance with ASTM D2370.
 6. Hardness: 10, plus or minus 3, measured in accordance with ASTM C661 using Shore A durometer.
 7. Water Vapor Transmission: 0.06 perm inch, maximum, measured in accordance with ASTM E96/E96M.
 8. Reinforcing: 1.18 oz/sq yd spunbonded polyester fabric.
 - a. Thickness: 7.1 mil, 0.0071 inch.
 - b. Width: 36 inches.
 - c. Product:
 - 1) Carlisle Coatings & Waterproofing, Inc; CCW-500 Reinforcing Fabric.
 9. Protection Board: Provide type capable of preventing damage to waterproofing due to backfilling and construction traffic for either horizontal (H) or vertical (V) applications.
 - a. Thickness: 90 mil, 0.090 inch, minimum.
 - b. High-density, rigid, expanded polystyrene foam board.
 - c. Product:
 - 1) Carlisle Coatings & Waterproofing Inc; CCW Protection Board-V.
 10. Adhesives, Sealants, Tapes, and Accessories: As indicated below or by waterproofing manufacturer in accordance with requirements.

2.4 ACCESSORIES

- A. Seaming Materials: As recommended by waterproofing manufacturer.
- B. Membrane Sealant: As recommended by waterproofing manufacturer.
- C. Adhesives: As recommended by waterproofing manufacturer.
- D. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with fluid-applied waterproofing.

- E. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials, as recommended by waterproofing manufacturer.
- F. Backer Rods: Closed-cell polyethylene foam rod, as recommended by waterproofing manufacturer.
- G. Primer: Synthetic rubber solvent-based primer and surface cleaner.
 - 1. Product:
 - a. Carlisle Coatings & Waterproofing Inc; Sure-Seal HP-250 Primer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting this work.
- B. Verify substrate surfaces are free of frozen matter, dampness, loose particles, cracks, pits, projections, penetrations, or foreign matter detrimental to adhesion or application of waterproofing system.
- C. Verify that substrate surfaces are smooth, free of honeycomb or pitting, and not detrimental to full contact bond of waterproofing materials.
- D. Verify that items penetrating surfaces to receive waterproofing are securely installed.
- E. Where existing conditions are responsibility of another installer, notify Architect of unsatisfactory conditions.
- F. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect adjacent surfaces from damage not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.
- C. Do not apply waterproofing to surfaces unacceptable to waterproofing manufacturer.
- D. Fill nonmoving joints and cracks with a filler compatible with waterproofing materials.
- E. Seal moving cracks with sealant and nonrigid filler, using procedures recommended by sealant and waterproofing manufacturers.
- F. Prepare building expansion joints at locations as indicated on drawings.
- G. Install cant strips at inside corners.

3.3 INSTALLATION

- A. Install fluid-applied waterproofing in accordance with manufacturers instructions and applicable requirements.
- B. Apply primer or surface conditioner at a rate recommended by manufacturer; protect conditioner from rain or frost until dry.
- C. At joints and cracks less than 1/2 inch in width including joints between horizontal and vertical surfaces, apply 12 inch wide strip of joint cover sheet.
- D. At joints from 1/2 inch to 1 inch in width, loop joint cover sheet down into joint between 1-1/4 inch to 1-3/4 inch, and extend sheet at least 6 inches on either side of expansion joint.
- E. Center joint cover sheet over joints, roll sheet into 1/8 inch thick coating of waterproofing material and apply second coat over sheet extending at least 6 inches beyond sheet edges.
- F. Extend membrane over cants and up intersecting surfaces at membrane perimeter minimum 6 inches above horizontal surface for first ply and ____ inches at subsequent plies laid in shingle fashion.
- G. Apply extra thickness of waterproofing material at corners, intersections, and angles.
- H. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane.
- I. Seal membrane and flashings to adjoining surfaces.
 - 1. Install termination bar along edges.

3.4 INSTALLATION - DRAINAGE COMPOSITE and PROTECTION BOARD

- A. Immediately after cooling, dust membrane with tack-reducing surfacing at rate of approximately 10 lb per 100 sq ft.
- B. After membrane has cooled, but before it becomes dusty, apply separation sheet and lap joints to ensure complete coverage.
- C. Place protection board directly against cooled membrane; butt joints, and scribe and cut boards around projections, penetrations, and interruptions.
- D. Adhere protection board to substrate with compatible adhesive.

3.5 PROTECTION

- A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION

SECTION 071616 - CRYSTALLINE WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Crystalline waterproofing.
- B. Preparation of surfaces.

1.2 REFERENCE STANDARDS

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens) 2021.
- B. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating 2005 (Reapproved 2017).
- C. ASTM D4259 - Standard Practice for Preparation of Concrete by Abrasion Prior to Coating Application 2018.
- D. COE CRD-C 48 - Handbook for Concrete and Cement Standard Test Method for Water Permeability of Concrete 1992.
- E. NSF 61 - Drinking Water System Components - Health Effects 2022, with Errata.
- F. UL (DIR) - Online Certifications Directory Current Edition.
- G. NRCA (WM) - The NRCA Waterproofing Manual 2021.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Test data showing hydraulic permeability.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
 - 5. Details for waterproofing at joints, intersections, and other special conditions.
- B. Manufacturer's qualification statement.
- C. Installer's qualification statement.
- D. Specimen warranty.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience and providing technical representative to visit project site.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Take necessary precautions to keep cementitious materials dry.

1.6 FIELD CONDITIONS

- A. Maintain environmental conditions, such as temperature, humidity, and ventilation within limits recommended by manufacturer for acceptable results; do not install products under environmental conditions outside the manufacturer's indicated limits.

1.7 WARRANTY

- A. Installer Warranty: Provide 2-year warranty commencing on the Date of Substantial Completion for correcting leaking waterproofing, unless leakage is caused by structural failure, structural movement, or other causes beyond the installer's control. Complete forms in Owner's name and register with installer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Crystalline Waterproofing:
 - 1. Xypex Chemical Corporation; XYPEX Concentrate: www.xypex.com/#sle.

2.2 ASSEMBLIES

- A. Crystalline Waterproofing for Concrete Building Surfaces:
 - 1. Interior side of elevator pits.

2.3 MATERIALS

- A. Crystalline Waterproofing: Portland cement, quartz or silica sand, and other active chemicals that when applied to surface of concrete forms insoluble crystals in capillary

pores preventing passage of liquids, while having no adverse effect on normal properties of concrete.

1. Water Permeability of Applied Concrete: No measurable leakage or water flow at pressure ranging from 175 psi to 200 psi when tested in accordance with COE CRD-C 48, using at least 2-inch thick sample, and with applied surface preparation and installation in accordance with NRCA (WM).
 2. Compressive Strength: At least 3600 psi at test age of 28 days in accordance with ASTM C109/C109M test method.
 3. Toxicity: Non-toxic.
 - a. Potable Water and Drinking Water Safe: Provide UL (DIR) listed and labeled waterproofing; tested to be safe for use in potable and drinking water applications in accordance with NSF 61.
 4. Color: Gray.
- B. Plugging Compound: Ready-mixed cementitious compound meeting requirements and approved by waterproofing manufacturer, resistant to water but vapor permeable for horizontal, vertical, and overhead surfaces not exposed to vehicular traffic and compatible with substrate.
- C. Patching Compound: Ready-mixed cementitious mortar approved by waterproofing manufacturer for patching or filling tie holes, reveals, honeycombs, or other damaged cementitious surfaces and compatible with substrate.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
 1. Remove dust, dirt, mortar, efflorescence, grease, oils, paint, form-release agents, and curing compounds in accordance with ASTM D4258.
- B. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under project conditions, and consider use of sandblasting, water blasting, or acid etching as recommended.
 1. Troweled Finish: Prepare concrete surface by abrasive cleaning in accordance with ASTM D4259 before coating application.
- C. Plug water leaks.

- D. Patch holes, construction joints, and cracks; remove defective concrete.
- E. Obtain approval of manufacturer's field representative before beginning installation.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's written instructions, maintain environmental conditions required and recommended by manufacturer, and keep a copy of manufacturer's instructions on site.
- B. Coordinate waterproofing installation with installation of products that must penetrate waterproofed surfaces.
- C. Prevent excessive drying of surface.
 - 1. Cure waterproofing for at least three days, or length of time required by manufacturer, with water spray and adequate air circulation.
 - 2. Do not use chemical curing agents unless explicitly approved by waterproofing manufacturer.
- D. Do not backfill, fill water or liquid holding structures, or apply finish coatings until time period recommended by manufacturer has passed.

3.4 FIELD QUALITY CONTROL

- A. Flood test waterproofing application by filling water holding structures to capacity and allowing to stand for not less than 24 hours.
- B. If any leaks appear, notify Architect and drain.
 - 1. Repair leaks at no additional cost to Owner.
 - 2. Repeat flood test until any leakage is eliminated.

3.5 PROTECTION

- A. Protect from damage by weather; do not cover with vapor impermeable sheathing or films unless air circulation is provided.
- B. Touch-up, repair or replace damaged waterproofing after Date of Substantial Completion.

END OF SECTION

SECTION 072100 - THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Board insulation at cavity wall construction, perimeter foundation wall, underside of floor slabs, and exterior wall behind metal panel wall finish.
- B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.2 REFERENCE STANDARDS

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

1.3 SUBMITTALS

- A. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.4 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.1 APPLICATIONS

- A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board.
- B. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.
- C. Insulation Over Metal Stud Framed Walls, Continuous: Extruded polystyrene (XPS) carbon black board.

- D. Insulation on Inside of Concrete and Masonry Exterior Walls: Extruded polystyrene (XPS) board.

2.2 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
 - 1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
 - 2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 - 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
 - 5. Board Edges: Square.
 - 6. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
 - 7. Products:
 - a. Kingspan Insulation LLC; GreenGuard XPS Type IV, 25 psi: www.kingspan.com/#sle.
 - b. Owens Corning Corporation; FOAMULAR Type 250 Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/#sle.

2.3 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
 - 1. Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.
 - 2. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
- B. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
 - 1. Application: Sealing of interior circular penetrations, such as pipes or cables.
 - 2. Width: Are required for application.
 - 3. Temperature Resistance: Range of minus 40 to 212 degrees F.
- C. Self-Adhered Transition Flashing: Multipurpose, self-adhered flashing with modified butyl adhesive, polyester fiber top sheet, and polypropylene interlayer.
 - 1. Application: Primerless adhesion for use as through-wall flashings and wall transitions to roof and below-grade systems.
 - 2. Thickness: 45 mil, 0.045 inch, nominal.
 - 3. Size: 6 inches wide, in rolls 75 feet long.

- D. Flashing Tape: Special reinforced film with high performance adhesive.
 - 1. Application: Window and door opening flashing tape.
 - 2. Width: As required for application.
- E. Sill Plate Sealer: Closed-cell foam tape with rubberized adhesive membrane; bridges gap between foundation structure and sill plate or skirt board.
 - 1. Width: 3-1/2 inches.
 - 2. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 30 days of weather exposure.
- F. Insulation Fasteners: Impaling clip of galvanized steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- G. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.
- H. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Adhere a 6 inches wide strip of polyethylene sheet over construction, control, and expansion joints with double beads of adhesive each side of joint.
 - 1. Tape seal joints.
 - 2. Extend sheet full height of joint.
- B. Apply adhesive to back of boards:
 - 1. Three continuous beads per board length.
- C. Install boards horizontally on foundation perimeter.
 - 1. Place boards to maximize adhesive contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and to protrusions.
- D. Extend boards over expansion joints, unbonded to foundation on one side of joint.

- E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.3 BOARD INSTALLATION AT EXTERIOR WALLS

- A. Adhere 6 inches wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
 - 1. Tape seal joints between sheets.
- B. Apply adhesive to back of boards:
 - 1. Three continuous beads per board length.
- C. Install boards horizontally on walls.
 - 1. Place boards to maximize adhesive contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and protrusions.
- D. Extend boards over expansion joints, unbonded to wall on one side of joint.
- E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.4 BOARD INSTALLATION AT CAVITY WALLS

- A. Adhere a 6 inches wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
 - 1. Tape seal joints between sheets.
- B. Apply adhesive to back of boards:
 - 1. Three continuous beads per board length.
- C. Install boards to fit snugly between wall ties.
- D. Install boards horizontally on walls.
 - 1. Place boards to maximize adhesive contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and protrusions.
- E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- F. Place 6 inches wide polyethylene sheet at perimeter of wall openings, from adhesive vapor retarder bed to window and door frames, and tape seal in place to ensure continuity of vapor retarder and air seal.

3.5 BOARD INSTALLATION UNDER CONCRETE SLABS

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

- C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.6 BATT INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

3.7 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

This page intentionally left blank

SECTION 072119 - FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Foamed-in-place insulation.
 - 1. In exterior framed walls.

1.2 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- B. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2019.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).
- E. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.
- F. FM 4880 - Evaluating the Fire Performance of Insulated Building Panel Assemblies and Interior Finish Materials; 2017.
- G. NFPA 275 - Standard Method of Fire Tests for the Evaluation of Thermal Barriers; 2022.
- H. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.
- I. UL 1040 - Standard for Safety Fire Test of Insulated Wall Construction; Current Edition, Including All Revisions.
- J. UL 1715 - Standard for Safety Fire Test of Interior Finish Material; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.4 SUBMITTALS

- A. Product Data: Provide product description, insulation properties, and preparation requirements.
- B. Certificates: Certify that products of this section meet or exceed specified requirements.
- C. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.
- D. Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- E. Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience, and approved by manufacturer.
- C. Air Barrier Association of America (ABAA) Evaluated Materials Program (EAP); www.airbarrier.org/#sle: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Foamed-In-Place Insulation:
 - 1. BASF Corporation; WALLTITE US Series Closed Cell: www.spf.basf.com/#sle.
 - 2. Carlisle Spray Foam Insulation; Sealtite Pro Closed Cell: www.carlislefsi.com/#sle.
 - 3. Johns Manville; JM Corbond III Closed Cell Spray Polyurethane Foam: www.jm.com/#sle.

2.2 MATERIALS

- A. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.

1. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and fire protection requirements.
 - a. Fire Protection: Provide 15-minute thermal barrier of 5/8 inch gypsum board or equivalent material complying with NFPA 275 test method, or foamed-in-place insulation either exposed or with covering that complies with FM 4880, NFPA 286, UL 1040, or UL 1715.
2. Thermal Resistance: R-value of 6.9, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
3. Water Vapor Permeance: Vapor retarder; 0.8 perms, maximum, when tested at intended thickness in accordance with ASTM E96/E96M, desiccant method.
4. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.
5. Air Permeance: 0.02 cfm per square foot, maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf.
6. Closed Cell Content: At least 90 percent.
7. Surface Burning Characteristics: Flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.

2.3 ACCESSORIES

- A. Primer: As required by insulation manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify work within construction spaces or crevices is complete prior to insulation application.
- B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation or overcoat adhesion.

3.2 PREPARATION

- A. Mask and protect adjacent surfaces from over spray or dusting.
- B. Apply primer in accordance with manufacturer's instructions.

3.3 APPLICATION

- A. Apply insulation in accordance with manufacturer's instructions.
- B. Apply insulation by spray method, to a uniform monolithic density without voids.
- C. Apply to a minimum cured thickness of 2 inch.

- D. Patch damaged areas.
- E. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.
- F. Trim excess away for applied trim or remove as required for continuous sealant bead.

3.4 PROTECTION

- A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION

SECTION 072700 - AIR BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Air barriers.

1.2 DEFINITIONS

- A. Air Barrier: Airtight barrier made of material that is virtually air impermeable but water vapor permeable, both to amount as specified, with sealed seams and sealed joints to adjacent surfaces.

1.3 REFERENCE STANDARDS

- A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- C. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).
- D. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.

1.4 SUBMITTALS

- A. Product Data: Provide data on material characteristics, performance criteria, and limitations.
- B. Shop Drawings: Provide drawings of special joint conditions.
- C. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.
- D. Installer's qualification statement.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.6 MOCK-UPS

- A. Construct air barrier mock-up, 3 feet long by 4 feet wide.
- B. Locate where directed.
- C. Mock-up may remain as part of work.

1.7 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.1 AIR BARRIER MATERIALS (AIR IMPERMEABLE AND WATER VAPOR PERMEABLE)

- A. Air Barrier, Fluid Applied: Vapor semi-permeable, elastomeric waterproofing.
 - 1. Air Barrier Coating:
 - a. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
 - b. Water Vapor Permeance: 11 perms, minimum, when tested in accordance with ASTM E96/E96M using Procedure B - Water Method, at 73.4 degrees F.
 - c. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A when tested in accordance with ASTM E84.
 - d. VOC Content: Zero.
 - e. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
 - f. Products:
 - 1) Henry Company; Air-Bloc All Weather STPE: www.henry.com/#sle.
 - 2) Hohmann & Barnard, Inc; ENVIRO-BARRIER STPE: www.h-b.com/#sle.

2.2 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Air Barrier and Adjacent Substrates: As indicated or in compliance with air barrier manufacturer's installation instructions.
- B. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrate and air barrier materials.
- C. Primer: Liquid applied polymer.

- D. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement waived if not installed on roof.
 - 1. Width: 4 inches.
 - 2. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 30 days of weather exposure.
 - 3. Products:
 - a. Henry Company; FortiFlash: www.henry.com/#sle.
 - b. Henry Company; FortiFlex Butyl: www.henry.com/#sle.
 - c. Henry Company; FortiFlash Butyl: www.henry.com/#sle.
- E. Sill Plate Sealer: Closed-cell foam tape with rubberized adhesive membrane; bridges gap between foundation structure and sill plate or skirt board.
 - 1. Width: 3-1/2 inches.
 - 2. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 30 days of weather exposure.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions are ready for work of this section.
- B. Where existing conditions are responsibility of another installer, notify Architect of unsatisfactory conditions.
- C. Do not proceed with this work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's installation instructions.
- B. Air Barriers: Install continuous airtight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.

- D. Fluid-Applied Coatings or Membranes:
 - 1. Prepare substrate in accordance with manufacturer's installation instructions; treat joints in substrate and between dissimilar materials as indicated.
 - 2. Use flashing to seal to adjacent construction and to bridge joints in coating substrate.
- E. Openings and Penetrations in Exterior Air Barriers:
 - 1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto air barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
 - 2. At openings with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
 - 3. At openings with nonflanged frames, seal air barrier to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
 - 4. At head of openings, install flashing under air barrier extending at least 2 inches beyond face of jambs; seal air barrier to flashing.
 - 5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
 - 6. Service and Other Penetrations: Form flashing around penetrating item and seal to air barrier surface.

3.4 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 075323 - ETHYLENE-PROPYLENE-DIENE-MONOMER ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Adhered roof system with ethylene-propylene-diene-monomer (EPDM) roofing membrane.
- B. Vapor retarder.
- C. Deck sheathing.
- D. Cover boards.
- E. Insulation.
- F. Roof system design by manufacture to meet code, including hail resistance.

1.2 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.
- D. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015 (Reapproved 2021).
- E. UL 790 - Standard for Standard Test Methods for Fire Tests of Roof Coverings; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.
 - 1. Review preparation and installation procedures, in addition to coordination and scheduling required with related work.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's written information listed below.

1. Product data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
 2. Preparation instructions and recommendations.
 3. Storage and handling requirements.
- B. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and setting plan for tapered insulation.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions provided.
- E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions, finish coating installation, special procedures, and perimeter conditions requiring special attention.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.
- H. Warranty Documentation.
1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
 2. Submit installer's certification that installation complies with required warranty conditions for waterproofing membrane.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with at least twenty years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least five years documented experience.
1. Approved by membrane manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture.
- C. Protect foam insulation from direct exposure to sunlight.
- D. Provide Safety Data Sheets (SDS) at project site during transportation, storage, and installation of materials.

- E. Comply with requirements from Owner to prevent overloading or disturbance of structure when loading materials onto roof.

1.7 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather, and refer to manufacturer's written installation instructions.
- B. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed that same day.
- D. Proceed with work so new roofing materials are not subject to construction traffic as work progresses.
- E. Do not allow grease, oils, fats, or other contaminants to come into direct contact with roofing membrane.

1.8 WARRANTY

- A. Material Warranty: Provide membrane manufacturer's warranty agreeing to replace material that shows manufacturing defects within 15 after installation.
- B. System Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing membrane that leaks or is damaged due to wind or other natural causes.
 - 1. System Warranty Term: 15 years.
 - 2. For repair and replacement include costs of both material and labor in warranty.
 - 3. Include accidental punctures in accordance with manufacturer's standard warranty terms.
 - 4. Include hail damage in accordance with manufacturer's standard warranty terms.
 - 5. Include metal roof edge water tightness in accordance with manufacturer's standard warranty terms.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Versico Roofing Systems: www.versico.com/#sle.

2.2 ROOFING APPLICATIONS

- A. Ethylene-Propylene-Diene-Monomer (EPDM) Membrane Roofing: Single-ply membrane.
 - 1. Adhered, over insulation.

2.3 PERFORMANCE / DESIGN CRITERIA

- A. Roof Covering External Fire Resistance Classification: Class A when tested in accordance to UL 790.
- B. Wind Uplift:
 - 1. Designed to withstand wind uplift forces calculated in accordance with ASCE 7, and
 - 2. Design Wind Speed: In accordance with local building code and authorities having jurisdiction (AHJ).
- C. Insulation Thermal Resistance (R-Value): Provide R-Value over entire roof deck in accordance with local building code requirements.

2.4 ROOFING MEMBRANE MATERIALS

- A. Single Source Responsibility: Provide and install products from single source.
- B. Vapor Barrier/Base Sheet: Self-adhering, rubberized asphalt membrane laminated to spun-bonded polyester fabric; 40 mils, 0.040 inch thick, minimum.
 - 1. Products:
 - a. Versico Roofing Systems; VapAir Seal 725TR Air/Vapor Barrier.
- C. Membrane: Ethylene-propylene-diene-monomer (EPDM); ASTM D4637/D4637M, Type I - Non-Reinforced.
 - 1. Membrane Thickness: 60 mils, 0.060 inch, minimum.
 - 2. Sheet Width: Factory fabricated into largest sheets possible.
 - 3. Color: As selected by Architect from manufacturer's full color range.
 - 4. Products:
 - a. Versico Roofing Systems; VersiGard Non-Reinforced EPDM.
- D. Seaming Materials: As recommended by membrane manufacturer.
- E. Flexible Flashing Material: Same material as roofing membrane.
- F. Base Flashing: Provide waterproof, fully adhered base flashing system at penetrations, plane transitions, and terminations.

2.5 DECK SHEATHING

- A. Deck Sheathing and/or Cover Board: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type.

1. Thickness: 5/8 inch, minimum.
2. Products:
 - a. GP DensDeck Prime Roof Board, distributed by Versico.
 - b. GP DensDeck Roof Board, distributed by Versico.

2.6 COVER BOARDS

- A. Cover Board: Polyisocyanurate (ISO) foam insulation complying with ASTM C1289, Type II, Class 4 with glass fiber reinforced facers on both sides, and Grade 1 with 80 psi, minimum, compressive strength.
 1. Board Thickness: 1/2 inch.
 2. Products:
 - a. Versico Roofing Systems; SecurShield HD Polyiso.

2.7 INSULATION

- A. Tapered Edge Strip: Provide tapered insulation along elevated perimeter edge metal to ensure roof drainage.
 1. Polyisocyanurate (ISO) Board: ISO foam core integrally bonded to facers, with shape as required for application.
- B. Polyisocyanurate (ISO) Board Insulation: Complies with ASTM C1289, Type II, Class 1 - Faced with organic felt facers (glass fiber reinforced cellulosic felt) on both major surfaces of core foam.
 1. Tapered Board: Slope as necessary for application, with 1/2 inch, minimum thickness, and fabricated from fewest possible layers.
 2. Grade and Compressive Strength: Grade 2, with 20 psi, minimum.
 3. Products:
 - a. Versico Roofing Systems; VersiCore MP-H Tapered.
- C. Polyisocyanurate (ISO) Board Insulation: Complying with ASTM C1289, Type II, Class 2 - Faced with coated glass fiber mat facers on both major surfaces of core foam.
 1. Board Thickness: see drawings for inches, nominal.
 2. Grade and Compressive Strength: Grade 2, with 20 psi, minimum.
 3. Products:
 - a. Versico Roofing Systems; SecurShield Polyiso.

2.8 ACCESSORIES

- A. Prefabricated Roof Expansion Joint Flashing: Butyl sheet over closed-cell foam backing seamed to galvanized steel flanges.
- B. Prefabricated Flashing Accessories:

1. Penetrations: Same material as membrane, with manufacturer's standard cut-outs, rigid inserts, clamping rings, and flanges.
 - a. Pipe Seals: Provide factory-applied tape on deck flange.
 - b. Products:
 - 1) Versico Roofing Systems; VersiGard Quick-Applied.
- C. Insulation Adhesive: Two component polyurethane, expanding foam.
- D. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, and compatible with roofing materials; 6 inches wide; self adhering.
- E. Membrane Adhesive: As recommended by membrane manufacturer.
- F. Strip Reglet Devices: Consisting of galvanized steel, with maximum possible length for each location and attachment flanges.
- G. Sealants: As recommended by membrane manufacturer.
- H. Membrane Cleaner: Manufacturer's standard, clear, and solvent-based membrane cleaner.
- I. Primer: Manufacturer's recommended product.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips, nailing strips, and reglets are in place.

3.2 SURFACE PREPARATION

- A. Clean substrate thoroughly prior to roof application.
- B. Do not begin this work until other work that requires foot or equipment traffic on roof has been completed.
- C. Apply manufacturer's recommended vapor retarder or temporary roofing before roof installation.

3.3 INSTALLATION - GENERAL

- A. Install roofing system in accordance with manufacturer's instructions, as well as NRCA (RM) and NRCA (WM) applicable requirements.
- B. Application of roofing membrane during unsuitable weather is not permitted.
- C. Application of roofing membrane when ambient temperature is outside temperature range recommended by manufacturer is not permitted.
- D. Application of roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring is not permitted.
- E. Exposing materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day is not permitted.
- F. Coordinate this work with installation of associated counterflashings being installed as specified in other sections as this work proceeds.
- G. When substrate preparation is responsibility of another installer, notify Architect of unsatisfactory conditions, and do not proceed until corrections have been made.

3.4 VAPOR RETARDER APPLICATION

- A. Apply vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
 - 1. Extend vapor retarder under cant strips and blocking to deck edge.
 - 2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of air barrier plane.
- B. Verify that vapor retarder is clean and dry, continuous, and ready for application of insulation.

3.5 INSULATION APPLICATION

- A. Attachment of Insulation: Embed insulation in adhesive and in full contact to deck in accordance with roofing and insulation manufacturer's instructions.
- B. Installing wet, damaged, or warped insulation boards is not permitted.
- C. Apply subsequent layers of insulation with joints staggered minimum 6 inches from joints of preceding layer.
- D. Apply tapered insulation to required slope pattern in accordance with manufacturer's instructions.

- E. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
- F. Apply boards with edges in moderate contact without forcing, and with gap between boards no greater than 1/4 inch wide; cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- G. Tape joints of insulation in accordance with roofing and insulation manufacturer's instructions.
- H. At roof drains, use factory-tapered boards or boards cut to slope to slope down to roof drains over distance of 18 inches.
- I. Only apply quantity of insulation than can be completely waterproofed in same day.

3.6 MEMBRANE APPLICATION

- A. Roll out membrane, free from wrinkles or tears; place sheet membrane into place without stretching.
- B. Shingle joints on sloped substrates in direction of drainage.
- C. Adhesive Adhered Membrane Application: Apply adhesive at manufacturer's recommended rate, and fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints; fully adhere one roll before proceeding to adjacent rolls.
- D. Overlap edges, ends, and seal seams by contact adhesive, minimum 3 inches wide, sealing permanently waterproof.
- E. At membrane intersections with vertical surfaces, provide the following:
 - 1. Extend membrane over and up cant strips at least 4 inches onto vertical surfaces.
 - 2. Fully adhere flexible flashing over membrane and up to nailing strips.
- F. Install roofing expansion joints as indicated on drawings, and ensure joints are watertight.
- G. Coordinate installation of roof related flashings, sumps, and drains; locate field splices away from low areas and roof drains, and shingle lap upslope sheets over downslope sheets.
- H. Install walkway pads at areas of concentrated traffic and as indicated on drawings; space pad joints to permit drainage.
- I. Daily Seal: Provide daily seal in accordance with manufacturer's installation instructions at end of each work day to prevent infiltration of water at incomplete flashings, terminations, and other unfinished membrane edges.

3.7 FIELD QUALITY CONTROL

- A. Attendance is required on-site of roofing and insulation material manufacturer's daily during installation of this work.

3.8 CLEANING

- A. Remove wrappings, empty containers, paper, and other debris from roof daily, and dispose of debris in compliance with local, State, and Federal regulations.
- B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- C. Repair or replace defaced or damaged finishes caused by work of this section.

3.9 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

This page intentionally left blank

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Manufactured sheet metal items, including flashings, counterflashings, downspouts, and exterior penetrations.
- B. Sealants for joints within sheet metal fabrications.
- C. Sheet metal splash pans.

1.2 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- D. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- F. CDA A4050 - Copper in Architecture - Handbook; current edition.
- G. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.3 SUBMITTALS

- A. Samples: Submit two samples, 4 by ___ inches in size, illustrating metal finish color.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Sheet Metal Flashing and Trim Manufacturers:
 - 1. Fry Reglet Corporation; 2 piece counterflashing.

2.2 SHEET MATERIALS

- A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch thick base metal, shop pre-coated with PVDF coating.
 - 1. Polyvinylidene Fluoride (PVDF) Coating: Superior performing organic powder coating, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
 - 2. Color: As selected by Architect from manufacturer's standard colors.
- B. Pre-Finished Aluminum: ASTM B209/B209M, 3005 alloy, H12 or H14 temper; 18 gauge, 0.040 inch thick; plain finish shop pre-coated with PVDF coating.
 - 1. Polyvinylidene Fluoride (PVDF) Coating: Superior performing organic powder coating, AAMA 2605; pretreated metal with two-coat system including primer and color coat with at least 70 percent PVDF coating.
 - 2. Color: As selected by Architect from manufacturer's standard colors.

2.3 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.4 GUTTER AND DOWNSPOUT FABRICATION

- A. Downspouts: Rectangular profile.
- B. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).
- C. Accessories: Profiled to suit gutters and downspouts.
 - 1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
 - 2. Downspout Supports: Brackets.
- D. Splash Pans: Same metal type as downspouts, formed to ___ by ___ inch size; rolled sides of ___ inch high for inverted pan placement.
- E. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3,000 psi at 28 days, with minimum 5 percent air entrainment.
- F. Seal metal joints.

2.5 EXTERIOR PENETRATION FLASHING PANELS

- A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

2.6 ACCESSORIES

- A. Fasteners: Stainless steel, with soft neoprene washers.
- B. Concealed Sealants: Non-curing butyl sealant.
- C. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

3.3 INSTALLATION

- A. Insert flashings into reglets to form tight fit; secure in place with lead wedges; pack remaining spaces with lead wool; seal flashings into reglets with sealant.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 - 1. Coat concealed side of uncoated-aluminum sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
 - 1. Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.
- E. Apply plastic cement compound between metal flashings and felt flashings.
- F. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- G. Exterior Flashing Receivers: Install in accordance with manufacturer's recommendations, and in proper relationship with adjacent construction, and as follows:
 - 1. Secure receiver at perimeter of wall opening with adhesives or fasteners.
 - 2. Place flashing into receiver channel.

- 3. Secure flashing with receiver clip.
- H. Seal metal joints watertight.
- I. Secure gutters and downspouts in place with concealed fasteners.
- J. Set splash pans under downspouts.

3.4 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.5 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

This page intentionally left blank

SECTION 077200 - ROOF ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof curbs.
- B. Equipment rails.
- C. Roof penetrations mounting curbs.
- D. Roof Safety Devices

1.2 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.
- C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

PART 2 PRODUCTS

2.1 ROOF CURBS

- A. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
 - 1. Applications: Roof curbs used for roof penetrations/openings as indicated on drawings.
 - 2. Roof Curb Mounting Substrate: Curb substrate consists of corrugated metal roof deck with insulation.
 - 3. Sheet Metal Material:
 - a. Aluminum: 0.080 inch minimum thickness, with 3003 alloy, and H14 temper.
 - 1) Finish: Mill finish.
 - 2) Color: As selected by Architect from manufacturer's standard line of colors.
 - 4. Fabricate curb bottom and mounting flanges for installation directly on metal roof panel system to match slope and configuration of system.
 - a. Extend side flange to next adjacent roof panel seam and comply with seam configurations and seal connection, providing at least 6 inch clearance between curb and metal roof panel flange allowing water to properly flow past curb.
 - b. Where side of curb aligns with metal roof panel flange, attach fasteners on upper slope of flange to curb connection allowing water to flow past below fasteners, and seal connection.
 - c. Maintain at least 12 inch clearance from curb, and lap upper curb flange on underside of down sloping metal roof panel, and seal connection.
 - d. Lap lower curb flange overtop of down sloping metal roof panel and seal connection.
 - 5. Provide layouts and configurations indicated on drawings.
- B. Curbs Adjacent to Roof Openings: Provide curb on each side of opening, with top of curb horizontal for equipment mounting.
 - 1. Provide preservative treated wood nailers along top of curb.
 - 2. Insulate inside curbs with 1-1/2 inch thick fiberglass insulation.
 - 3. Height Above Finished Roof Surface: 8 inches, minimum.
- C. Equipment Rail Curbs: Straight curbs on each side of equipment, with top of curbs horizontal and level with each other for equipment mounting.
- D. Pipe, Duct, or Conduit Mounting Curbs: Vertical posts, minimum 8 inches square unless otherwise indicated.

2.2 ROOF SAFETY DEVICES

- A. Roof Top Tie Off Device: Basis of Design: FallTech, Model 78012WCSWE, 18" tall. Bolt to roof deck. Manuf standard color.

2.3 NON-PENETRATING ROOFTOP SUPPORTS/ASSEMBLIES

- A. Non-Penetrating Rooftop Support/Assemblies: Manufacturer-engineered and factory-fabricated, with pedestal bases that rest on top of roofing membrane, and not requiring any attachment to roof structure and not penetrating roofing assembly.
 - 1. Design Loadings and Configurations: As required by applicable codes.
 - 2. Height: Provide minimum clearance of 6 inches under supported items to top of roofing.
 - 3. Support Spacing and Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 - 4. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
 - 5. Hardware, Bolts, Nuts, and Washers: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.4 CLEANING

- A. Clean installed work to like-new condition.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 078100 - APPLIED FIRE PROTECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Applied fire protection of interior structural steel not exposed to damage or moisture.
- B. Preparation of applied fire protection for application of exposed overcoat finish specified elsewhere.

1.2 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- B. ASTM E736/E736M - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members; 2019 (Reapproved 2023).
- C. ASTM E759/E759M - Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2023).
- D. ASTM E760/E760M - Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2023).
- E. ASTM E859/E859M - Standard Test Method for Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members; 2023.
- F. ASTM E937/E937M - Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993 (Reapproved 2023).
- G. UL (FRD) - Fire Resistance Directory; Current Edition.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with placement of ceiling hanger tabs, mechanical component hangers, and electrical components.
- B. Preinstallation Meeting: Convene one week before starting work of this section.

1.4 SUBMITTALS

- A. Product Data: Provide data indicating product characteristics.
- B. Manufacturer's Certificate: Certify that applied fireproofing products meet or exceed requirements of Contract Documents.

- C. Test Reports: Reports from reputable independent testing agencies for proposed products, indicating compliance with specified criteria, conducted under conditions similar to those on project, as follows:
 - 1. Bond strength.
 - 2. Bond impact.
 - 3. Compressive strength.
 - 4. Fire tests using substrate materials similar those on project.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Field Quality Control Submittals: Submit field test report.
- F. Installer's Qualification Statement.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience

1.6 FIELD CONDITIONS

- A. Do not apply fireproofing when temperature of substrate material and surrounding air is below 40 degrees F or when temperature is predicted to be below said temperature for 24 hours after application.
- B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.
- C. Provide temporary enclosure to prevent spray from contaminating air.

1.7 WARRANTY

- A. Correct defective Work within a two year period after Date of Substantial Completion.
 - 1. Include coverage for fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering.
 - 2. Reinstall or repair failures that occur within warranty period.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Applied Fire Protection:
 - 1. GCP Applied Technologies; ____: www.gcpat.com/#sle.

2.2 APPLIED FIRE PROTECTION ASSEMBLIES

- A. Provide assemblies as indicated on drawings.
- B. Provide fire resistance ratings for following building elements as required by local building code:
 - 1. Roof construction, including supporting beams and joists, 2 hours.

2.3 MATERIALS

- A. Applied Fire Protection Material for Interior Applications, Concealed: Manufacturer's standard factory mixed material, which when combined with water is capable of providing indicated fire resistance, and complying with following requirements:
 - 1. Composition: Gypsum-based; not mineral-fiber-based.
 - 2. Bond Strength: 150 pounds per square foot, minimum, when tested in accordance with ASTM E736/E736M when set and dry.
 - 3. Compressive Strength: 8.33 pounds per square inch, minimum.
 - 4. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760/E760M.
 - 5. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937/E937M.
 - 6. Air Erosion Resistance: Weight loss of 0.025 g/sq ft, maximum, when tested in accordance with ASTM E859/E859M after 24 hours.
 - 7. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of 0 (zero), when tested in accordance with ASTM E84.
 - 8. Effect of Deflection: No cracking, spalling, or delamination, when tested in accordance with ASTM E759/E759M.
 - 9. Manufacturers:
 - a. GCP Applied Technologies; Monokote MK-6: www.gcpat.com/#sle.

2.4 ACCESSORIES

- A. Primer Adhesive: Of type recommended by applied fire protection manufacturer.
- B. Overcoat: As recommended by manufacturer of applied fire protection material.
- C. Metal Lath: Expanded metal lath; minimum weight of 1.7 psf, galvanized finish.
- D. Water: Clean, potable.
- E. And all components needed to provide a completed application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive fireproofing.
- B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
- C. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.
- D. Verify that voids and cracks in substrate have been filled.
- E. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

3.2 PREPARATION

- A. Perform tests as recommended by fireproofing manufacturer in applications where adhesion of fireproofing to substrate is in question.
- B. Remove incompatible materials that could effect bond by scraping, brushing, scrubbing, or sandblasting.
- C. Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.
- D. Apply fireproofing manufacturer's recommended bonding agent on primed steel.
- E. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.
- F. Close off and seal duct work in areas where fireproofing is being applied.

3.3 APPLICATION

- A. Install metal lath over structural members as indicated or as required by UL Assembly Design Numbers.
- B. Apply primer adhesive in accordance with manufacturer's instructions.
- C. Apply fireproofing in uniform thickness and density as necessary to achieve required ratings.

3.4 FIELD QUALITY CONTROL

- A. Inspect installed fireproofing after application and curing for integrity, prior to its concealment.
 - 1. Submit field test reports promptly to Contractor and Architect.
- B. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings and requirements of authorities having jurisdiction (AHJ).
- C. Repair or replace applied fireproofing at locations where test results indicate fireproofing does not meet specified requirements.
- D. Re-inspect installed fireproofing for integrity of fire protection, after installation of subsequent Work.

3.5 CLEANING

- A. Remove excess material, overspray, droppings, and debris.
- B. Remove fireproofing from materials and surfaces not required to be fireproofed.
- C. At exposed fireproofing, clean surfaces that have become soiled or stained, using manufacturer's recommended procedures.

END OF SECTION

This page intentionally left blank

SECTION 078123 - INTUMESCENT FIRE PROTECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Thin-film intumescent fire protection.
- B. Protective and/or decorative topcoats, Refer to Interior Paint Specifications. Primer and Finish Top Coats must be compatible with Intumescent Coatings.

1.2 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- B. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Performance characteristics and test results.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- B. Primers and Finish Decorative Coats: Submit product data indicating these coatings are compatible and acceptable to Intumescent Coating Manufacturer and that these products will not jeopardize Coating ratings.
- C. Selection Samples: For decorative top coat, color chips representing manufacturer's full range of available colors and sheens.
- D. Certificates: Certify that intumescent fireproofing provided for this project meets or exceeds specified requirements in all respects.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company that specializes in manufacturing the type of products specified, with minimum of ten years of documented experience.

- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.5 MOCK-UPS

- A. Provide a mock-up for evaluation of surface preparation techniques and application workmanship; approved mock-up will serve as a standard of comparison for subsequent work of this section.
- B. Finish at least 100 sq ft of surface in areas as designated by Architect.
- C. Evaluate mock-up for compliance with specified requirements, including thickness and finish texture.
- D. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
- E. Refinish mock-up area as required to produce acceptable work.
- F. Approved mock-up may remain as part of the project.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers with identification labels and testing agency markings intact and legible.
- B. Store products in manufacturer's unopened packaging until ready for installation.
 - 1. Store at temperatures not less than 50 degrees F in dry, protected area.
 - 2. Protect from freezing, and do not store in direct sunlight.
 - 3. Dispose of any materials that have come into contact with contaminants of any kind prior to application.
- C. Dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 FIELD CONDITIONS

- A. Protect areas of application from windblown dust and rain.
- B. Maintain ambient field conditions, such as temperature, humidity, and ventilation, within limits recommended by manufacturer for optimum results. Do not install products under ambient conditions outside manufacturer's absolute limits.
 - 1. Provide temporary enclosures as required to control ambient conditions.
 - 2. Do not apply intumescent fireproofing when ambient temperatures are below 50 degrees F without specific approval from manufacturer.

3. Ensure that relative humidity is between 40 and 60 percent in areas of application.
4. Provide ventilation in enclosed spaces during application and for not less than 72 hours afterward.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Intumescent Thin-Film Fire Protection for Metal:
 1. Isolatek International Corp: CAFCO SprayFilm WB 5: www.isolatek.com/#sle.

2.2 SYSTEM REQUIREMENTS

- A. Fireproofing: Provide intumescent thin-film fire protection systems tested by an independent testing agency in accordance with ASTM E119 and acceptable to authorities having jurisdiction (AHJ).
- B. Structural Steel, Deck: Fire resistance rating of refer to Life Safety drawings for Ratings.

2.3 MATERIALS

- A. Fire Resistive Coating System: Thin-film intumescent fire protection system for locations indicated.
 1. Surface Burning Characteristics: Class A, flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
- B. Sealers and Primer: As required by tested and listed assemblies, and recommended by fireproofing manufacturer to suit specific substrate conditions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates to determine if they are in satisfactory condition to receive intumescent fire protection; verify that substrates are clean and free of oil, grease, incompatible primers, or other foreign substances capable of impairing bond to fireproofing system.
- B. Do not begin installation until substrates have been properly prepared.
- C. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Thoroughly clean surfaces to receive fireproofing.
- B. Repair substrates to remove surface imperfections that could effect uniformity of texture and thickness of fireproofing system, and remove minor projections and fill voids that could telegraph through finished work.
- C. Cover or otherwise protect other work that might be damaged by fallout or overspray of fireproofing system, and provide temporary enclosures as necessary to confine operations and maintain required ambient field conditions.

3.3 APPLICATION

- A. Comply with manufacturer's instructions for each particular intumescent fire protection system installation application as indicated.
- B. Apply manufacturer's recommended primer to required coating thickness.
- C. Apply fireproofing to full thickness over entire area of each substrate to be protected.
- D. Apply coats at manufacturer's recommended rate to achieve dry film thickness (DFT) as required for fire resistance ratings designated for each condition.
- E. Apply intumescent fire protection by spraying to maximum extent possible, and as necessary complete coverage by roller application or other method acceptable to manufacturer.
- F. Achieve uniform finished appearance complying with approved mock-up.

3.4 CLEANING

- A. Immediately after installation of fireproofing in each area, remove overspray and fallout from other surfaces and clean soiled areas.

3.5 PROTECTION

- A. Protect installed intumescent fire protection from damage due to subsequent construction activities, so fireproofing is without damage or deterioration before Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls.
 - 2. Penetrations in horizontal assemblies.
 - 3. Penetrations in smoke barriers.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at [Project site] .

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek Group in its "Directory of Listed Building Products."
 - 3) FM Global in its "Building Materials Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 - 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. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems Inc.
 - c. Hilti, Inc.
 - d. RectorSeal.
 - e. Specified Technologies, Inc.
 - f. Tremco, Inc.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).
1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at and no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.
- F. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content:
1. Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- G. Low-Emitting Materials: Penetration firestopping sealants and sealant primers shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- H. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those

components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

1. Permanent forming/damming/backing materials.
2. Substrate primers.
3. Collars.
4. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- D. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping 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 of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming 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.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches (76 mm) high and with minimum 0.375-inch (9.5-mm) strokes.
 - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).

- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping 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 that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION

SECTION 078443 - JOINT FIRESTOPPING

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. Joints in or between fire-resistance-rated constructions.
 - 2. Joints at exterior curtain-wall/floor intersections.
 - 3. Joints in smoke barriers.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site .

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and

found to comply with UL's "Qualified Firestop Contractor Program Requirements."

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."

2.2 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Basis of Design: 3M Fire Protection Products.
- C. 3M Fire Barrier Sealant FD 150+: Single-part, water-based sealant. Sag-resistant, low-shrinkage, low VOC, UL 2079.
 - 1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire-rated systems.

2. Location: For use at top-of-wall, bottom-of-wall, wall-to-wall and floor-to-floor.
 3. Compression/Extension Recovery: +/- 19 percent of original joint width.
 4. Meets optional L rating requirements.
- D. 3M Fire Barrier Water Tight Sealant 1000 NS: Single-part, non-slump elastomeric silicone sealant. Sag-resistant, low VOC, UL 2079.
1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire rated systems.
 2. Meets UL Water Leakage Test, W Rating – Class 1 requirements.
 3. Location: For use at top-of-wall, bottom-of-wall, wall-to-wall, floor-to-floor, floor-to-wall and perimeter joints.
 4. Compression/Extension Recovery: +/- 15 percent of original joint width.
- E. 3M Fire Barrier Water Tight Sealant 1003 SL: Single-part, self-leveling elastomeric silicone sealant. Sag-resistant, low VOC, UL 2079.
1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire rated systems.
 2. Meets UL Water Leakage Test, W Rating – Class 1 requirements.
 3. Location: For use at top-of-wall, bottom-of-wall, floor-to-wall and floor-to-floor joints.
 4. Compression/Extension Recovery: +/- 15 percent of original joint width.
- F. 3M Fire Barrier Sealant 2000 NS: Single-part, non-slump elastomeric silicone sealant. Sag-resistant, low VOC, UL 2079.
1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire rated systems.
 2. Service Flexibility: Accommodate vibration from normal building movement.
 3. Location: For use at top-of-wall, bottom-of-wall, wall-to-wall, floor-to-wall, floor-to-floor and perimeter joints.
 4. Compression/Extension Recovery: +/- 31 percent of original joint width.
- G. 3M Fire Barrier Sealant 2000+: Silicone Sealant: Single-part, elastomeric silicone sealant. Sag-resistant, low VOC, UL 2079.
1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire rated systems.
 2. Compression/Extension Recovery: +/- 13 percent of original joint width.
 3. Location: For use at top-of-wall, bottom-of-wall, wall-to-wall, floor-to-wall and floor-to-floor joints.
- H. 3M FireDam Spray 200: Water-based, paintable, low VOC, freeze/thaw resistant spray applied fire resistive product. Applied with conventional airless spray equipment, UL 2079.
1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire rated systems.
 2. Compression/Extension Recovery: +/- 50 percent of joint width.
 3. Location: For use at head-of-wall, wall-to-wall, floor-to-floor, bottom-of-wall, floor-to-wall and perimeter joints.
- I. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

- J. VOC Content: Fire-resistive joint system sealants shall comply with the following limits for VOC content:
 - 1. Architectural Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- K. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing fire-resistive joint systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping 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.

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
 - 3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing agency.
 - 4. Date of installation.
 - 5. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.
- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
- C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
 - 1. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

END OF SECTION

SECTION 079200 - JOINT SEALANTS - DOW SILICONES CORPORATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.2 REFERENCE STANDARDS

- A. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- B. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- C. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.
- D. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2017).

1.3 SUBMITTALS

- A. Product Data for Joint Sealants: Submit manufacturer's technical datasheets for each product to be used, and include the following:
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates that product is not compatible with.
 - 5. Substrates that primer is required.
- B. Product Data for Accessories: Submit manufacturer's technical data sheet for each accessory product to be used, including physical characteristics, installation instructions, and recommended tools.
- C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- D. Installer's qualification statement.
- E. Executed warranty.

1.4 QUALITY ASSURANCE

- A. Maintain one copy of each referenced document covering installation requirements on site.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

1.5 WARRANTY

- A. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Joint Sealants:
 - 1. Dow Silicones Corporation: www.dow.com/#sle.

2.2 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to:
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints are indicated below.
 - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items:
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
 - 1) Exception: Such gaps and openings in gypsum board and plaster finished stud walls and suspended ceilings.

- 2) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated.
 - c. Other joints are indicated below.
 3. Do not seal the following types of joints:
 - a. Intentional weep holes in masonry.
 - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
 - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - d. Joints where installation of sealant is specified in another section.
 - e. Joints between suspended panel ceilings/grid and walls.
 - B. Exterior Joints: Use nonsag nonstaining silicone sealant, unless otherwise indicated.
 1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, noncuring.
 2. Lap Joints between Manufactured Metal Panels: Butyl rubber, noncuring.
 3. Control and Expansion Joints in Concrete Paving: Self-leveling silicone traffic-grade sealant.
 - C. Interior Joints: Use nonsag silicone sealant, unless otherwise indicated.
 1. Wall and Ceiling Joints in Nonwet Areas: Silicone sealant.
 2. Wall and Ceiling Joints in Wet Areas: Nonsag silicone sealant for continuous liquid immersion.
 3. Floor Joints in Wet Areas: Nonsag silicone non-traffic-grade sealant suitable for continuous liquid immersion.
 4. Wall, Ceiling, and Floor Joints Where Tamper-Resistance is Required: Nonsag silicone sealant.
 5. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
 6. Narrow Control Joints in Interior Concrete Slabs: Self-leveling silicone sealant.
 7. Other Floor Joints: Self-leveling silicone traffic-grade sealant.
 - D. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.
 - E. Areas Where Tamper-Resistance is Required: As indicated on drawings.
- 2.3 JOINT SEALANTS - GENERAL
- A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.

2.4 NONSAG JOINT SEALANTS

- A. Hybrid Elastomeric Sealant: ASTM C920, Grade NS, Uses T2, NT, M, A, G, and O; single component; not expected to withstand continuous water immersion.
 - 1. Movement Capability: Plus and minus 50 percent, minimum.
 - 2. Color: To be selected by Architect from manufacturer's standard range.
 - 3. Service Temperature Range: Minus 75 to 300 degrees F.
 - 4. Products:
 - a. Dow; DOWSIL Contractors Paintable Sealant - CPS: www.dow.com/#sle.
- B. Nonstaining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 50 percent, minimum.
 - 2. Porous Stone: Nonstaining to light-colored natural stone when tested in accordance with ASTM C1248.
 - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 - 4. Color: To be selected by Architect from manufacturer's standard range.
 - 5. Products:
 - a. Dow; DOWSIL 790 Silicone Building Sealant: www.dow.com/#sle.
- C. Silicone Sealant: ASTM C920, Grade NS, Use T; single-component, approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
 - 1. Movement Capability: Plus 100 percent and minus 50 percent, minimum.
 - 2. Color: To be selected by Architect from manufacturer's standard range.
 - 3. Products:
 - a. Dow; DOWSIL NS Parking Structure Sealant: www.dow.com/#sle.
- D. Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 25 percent, minimum.
 - 2. Color: Match adjacent finished surfaces.
 - 3. Products:
 - a. Dow; DOWSIL 999-A Building and Glazing Sealant: www.dow.com/#sle.

2.5 SELF-LEVELING JOINT SEALANTS

- A. Self-Leveling Silicone Sealant: ASTM C920, Grade P, Uses M and A; single- or multi-component, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
 - 1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
 - 2. Color: To be selected by Architect from manufacturer's standard range.
 - 3. Products:

- a. Dow; DOWSIL 890-SL Silicone Joint Sealant: www.dow.com/#sle.

2.6 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Noncorrosive and nonstaining; type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in an inconspicuous area to verify that it does not stain or discolor slab.

3.3 INSTALLATION

- A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

- B. Provide joint sealant installations complying with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
 - 1. Width/depth ratio of 2:1.
 - 2. Neck dimension no greater than 1/3 of the joint width.
 - 3. Surface bond area on each side not less than 75 percent of joint width.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- H. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

END OF SECTION

SECTION 079219 - ACOUSTICAL JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes acoustical joint sealants.

1.2 ACTION SUBMITTALS

- A. Product Data: For each acoustical joint sealant.
- 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. Acoustical-Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample Warranties: For special warranties.

1.4 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace acoustical 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.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E90.
- B. VOC Content of Interior Sealants: Sealants and sealant primers shall comply with the following:

1. Acoustical sealants and sealant primers shall have a VOC content of 250 g/L or less.
- C. Low-Emitting Interior Sealants: Acoustical sealants and sealant primers shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services) "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. GE Construction Sealants; Momentive Performance Materials Inc.; RCS20 Acoustical.
 - b. Hilti, Inc.; CP 506 Smoke and Acoustical Sealant.
 - c. Pecora Corporation; AIS-919.
 - d. Tremco Incorporated; Tremco Acoustical Sealant.
 - e. United States Gypsum Company; SHEETROCK Acoustical Sealant.
 2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.
- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nonsag, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber acoustical sealant.

2.3 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- 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 to 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 acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other

conditions affecting performance of the Work.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical-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.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer 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.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C919, ASTM C1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect acoustical 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, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION

SECTION 079513 - EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Expansion joint cover assemblies for floor, wall, ceiling, soffit, and exterior surfaces.

1.2 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2020.
- D. ITS (DIR) - Directory of Listed Products; Current Edition.
- E. UL (DIR) - Online Certifications Directory; Current Edition.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Installation Templates: For frames and anchors to be embedded in concrete or masonry, furnish templates to relevant installers; include installation instructions and tolerances.

1.4 SUBMITTALS

- A. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.
- B. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction and anchorage locations.
- C. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Expansion Joint Cover Assemblies:
 - 1. Balco, a CSW Industries Company.
 - a. 2" TCWW for Interior Masonry Construction (TCWW-2).
 - 1) 2HTCWW-2 for Fire Rated Walls.
 - 2) 3HFCWWE-2SAN-MBW for Fire Rated Walls.
 - b. 2" GCWW for Interior Gyp Borad Construction (GCWW-2).
 - c. 2" TCWWE-2-SAN for Interior Expansion Joints.
 - d. 2" FCWW for Exterior Masonry Construction (FCWW-2).
 - e. 2" FCWWE-2-SAN Exterior Expansion Joints.
 - f. 2" NBSFL for Floor Construction (NBSFL-2).

2.2 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS

2.3 EXPANSION JOINT COVER ASSEMBLIES

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
 - 1. Joint Dimensions and Configurations: As indicated on drawings.
 - 2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
 - 3. Joint Cover Styles: As indicated on drawings.
 - 4. Joint Movement Capability: If not indicated, provide minimum plus/minus 25 percent joint movement capability.
 - 5. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
 - 6. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.
- B. Resilient Seal Type Covers: Having flat exposed surface without crevices that could collect dirt; designed to withstand expected movement without extrusion of seal from joint assembly; for floors, provide style that is flush with top of floor covering; for exterior joints, weathertight.
- C. Sliding Cover Plate Type Covers: Provide plate with beveled edges and neat fit that does not collect dirt.
- D. Covers in Gypsum Board Assemblies: Provide style with anchoring wings that can be completely covered by joint compound.
- E. Covers in Fire Rated Assemblies: Provide cover assembly having fire rating equivalent to that of assembly into which it is installed.
 - 1. Acceptable Evaluation Agencies: UL (DIR) and ITS (DIR).

2.4 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
 - 1. Exposed Finish at Floors: Mill finish or natural anodized.
 - 2. Exposed Finish at Walls and Ceilings: Natural anodized.
- B. Resilient Seals:
 - 1. Exterior: EPDM rubber, Neoprene, or Santoprene; no PVC; Shore A hardness of 40 to 50 Durometer.
 - 2. Color: Black.
- C. Anchors and Fasteners: As recommended by cover manufacturer.
- D. Ferrous Metal Anchors: Galvanized where embedded in concrete or in contact with cementitious materials.
- E. Threaded Fasteners: Stainless steel.
- F. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.
- B. Verify that frames and anchors installed by others are in correct locations and suitable for installation of remainder of assembly.

3.2 INSTALLATION

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level, flush with adjacent surfaces.
- C. Rigidly anchor to substrate to prevent misalignment.

3.3 PROTECTION

- A. Do not permit traffic over unprotected floor joint surfaces.
- B. Provide strippable coating to protect finish surface.

END OF SECTION

This page intentionally left blank

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated hollow metal doors and frames.
- D. Thermally insulated hollow metal doors with frames.
- E. Hollow metal borrowed lites glazing frames.
- F. Accessories, including glazing, louvers, and matching panels.

1.2 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2018.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2020.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021a.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
- I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.

- J. ASTM C476 - Standard Specification for Grout for Masonry; 2022.
- K. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2016.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- M. ITS (DIR) - Directory of Listed Products; Current Edition.
- N. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- O. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- P. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2017.
- Q. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- R. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- S. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- T. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2019.
- U. UL (DIR) - Online Certifications Directory; Current Edition.
- V. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: <https://steeldoors.org/sdi-certified/#sle>.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 2. Curries, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 3. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
 - 4. Steelcraft, an Allegion brand: www.allegion.com/#sle.
 - 5. de la Fontaine..

2.2 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
 - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
 - 4. Door Edge Profile: Manufacturers standard for application indicated.
 - 5. Typical Door Face Sheets: Flush.
 - 6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturer's standard.
 - 7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
 - 8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvanized) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
 - a. Based on SDI Standards: Provide at least A40/ZF120 (galvanized) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvanized) for corrosive locations.

- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.3 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Exterior Doors: Thermally insulated.
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 16 gauge, 0.053 inch, minimum.
 - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
 - 2. Door Core Material: Vertical steel stiffeners with fiberglass batts.
 - 3. Door Thickness: 1-3/4 inches, nominal.
 - 4. Door Finish: Factory primed and field finished.
- C. Interior Doors, Non-Fire-Rated:
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 16 gauge, 0.053 inch, minimum.
 - 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 - 3. Door Thickness: 1-3/4 inches, nominal.
 - 4. Door Face Sheets: Flush.
 - 5. Door Finish: Factory primed and field finished.
- D. Fire-Rated Doors:
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 16 gauge, 0.053 inch, minimum.

2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
3. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
4. Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - a. Attach fire rating label to each fire rated unit.
5. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
6. Door Thickness: 1-3/4 inches, nominal.
7. Door Face Sheets: Flush.
8. Door Finish: Factory primed and field finished.

2.4 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Exterior Door Frames: Full profile/continuously welded type.
 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
 2. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.
 3. Frame Finish: Factory primed and field finished.
- D. Interior Door Frames, Non-Fire Rated: Face welded type.
 1. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch, maximum, above floor at 45 degree angle.
 2. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.
 3. Frame Finish: Factory primed and field finished.
- E. Door Frames, Fire-Rated: Face welded type.
 1. Fire Rating: Same as door, labeled.
 2. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch, maximum, above floor at 45 degree angle.
 3. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.
 4. Frame Finish: Factory primed and field finished.
- F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- G. Mullions for Pairs of Doors: Removable type, with profile similar to jambs.
- H. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

- I. Transom Bars: Fixed, of profile same as jamb and head.
- J. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- K. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
- L. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.5 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.6 ACCESSORIES

- A. Louvers: Roll formed steel with overlapping frame; finish same as door components ; factory-installed.
 - 1. In Fire-Rated Doors: UL (DIR) or ITS (DIR) listed fusible link louver, same rating as door.
 - 2. Style: Standard straight slat blade.
 - 3. Fasteners: Exposed or concealed fasteners.
- B. Door Window Frames: Door window frames with glazing securely fastened within door opening.
 - 1. Size: As indicated on drawings.
 - 2. Metal Finish: Gray polyester powder coating.
 - 3. Glazing: 1/4 inch thick, tempered glass unless doors is exterior, then provide insulated glass; provide rated glass in rated doors., in compliance with requirements of authorities having jurisdiction.
- C. Glazing: As specified in Section 088000, factory installed.
- D. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.
- E. Astragals and Edges for Double Doors: Pairs of door astragals, and door edge sealing and protection devices.
 - 1. UL listed products in compliance with requirements of authorities having jurisdiction.
 - 2. Provide surface mounted astragal to cover or fill space for full door height between pair of doors or door and adjacent jamb.

3. Astragal Type: Split, two parts, and with cutouts for other door hardware and sealing gasket.
 4. Material: Aluminum.
 5. Metal Finish: Gray powder coating.
 6. Provide non-corroding fasteners at exterior locations.
- F. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- G. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- H. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.2 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.3 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Install door hardware as specified in Hardware Section .
 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.

- F. Comply with glazing installation requirements of Glazing Section.
- G. Coordinate installation of electrical connections to electrical hardware items.
- H. Touch up damaged factory finishes.

3.4 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.5 ADJUSTING

- A. Adjust for smooth and balanced door movement.

3.6 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 081416 - FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flush wood doors; flush configuration; fire-rated and non-rated.

1.2 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- C. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- D. ASTM E413 - Classification for Rating Sound Insulation; 2022.
- E. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- F. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- G. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- H. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.
- I. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- J. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2021, with Errata.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

- A. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- B. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for

glazing, fire-protection ratings for fire-rated doors and other details.

1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

- C. Samples: Submit two samples of door veneer, 8 by 10 inches in size illustrating wood grain, stain color, and sheen.
- D. Warranty, executed in Owner's name.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.
- D. Mark each door on bottom rail with opening number used on Shop Drawings.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.8 WARRANTY

- A. Manufacturer Warranty: Provide manufacturer's warranty on interior doors for the life of the installation. Complete forms in Owner's name and register with manufacturer.
 1. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.
 - a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 - 1. Masonite Architectural; Aspiro Select Wood Veneer Doors:
www.architectural.masonite.com/#sle.
 - 2. VT Industries, Inc; Heritage Collection: www.vtindustries.com/#sle.
- B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 DOORS

- A. Doors: See drawings for locations and additional requirements.
 - 1. Quality Standard: Custom Grade, Extra Heavy Duty performance, in accordance with WDMA I.S. 1A.
 - 2. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS), AWMAC/WI (NAAWS) or WDMA I.S. 1A.
 - 3. Adhesives: Do not use adhesives that contain urea formaldehyde.
 - 4. Composite Wood Products: Products shall be made without urea formaldehyde.
 - 5. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at each location.
 - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is closed.
 - a. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
 - b. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
 - c. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
 - d. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

2.3 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type structural composite lumber core (SCLC), plies and faces as indicated.
 - 1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: 700 lbf (3100 N).
 - b. Screw Withdrawal, Edge: 400 lbf (1780 N).
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.
 - 1. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware and as follows:
 - a. 5-inch (125-mm) top-rail blocking.
 - b. 5-inch (125-mm) bottom-rail blocking, in doors indicated to have protection plates.
 - c. 5-inch (125-mm) midrail blocking, in doors indicated to have armor plates.
 - 2. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - a. Screw-Holding Capability: 550 lbf (2440 N) per WDMA T.M.-10.

2.4 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Maple, HPVA Grade A, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
 - 1. Vertical Edges: Same species as face veneer.
 - 2. Pair and Set Match: Provide for doors hung in same opening.
 - 3. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.
 - 4. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.
- B. Facing Adhesive: Type I - waterproof.

2.5 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
 - 1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
 - 2. Provide solid blocking for other throughbolted hardware.

- C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.
- D. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- E. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- G. Provide edge clearances in accordance with the quality standard specified.

2.6 FINISHES - WOOD VENEER DOORS

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
 - 1. Transparent:
 - a. Grade: Premium.
 - b. System - TR-6, Catalyzed Polyurethane.
 - c. Stain: As selected by Architect.
 - d. Sheen: Satin.
 - e. Effect: Semifilled finish, produced by applying an additional finish coat to partially fill the wood pores.
- C. Factory finish doors in accordance with approved sample.
- D. Seal door top edge with color sealer to match door facing.

2.7 ACCESSORIES

- A. Metal Louvers:
 - 1. Material and Finish: Roll formed steel; pre-painted finish to color as selected.
 - 2. Louver Blade: Inverted V blade, sight proof, light proof.
 - 3. Frame: style with surface fasteners.
- B. Glazed Openings:
 - 1. Heat-Strengthened and Fully Tempered Glass: ASTM C1048.
 - 2. Fire-Protection-Rated Glass: Safety Certification, 16 CFR 1201, Category II.
 - 3. Tint: Clear.

C. LIGHT FRAMES

1. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
 - a. Wood Species: Species compatible with door faces.
 - b. Profile: Manufacturer's standard shape.
 - c. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.
2. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- (1.2-mm-) thick, cold-rolled steel sheet; factory primed for paint with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated.

D. Astragals and Edges for Double Doors: Pairs of doors astragals, and door edge sealing and protection devices.

1. UL listed products in compliance with requirements of authorities having jurisdiction.
2. Provide surface mounted astragal to cover or fill space for full door height between pair of doors or door and adjacent jamb.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 1. Install fire-rated doors in accordance with NFPA 80 requirements.
 2. Install smoke and draft control doors in accordance with NFPA 105 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.

- E. Coordinate installation of glazing.
- F. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
 - a. Comply with NFPA 80 for fire-rated doors.
 - b. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
 - 2. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- G. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- H. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.
- I. Install door louvers plumb and level.

3.3 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.4 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.
- C. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

This page intentionally left blank

SECTION 081613 - FIBERGLASS DOORS

PART 1 GENERAL

1.1 Section Includes

- A. Fiberglass doors.
- B. Fiberglass door frames.

1.2 Reference Standards

- A. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2018.
- C. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- E. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- F. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).
- G. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

1.3 Administrative Requirements

- A. Coordination: Obtain hardware templates from hardware manufacturer prior to starting fabrication.

1.4 Submittals

- A. Product Data: Provide manufacturer's standard details, installation instructions, hardware and anchor recommendations.

- B. Shop Drawings: Indicate layout and profiles; include assembly methods.
 - 1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.
 - 2. Indicate wall conditions, door and frame elevations, sections, materials, gauges, finishes, location of door hardware by dimension, and details of openings; use same reference numbers indicated on drawings to identify details and openings.
 - C. Selection Samples: Submit two complete sets of color chips, illustrating manufacturer's available finishes, colors, and textures.
 - D. Maintenance Data: Include instructions for repair of minor scratches and damage.
 - E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer; include detailed terms of warranty.
- 1.5 Delivery, Storage, and Handling
- A. Mark doors with location of installation, door type, color, and weight.
 - B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - C. Store materials in original packaging, under cover, protected from exposure to harmful weather conditions and from direct contact with water.
 - 1. Store at temperature and humidity conditions recommended by manufacturer.
 - 2. Do not use non-vented plastic or canvas shelters.
 - 3. Immediately remove wet wrappers.
 - D. Store in position recommended by manufacturer, elevated minimum 4 inches above grade, with minimum 1/4 inch space between doors.
- 1.6 Field Conditions
- A. Do not install doors until structure is enclosed.
 - B. Maintain temperature and humidity at manufacturer's recommended levels during and after installation of doors.
- 1.7 Warranty
- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 Manufacturers

- A. Fiberglass Composite Doors:
 - 1. Special-Lite, Inc; AF-217: www.special-lite.com/#sle.

2.2 Door and Frame Assemblies

- A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.
 - 1. Operation: Manual.
 - 2. Physical Endurance: Swinging door cycle test to ANSI/SDI A250.4, Level A (1,000,000 cycles) minimum; tested with hardware and fasteners intended for use on project.
 - 3. Screw-Holding Capacity: Tested to 890 pounds, minimum.
 - 4. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less, when tested in accordance with ASTM E84.
 - 5. Flammability: Self-extinguishing when tested in accordance with ASTM D635.
 - 6. Sizes: As indicated on drawings.
 - 7. Clearance Between Door and Frame: 1/8 inch, maximum.
 - 8. Clearance Between Bottom of Door and Finished Floor: 3/4 inch, maximum; not less than 1/4 inch clearance to threshold.

2.3 Components

- A. Doors: Fiberglass construction with reinforced core.
 - 1. Type: As indicated on drawings, including swinging and sliding doors.
 - 2. Thickness: 1-3/4 inch, nominal.
 - 3. Core Material: Manufacturer's standard core material for application indicated.
 - 4. Construction:
 - 5. Face Sheet Texture: Pebble grain.
 - 6. Door Panel Configuration: As indicated on drawings.
 - 7. Subframe and Reinforcements: Manufacturer's standard materials.
 - 8. Waterproof Integrity: Provide factory fabricated edges, cut-outs, and hardware preparations of fiberglass reinforced plastic (FRP); provide cut-outs with joints sealed independently of glazing, louver inserts, or trim.
 - 9. Hardware Preparations: Factory reinforce, machine, and prepare for door hardware including field installed items; provide solid blocking for each item; field cutting, drilling or tapping is not permitted; obtain manufacturer's hardware templates for preparation as necessary.
- B. Door Frames: Provide type in compliance with performance requirements specified for doors.
 - 1. Type: aluminum frame..
 - 2. Profiles: As indicated on drawings.
 - 3. Non-Fire-Rated:

- a. Aluminum, 0.04 inch minimum wall thickness; natural anodized finish.
- 4. Corner Joints: Mitered with concealed corner blocks or angles of same material as frame; fiberglass and aluminum joined with screws; steel and stainless steel spot welded; sealed watertight with silicone sealant; field assemble knock-down type frames as required.
- 5. Hardware Cut-outs: Provide continuous backing or mortar guards of same material as frame, with watertight seal.
- 6. Frame Anchors: Stainless steel, Type 304; provide three anchors in each jamb for heights up to 84 inches with one additional anchor for each additional 24 inches in height.
- 7. Reinforcing: Provide manufacturer's standard reinforcing at hinge, strike, and closer locations.

2.4 Performance Requirements

- A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.
- B. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 7.5 psf.
- C. Air Leakage: Maximum of 0.1 cfm per square foot at 6.27 psf differential pressure, when tested in accordance with ASTM E283.
- D. Structural Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.
- E. Thermal Transmittance, Exterior Doors: AAMA 1503, U-value of 0.35, maximum, measured on exterior door in size required for this project.

2.5 Finishes

- A. Gel Coating: Ultraviolet (UV) stabilized polyester finish.
 - 1. Thickness: Minimum 15 mils, 0.015 inch wet thickness, plus/minus 3 mils, 0.003 inch.
 - 2. Color: As selected by Architect from manufacturer's standard line of colors.

2.6 Accessories

- A. Stops for Glazing and Louver: Fiberglass, unless otherwise indicated or required by fire rating; provided by door manufacturer to fit factory made openings, with color and texture to match door; fasteners shall maintain waterproof integrity.

1. Exterior Doors: Provide non-removable stops on exterior side with continuous compression gasket weatherseal.
2. Glazed Openings: Provide removable stops on interior side.
3. Opening Sizes and Shapes: As indicated on drawings.

PART 3 EXECUTION

3.1 Examination

- A. Verify actual dimensions of openings by field measurements before door fabrication; show recorded measurements on shop drawings.
- B. Do not begin installation until substrates have been properly prepared.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 Preparation

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- B. Clean and prepare substrate in accordance with manufacturer's directions.
- C. Protect adjacent work and finish surfaces from damage during installation.

3.3 Installation

- A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors.
- B. Set units plumb, level, and true-to-line, without warping or racking doors, and with specified clearances; anchor in place.
- C. Set thresholds in continuous bed of sealant.
- D. In masonry walls, install frames prior to laying masonry; anchor frames into masonry mortar joints; fill jambs with grout as walls are laid up.
- E. In stud walls, install frames prior to building walls; anchor frames to studs using concealed anchors.
- F. Separate aluminum and other metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.
- G. Repair or replace damaged installed products.

3.4 Adjusting

- A. Lubricate, test, and adjust doors to operate easily, free from warp, twist or distortion, and to fit watertight for entire perimeter.
- B. Adjust hardware for smooth and quiet operation.
- C. Adjust doors to fit snugly and close without sticking or binding.

3.5 Cleaning

- A. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.

3.6 Protection

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 083100 - ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall- and ceiling-mounted access units.

1.2 REFERENCE STANDARDS

- A. UL (FRD) - Fire Resistance Directory; Current Edition.

1.3 SUBMITTALS

- A. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 ACCESS DOORS AND PANELS ASSEMBLIES

- A. Wall-Mounted Units:
 - 1. Location: As indicated on drawings.
 - 2. Panel Material: Steel.
 - 3. Size: 16 by 16 inches, unless otherwise indicated.
 - 4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
 - 5. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
 - 6. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.
- B. Wall-Mounted Units in Wet Areas:
 - 1. Location: Wet areas.
 - 2. Panel Material: Stainless steel, Type 304.
 - 3. Size: 16 by 16 inches, unless otherwise indicated.

4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
 5. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
 6. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.
- C. Fire-Rated Wall-Mounted Units:
1. Location: As indicated on drawings.
 2. Wall Fire-Rating: As indicated on drawings.
 3. Panel Material: Steel.
 4. Size: 16 by 16 inches, unless otherwise indicated.
 5. Door/Panel: Insulated double-surface panel, with tool-operated spring or cam lock and no handle.
- D. Ceiling-Mounted Units:
1. Location: As indicated on drawings.
 2. Panel Material: Steel.
 3. Size - Other Ceilings: 16 by 16 inches, unless otherwise indicated.
 4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
 5. Ceiling Mounting Criteria: Provide concealed flange face frame and door surface flush with frame surface.
- E. Fire-Rated Ceiling-Mounted Units:
1. Location: As indicated on drawings.
 2. Ceiling Fire-Rating: As indicated on drawings.
 3. Panel Material: Steel.
 4. Size: 12 by 12 inches, unless otherwise indicated.
 5. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

2.2 Wall- and Ceiling-MOUNTED ACCESS UNITS

- A. Manufacturers:
1. Activar Construction Products Group, Inc. - JL Industries:
www.activarcpg.com/#sle.
 - a. Multipurpose Stainless Steel Access Panel: Activar/JL Industries TM.
 - b. Concealed-Frame Access Panel: Activar/JL Industries CT.
 - c. Insulated Fire-Rated Access Panel: Activar/JL Industries FD.
 2. ACUDOR Products Inc: www.acudor.com/#sle.
 - a. Fire-Rated Wall-Mounted Units - 2 Hours or Less: ACUDOR FW-5015.
 - b. Wall- and Ceiling-Mounted Units: ACUDOR DW-5040.
 - c. Stainless Steel Wall Mounted Units: ACUDOR UF-5500.

3. Babcock-Davis: www.babcockdavis.com/#sle.
 4. Best Access Doors: www.bestaccessdoors.com/#sle.
 5. Milcor, Inc: www.milcorinc.com/#sle.
- B. Wall- and Ceiling-Mounted Units: Factory-fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
1. Material: Steel.
 2. Style: Exposed frame with door surface flush with frame surface.
 - a. Gypsum Board Mounting Criteria: Use drywall bead type frame.
 3. Door Style: Single thickness with rolled or turned in edges.
 4. Frames: 16 gauge, 0.0598 inch, minimum thickness.
 5. Double-Skinned Hollow Steel Sheet Door Panels: 16 gauge, 0.059 inch, minimum thickness, on both sides and along each edge.
 6. Insulation: Non-combustible mineral wool or glass fiber.
 7. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
 - a. Provide products listed by UL (FRD) as suitable for purpose indicated.
 8. Finish:
 - a. Wet Locations: 304 stainless, No. 4 brushed.
 - b. Standard Locations: Steel, primed.
 9. Hardware:
 - a. Hardware for Fire-Rated Units: As required for listing.
 - b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
 - c. Latch/Lock: Cylinder lock-operated cam latch, two keys for each unit.
 - d. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.
 - e. Inside Latch Release: Mechanism that allows door/panel to be opened from inside.

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 doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
 2. Provide mounting holes in frames for attachment of units to metal or wood framing.
 3. Provide mounting holes in frame for attachment of masonry anchors.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
1. For cylinder locks, furnish two keys per lock and key all locks alike.
- E. Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.3 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

3.4 ADJUSTING

- 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

SECTION 083323 - OVERHEAD COILING DOORS

PART 1 GENERAL

1.1 Section Includes

- A. Exterior coiling doors.
- B. Fire-rated coiling doors.
- C. Electric operators and control stations.
- D. Wiring from electric circuit disconnect to operators and control stations.

1.2 Reference Standards

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ITS (DIR) - Directory of Listed Products; Current Edition.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- E. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008 (Reaffirmed 2020).
- F. NEMA MG 1 - Motors and Generators; 2021.
- G. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- H. UL (DIR) - Online Certifications Directory; Current Edition.
- I. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.3 Submittals

- A. Product Data: Provide general construction, electrical equipment, and component connections and details.
- B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- C. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.

- D. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.4 Quality Assurance

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.
- C. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified and indicated.

1.5 Warranty

- A. Manufacturer Warranty: Provide 2-year manufacturer warranty for roller shaft counterbalance assembly. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 Manufacturers

- A. Overhead Coiling Metal Doors:
 - 1. Overhead Door Corporation; Model 625 Stormtite Insulated Rolling Service Door: www.overheaddoor.com/#sle.
- B. Overhead Coiling Fire Doors:
 - 1. Overhead Door Corporation; FireKing Model 630 Fire Doors: www.overheaddoor.com/#sle.

2.2 COILING DOORS

- A. Exterior Coiling Doors: Steel slat curtain.
 - 1. Capable of withstanding positive and negative wind loads of 20 psf without undue deflection or damage to components.
 - 2. Sandwich Slats: Manufacturer's standard, with core of foamed-in-place polyurethane insulation; minimum R-value of 4.88.
 - 3. Finish: Factory painted, color as selected.
 - 4. Guide, Angles: Galvanized steel.
 - 5. Hood Enclosure: Manufacturer's standard; primed steel.
 - 6. Electric operation.

7. Mounting: Surface mounted.
 8. Locking Devices: Slide bolt on inside.
- B. Fire-Rated Coiling Doors: Steel slat curtain; comply with NFPA 80.
1. Refer to drawings for hour fire rating.
 2. Provide products listed and labeled by ITS (DIR) or UL (DIR) as suitable for purpose specified and indicated on drawings.
 3. Finish: Factory painted, color as selected.
 4. Guides, Angles: Stainless steel.
 5. Hood Enclosure: Manufacturer's standard; primed steel.
 6. Fire Alarm Release Mechanism: Electric-motor operated from fire alarm system and local smoke detectors.
 - a. Provide fail-secure, fail-closed, locking device upon power loss.
 - b. Provide 10 second time delay for activation upon loss of power.
 7. Electric operation.
 8. Mounting: Surface mounted.

2.3 MATERIALS

- A. Metal Curtain Construction: Interlocking slats.
1. Curtain Bottom for Slat Curtains: Fitted with angles to provide reinforcement and positive contact in closed position.
 2. Weatherstripping for Exterior Doors: Moisture and rot proof, resilient type, located at jamb edges, bottom of curtain, and where curtain enters hood enclosure of exterior doors.
- B. Guide Construction: Continuous, of profile to retain door in place with snap-on trim, mounting brackets of same metal.
- C. Guides - Angle: ASTM A36/A36M metal angles, size as indicated.
1. Hot-dip galvanized in compliance with ASTM A123/A123M.
- D. Hood Enclosure and Trim: Internally reinforced to maintain rigidity and shape.
1. Prime painted.
- E. Lock Hardware:
1. For Interior motor operated units, additional lock or latching mechanisms are not required.
 2. Slide Bolt for Exterior Doors: Provide on single-jamb side, extending into slot in guides.
- F. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.

2.4 Electric Operation

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
 - 1. Provide interlock switches on motor operated units.
 - 2. Provide tamperproof operation cycle counter.
- B. Electric Operators:
 - 1. Mounting: Side mounted.
 - 2. Motor Enclosure:
 - a. Exterior Coiling Doors: NEMA MG 1, Type 4; open drip proof.
 - b. Interior Coiling Doors: NEMA MG 1, Type 1; open drip proof.
 - 3. Motor Rating: 1/3 HP; continuous duty.
 - 4. Motor Voltage: 120 volts, single phase, 60 Hz.
 - 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
 - 6. Controller Enclosure: NEMA 250, Type 4.
 - 7. Opening Speed: 12 inches per second.
 - 8. Brake: Manufacturer's standard type, activated by motor controller.
 - 9. Manual override in case of power failure.
- C. Control Station: Provide standard key-operated, 'Open-Close-Stop' momentary-contact control device for each operator complying with UL 325.
 - 1. 24 volt circuit.
 - 2. Surface mounted, at interior door jamb.
 - 3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
 - a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.
- D. Safety Edge: Located at bottom of coiling door, full width, electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.1 Examination

- A. Verify that adjacent construction is suitable for door installation.
- B. Verify that electrical services have been installed and are accessible.
- C. Verify that door opening is plumb, header is level, and dimensions are correct.

- D. Notify Architect of any unacceptable conditions or varying dimensions.
- E. Commencement of installation indicates acceptance of substrate and door opening conditions.

3.2 Installation

- A. Install units in accordance with manufacturer's instructions.
- B. Install fire-rated doors in accordance with NFPA 80.
- C. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- D. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- E. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- F. Coordinate installation of electrical service with Section 260583.
- G. Complete wiring from disconnect to unit components.
- H. Complete wiring from fire alarm system.
- I. Install enclosure and perimeter trim.

3.3 Tolerances

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch.
- C. Maximum Variation From Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 feet straight edge.

3.4 Adjusting

- A. Adjust operating assemblies for smooth and noiseless operation.

3.5 Cleaning

- A. Clean installed components.
- B. Remove labels and visible markings.

END OF SECTION

SECTION 083343 - SMOKE CURTAINS

PART 1 GENERAL

1.1 Section Includes

- A. Deployable Draft-Protective Curtain Assemblies.

1.2 Coordination

- A. Coordinate smoke curtain assemblies with power, signal, fire-alarm, and smoke-detection systems.
- B. Coordinate smoke-protective curtain assemblies with ceilings for operational clearances and maintenance access requirements.
- C. Coordinate smoke-protective curtain assemblies with walls for support requirements, rating continuity above ceilings, and recessed wall switches.
- D. Coordinate requirements for metal supports required for smoke-protective curtain assemblies.

1.3 Informational Submittals

- A. Product Data: Manufacturer's product information and data sheets for each product specified in this section, including:
 - 1. Substrate preparation instructions and recommendations
 - 2. Installation means and methods.
 - 3. Recommendations and requirements for proper storage and handling.
- B. Shop Drawings:
 - 1. Submit Manufacturer's approved shop drawings detailing the section and elevation views of each product to be installed.
 - 2. Coordinate with locations listed on Contract Drawings.
- C. Warranty Information:
 - 1. Submit confirmation and details of manufacturer's warranty, extended warranty, and replacement policies.

1.4 Closeout SUBMITTALS

- A. Operation and Maintenance Data: For smoke- and draft-protective curtain assemblies to include in emergency, operation, and maintenance manuals.

- B. Field quality-control reports for required testing.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer: Minimum of seven (7) years experience in manufacturing draft-control curtain assemblies at a facility in the United States that have been successfully installed in compliance with requirements of authorities having jurisdiction.
 - 2. Installers: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1.6 Delivery, Storage and Handling

- A. Deliver, store and handle materials and products in accordance with the manufacturer's instructions and recommendations and industry standards.
- B. Store all materials in the manufacturer's original packaging until ready for installation. Protect all products from damage or exposure to adverse weather conditions.

1.7 Project Conditions

- A. Prior to fabrication, verify that dimensions are consistent with those found in the construction drawings. Where discrepancies exist, confirm the proper dimensions with the Architect before proceeding with work.

1.8 WARRANTY

- A. Manufacturer Warranty: Provide manufacturer's warranty covering parts and labor costs to repair or replace part that fail to perform.
 - 1. Warranty Period: Parts and labor warranty for 12 months from date of Substantial Completion or date of purchase, whichever comes first.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design : Smoke Guard, A CSW Industrials Company.

2.2 SMOKE-PROTECTIVE CURTAIN ASSEMBLIES

- A. Alarm-activated fabric smoke curtain assembly complying with NFPA 92.

1. Basis of Design Product: Model 2100 Smoke, by Smoke Guard, a CSW Industrials Company.
- B. Smoke Control: Provide smoke- and fire-protective curtain assemblies that are listed and labeled with the letter "S" on the rating label by a qualified testing agency for smoke- and draft-control based on testing in accordance with UL 1784 without an artificial bottom seal; with maximum air-leakage rate of 3.0 cfm/sq. ft. (0.01524 cu. m/s x sq. m) of opening at 0.10 inch wg (24.9 Pa) for both ambient and elevated temperature tests.
- C. Curtain Materials: Provide manufacturer's standard multi-layer glass fiber fabric coated on one or both sides complying with each of the following:
 1. Fire-Test-Response Characteristics: Provide products that pass NFPA 701, as determined by testing of fabrics that were treated using treatment-application method intended for use for this Project by a testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Flame-Spread and Smoke-Developed Indexes: 25 and 50, respectively, when tested in accordance with ASTM E84.
 3. Screen Reinforcement: Provide film with reinforcement to limit deflection or tearing.
- D. Curtain Attachment: Curtain shall form a pressure-resisting seal with
 1. Side Guides: Formed from galvanized-steel sheet conforming to ASTM A653/A653M with integral pressure-retaining tabs.
 2. Weighted Bottom Bar: Provide weighted bottom bar to ensure smooth operation and hold curtain taut.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Housing Type: Sheet metal housings containing support rollers and associated electronics.
 1. Coordinate operator wiring requirements and electrical characteristics with building electrical system.
- G. Operation: Controlled descent automatically by fail-safe gravity deployment and motorized rewind. Curtain deploys on activation of one of the following:
 1. Local Smoke Detector.
 2. Building Fire Alarm.
 3. Testing Key Switch.
- H. Release Mechanism: Labelled as defined by UL864.
- I. Optional Egress: Provide a means of egress in accordance with AC77 Section 3.1.6.2 including both of the following:

1. Manual Egress by lifting the curtain, requiring force no greater than 15 pounds to initiate egress operation.
2. Powered egress initiated by screen mounted rewind switches mounted on each side of the curtain.

2.3 Accessories

1. End of Line Diode: Provide manufacturer's standard diode device installed at smoke detector to monitor the circuit.
 - a. Power Requirements: 3.3 Volts, 2 Watts.
2. Firefighter's Smoke Control Station (FSCS): Provide manufacturer's standard integration with FSCS with the following functionality:
 - a. Open/Retract Curtain.
 - b. Open Confirm.
 - c. Open Fault Alert.
 - d. Close/Deploy Curtain.
 - e. Close Confirm.
 - f. Closed Fault Alert.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates upon which work will be installed.
 1. Verify related work performed under other sections is complete and in accordance with Shop Drawings.
 2. Verify wall surfaces and elevator door frames are acceptable for installation of smoke containment system components.
- B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Verify that locations of concealed reinforcements have been clearly marked for the installer.
- E. Locate reinforcement points and clearly mark their locations if not already done.

3.2 PREPARATION

- A. Clean surfaces prior to installation.
- B. Prepare surfaces as recommended by the manufacturer for achieving optimal results.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's current installation instructions and industry recognized best practices.
- B. Install in accordance with all code bodies having jurisdiction.

3.4 Cleaning and Protection

- A. Clean and remove all stains, grime, or other soils using soap and water. Only use detergents approved by the manufacturer for use on the finishes specified. Do not use acid solutions, steel wool, and other harsh abrasives.
- B. Damaged products must be repaired or replaced prior to substantial completion.
- C. Protect installed products until completion of work specified in this section.

3.5 FIELD QUALITY CONTROL

- A. Field Test: Follow manufacturer's cycle test procedures.
 - 1. Notify Owner's Representative, local Fire Marshal, alarm sub-contractor and elevator sub-contractor or service company minimum one week in advance of scheduled testing.
 - 2. Complete maintenance service record.

3.6 DEMONSTRATION

- A. Demonstrate required testing and maintenance procedures to Owner's Representative.

3.7 Maintenance and Testing:

- A. Perform minimum semi-annual maintenance and testing on each smoke containment system as required by the manufacturer's warranty, code agency evaluation reports, and as required by local authority having jurisdiction.
 - 1. Retain permanent record of tests.
- B. Fire Event: Owner shall engage a qualified inspector to assess unit(s) after exposure to a fire event.

END OF SECTION

This page intentionally left blank

SECTION 083473 - SOUND CONTROL DOOR ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sound control door assemblies.
 - 1. Wood doors and metal frames.
 - 2. Interior doors and frames, non-fire-rated.

1.2 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2020.
- C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.
- D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.
- E. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- F. ASTM E413 - Classification for Rating Sound Insulation; 2022.
- G. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- H. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- I. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2016.
- J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- K. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- L. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- M. NAAMM HMMA 865 - Guide Specifications for Sound Control Hollow Metal Door and Frames Assemblies; 2013.
- N. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2019.
- O. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2021, with Errata.

1.3 SUBMITTALS

- A. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, fire-protection ratings for fire-rated doors, and finishes.
- B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- C. Samples: Submit two samples of door veneer, 8 inch by ___ inch in size showing factory finishes, colors, and surface texture.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Manufacturer's Qualification Statement.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect wood doors in compliance with WDMA I.S. 1A and specified requirements.
- B. Store wood doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas, or in areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.
- C. Remove doors and frames from resilient packaging upon delivery on site and inspect for damage, provide cover over doors for protection until installed, and store in vertical position properly braced with blocking to permit air circulation between components.
- D. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Wood Sound Control Door Assemblies:
 - 1. IAC Acoustics; Noise-Lock..

2.2 REGULATORY REQUIREMENTS

- A. Accessibility: Comply with ICC A117.1 and ADA Standards.
- B. Opening Force of Sound Control Doors, Non-Fire Rated: 5 lbs, maximum, in compliance with ADA Standards.
- C. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- D. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with specified requirements for each type; for instance, a sound control door is also indicated as being an exterior door must comply with requirements specified for sound control doors and exterior doors; where two requirements conflict, comply with most stringent.

2.3 COMPONENTS

- A. Panels: Same construction, performance, and finish as doors.
- B. Door Edge Profile: Manufacturer's standard for application indicated.
- C. Glazed Lights: Factory installed, with removable stops on secure side; sizes and configurations as indicated on drawings.
 - 1. Style: Manufacturer's standard.

2.4 SOUND CONTROL DOORS

- A. Wood Sound Control Interior Doors: Provide fire-rated door construction as indicated.
 - 1. Wood Doors: Refer to drawings for locations and additional requirements.
 - a. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS), AWMAC/WI (NAAWS) or WDMA I.S. 1A.
 - b. Wood Veneer Faced Doors: 5-ply or 7-ply unless otherwise indicated.
 - 1) Wood veneer facing with factory transparent finish.
 - 2. Sound Transmission Class (STC) Rating of Sound Control Door Assembly: STC of 61, minimum, calculated in accordance with ASTM E413, and tested in accordance with ASTM E90.
 - 3. Door Face Sheets: Flush.
 - 4. Door Finish: Factory finished.
 - 5. Sound Seals: As required by manufacturer to meet indicated sound control ratings.
 - 6. Interior Doors, Non-Fire Rated:
 - a. Door Core Material: As required by manufacturer to meet indicated sound control ratings.

2.5 SOUND CONTROL DOOR FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Metal Sound Control Interior Door Frames: Face welded type.
 - 1. Frame Finish: Factory primed and field finished.
- C. Provide mortar guard boxes for hardware cut-outs in frames installed in masonry or being grouted.
- D. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch high to fill opening without cutting masonry units.
- E. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.6 DOOR HARDWARE

- A. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, two on head of pairs without center mullions, and in compliance with sound control requirements.
- B. Hinges: Type required by door manufacturer.

- C. Threshold: Provide sound control/acoustic seal for sill of door in closed position by door manufacturer.
- D. Sound Control Seals: Provide sound control/acoustic seals for jambs and head of door in closed position by door manufacturer.

2.7 FINISHES

- A. Primer, Metal Doors and Frames: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard, in compliance with local VOC requirements.
- B. Wood Door Finish: Complying with WDMA I.S. 1A, premium grade, manufacturer's standard coating.
 - 1. Color: As selected by Architect from manufacturer's standard range.

2.8 ACCESSORIES

- A. Glazing: Clear Tempered glass, factory installed, and tested to comply with specified sound control and fire ratings as indicated.
- B. Grout for Frames: Portland cement grout with maximum of 4 inch slump for hand troweling; thinner pumpable grout of higher slump is not permitted.
 - 1. Grouting of frames in drywall/gypsum board construction is not permitted.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.2 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.3 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Coordinate frame anchor placement with wall construction.

- C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- D. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 865.
- E. Factory installed glazing, comply with installation requirements; see Section 088000.
- F. Touch up damaged factory finishes.

3.4 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 865.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.5 FIELD QUALITY CONTROL

- A. Repair or replace sound control door components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.6 ADJUSTING

- A. Adjust for smooth and balanced sound control door movement.
- B. Adjust sound control doors so that seals are fully engaged when door is closed.
- C. Adjust sound control doors for force to close, latch, and unlatch; adjust as necessary in compliance with requirements.

3.7 SCHEDULE

- A. Refer to Door and Frame Schedule on drawings.

END OF SECTION

SECTION 083613 - SECTIONAL DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Overhead sectional doors, electrically operated.
- B. Operating hardware and supports.
- C. Electrical controls.

1.2 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- B. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).
- C. DASMA 102 - American National Standard Specifications for Sectional Doors; 2018.
- D. ITS (DIR) - Directory of Listed Products; Current Edition.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL (DIR) - Online Certifications Directory; Current Edition.
- G. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- B. Product Data: Show component construction, anchorage method, and hardware.
- C. Samples: Submit two panel finish samples, 6 by 6 inch in size, illustrating color and finish.
- D. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.
- E. Manufacturer's Qualification Statement.

- F. Installer's Qualification Statement.
- G. Operation Data: Include normal operation, troubleshooting, and adjusting.
- H. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.
- I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.
- C. Comply with applicable code for motor and motor control requirements.

1.5 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Warranty: Include coverage for electric motor and transmission.
- C. Provide five year manufacturer warranty for electric operating equipment.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Sectional Doors:
 - 1. Overhead Door; Thermacore, Model 850: www.overheaddoor.com/#sle.

2.2 STEEL DOORS

- A. Steel Doors: Flush steel, insulated; both Standard Lift and High Lift doors operating style with track and hardware; complying with DASMA 102, Commercial application.
 - 1. Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.
 - 2. Door Nominal Thickness: 3 inches thick.
 - 3. Thermal Transmittance: U-factor of .038 Btu/hr sq ft degrees F, maximum, in accordance with DASMA 102.

4. Exterior Finish: Factory finished with acrylic baked enamel; color as selected by Architect.
 5. Interior Finish: Factory finished with acrylic baked enamel; color as selected from manufacturers standard line.
- B. Door Panels: Steel construction; outer steel sheet of .015 inch minimum thickness, flush profile; inner steel sheet flat profile; polyurethane insulation.
- C. Window Frame: Manufacturers standard, finish to match.
- D. Glazing: Polycarbonate; single pane; clear; 1/8 inch overall thickness.

2.3 COMPONENTS

- A. Sill Weatherstripping: Resilient hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.
- B. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.
- C. Head Weatherstripping: EPDM rubber seal, one piece full length.
- D. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.
- E. Lock: Inside center mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior and exterior handle.

2.4 MATERIALS

- A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G60/Z180 coating, plain surface.
- B. Insulation: Foamed-in-place polyurethane, bonded to facing.

2.5 ELECTRIC OPERATION

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
1. Provide interlock switches on motor operated units.
 2. Provide tamperproof operation cycle counter.
- B. Electric Operators:
1. Mounting: Side mounted on cross head shaft.
 2. Motor Rating: 1/3 hp; continuous duty.
 3. Motor Voltage: 120 volts, single phase, 60 Hz.
 4. Opening Speed: 12 inches per second.

5. Brake: Adjustable friction clutch type, activated by motor controller.
6. Manual override in case of power failure.
- C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated; enclose terminal lugs in terminal box sized to comply with NFPA 70.
- D. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
 1. 24 volt circuit.
 2. Surface mounted, at interior door jamb.
 3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
 - a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.
- E. Safety Edge: Located at bottom of sectional door panel, full width; electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object; hollow neoprene covered to provide weatherstrip seal.
- F. Safety Edge: Located at bottom of sectional door panel, full width; electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object; hollow neoprene covered to provide weatherstrip seal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- B. Verify that electric power is available and of the correct characteristics.

3.2 PREPARATION

- A. Prepare opening to permit correct installation of door unit to perimeter air and vapor barrier seal.
- B. Apply primer to wood frame.

3.3 INSTALLATION

- A. Install door unit assembly in accordance with manufacturer's instructions.
- B. Anchor assembly to wall construction and building framing without distortion or stress.

- C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- D. Fit and align door assembly including hardware.
- E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.
- F. Install perimeter trim.

3.4 ADJUSTING

- A. Adjust door assembly for smooth operation and full contact with weatherstripping.
- B. Have manufacturer's field representative present to confirm proper operation and identify adjustments to door assembly for specified operation.

3.5 CLEANING

- A. Clean doors and frames and glazing.
- B. Remove temporary labels and visible markings.

3.6 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.
- B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

This page intentionally left blank

SECTION 084313 - ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.

1.2 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- G. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- H. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).
- I. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.

- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.4 SUBMITTALS

- A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
 - 1. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- C. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- E. Specimen warranty.

1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.7 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.8 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- C. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Aluminum-Framed Storefronts:
 - 1. EFCO, LLC: www.efcocorp.com.

2.2 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

- A. Center-Set Style, Thermally-Broken:
 - 1. Basis of Design: EFCO, Ilc; Series 403X.
 - 2. Vertical Mullion Dimensions: 2" x 4-1/2".
- B. Center-Set Style, Not Thermally-Broken:
 - 1. Basis of Design: EFCO, Ilc; Series 402.
 - 2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
 - 3. Location: Interior Vestibules.

2.3 BASIS OF DESIGN -- SWINGING DOORS

- A. Wide Stile, Insulating Glazing, Thermally-Broken:
 - 1. Basis of Design: EFCO, Ilc; Series D502.
 - 2. Thickness: 2 inches.

2.4 ALUMINUM-FRAMED STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Finish:
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
 - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

2. Finish Color: As selected by Architect from manufacturer's standard line.
3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
9. Maintain continuous air barrier and/or vapor retarder seal throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel, and heel bead of glazing compound.

B. Performance Requirements

1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - a. Design Wind Loads: Comply with requirements of ASCE 7.
 - b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf.
3. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.
4. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.
5. Overall U-value Including Glazing: 0.38 Btu/(hr sq ft deg F), maximum.

2.5 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.

1. Framing members for interior applications need not be thermally broken.
 2. Glazing Stops: Flush.
- B. Swing Doors: Glazed aluminum.
1. Thickness: 2 inches.
 2. Top Rail: 5 inches wide.
 3. Vertical Stiles: 5 inches wide.
 4. Bottom Rail: 10 inches wide.
 5. Glazing Stops: Square.
 6. Finish: Same as storefront.

2.6 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Fasteners: Stainless steel.
- C. Concealed Flashings: Stainless steel, 26 gauge, 0.0187 inch minimum thickness.
- D. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.
- E. Sealant for Setting Thresholds: Non-curing butyl type.
- F. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.7 FINISHES

- A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.
- B. Color: As selected by Architect from manufacturer's standard range.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.8 HARDWARE

- A. For each door, include weatherstripping, sill sweep strip, and threshold.
- B. Other Door Hardware: See Section 087100.
- C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- D. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.
- E. Threshold: Thermally broken extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.2 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Set thresholds in bed of sealant and secure.
- J. Install glass and infill panels using glazing method required to achieve performance criteria; see Section 088000.
- K. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 ADJUSTING

- A. Adjust operating hardware and sash for smooth operation.

3.5 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.6 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

This page intentionally left blank

SECTION 084413 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum-framed curtain wall, with vision glazing and glass infill panels.
- B. Firestopping between curtain wall and edge of floor slab.

1.2 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- E. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- H. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- K. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2018 (Reapproved 2022).
- L. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.

- M. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).
- N. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.4 SUBMITTALS

- A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- C. Samples: Submit two samples 4 by 4 inches in size illustrating finished aluminum surface, glazing, infill panels, and glazing materials.
- D. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- E. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.
- F. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.
- G. Designer's Qualification Statement.
- H. Manufacturer's Qualification Statement.
- I. Installer's Qualification Statement.
- J. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
 - 1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.7 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.8 WARRANTY

- A. Correct defective Work within a 1 year period after Date of Substantial Completion.
- B. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: EFCO Corp; 5600 Curtain Wall.

2.2 CURTAIN WALL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Outside glazed, with pressure plate and mullion cover.
 - 2. Fabrication Method: Either shop/factory or field fabricated system.
 - 3. Glazing Method: Field glazed system.

4. Vertical Mullion Dimensions: 2-1/2 inches wide by 7-1/2 inches deep.
 5. Finish: Class I color anodized.
 - a. Factory finish surfaces that will be exposed in completed assemblies.
 - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 - c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
 6. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 7. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 8. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 9. Maintain continuous air barrier and/or vapor retarder seal throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.
 10. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 11. Preparation for Window Treatments: Provide reinforced interior horizontal head rail.
- B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
1. Design Wind Loads: Comply with the applicable code.
 - a. Measure performance by testing in accordance with ASTM E330/E330M, using test loads equal to 1.5 times the design wind loads and 10 second duration of maximum pressure.
 - b. Member Deflection: For spans less than 13 feet 6 inches, limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 1/4 inch, whichever is less and with full recovery of glazing materials.
 - c. Member Deflection: For spans over 13 feet 6 inches and less than 40 feet, limit member deflection to flexure limit of glass in any direction, and maximum of 1/240 of span plus 1/4 inch, with full recovery of glazing materials.
 2. Seismic Loads: Design and size components to withstand seismic loads and sway displacement in accordance with requirements of ASCE 7.
 3. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - a. Expansion and contraction caused by 180 degrees F surface temperature.

- b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
 - c. Movement of curtain wall relative to perimeter framing.
 - d. Deflection of structural support framing, under permanent and dynamic loads.
- C. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
- D. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
 - 1. Test Pressure Differential: 15 psf.
- E. Air Leakage: 0.06 cfm/sq ft maximum leakage of wall area when tested in accordance with ASTM E283/E283M at 6.27 psf pressure difference across assembly.
- F. Thermal Performance Requirements:
 - 1. Condensation Resistance Factor of Framing: 60, minimum, measured in accordance with AAMA 1503.
 - 2. Overall U-value Including Glazing: 0.38 Btu/(hr sq ft deg F), maximum.

2.3 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 - 1. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: See Section 088000.

2.4 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209/B209M.
- C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- D. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
- E. Exposed Flashings: Aluminum sheet, 20 gauge, 0.032 inch minimum thickness; finish to match framing members.
- F. Concealed Flashings: Stainless steel, 26 gauge, 0.0187 inch minimum thickness.

- G. Firestopping: See Section 078400.
- H. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; compatible with glazing accessories.
- I. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, and compatible with flashing material.
- J. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- K. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.5 FINISHES

- A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.
- B. Color: To be selected by Architect from manufacturer's standard range.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other related work.
- B. Verify that curtain wall openings and adjoining water-resistive and air barrier seal materials are ready to receive work of this section.
- C. Verify that anchorage devices have been properly installed and located.

3.2 INSTALLATION

- A. Install curtain wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.

- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Install firestopping at each floor slab edge.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.4 ADJUSTING

- A. Adjust operating sash for smooth operation.

3.5 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, take care to remove dirt from corners, and wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.6 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

This page intentionally left blank

SECTION 085113 - ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Extruded aluminum windows with fixed sash and operating sash.
- B. Operating hardware.
- C. Insect screens.

1.2 REFERENCE STANDARDS

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights; 2017.
- B. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- E. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- F. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- I. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- J. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.4 SUBMITTALS

- A. Product Data: Include component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.
- B. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, anchorage locations, and installation requirements.
- C. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.
- D. Manufacturer's qualification statement.
- E. Installer's qualification statement.
- F. Specimen warranty.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of AAMA CW-10.
- B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.7 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F.
- B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.8 WARRANTY

- A. Correct defective work within a one year period after Date of Substantial Completion.

- B. Manufacturer Warranty: Provide 10-year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units. Complete forms in Owner's name and register with manufacturer.
- C. Manufacturer Warranty: Provide 10-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 BASIS OF DESIGN - AW PERFORMANCE CLASS WINDOWS

- A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 having Performance Class of AW, and Performance Grade at least as high as specified design pressure.
- B. Fixed, Thermally-Broken:
 - 1. Basis of Design: EFCO; Series FX45 Fixed.
- C. Projected, Face of Sash and Frame in Approximately Same Plane:
 - 1. Basis of Design: EFCO; Series 450X Project Out.
- D. Horizontal Sliding; with Matching Fixed Units:
 - 1. Basis of Design: EFCO; Series SX45 Sliders.

2.2 ALUMINUM WINDOWS

- A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.
 - 1. Operable Units: Double weatherstripped.
 - 2. Provide factory-glazed units.
 - 3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
 - 4. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 - 5. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
 - 6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

7. Thermal Movement: Design to accommodate thermal movement caused by 180 degrees F surface temperature without buckling stress on glass, joint seal failure, damaging loads on structural elements, damaging loads on fasteners, reduction in performance or other detrimental effects.
- B. Fixed, Non-Operable Type:
 1. Construction: Thermally broken.
 2. Glazing: Insulated, see Glazing Specification..
- C. Outswinging Casement Type:
 1. Construction: Thermally broken.
 2. Provide screens.
 3. Glazing: Insulated, see Glazing Specification.
- D. Horizontal Sliding Type:
 1. Construction: Thermally broken.
 2. Provide screens.
 3. Glazing: Insulated, see Glazing Specification.

2.3 PERFORMANCE REQUIREMENTS

- A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
 1. Performance Class (PC): AW.
- B. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
- C. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 15 psf.
- D. Air Leakage: 0.30 cfm/sq ft maximum leakage per unit area of outside window frame dimension when tested at 1.57 psf pressure difference in accordance with ASTM E283/E283M.
- E. Condensation Resistance Factor of Frame: 67, measured in accordance with AAMA 1503.
- F. Overall Thermal Transmittance (U-value)
 1. Fixed: 0.38, maximum, including glazing, measured on window sizes required for this project.
 2. Operable: 0.45, maximum, including glazing, measured on window sizes required for this project.
- G. Fenestration Assembly Thermal Transmittance (U-value): Comply with ASHRAE Std 90.1 I-P for building envelope requirements for applicable climate zone. U= 0.31 minimum.

- H. **Rescue Windows:** Submitted manufacturers product shall comply with New York State Education Department (SED) S106-4 and the following:
1. Clear Opening: Minimum clear opening area for unit 6 sq.ft. Provide horizontally and vertically 24 inches minimum dimensions for the clear opening.
 2. Labels: Provide window labels on inside and outside faces.
 - a. Bright yellow background with black letters.
 - b. Size: Minimum 3 by 5 inches.
 - c. Text: "RESCUE WINDOW" readable from each side of the unit.
 3. Provide labels at rescue window units of all student occupied spaces.
 4. Rescue window latching: Maximum height of window latch is 54 inches above finished floor, typical all locations

2.4 COMPONENTS

- A. Glazing: See Section 088000.
- B. Sills: .040 inch thick, extruded aluminum; sloped for positive wash; fit under sash leg to 1/2 inch beyond wall face; one piece full width of opening; jamb angles to terminate sill end.
- C. Insect Screens: Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable hardware allowing screen removal without use of tools.
1. Hardware: Spring loaded steel pins; four per screen unit.
 2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's standard mesh.
 3. Frame Finish: Same as frame and sash.
 4. **Rescue Window** Locations: Provide sliding screens. All other screens to be fixed.
- D. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to achieve effective weather seal.
- E. Fasteners: Stainless steel.
- F. Sealant for Setting Sills and Sill Flashing:
1. See Section 079200 for additional requirements.

2.5 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

2.6 HARDWARE

- A. Sash lock: Lever handle with cam lock.
- B. Operator: Lever action handle fitted to projecting sash arms with limit stops.

- C. Projecting Sash Arms: Cadmium plated steel, friction pivot joints with nylon bearings, removable pivot clips for cleaning.
- D. Window Opening Control Devices (WOCD): Provide operable window sash hardware that limits openings to only allow passage of 4 inch diameter rigid sphere or less, and are easily releasable to fully open without use of keys, tools, or special knowledge.
- E. Bottom Rollers: Stainless steel, adjustable.
- F. Limit Stops: Resilient rubber.

2.7 FINISHES

- A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42, integrally colored anodic coating not less than 0.7 mil thick.
- B. Finish Color: As selected by Architect from manufacturer's standard range.
- C. Operator and Exposed Hardware: Enameled to color as selected from manufacturer's standard line.
- D. Apply one coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that wall openings and adjoining water-resistive barrier materials are ready to receive aluminum windows; see Section 072500.

3.2 WINDOW INSTALLATION

- A. Install windows in accordance with manufacturer's instructions.
- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- D. Install sill and sill end angles.
- E. Set sill members and sill flashing in continuous bead of sealant.

- F. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- G. Install operating hardware not pre-installed by manufacturer.
- H. Install glass and infill panels in accordance with requirements; see Section 088000.

3.3 TOLERANCES

- A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.4 ADJUSTING

- A. Adjust hardware for smooth operation and secure weathertight closure.

3.5 CLEANING

- A. Remove protective material from factory finished aluminum surfaces.
- B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.
- D. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

This page intentionally left blank

SECTION 085113.10 – SOUND CONTROL WINDOW SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide sound control window assemblies where shown on the Drawings, as specified herein. The work includes window assemblies complete with frames, stops, glazing, sound-absorbing material and concealed fasteners factory installed. Glass and glazing material are factory assembled in frame and shipped complete as one unit.

1.02 SYSTEM PERFORMANCE REQUIREMENTS

- A. Sound Rating: Provide window assemblies that have been fabricated as sound-retardant units, tested according to ASTM E 90 and have the following certified Sound Transmission Class (STC) rating as determined according to ASTM E 413.
 - 1. STC Rating 59

1.03 SUBMITTALS

- A. Product Data:
 - 1. Material lists of items provided under this Section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Shop Drawings showing details of each frame type, elevations of door designs, details of openings, and details of construction, installation and anchorage.
 - 4. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
 - 5. Test Reports.

1.04 QUALITY ASSURANCE

- A. Single-Source Responsibility: Provide sound control windows, including stops, glazing, frame and sound-absorbing material essential for sound control as an assembly and by a single firm specializing in producing this type of work for a minimum of ten (10) years.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Use all means necessary to protect the materials of this section before, during and after installation and to protect the installed work and materials of all other trades.

1.06 WARRANTY

- A. Acoustic window materials and associated hardware shall be guaranteed against defective workmanship for one (1) year from date of shipment.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Provide double glazed, "Noise Lock" acoustic window(s) and frame(s) with stops, glazing, sound-absorbing material, and concealed fasteners as manufactured by IAC Acoustics, A Division of Sound Seal 401 Airport Road, North Aurora, IL 60542 630-270-1790.

2.02 MANUFACTURED ASSEMBLIES (NOISE LOCK WINDOWS)

- A. Glass pane(s) minimum thickness:

STC 59 Rating, 1/2" (13 mm) interior, 3/8" (10 mm) exterior – double pane
- B. Frame(s) shall be 1 1/4" thick, fabricated from not less than 12 gauge cold rolled, galvanized steel with an A60 coating weight, reinforced and filled with sound-absorbing acoustic fill. Inside and outside corners shall be mitered and interlocked to hairline measurements, made square, continuously welded, and ground smooth, flush and invisible. The window assembly can be installed into either existing or new construction openings.
- C. Acoustic seals for glazing shall be vibration-isolating resilient gaskets, U-shaped and continuous santoprene UV grade 65-75 durometer black. Self-contained, sound absorptive interior perimeter of not less than 22 gauge (0.76 mm) steel shall be perforated and pre-finished black. Desiccant material shall be incorporated into multiple glazed units.
- D. Stops: Provide stops that are 1" (25 mm) high (min) and readily removable, fabricated from not less than 16 gauge (2 mm) rolled steel sections predrilled and aligned with frame to form tight square acoustical joints. Stop fasteners shall be concealed.
- E. Assembly: The assembly of the acoustic window units including frames, stops, glazing, acoustic seals, sound-absorbing material and concealed fasteners shall take place at the factory to insure required noise reduction is achieved. Glazing shall not need to be removed to facilitate fastening or anchoring at the job site.

2.03 FABRICATION

- A. General: Fabricate units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Wherever practical, fit and assemble units in the manufacturer's plant. Identify work that is not permanently factory-assembled before shipment to ensure proper assembly at the Project site. Weld exposed joints continuously: grind, fill dress and make smooth flush and invisible.

2.04 FINISHES

- A. Frames shall receive a shop coat of a rust-inhibitive primer. The primer shall be applied over properly prepared metal, in accordance with the manufacturer's standard shop prime coat procedure and oven-baked dry. Field Paint Finish.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions.

3.02 PREPARATION

- A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.
- B. Adjacent Construction: Coordinate window assembly details with details of adjacent work to ensure proper attachments and clean junctions.

3.03 INSTALLATION

- A. Install work in accordance with reviewed shop drawings and these specifications using only factory-trained personnel as required by the Manufacturer and approved by the Architect.
 - 1. Install windows and shim accordingly to allow for a plumb and square installation without excessive clearances.
 - 2. During installation, solidly pack acoustic insulation around frames that are installed in stud and gypsum-wallboard partitions.
 - 3. Caulk exterior joint prior to painting.
 - 4. Install sound control window assemblies during finish phase of construction to protect units from damage.

3.04 DEMONSTRATION

- A. Instruct the Owner's maintenance personnel regarding the maintenance of all acoustic windows.

END OF SECTION

SECTION 085659 - SERVICE AND TELLER WINDOW UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Service and teller window units with pass-through device.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate work with adjacent materials specified in other sections and as indicated on drawings and approved shop drawings.
- B. Coordinate electrical service and rough-in requirements.
- C. Preinstallation Meeting: Prior to start of installation arrange a meeting on site to familiarize installer and installers of related work with requirements relating to this work.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for specified products indicating materials, operation, glazing, finishes, and installation instructions.
- B. Shop Drawings: Indicate configuration, sizes, rough-in, mounting, anchors and fasteners, and installation clearances.
- C. Manufacturer Qualification Statement.
- D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least three years documented experience, and with ability to provide test reports showing that their standard manufactured products meet the specified requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver units in manufacturer's original packaging and unopened containers with identification labels intact.
- B. Store units in area protected from exposure to weather and vandalism.

1.6 WARRANTY

- A. Provide manufacturer's warranty agreeing to repair or replace units and their components that fail in materials or workmanship within two years from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Service and Teller Window Units:
 - 1. Quikserv; Model TI-3036 with Amplified Speak thru Intercom System:
www.quikserv.com/#sle.

2.2 SERVICE AND TELLER WINDOW UNITS WITH PASS-THROUGH DEVICE

- A. Location: Built within interior wall, as indicated on drawings.
- B. Type of Use: Walk-up.
- C. Window Type: Fixed.
 - 1. Overall Window Frame Size: As indicated on drawings.
 - 2. Frame Material: Aluminum.
 - a. Finish: Color anodized.
- D. Glazing: Bullet Resistant, clear.
- E. Pass-Through Device: deal tray.
 - 1. Material: Stainless steel.
- F. Communication: Integrated microphone, and speaker,.

2.3 ASSEMBLY COMPONENTS

- A. Windows: Factory-fabricated, finished, and glazed, with extruded aluminum frame and glazing stops; complete with hardware and anchors.
 - 1. Provide window units that are re-glazable from the secure side without dismantling the non-secure side of framing.
 - 2. Rigidly fit and secure joints and corners with internal reinforcement. Make joints and connections flush, hairline, and weatherproof. Fully weld corners.
 - 3. Apply factory finish to exposed surfaces.
- B. Deal Tray: Integral with window sill.
 - 1. Material: One piece stainless steel tray construction, 18 gauge, 0.0500 inch minimum thickness.

2. Overall Size with Curved Tray Bottom: 8 inch deep by 11-1/2 inch wide.

- C. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.

2.4 MATERIALS

- A. Aluminum Extrusions: Minimum 1/8 inch thick frame and sash material complying with ASTM B221 and ASTM B221M.

1. Mill Finished Aluminum Surfaces: Manufacturer's standard finish.
2. Finish: Class I natural anodized.

- B. Stainless Steel: Type 304 with No. 3 - Coarse finish.

2.5 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.
- C. Color: To be selected by Architect from manufacturer's standard range.

2.6 ACCESSORIES

- A. Electrical Components: 120 VAC, 60 Hz, 15 amps, single phase, unless otherwise indicated.
- B. Intercom System: Multi-channel intercom with volume control for drive-up communication to up to two remote lanes; counter microphone control station with remote call button, microphone and speaker.
1. Privacy Controls: Handset.
 2. Wireless Headset.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that window openings are ready for installation of windows.
- B. Verify that correct embedded anchors are in place and in proper location; repair or replace anchors as required to achieve satisfactory installation.
- C. Notify Architect if conditions are not suitable for installation of units; do not proceed until conditions are satisfactory.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install units in correct orientation (inside/outside or secure/non-secure).
- C. Anchor units securely in manner so as to achieve performance specified.
- D. Connect electrical components to power source.
- E. Remove and replace defective work.

3.3 CLEANING

- A. Remove protective material from factory finished surfaces.
- B. Clean exposed surfaces promptly after installation without damaging finishes.

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain operable units.
 - 1. Instructor: Manufacturer's training personnel.
 - 2. Location: At project site.
 - 3. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

3.5 PROTECTION

- A. Provide temporary protection to ensure that service and teller windows are without damage upon Date of Substantial Completion.

END OF SECTION

SECTION 086200 - UNIT SKYLIGHTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Skylights with integral frame.
- B. Integral insulated curb.

1.2 REFERENCE STANDARDS

- A. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- D. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2019c.

1.3 SUBMITTALS

- A. Product Data: Include structural, thermal, and daylighting performance values.
- B. Shop Drawings: Indicate configurations, dimensions, locations, fastening methods, and installation details.
- C. Manufacturer's Installation Instructions: Indicate special procedures.
- D. Specimen warranty.

1.4 WARRANTY

- A. Manufacturer Warranty: Provide five-year manufacturer warranty including coverage for leakage due to defective skylight materials or construction. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Unit Skylights:
 - 1. American Skylights a Division of the Andi Group; Thermally Broken & Insulated Self Flashing (Model TSF), Model TSF-12-PYR: www.americanskylights.com/#sle.

2.2 SKYLIGHTS

- A. Skylights: Factory-assembled glazing in aluminum frame, free of visual distortion, and weathertight.
 - 1. Shape: Pyramidal.
 - 2. Glazing: Double.
 - 3. Nominal Size: 4' by 4' ..

2.3 PERFORMANCE REQUIREMENTS

- A. Provide unit skylights that comply with the following:
 - 1. Allow for expansion and contraction within system components caused by a cycling surface temperature range of 170 degrees F without causing detrimental effects to system or components.

2.4 Design Criteria

- A. Unit Skylight Design: Design and size components to withstand dead loads and live loads caused by snow, hail, and positive and negative wind loads acting on skylight unit without damage or permanent set.
 - 1. Regulatory Requirements: Comply with applicable code criteria for loads, including seismic loads.
 - 2. Design Loads: As indicated on drawings.

2.5 COMPONENTS

- A. Double Glazing: Polycarbonate plastic; factory sealed.
 - 1. Outer Glazing: Clear transparent.
 - 2. Inner Glazing: Clear transparent.
- B. Frames: ASTM B221 ASTM B221M Extruded aluminum thermally broken, reinforced and welded corner joints, integral curb frame mounting flange and counterflashing to receive roofing flashing system, with integral condensation collection gutter, glazing retainer; clear anodized finish.

2.6 ACCESSORIES

- A. Anchorage Devices: Type recommended by manufacturer, exposed to view.
- B. Sealant: Elastomeric, silicone or polyurethane, compatible with material being sealed .

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that openings and substrate conditions are ready to receive work of this section.
- C. Verify that curbs installed under other sections are complete.

3.2 INSTALLATION

- A. Install unit skylights in accordance with manufacturer's instructions and ASTM E2112.
- B. Install aluminum curb assembly, fastening securely to roof decking; flash curb assembly into roofing system.
- C. Install skylight units and mount securely to curb assembly; install counterflashing as required.
- D. Apply sealant to achieve watertight assembly.

3.3 CLEANING

- A. Upon completion of installation, thoroughly clean skylight aluminum surfaces in accordance with AAMA 609 & 610.
- B. Remove protective material from prefinished aluminum surfaces.
- C. Wash down exposed surfaces; wipe surfaces clean.
- D. Remove excess sealant.

END OF SECTION

This page intentionally left blank

SECTION 087100 – DOOR HARDWARE

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 but not limited to the following:

- 1. Mechanical and/or electrical hardware.
- 2. Cylinder for hardware specified in other sections.

- B. Related Requirements

- 1. Division 1 Section "Sustainable Design Requirements".
- 2. Division 01 Section "Closeout Procedures"
- 3. Division 06 Section "Rough Carpentry".
- 4. Division 06 Section "Finish Carpentry".
- 5. Division 08 Section "Hollow Metal Doors and Frames".
- 6. Division 08 Section "Flush Wood Doors".

- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

- 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
- 2. ICC/IBC - International Building Code.
- 3. NFPA 70 - National Electrical Code.
- 4. NFPA 80 - Fire Doors and Windows.
- 5. NFPA 101 - Life Safety Code.
- 6. NFPA 105 - Installation of Smoke Door Assemblies.
- 7. NYS SED – Manual of Planning Standards (MPS).
- 8. State Building Codes, Local Amendments.

1.3 COORDINATION

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory 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.
- B. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

- C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.4 COORDINATION AND MEETINGS

- A. Location: Conduct conferences on project site or other location as directed by the Architect/Owner.

- B. Preinstallation Conference

- 1. Purpose of the Preinstallation conference is to:

- a. Coordinate between trades, so all understand their responsibilities.
 - b. To instruct the installing contractors' personnel on the proper installation and adjustment of their respective products.
 - 1. The hardware supplier is responsible for bringing the installation instructions to the meeting.
 - c. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - d. Review sequence of operation narratives for each unique access-controlled opening.
 - e. Review the requirements for local and state building codes and how they apply to doors, frames, and hardware.
 - 1. Gap requirements around the doors to follow NFPA 80.
 - 2. Opening forces to follow DOJ's "2010 ADA Standards for accessible design".
 - f. Review any special applications.

- 2. Conference participants shall include but not limited to:

- a. General Contractor.
 - b. Installer for doors, frames, and hardware.
 - c. Supplier Representative.
 - d. Owner and/or Owners Representative.
 - e. Construction Manager (if applicable).
 - f. Architect and/or Architects Consultant.

- C. Keying Conference:

- 1. Incorporate conference decisions into keying schedule after reviewing door hardware keying system including, but not limited to, the following:

- a. Flow of traffic and degree of security required.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for key control system.
 - 1. This is to include the number of keys per keyset.
 - 2. Number of Master level keys.
 - 3. Use of keyed construction cores.
 - d. Requirements for access control.
 - e. Address for delivery of keys.

- 2. Keying Conference participants shall include but not limited to:

- a. Supplier Representative.
- b. Owner and/or Owners Representative.
- c. Architect and/or Architects Consultant.

1.5 SUBMITTALS

- A. Submittal Sequence to follow in this order and each are to be submitted under separate cover:
 1. Information Submittal.
 2. Door Hardware Schedule.
 3. Hardware Product Data.
 4. Samples.
 5. Keying Schedule (Only after the keying meeting has taken place).
 6. Closeout Submittals.
 7. Submit door hardware schedule concurrent with submissions of Product Data, Samples, Riser Diagrams.
- B. Information Submittals:
 1. Qualification Data: Submit qualification data for the Installer and Supplier as defined under Quality Assurance of the Section.
 2. Product Certifications:
 - a. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.
 3. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 1. Format: Use same scheduling sequence and use same door numbers as in the Contract Documents.
 2. Content: Include the following information:
 - a. Index of openings showing hardware set assignments.
 - b. Identification number, location, hand, fire rating, size, degree of opening, and material of each door and frame.
 - c. Locations of each door hardware set, cross-referenced to floor plans, and to door and frame schedule.
 - d. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - e. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - f. Fastenings and other installation information.
 - g. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
 - h. Mounting locations for door hardware.

- i. Complete list of related door devices specified or supplied in other Sections for each door and frame.
- D. Door Hardware Product Data: Prepared by or under the supervision of supplier.
 1. Provide an index of products used grouped by manufacturer.
 2. Each product shall be highlighted or marked accordingly.
 - a. Do not include pages or products that are not applicable to the project. If they appear on the same page as a product being used, they shall be crossed out.
- E. Samples:
 1. Provide a finish sample for each exposed product in each finish specified, in manufacturer's standard size.
 2. Tag Samples with full product description to coordinate samples with the door hardware schedule.
- F. Keying Schedule: Only after a keying meeting with the owner has taken place, prepare a keying schedule detailing final instruction. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions.
 1. The owner must approve the submitted keying schedule prior to the ordering of permanent cylinders/cores.
- G. Closeout Submittals:
 1. After final approval is received from the architect, submit a Record Copy of the Door and Hardware Schedule with all the content as previously required.
 - a. Submittal must be stamped "RECORD COPY."
 - b. The Record Copy will be given to the installer for the installation of the hardware.
 2. Warranty Submittal: Warranty information to include the following information:
 - a. Original factory order number.
 - b. Date order was placed.
 - c. Date of installation (approximately if unknown).
 3. Operating and Maintenance Manuals:
 - a. Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.
- H. Submittals that do not comply with all the requirements above will be rejected and will have to be resubmitted. Any project delays caused by incorrect/incomplete submittals will be the responsibility of the General Contractor and Hardware Supplier.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Door Hardware Supplier Qualifications:

1. Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project.
2. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity.
3. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

1.7 DELIVERY AND STORAGE

A. All hardware for field installation shall be delivered to the project site.

1. Any hardware that is required to be factory installed shall be delivered to the factory at the cost of the supplier of the doors or frames requiring the factory installation.

B. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site.

1. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
2. The storage area must maintain low humidity and a temperature between 60 to 90 degrees Fahrenheit.

C. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

D. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.8 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. 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. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Ten (10) years for mechanical mortise locks.
2. Five (5) years for mechanical exit hardware.
3. Thirty (30) years for mechanical, manual overhead door closers.
4. Two (2) years for electromechanical door hardware.

1.9 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

Part 2 – PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of door hardware from single manufacturer.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
- C. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOJ's "2010 ADA Standards for Accessible Design".

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
2. Comply with the following maximum opening-force requirements:
 - a. Interior, Hinged Doors: 5 lbf applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
 - c. Provide thresholds not more than 1/2 inch high.
 - d. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
 - e. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.3 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. For products furnished, but not installed, under this Section, Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.
- C. Equals: Requests for equals and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01. Approval of requests is at the discretion of the architect, owner, and their designated consultants.
- D. Substitutions: Are not allowed unless the specified product(s) are no longer available.

2.4 HINGES

- A. Hinges are to meet or exceed ANSI/BHMA A156.1 requirements.
- B. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
- C. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 1. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 2. Sizes from 3'1" to 4'0": 5" heavy weight.
- D. Hinge Type: Provide the type listed in the hardware sets.
- E. Hinge Options:
 1. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
- F. Manufacturers:
 1. Hager Companies (HA).

2. McKinney Products (MK).
3. Stanley Hardware (ST).

2.5 CONTINUOUS HINGES

A. General Requirements:

1. Continuous Hinges are to meet or exceed ANSI/BHMA A156.26 Grade 1 Requirements.
2. Fabricated to full height of door and to template screw locations; with components finished after milling and drilling are complete.
3. Hinges are to be non-handed.
4. Factories to prepare for electrical cut-outs.
5. Hinge Type: Provide the type listed in the hardware sets.
6. Coordinate with door manufacturers for the exact type required, as it varies between door manufacturers and application.
7. Fasteners: All of the fasteners are to be fabricated from corrosion resistant materials.
 - a. Provide either 12-24 x 3/4" self-drilling, thread-forming or 12-24 x 1/2" thread-forming screws that are made of 410 stainless-steel with an undercut head.

B. Continuous, Gear-Type Hinges:

1. Manufactured out of 6063-T6 extruded-aluminum, pin-less, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating bearings.
2. Manufacturers:
 - a. Architectural Builders Hardware (AH).
 - b. Hager Companies (HA).
 - c. Markar (MK).
 - d. Select (SE)

2.6 MANUAL FLUSH AND SURFACE BOLTS

- A. Bolts are to meet or exceed ANSI/BHMA A156.3 and A156.16, Grade 1 requirements.
- B. Furnish Dustproof Strikes for all bottom bolts.
- C. Provide related accessories or mounting brackets as required for appropriate installation and operation.
- D. Manufacturers:
 1. Architectural Builders Hardware (AH).
 2. Rockwood Manufacturing (RO).
 3. Trimco (TC).

2.7 CYLINDERS AND KEYING

A. Cylinders: Original manufacturer cylinders complying with the following:

1. Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

2. Meet or exceed ANSI/BHMA A156.5 Grade 1 requirements.
 3. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
 4. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - a. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes. Stamped collars are not allowed.
 5. Face finished to match lockset.
 6. Core Type: Interchangeable.
 7. Keyway: Match Existing.
 8. Keying: Factory Keyed, per approved Keying Schedule.
 9. Key Quantity:
 - a. Change keys per cylinder/core: Two (2).
 - b. Master keys per level: Five (5).
 - c. Control Keys (where required): Five (5).
- B. Construction Cores:
1. Construction Cores: Provide keyed construction cores that are replaceable by permanent cores.
 - a. Provide 10 construction master keys.
 - b. Provide 2 Construction Core Removal Keys.
- C. Key Registration List:
1. Provide transcript list in writing or electronic file (proper format) as directed by the Owner.
 2. Furnish a list of opening numbers with locking devices, showing cylinder types and quantities required when cylinders or cores are to be owner furnished.
- D. Manufacturers:
1. Best (BE). NO SUBSTITUTION

2.8 MECHANICAL LOCK AND LATCHING DEVICE

- A. Mortise Locksets:
1. Locks shall meet or exceed ANSI/BHMA A156.13, Series 1000, Operational Grade 1, and Security.
 2. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
 3. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to a minimum of 10 million cycles.
 4. Lock trim and function as shown in hardware sets.
 5. Manufacturers:
 - a. Best (BE) 45H Series.
 - b. Sargent Manufacturing (SA) 8200 Series.
 - c. Schlage (SC) L9000 Series.

2.9 LOCK AND LATCH STRIKES

A. Standards:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Dustproof Strikes: BHMA A156.16.

B. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame.

C. Finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - a. Provide at paired openings with metal edges and astragals.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Dustproof Strikes: Provide for all bottom flush bolts or latches, exit devices, and where thermal pins are required from the door to the floor at fire rated openings.

2.10 EXIT DEVICES

A. Exit Devices and Auxiliary Items shall meet or exceed ANSI/BHMA A156.3, Grade 1 requirements.

B. On fire rated doors, provide Exit Devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware".

C. Exit Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar.

1. Provide solid filler plate(s) where gap behind the Exit Device exists.
2. When used on full glass door applications provide a filler plate that fills in the gap between the Exit Device and the Glass.

D. Provide exit latches with deadlocking feature.

E. Where function of the Exit Device requires a cylinder, provide a cylinder per the requirements of the Keying System.

F. Function and Trim design as listed in the Hardware Sets.

G. Provide mounting brackets or spacers as required for proper installation and operation.

H. Extended cycle test: Devices to have been cycle tested to 10 million cycles.

I. Provide Through Bolts for All Exit Devices installed on wood doors.

J. Do not cut perimeter gasket to mount the Exit Device Strikes. Adjust template accordingly.

K. Coordinate the mounting centerline of the Exit Devices with the Door Elevations.

1. Exit Devices shall not be mounted over vision kits, unless approved by the Architect.

L. Manufacturers:

1. Sargent (SA) 80 Series.
2. Precision (PR) Apex Series.
3. Von Duprin (VD) 99 Series.

2.11 SURFACE CLOSERS

- A. Surface Closers shall meet or exceed ANSI/BHMA A156.4, Grade 1 requirements.
- B. Surface Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
- C. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use.
- D. Provide Surface Closers complying the Americans with Disabilities Act, ANSI ICC/A117.1.
- E. Extended cycle test: Surface Closers to have been cycle tested to 10 million cycles.
- F. Provide metal closer covers.
- G. Closers shall not be installed on exterior or corridor side of doors.
 1. Where a conflict exists, bring it to the attention of the Architect prior to installation.
- H. Provide accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation and operation.
- I. Coordinate with Overhead Holder/Stop installation, provide special templates as required to avoid hardware conflicts.
- J. When installing Mullions in Aluminum or Fiberglass Framing, install using Rivnuts and Stainless-Steel machine screws.
- K. Provide Through Bolts for Surface Closers installed on wood doors.
- L. Manufacturers:
 1. LCN (LC) 4010/4110Series.
 2. Norton (NO) 9500 Series.
 3. Stanley (ST) EDH9000 Series.

2.12 OVERHEAD STOPS AND HOLDERS

- A. Stops and Holders shall meet or exceed ANSI/BHMA A156.8, Grade 1 requirements.
- B. Provide units that are through bolted on all Wood Door applications.

- C. Coordinate with door closer installation, special templating may be required.
- D. Where stops and holders are specified, coordinate with door manufacturer to insure proper application, installation, and operation.
- E. Function as show in Hardware Sets.
- F. Manufacturers:
 - 1. Architectural Builders Hardware (AH).
 - 2. Glynn Johnson (GJ).
 - 3. Rixson (RF).

2.13 ARCHITECTURAL TRIM

- A. Protective Plates (kick, armor, or mop):
 - 1. Shall meet ANSI/BHMA A156.6 requirements.
 - 2. Protective plates, fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
 - 3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80.
 - 4. Kick and Armor Plates are to be installed on the push side of the door, unless stated otherwise.
 - 5. Mop Plates are to be installed on the pull side of the door.
 - 6. Size: Fabricate protection plates not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
 - 7. Provide adhesive mounting that meets UL fire rating requirements.
 - 8. Provide Plates are to be beveled on all 4 edges.
 - 9. Height: 10", unless noted otherwise.
 - 10. Manufacturers:
 - a. Burns Manufacturing (BU).
 - b. Rockwood Products (RO).
 - c. Trimco (TC).
- B. Metal Edges and Astragals:
 - 1. Provide Metal Edges and Astragals on both leaf's of doors that have flush bolts.
 - 2. Fabricated from the following:

- a. Steel: 050-inch thick.
3. Size: Height to match door Height.
4. Finish: Standard Color as selected by Architect.
5. Prepare Metal Edges and Astragals for hardware as required.
6. Provide Metal Edges and Astragals to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
7. Manufacturers:
 - a. Architectural Builders Hardware (AH).
 - b. National Guard (NG).
 - c. Rockwood Products (RO).

2.14 DOOR STOPS AND HOLDERS

- A. Door Stops and Holders shall comply with ANSI/BHMA A156.16, Grade 1 requirements.
- B. Provide wall bumpers, either convex or concave types as required.
- C. Provide Door stops with anchorage required based upon wall or floor application.
- D. Do not mount floor stops where they will impede traffic.
- E. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
- F. Manufacturers:
 1. Burns Manufacturing (BU).
 2. Rockwood Products (RO).
 3. Trimco (TC).

2.15 THRESHOLDS

- A. Thresholds shall comply with ANSI/BHMA A156.21 requirements.
- B. Thresholds shall be fabricated to full width of opening.
- C. Provide non-slip surface.
- D. Provide Stainless Steel Fasteners, type as detailed or required for specific floor conditions.
- E. Manufacturers:
 1. National Guard (NG).
 2. Pemko (PE).
 3. Reese (RE).

2.16 GASKETING

- A. Door Gasketing shall comply with ANSI/BHMA A156.22 requirements.
- B. Provide with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
- C. Perimeter gasketing should not be cut around door hardware. Gaskets must maintain a continuous seal at the top and vertical edges. Adjust hardware templates accordingly.
- D. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
- E. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
- F. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- G. Maximum Air Leakage: When tested according to ASTM E 283 with tested pressure differential of 0.3-inch wg (75 Pa), as follows:
 - 1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
 - 2. Gasketing on Single Doors: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
 - 3. Gasketing on Double Doors: 0.50 cfm per foot (0.000774 cu. m/s per m) of door opening.
- H. Manufacturers:
 - 1. National Guard (NG).
 - 2. Pemko (PE).
 - 3. Reese (RE).

2.17 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.
 - 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
 - 1. The use of Aluminum or Brass/Bronze based screws is not acceptable.

- C. Fasteners: Provided by door hardware manufacturer, to comply with published installation instructions, templates and as test for fire rated applications.
1. The use of other fasteners will be rejected.
 2. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.
 3. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners.
 4. Where hardware is being attached to Aluminum or FRP doors and frames Rivnuts (Rivet Nuts) and machine screws must be used.
 5. Exit Devices, Surface Door Closers, Pulls, and Overhead Stops that are installed on wood doors shall be installed using through-bolts.
 6. Gasket Fasteners: Provide Stainless Steel fasteners.
 7. Threshold Fasteners:
 - a. Concrete floors: Provide ¼-20 Stainless Steel Machine Screws and Expansion Shields.
 - b. Wood floors: Provide #10 Stainless Steel Wood Screws.
 8. Continuous Hinge Fasteners:
 - a. All of the fasteners are to be fabricated from corrosion resistant materials.
 - b. Provide either 12-24 x 3/4" self-drilling, thread-forming or 12-24 x 1/2" thread-forming screws that are made of 410 stainless-steel with an undercut head.
 9. Butt Hinge Fasteners:
 - a. Provide screws out of steel or stainless Steel to match hinge base material.
 - b. Provide Wood Screws for wood door and frame applications.
 - c. Provide Machine Screws for metal door and frame applications.

2.18 FINISHES

- A. Provide finishes complying with ANSI/BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

Part 3 – EXECUTION

3.1 EXAMINATION

- A. 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 of the Work.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware.
- C. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
- B. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
- C. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames".
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors".
 - 3. Comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities".
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- E. Self-closing doors must close and latch completely from the fully opened position.
- F. Lock Cylinders:
 - 1. Install keyed construction cores to secure building and areas during construction period.
 - 2. Replace construction cores with permanent cores as directed by Owner.

- G. Thresholds: Set thresholds in full bed of sealant, and caulk around all edges, complying with requirements specified in Section 079200 "Joint Sealants."
- H. Gaps: Gaps around the head and vertical edges of the doors shall meet the following requirements:
 - 1. Wood Doors: 1/8" top, vertical edge, and in between paired doors.
 - 2. Hollow Metal Doors: 1/8" +/- 1/16" top, vertical edge, and in between paired doors.
 - 3. Where shimming is required to adjust the gaps the shim material must be steel. Cardboard, paper, and other materials are not acceptable.
 - 4. Bottom of door (Undercut) shall not exceed 1" on non-rated openings and 3/4" on rated openings.
- I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 1. Do not notch or cut perimeter gasketing to install other surface-applied hardware.
- J. Pressure Sensitive Gasketing:
 - 1. Do not install until the frame and door have been finished painted/stained.
 - 2. Surface must be cleaned with alcohol wipes and dry before Gasketing is applied. Follow manufacturer's instructions.
- K. Door Bottoms: Apply to bottom of door, forming seal with floor or threshold when door is closed.
- L. Door Closers: Adjust closers to follow opening forces listed under this section's Performance Requirements.
 - 1. Degree of opening: Template the closer to allow for the maximum degree of opening the conditions will allow.
 - 2. Back Check valve shall be adjusted so it engages 10 degrees prior to the door reaching full swing.
 - 3. The Latch Speed valve shall be adjusted so the door latches properly without slamming.
 - 4. When through-bolts are used on wood doors, do not overtighten, and crush the door. If this happens the door is to be replaced.
 - 5. Where closers or arms are installed on Aluminum or FRP doors and/or frames, install using Rivnuts (Rivet Nuts).
- M. Wall Bumpers or Stops: Note that blocking in drywall partitions where wall stops, or other wall mounted hardware is located is required.

3.4 FIELD QUALITY CONTROL

DOOR HARDWARE

- A. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating, and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
- B. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.
 - 1. Submit documentation of incomplete items in PDF electronic format.
- C. Fire Door Assembly Inspection: Reference Division 01 Sections "Closeout Procedures" for stipulations requiring an initial fire door assembly inspection, including documentation reporting, upon completion of door hardware installation according to NFPA 80 Standard for Fire Doors and Other Opening Protectives, paragraph 5.2.4, requirements.

3.5 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. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

3.8 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.9 DOOR HARDWARE SCHEDULE

- A. The hardware sets represent the design intent and direction of the owner and architect. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process.

B. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required.

C. HARDWARE SETS:

Set: 1.0

1 Continuous Hinge	A240HD 083	C	AH
1 Fire Rated Rim Exit	99 L F -2SI SNB 996L 06	626	VD
2 Rim Cylinder	12E-72 Patented	626	BE
1 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Gasket	700SA		NG

Set: 2.0

1 Continuous Hinge	A240HD 083	C	AH
1 Fire Rated Rim Exit	99 L F -2SI SNB 996L 06	626	VD
2 Rim Cylinder	12E-72 Patented	626	BE
1 Closer, Spring Stop Arm	4111 SCUSH MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Gasket	700SA		NG

Set: 3.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 NRP 4-1/2" x 4-1/2"	US26D	HA
1 Intruder Lock w/indicator inside only	45H7IND 15J Patented VIN (inside only)	626	BE
1 Closer, Spring Stop Arm	4111 SCUSH MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Wall Stop	1270WX	630	TC
1 Gasket	700SA (head only)		NG
1 Gasket	700EN (Jambs only)		NG

Set: 4.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 NRP 4-1/2" x 4-1/2"	US26D	HA
1 Intruder Lock w/indicator inside only	45H7IND 15J Patented VIN (inside only)	626	BE
1 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Wall Stop	1270WX	630	TC

DOOR HARDWARE

087100 - 19

1 Gasket	700SA (head only)	NG
2 Gasket	700EN (Jambs only)	NG

Set: 5.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Intruder Lock w/indicator inside only	45H7IND 15J Patented VIN (inside only)	626	BE
1 Surf Overhead Stop	9022A	US32D	AH
1 Closer, Regular Arm	4011 REGARM MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Gasketing	137NA		NG

Set: 6.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Intruder Lock w/indicator inside only	45H7IND 15J Patented VIN (inside only)	626	BE
1 Surf Overhead Stop	9022A	US32D	AH
1 Closer, Regular Arm	4011 REGARM MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Gasket	700SA (head only)		NG
1 Gasket	700EN (Jambs only)		NG

Set: 7.0

1 Continuous Hinge	A110HD 083	C	AH
1 Intruder Lock w/indicator inside only	45H7IND 15J Patented VIN (inside only)	626	BE
1 Conc Overhead Stop	1023SA	US32D	AH
1 Closer, Regular Arm	4011 REGARM MC	689	LC
1 Perimeter Gasket	By Frame Manufacturer		OT

Set: 8.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 NRP 4-1/2" x 4-1/2"	US26D	HA
1 Intruder Lock w/indicator inside only	45H7IND 15J Patented VIN (inside only)	626	BE
1 Kick Plate	K0050 HB ADH	630	TC
1 Wall Stop	1270WX	630	TC
3 Silencer	1229A		TC

Set: 9.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 NRP 4-1/2" x 4-1/2"	US26D	HA
1 Intruder Lock w/indicator inside only	45H7IND 15J Patented VIN (inside only)	626	BE
1 Surf Overhead Stop	9022A	US32D	AH
1 Kick Plate	K0050 HB ADH	630	TC
3 Silencer	1229A		TC

Set: 10.0

2 Continuous Hinge	A240HD 083	C	AH
1 Mullion	KR9954 7'5	689	VD
2 Fire Rated Rim Exit	99 L F -2SI SNB 996L 06	626	VD
4 Rim Cylinder	12E-72 Patented	626	BE
1 Mortise Cylinder	1E-74 Patented	626	BE
2 Closer, Parallel Arm	4111 EDA MC	689	LC
2 Kick Plate	K0050 HB ADH	630	TC
2 Wall Stop	1270WX	630	TC
2 Gasket	700SA		NG
1 Mullion Gasket	5100N		NG

Set: 11.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Office Lock	45H7A 15J Patented	626	BE
1 Wall Stop	1270WX	630	TC
1 Gasket	700EN		NG

Set: 12.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Office Lock	45H7A 15J Patented	626	BE
1 Surf Overhead Stop	9022A	US32D	AH
1 Gasket	700EN		NG

Set: 13.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Office Lock	45H7A 15J Patented	626	BE
1 Closer, Regular Arm	4011 REGARM MC	689	LC

1 Wall Stop	1270WX	630	TC
1 Gasket	700EN		NG

Set: 14.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Privacy Lock	45H0L 15J VIN VIT	626	BE
1 Wall Stop	1270WX	630	TC
3 Silencer	1229A		TC

Set: 15.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Storeroom Lock	45H7D 15J Patented	626	BE
1 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Wall Stop	1270WX	630	TC
1 Gasket	700SA (head only)		NG
2 Gasket	700EN (Jambs only)		NG

Set: 16.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Storeroom Lock	45H7D 15J Patented	626	BE
1 Closer, Spring Stop Arm	4111 SCUSH MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Gasket	700SA (head only)		NG
2 Gasket	700EN (Jambs only)		NG

Set: 17.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Storeroom Lock	45H7D 15J Patented	626	BE
1 Closer, Regular Arm	4011 REGARM MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Wall Stop	1270WX	630	TC
1 Gasket	700EN		NG

Set: 18.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 5" x 4-1/2"	US26D	HA
-------------------------------	------------------------------------	-------	----

1 Intruder Lock w/indicator inside only	45H7IND 15J Patented VIN (inside only)	626	BE
1 Closer, Regular Arm	4011 REGARM MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Wall Stop	1270WX	630	TC
1 Gasket	700EN		NG

Set: 19.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Storeroom Lock	45H7D 15J Patented	626	BE
1 Kick Plate	K0050 HB ADH	630	TC
1 Wall Stop	1270WX	630	TC
3 Silencer	1229A		TC

Set: 20.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 NRP 4-1/2" x 4-1/2"	US26D	HA
1 Storeroom Lock	45H7D 15J Patented	626	BE
1 Surf Overhead Stop	9022A	US32D	AH
1 Kick Plate	K0050 HB ADH	630	TC
3 Silencer	1229A		TC

Set: 21.0

2 Continuous Hinge	A240HD 083	C	AH
1 Dust Proof Strike	1870	US32D	AH
1 Flush Bolt	1857P	US32D	AH
1 Storeroom Lock	45H7D 15J Patented	626	BE
1 Closer, Regular Arm	4011 REGARM MC	689	LC
2 Kick Plate	K0050 HB ADH	630	TC
2 Wall Stop	1270WX	630	TC
1 Astragal	560 7'0" Cut Out-Strike Cut Out-Flush Bolt	BPR	NG
1 Edge Guard	542 7'0" Cut Out-Lock Face	BPR	NG
1 Gasket	700SA (head only)		NG
2 Gasket	700EN (Jambs only)		NG
1 Astragal Gasket	5020	b	NG

Set: 22.0

6 Hinge, Full Mortise, Hvy Wt	BB1168 NRP 4-1/2" x 4-1/2"	US26D	HA
1 Dust Proof Strike	1870	US32D	AH
1 Flush Bolt	1857P	US32D	AH
1 Storeroom Lock	45H7D 15J Patented	626	BE
2 Surf Overhead Stop	9022A	US32D	AH
2 Kick Plate	K0050 HB ADH	630	TC
1 Astragal (Active Leaf)	562 7'0" Cut Out-Lock Face	*	NG
1 Edge Guard (Inactive Leaf)	540 7'0" Cut Out-Strike Cut Out-Flush Bolt	*	NG
2 Silencer	1229A		TC

Set: 23.0

6 Hinge, Full Mortise, Hvy Wt	BB1168 NRP 4-1/2" x 4-1/2"	US26D	HA
1 Dust Proof Strike	1870	US32D	AH
1 Flush Bolt	1857P	US32D	AH
1 Storeroom Lock	45H7D 15J Patented	626	BE
2 Kick Plate	K0050 HB ADH	630	TC
2 Wall Stop	1270WX	630	TC
1 Astragal (Active Leaf)	562 7'0" Cut Out-Lock Face	*	NG
1 Edge Guard (Inactive Leaf)	540 7'0" Cut Out-Strike Cut Out-Flush Bolt	*	NG
2 Silencer	1229A		TC

Set: 24.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Classroom Lock	45H7R 15J Patented	626	BE
1 Kick Plate	K0050 HB ADH	630	TC
1 Wall Stop	1270WX	630	TC
3 Silencer	1229A		TC

Set: 25.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Classroom Lock	45H7R 15J Patented	626	BE
1 Closer, Regular Arm	4011 REGARM MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Wall Stop	1270WX	630	TC
1 Gasket	700EN		NG

Set: 26.0

1 Continuous Hinge	A110HD 083	C	AH
1 Storeroom Lock	45H7D 15J Patented	626	BE
1 Electric Strike	4100	US32D	TR
1 Conc Overhead Stop	1023SA	US32D	AH
1 Closer, Regular Arm	4011 REGARM MC	689	LC
1 Perimeter Gasket	By Frame Manufacturer		OT
1 Door Release	TS-18		AK

Notes: Theory of operation:

Door to be closed and locked at all times

entry allowed by remote push button release or mechanical key override.

When remote push button activated the electric strike shall release for 5 seconds allowing entry. After 5 seconds the electric strike will return to the secure state.

Free egress at all times.

Fail secure

Set: 27.0

3 Hinge, Full Mortise, Hvy Wt	SEC.ST FBB168 NRP 4-1/2" x 4-1/2"	US26D	ST
1 Dormitory Lock	45H7TD 15J Patented	626	BE
1 Wall Stop	1270WX	630	TC
3 Silencer	1229A		TC

Set: 28.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Passage Latch	45H0N 15J	626	BE
1 Wall Stop	1270WX	630	TC
3 Silencer	1229A		TC

Set: 29.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Passage Latch	45H0N 15J	626	BE
1 Closer, Regular Arm	4011 REGARM MC	689	LC
1 Gasket	700EN		NG
3 Silencer	1229A		TC

Set: 30.0

1 Continuous Hinge	A110HD 095	C	AH
1 Dormitory Lock	45H7TD 15J Patented	626	BE
1 Conc Overhead Stop	1023SA	US32D	AH
1 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
1 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG
1 Latch Protector	5001	630	TC

Set: 31.0

1 Continuous Hinge	A110HD 083	C	AH
1 Storeroom Lock	45H7D 15J Patented	626	BE
1 Conc Overhead Stop	1023SA	US32D	AH
1 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
1 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG
1 Latch Protector	5001	630	TC

Set: 32.0

2 Continuous Hinge	A110HD 095	C	AH
1 Dust Proof Strike	1870	US32D	AH
1 Flush Bolt	1855S 24"	US32D	AH
1 Flush Bolt	1855S	US32D	AH
1 Storeroom Lock	45H7D 15J Patented	626	BE
2 Conc Overhead Stop	1023SA	US32D	AH
1 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
2 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG
1 Latch Protector	5001	630	TC

Set: 33.0

2 Continuous Hinge	A110HD 083	C	AH
1 Flush Bolt	1855P	US32D	AH

1 Dust Proof Strike	1870	US32D	AH
1 Storeroom Lock	45H7D 15J Patented	626	BE
2 Conc Overhead Stop	1023SA	US32D	AH
1 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
2 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG
1 Latch Protector	5001	630	TC

Set: 34.0

2 Continuous Hinge	A110HD 083	C	AH
1 SVR Nightlatch	9927 LNL LBR 996L-NL 06 LD	626	VD
1 SVR Exit Only	9927 EO LBR LD	626	VD
1 Rim Cylinder	12E-72 Patented	626	BE
2 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Astragal	A605A(SET)		NG
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
2 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG

Set: 35.0

2 Continuous Hinge	A110HD 083	C	AH
1 Mullion	5654 7'2	628	VD
1 Stabilizer	154	689	VD
2 Rim Exit Only	LD 99 EO	626	VD
2 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Astragal	A605A(SET)		NG
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
1 Mullion Gasket	5100N		NG
2 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG

Set: 36.0

2 Continuous Hinge	A110HD 083	C	AH
1 Flush Bolt	1855P	US32D	AH
1 Dust Proof Strike	1870	US32D	AH
1 Passage Latch	45H0N 15J	626	BE
2 Conc Overhead Stop	1023SA	US32D	AH
1 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
2 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG

Set: 37.0

2 Continuous Hinge	A110HD 095	C	AH
1 Stabilizer	154	689	VD
1 Mullion	5654 8'2	628	VD
2 Rim Exit Only	LD 99 EO	626	VD
2 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Astragal	A605A(SET)		NG
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
1 Mullion Gasket	5100N		NG
2 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG

Set: 38.0

2 Continuous Hinge	A110HD 095	C	AH
1 Stabilizer	154	689	VD
1 Mullion	5654 8'2	628	VD
1 Rim Exit Only	LD 99 EO	626	VD
1 Rim Exit Nightlatch	LD 99 LNL 996L-NL	626	VD
1 Rim Cylinder	12E-72 Patented	626	BE
2 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Astragal	A605A(SET)		NG
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
2 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG

Set: 39.0

2 Continuous Hinge	A110HD 083	C	AH
1 Mullion	5654 7'2	628	VD
1 Stabilizer	154	689	VD
1 Rim Exit Only	LD 99 EO	626	VD
1 Rim Exit Nightlatch	LD 99 LNL 996L-NL	626	VD
1 Rim Cylinder	12E-72 Patented	626	BE
2 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Astragal	A605A(SET)		NG
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
2 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG

Set: 40.0

2 Continuous Hinge	A240HD 083	C	AH
1 SVR Exit, Nightlatch	9927 LNL F SNB LBR 996L-NL 06	626	VD
1 SVR Exit, Exit Only	9927 EO F SNB LBR-AFL	626	VD
1 Rim Cylinder	12E-72 Patented	626	BE
2 Closer, Parallel Arm	4111 EDA MC	689	LC
2 Kick Plate	K0050 HB ADH	630	TC
2 Wall Stop	1270WX	630	TC
1 Astragal	A605A(SET)		NG
1 Gasket	700SA (head only)		NG
2 Gasket	700EN (Jambs only)		NG

Set: 41.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Classroom Lock	45H7R 15J Patented	626	BE
1 Surf Overhead Stop	9022A	US32D	AH
1 Closer, Regular Arm	4011 REGARM MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Gasket	700SA (head only)		NG
1 Gasket	700EN (Jambs only)		NG

Set: 42.0

1 Rim Cylinder	12E-72 Patented	626	BE
----------------	---------------------------------	-----	----

Set: 43.0

1 Continuous Hinge	A240HD 083	C	AH
1 Rim Exit, Nightlatch	99 LNL F SNB 996L-NL 06	626	VD
1 Rim Cylinder	12E-72 Patented	626	BE
1 Closer, Spring Stop Arm	4111 SCUSH MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Gasket	700SA		NG

Set: 44.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Storeroom Lock	45H7D 15J Patented	626	BE
1 Electric Strike	4100	US32D	TR
1 Closer, Regular Arm	4011 REGARM MC	689	LC
1 Wall Stop	1270WX	630	TC
1 Gasket	700EN		NG
1 Card Reader	By others		OT

Notes: The access control panel is to power the electric strike

Theory of operation:

Door to be closed and locked at all times

entry allowed through access control system or mechanical key override.

When valid credentials are presented the electric strike shall release for 5 seconds allowing entry. After 5 seconds the electric strike will return to the secure state.

Free egress at all times.

Fail secure

Set: 45.0

2 Continuous Hinge	A240HD 083	C	AH
2 SVR Exit Only	9927 EO LBR LD	626	VD
2 Closer, Spring Stop Arm	4111 SCUSH MC	689	LC
2 Kick Plate	K0050 HB ADH	630	TC
2 Silencer	1229A		TC

Set: 46.0

2 Continuous Hinge	A240HD 083	C	AH
--------------------	----------------------------	---	----

DOOR HARDWARE

2 Rim Exit Only	99 EO F SNB	626	VD
2 Closer, Parallel Arm	4111 EDA MC	689	LC
2 Kick Plate	K0050 HB ADH	630	TC
2 Electromagnetic Holder	2300	US28	AH
1 Gasket	700SA		NG

Set: 47.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Passage Latch	45H0N 15J	626	BE
1 Wall Stop	1270WX	630	TC
1 Gasket	700EN		NG
1 Door Bottom	522N		NG
1 Threshold	950N		NG

Set: 48.0

1 HARDWARE	All Hardware By Door and Frame MFG		OT
------------	---------------------------------------	--	----

Set: 49.0

2 Continuous Hinge	A110HD 095	C	AH
1 SVR Nightlatch	9927 LNL LBR 996L-NL 06 LD	626	VD
1 SVR Exit Only	9927 EO LBR LD	626	VD
2 Closer, Parallel Arm	4111 EDA MC	689	LC
2 Electromagnetic Holder	2300	US28	AH
1 Perimeter Gasket	By Frame Manufacturer		OT

Set: 50.0

1 Continuous Hinge	A110HD 083	C	AH
1 Rim Exit Device	99 L 996L 06	626	VD
1 Rim Cylinder	12E-72 Patented	626	BE
1 Closer, Regular Arm	4011 REGARM MC	689	LC
1 Wall Stop	1270WX	630	TC
1 Perimeter Gasket	By Frame Manufacturer		OT
1 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG

Set: 51.0

2 Continuous Hinge	A240HD 083	C	AH
1 SVR Exit, Nightlatch	9927 LNL F SNB LBR 996L-NL 06	626	VD
1 SVR Exit, Exit Only	9927 EO F SNB LBR-AFL	626	VD
1 Rim Cylinder	12E-72 Patented	626	BE
2 Closer, Parallel Arm	4111 EDA MC	689	LC
2 Kick Plate	K0050 HB ADH	630	TC
2 Electromagnetic Holder	2300	US28	AH
1 Astragal	A605A(SET)		NG
1 Gasket	700SA (head only)		NG
2 Gasket	700EN (Jambs only)		NG

Set: 52.0

3 Hinge, Full Mortise, Hvy Wt	BB1168 4-1/2" x 4-1/2"	US26D	HA
1 Dormitory Lock w/indicator both sides	45H7T 15J Patented VIB	626	BE
1 Closer, Regular Arm	4011 REGARM MC	689	LC
1 Kick Plate	K0050 HB ADH	630	TC
1 Wall Stop	1270WX	630	TC
1 Gasket	700SA		NG

Set: 53.0

1 Continuous Hinge	A110HD 095	C	AH
1 Continuous Hinge	A110HD 095 EA12-EZAL	C	AH
1 SVR Exit, Exit Only w/dogging	CD 9927 EO LBR	626	VD
1 SVR Exit, Latch Retraction w/dogging	SD-QEL 9927 NLOP CON 110MD-NL	626	VD
1 Rim Cylinder	12E-72 Patented	626	BE
2 Mortise Cylinder	1E-74 Patented	626	BE
2 Flush Pull	1111C	630	TC
2 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Perimeter Gasket	By Frame Manufacturer		OT
1 Wire Harness	EZAL-300-1		AH
1 Wire Harness	EZAL-12		AH
1 Door Release	TS-18		AK
1 Card Reader	By others		OT
1 Power Supply	PS902 900-2RS-FA		VD

Notes: V101 LHR leaf is active

The power supply is shared between doors V101 and V101C

Theory of operation during student arrival and dismissal:

The exit devices are to be put in the dogged position allowing the doors to be freely pulled open.

Theory of operation other times:

Door to be closed and locked at all times.

Entry allowed through the access control system.

Upon valid credentials or remote release the exit device shall unlock for 5 seconds, return to the locked state.

Remote access is allowed through access control system

Free egress at all times

upon power failure the door shall remain secure, fail secure.

Set: 54.0

2 Continuous Hinge	A110HD 095	C	AH
2 SVR Exit, Exit Only w/dogging	CD 9927 EO LBR	626	VD
2 Mortise Cylinder	1E-74 Patented	626	BE
2 Flush Pull	1111C	630	TC
2 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Perimeter Gasket	By Frame Manufacturer		OT

Notes: Theory of operation during student arrival and dismissal:

The exit devices are to be put in the dogged position allowing the doors to be freely pulled open.

Theory of operation other times:

The exit devices will be in the undogged position.

Free egress at all times.

Set: 55.0

2 Continuous Hinge	A110HD 095	C	AH
1 Stabilizer	154	689	VD
1 Mullion	5654 8'2	628	VD
2 Rim Exit, Exit Only w/dogging	CD 99 EO	626	VD
2 Mortise Cylinder	1E-74 Patented	626	BE
2 Flush Pull	1111C	630	TC
2 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Astragal	A605A(SET)		NG

1 Drip Strip	16A	NG
1 Perimeter Gasket	By Frame Manufacturer	OT
1 Mullion Gasket	5100N	NG
2 Door Bottom	95WH	NG
1 Threshold	896HDN SIA	NG

Notes: Theory of operation during student arrival and dismissal:
The exit devices are to be put in the dogged position allowing the doors to be freely pulled open.

Theory of operation other times:
The exit devices will be in the undogged position.

Free egress at all times.

Set: 56.0

2 Continuous Hinge	A110HD 095	C	AH
1 Stabilizer	154	689	VD
1 Mullion	5654 8'2	628	VD
1 Rim Exit Only	LD 99 EO	626	VD
1 Rim Exit Nightlatch	LD 99 NLOP 110MD-NL	626	VD
1 Rim Cylinder	12E-72 Patented	626	BE
1 Flush Pull	1111C	630	TC
2 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Astragal	A605A(SET)		NG
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
1 Mullion Gasket	5100N		NG
2 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG

Set: 57.0

2 Continuous Hinge	A110HD 095	C	AH
1 Stabilizer	154	689	VD
1 Mullion	5654 8'2	628	VD
2 Rim Exit Only	LD 99 EO	626	VD
2 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Astragal	A605A(SET)		NG
1 Drip Strip	16A		NG

1 Perimeter Gasket	By Frame Manufacturer	OT
1 Mullion Gasket	5100N	NG
2 Door Bottom	95WH	NG
1 Threshold	896HDN SIA	NG

Set: 58.0

1 Continuous Hinge	A110HD 095	C	AH
1 Continuous Hinge	A110HD 095 EA12-EZAL	C	AH
1 Stabilizer	154	689	VD
1 Mullion	5654 8'2	628	VD
1 Rim Exit, Exit Only w/dogging	CD 99 EO	626	VD
1 Rim Exit, Latch Retraction w/dogging	SD-QEL 99 NLOP CON 110MD-NL	626	VD
1 Rim Cylinder	12E-72 Patented	626	BE
3 Mortise Cylinder	1E-74 Patented	626	BE
2 Flush Pull	1111C	630	TC
2 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
1 Mullion Gasket	5100N		NG
2 Door Bottom	95WH		NG
1 Threshold	896HDN SIA		NG
1 Wire Harness	EZAL-300-1		AH
1 Wire Harness	EZAL-12		AH
1 Door Release	TS-18		AK
1 Card Reader	By others		OT

Notes: V101C LHR active.

The power supply is shared with door V101

Theory of operation during student arrival and dismissal:

The exit devices are to be put in the dogged position allowing the doors to be freely pulled open.

Theory of operation other times:

Doors are to be closed and locked at all times.

Entry allowed through the access control system.

Upon valid credentials or remote release the exit device shall unlock for 5 seconds, return to the locked state.

Remote access is allowed through access control system

Free egress at all times

upon power failure the door shall remain secure, fail secure.

Set: 59.0

2 Continuous Hinge	A110HD 083	C	AH
2 Flush Pull	1111C	630	TC
2 Push Bar	1741 30"	630	TC
2 Closer, Parallel Arm	4111 EDA MC	689	LC
2 Wall Stop	1270WX	630	TC

Set: 60.0

2 Continuous Hinge	A110HD 095	C	AH
2 Flush Pull	1111C	630	TC
2 Push Bar	1741 30"	630	TC
1 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Wall Stop	1270WX	630	TC

Set: 61.0

2 Continuous Hinge	A110HD 095	C	AH
2 Flush Pull	1111C	630	TC
2 Push Bar	1741 30"	630	TC
2 Closer, Parallel Arm	4111 EDA MC	689	LC
2 Wall Stop	1270WX	630	TC

Set: 62.0

1 Continuous Hinge	A110HD 083	C	AH
1 Continuous Hinge	A110HD 083 EA12-EZAL	C	AH
1 Mullion	5654 7'2	628	VD
1 Stabilizer	154	689	VD
1 Rim Exit Only	LD 99 EO	626	VD
1 Rim Exit, Latch retraction	QEL 99 NLOP CON 110MD-NL	626	VD
1 Rim Cylinder	12E-72 Patented	626	BE
1 Flush Pull	1111C	630	TC
2 Conc Overhead Stop	1023SA	US32D	AH
2 Closer, Parallel Arm	4111 EDA MC	689	LC
1 Astragal	A605A(SET)		NG
1 Drip Strip	16A		NG
1 Perimeter Gasket	By Frame Manufacturer		OT
1 Mullion Gasket	5100N		NG

2 Door Bottom	95WH	NG
1 Threshold	896HDN SIA	NG
1 Wire Harness	EZAL-300-1	AH
1 Wire Harness	EZAL-12	AH
1 Card Reader	By others	OT
1 Power Supply	PS902 900-2RS-FA	VD

Notes: Theory of operation other times:

Doors are to be closed and locked at all times.

Entry allowed through the access control system.

Upon valid credentials the exit device shall unlock for 5 seconds, return to the locked state.

Free egress at all times

upon power failure the door shall remain secure, fail secure.

END OF SECTION

SECTION 088000 - GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing units.

1.2 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- E. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.
- F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- G. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.
- H. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- I. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.
- J. GANA (SM) - GANA Sealant Manual; 2008.
- K. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2020.
- L. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2020.
- M. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2020.

1.3 SUBMITTALS

- A. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- B. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- C. Samples: Submit two samples 12 by 12 inch in size of glass units.
- D. **Samples of Insulated Spandrel Units: Provide one Sample with the outboard light Tinted as Specified and one Sample with the outboard light Clear Tempered Glass. Final colors of outboard glass and paint coating to be selected by the Architect.**
- E. Certificate: Certify that products of this section meet or exceed specified requirements.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for tinted glass coated glass insulating glass glazing sealants and glazing gaskets.
 - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- I. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- J. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- K. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience and who is approved by coated-glass manufacturer.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience and certified under the National Glass Association's Certified Glass Installer Program..
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- E. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- F. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.
- 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 "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."
 - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- H. **Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201.**
- I. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1.5 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
- B. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
- C. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

1.6 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 WARRANTY

- A. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
- B. Laminated Glass: Provide a ten (10) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. **Provide glazing that meets the minimum requirements of the NYS building code §2406.1 Human impact loads. Individual glazed areas, including glass mirrors, in hazardous locations as defined in §2406.2 shall pass the test requirements of CPSC 16 CFR 1201, listed in Chapter 35. Glazing shall comply with the CPSC 16 CFR, Part 1201 criteria for Category I or Category II as indicated in Table 2406.1.**
 - 1. **All glass units over 9 square feet in size shall be Category II safety glass.**
- B. All interior glazing to comply with NFPA 80 and/or ASTM E119 – coordinate with glazing size and types.
- C. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Design Pressure: As indicated on drawings.
 - 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 - 3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 - 4. Glass thicknesses listed are minimum.
- D. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
- E. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
 - 1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.

3. Solar Optical Properties: Comply with NFRC 300 test method.
- F. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E 1300 by a qualified **NYS licensed professional engineer**, using the following design criteria. Design to be signed and sealed and certified to be in compliance with the building code of NYS and as specified.
1. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201
Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
 - a. Wind Design Data: As indicated on Drawings.
 - b. Basic Wind Speed: 90 mph (40 m/s).
 2. Design Snow Loads: As indicated on Drawings.
 3. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
 4. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
 5. Probability of Breakage for Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass for a probability of breakage not greater than 0.001.
 6. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.
 7. Differential Shading: Design glass to resist thermal stresses induced by differential shading withing individual glass lites.
 8. Thermal Movements: Allow for thermal movements

2.2 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
1. Kind (**Type G4**) - Fully Tempered Type: Complies with ASTM C1048; Type I (transparent flat glass); Quality-Q3; of class 1, Condition A.
 - a. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
 - 1) Heat Treated Flat Glass to be by horizontal (roller hearth) process with inherent rollerwave distortion parallel to the bottom edge of the glass as installed.
 - 2) Maximum peak to valley rollerwave 0.003" (0.08mm) in the central area and 0.008" (0.20mm) within 10.5" (267mm) of the leading and trailing edge.
 - 3) Maximum bow and warp 1/32" per lineal foot (0.79mm).

- 4) **All tempered architectural safety glass shall conform with ANSI Z97.1 and CPSC 16 CFR 1201.**
 - b. Labeled glass: Permanently label glass per ASTM standard for tempered glass (sand blasted or etched graphic)
 - c. Thickness: **Type G4**: Clear, 1/4 inch.
- 2. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
- B. Laminated Glass (**Type G5**): Float glass laminated in accordance with ASTM C1172.
 - 1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.

2.3 INSULATING GLASS UNITS

- A. Manufacturers:
 - 1. Guardian Glass, LLC: www.guardianglass.com/#sle.
- B. Fabricator: Certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.
- C. Insulating Glass Units: Types as indicated.
 - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 - 2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
 - 3. Warm-Edge Spacers: Low-conductivity thermoplastic with dessicant warm-edge technology design.
 - a. Spacer Width: As required for specified insulating glass unit.
 - b. Spacer Height: Manufacturer's standard.
 - 4. Spacer Color: Black.
 - 5. Edge Seal:
 - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
 - b. Color: Black.
 - 6. Purge interpane space with dry air, hermetically sealed.
- D. Type G2 Clear Insulating Glass Units: Vision glass, double glazed.
 - 1. Applications: Inner Vestibule doors.
 - 2. Space between lites filled with air.
 - 3. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.

4. Metal edge spacer.
 5. Inboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 6. Total Thickness: 1 inch.
 7. **Provide safety glazing labeling.**
- E. Type G1 - Tinted Insulating Glass Units: Vision glass, double glazed.
1. Basis of Design - Guardian Glass, LLC: www.guardianglass.com/#sle.
 2. Applications: Exterior glazing unless otherwise indicated.
 3. Space between lites filled with air.
 4. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Crystal Gray.
 - b. Coating: Low-E (passive type), SunGuard eXtraSelective SNX 62/27 on #2 surface.
 5. Warm-edge spacer.
 6. Inboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 7. Total Thickness: 1 inch.
 8. Thermal Transmittance (U-Value), Summer - Center of Glass: 0.209, nominal.
 9. Visible Light Transmittance (VLT): 44 percent, nominal.
 10. Shading Coefficient: 0.24, nominal.
 11. Solar Heat Gain Coefficient (SHGC): 0.21, nominal.
 12. Visible Light Reflectance, Outside: 8 percent, nominal.
 13. Glazing Method: Dry glazing method, gasket glazing.
 14. **Provide safety glazing labeling.**
- F. Type G6 Insulating Glass Units: Spandrel glazing.
1. Basis of Design: Guardian Glass, Guardian Deco HT.
 2. Final colors and combinations to be reviewed and selected by the Architect during the Submittal Sample Process. See Submittal Sample information in Part 1 of this specification.
 3. Applications: Exterior spandrel glazing unless otherwise indicated.
 4. Space between lites filled with air.
 5. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Glass Tint: Guardian Crystal Gray..
 - b. Coating: Guardian Deco HT., on #2 surface. Color to be selected by the Architect.
 6. Warm-edge spacer.
 7. Inboard Lite: Fully tempered float glass, 1/4 inch thick.
 - a. Tint: Clear.
 8. Total Thickness: 1 inch.
 9. Glazing Method: Dry glazing method, gasket glazing.

2.4 ACCESSORIES

- 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: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- D. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D. Verify that sealing between joints of glass framing members has been completed effectively.
- E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.3 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.4 INSTALLATION - PRESSURE GLAZED SYSTEMS

- A. Application - Exterior Glazed: Set glazing infills from exterior side of building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install pressure plates without displacing glazing gasket; exert pressure for full continuous contact.
- E. Install cover plate.

3.5 CLEANING

- A. Remove nonpermanent labels immediately after glazing installation is complete.
- B. Clean glass and adjacent surfaces after sealants are fully cured.
- C. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.6 PROTECTION

- A. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 088813 - FIRE-RATED GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire-rated glazing units.
- B. Glazing compounds.

1.2 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. ITS (DIR) - Directory of Listed Products; Current Edition.
- D. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- E. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies; 2022.
- F. UL (DIR) - Online Certifications Directory; Current Edition.
- G. UL 9 - Standard for Fire Tests of Window Assemblies; Current Edition, Including All Revisions.
- H. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- I. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data on Glazing Unit Glazing Types: Provide structural, physical, and environmental characteristics, size limitations, special handling and installation requirements.
- B. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- C. Samples: One samples 12 by 12 inch in size of glass units.
- D. Certificate: Certify that products of this section meet or exceed specified requirements.

- E. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.
- H. Specimen warranty.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
 - 1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
 - a. Safety Glazing Certification Council (SGCC).
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
 - 1. Provide a qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.5 FIELD CONDITIONS

- A. Ambient Conditions: Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during, and 24 hours after installation of glazing compounds.

1.6 WARRANTY

- A. Manufacturer Warranty for Laminated Glass: Provide 5-year manufacturer warranty coverage for delamination, including providing products to replace failed units, and commencing on the Date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.
- B. Manufacturer Warranty for Heat Soaked Tempered Glass: Provide 5-year manufacturer warranty coverage for spontaneous breakage of fully tempered glass caused by nickel sulfide (NiS) inclusions, and commencing on the Date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fire-Protection-Rated Glass:
 - 1. Manufacturers:
 - a. SAFTIFIRST, a division of O'Keeffe's Inc: www.safti.com/#sle.

2.2 GLAZING UNITS

- A. Type G3 - Fire-Protection Safety-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve indicated fire rating period of 90 minutes or less.
 - 1. Applications:
 - a. Glazing in fire-resistance-rated door assembly.
 - b. Glazing in fire-resistance-rated window assembly.
 - c. Other locations as indicated on drawings.
 - 2. Glass Type: laminated fire-rated and impact safety-rated .
 - 3. Provide products listed by UL (DIR) and approved by authorities having jurisdiction.
 - 4. Safety Glazing Certification: 16 CFR 1201 Category I and II.
 - 5. Glazing Method: As required for fire rating.
 - 6. Fire-Rating Period: As scheduled.
 - 7. Markings for Fire-Protection-Rated Glazing Assemblies: Provide permanent markings on fire-protection-rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction
 - a. "D" - meets fire door assembly criteria of NFPA 252, UL 10B, or UL 10C fire test standards.
 - b. "OH" - meets fire window assembly criteria, including hose stream test of NFPA 257 or UL 9 fire test standards.
 - c. "H" - meets fire door assembly hose stream test of NFPA 252, UL 10B, or UL 10C fire tests standards.
 - d. "XXX" - placeholder that represents fire-rating period, in minutes.
 - 8. Products:
 - a. SAFTIFIRST, a division of O'Keeffe's Inc; Superlite X 45 and 60. ; www.safti.com/#sle.

2.3 ACCESSORIES

- A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.

- B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
 - 1. Sealants shall have a VOC content of 250 g/L or less.
 - 2. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- C. Verify that sealing between joints of glass framing members has been completed effectively.
- D. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.3 INSTALLATION - GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers unless more stringent requirements are indicated, including those in referenced glazing standards.
- B. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- C. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

- D. Prevent glass from contact with contaminating substances that may result from construction operations including, but not limited to weld spatter, fire-safing, plastering, mortar droppings, etc.

3.4 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than four days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.5 PROTECTION

- A. After installation, mark pane with 'X' by using removable plastic tape or paste; do not mark heat-absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

This page intentionally left blank

SECTION 088859 - ATTACK-RESISTANT GLAZED ASSEMBLIES - ARMOURED ONE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Attack-resistant glazed assemblies. Indicated also as 'Security Glazing'.
 - 1. This Section only covers Attack Resistant Insulated glass installed in Storefront, Exterior Doors, Windows; locations as indicated. Storefront, Exterior Doors and Windows specified elsewhere in division 8.
 - 2. Glass tint to match all other exterior glass, Guardian Crystal Gray.

1.2 REFERENCE STANDARDS

- A. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.
- B. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Furnish anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, to be embedded into concrete or masonry, with setting diagrams and installation, to applicable installer in time for installation.
- B. Preinstallation Meeting: Arrange an on-site meeting to familiarize attack-resistant glazed assembly installer, and installers of related work, with requirements.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's published data showing materials, construction details, dimensions of components, and finishes.
- B. Shop Drawings: Include drawings prepared specifically for this project, showing plans, elevations, sections, details of construction, anchorage to other work, hardware, and glazing.
- C. Test Reports: Test reports for each specific door model and glazing to be furnished, showing compliance with specified requirements.
- D. Manufacturer's qualification statement.
- E. Installer's qualification statement.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Independent testing agency able to show experience in conducting tests of the type specified.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 WARRANTY

- A. Manufacturer Warranty: Provide two-year manufacturer warranty for attack-resistant glass agreeing to repair or replace glass that fails to perform as specified. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Attack-Resistant Glazing:
 - 1. Armoured One; Insulated Glass Units: www.armouredone.com/#sle.

2.2 GLAZING and Film COMPONENTS

- A. Insulated Shooter/Attack Resistant Glazing Unit Type G7: Vision glass, double glazed with proprietary translucent security film bonded to one side.
 - 1. Applications: Exterior Glass locations indicated on drawings.
 - 2. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 - 3. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
 - 4. Unit Composition:
 - a. Total Thickness: 1 inch.
 - b. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - 1) Tint: Guardian Crystal Gray.
 - 2) Coating: Low-E (passive type), on #2 surface.
 - c. Space between lites filled with air.
 - 1) Purge interpane space with dry air, hermetically sealed.
 - d. Spacers:

- 1) Warm-Edge Spacers: Polypropylene warm-edge technology design.
 - a) Spacer Width: As required for specified insulating glass unit.
 - b) Spacer Height: Manufacturer's standard.
- e. Inboard Lite: Clear Monolithic attack/shooter resistant glass.
 - 1) Coating: on #3 surface.
- f. Edge Seal:
 - 1) Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
 - 2) Color: Black.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that openings are ready for installation of assemblies.
- B. Verify that correct embedded anchors are in place and in proper location; repair or replace anchors as required to achieve satisfactory installation.
- C. Notify Architect if conditions are not suitable for installation; do not proceed until conditions are satisfactory.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and drawing details.
- B. Install in correct orientation, inside/outside or secure/non-secure.
- C. Anchor assemblies securely in manner necessary to achieve specified performance.
- D. Set sill members and sill flashing in continuous bead of sealant.

3.3 CLEANING

- A. Clean exposed surfaces promptly after installation without damaging finishes.
- B. Remove and replace defective work.

END OF SECTION

This page intentionally left blank

SECTION 089100 - LOUVERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Louvers, frames, and accessories.

1.2 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- B. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2023.
- C. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices; 2021, with Editorial Revision (2022).
- D. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

1.3 SUBMITTALS

- A. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- B. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, and tolerances; head, jamb and sill details; blade configuration, screens, blank-off areas required, and frames.
- C. Test Reports: Independent agency reports showing compliance with specified performance criteria.

1.4 WARRANTY

- A. Provide five year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.
 - 1. Finish: Include twenty year coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Louvers:

1. Construction Specialties, Inc; Drainable Louver: Model A4177, www.c-sgroup.com/#sle.

2.2 LOUVERS

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
 1. Wind Load Resistance: Design to resist positive and negative wind load of 25 psf without damage or permanent deformation.
 2. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
 3. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
 4. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.
- B. Louvers: Aluminum outer frames, louver end frames only, non-thermally broken, air ventilator with overlapping louvers.
 1. Free Area: 50, minimum.
 2. Frame: 4 inch deep, extruded aluminum.
 3. Frame Size: As indicated on drawings.

2.3 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Formed Aluminum: Formed sheet, ASTM B209/B209M.

2.4 FINISHES

- A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.
- B. Color: Custom, to match approved sample.

2.5 ACCESSORIES

- A. Blank-Off Panels: Aluminum face and back sheets, polyisocyanurate foam core, 1-1/2 inch thick, match louver color; provide where duct connected to louver is smaller than louver frame, sealing off louver area outside duct.
- B. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.

- C. Bird Screen: Interwoven wire mesh of steel, 14 gauge, 0.0641 inch diameter wire, 1/2 inch open weave, diagonal design.
- D. Insect Screen: 18 x 16 size aluminum mesh.
- E. Fasteners and Anchors: Galvanized steel.
- F. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.
- G. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.
- B. Verify that field measurements are as indicated.

3.2 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Coordinate with installation of flashings by others.
- C. Install louvers level and plumb.
- D. Set sill members and sill flashing in continuous bead of sealant.
- E. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- F. Secure louver frames in openings with concealed fasteners.
- G. Coordinate with installation of mechanical ductwork.

3.3 CLEANING

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

END OF SECTION

This page intentionally left blank

SECTION 092116 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal stud wall framing.
- B. Metal channel ceiling framing.
- C. Gypsum Ceiling Suspension system.
- D. Sound isolation clips for Acoustic Sound Dampening Ceiling System.
- E. Acoustic insulation.
- F. Gypsum sheathing.
- G. Cementitious backing board.
- H. Gypsum wallboard.
- I. Joint treatment and accessories.
- J. Acoustic (sound-dampening) wall and ceiling board.
- K. Noise barriers in gypsum board assemblies.

1.2 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2020).
- B. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2018.
- C. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2019.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- F. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.

- G. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).
- H. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
- I. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- J. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- K. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2020.
- L. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.
- M. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.
- N. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
- O. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
- P. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018.
- Q. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2022.
- R. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- S. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2019.
- T. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019, with Editorial Revision (2020).
- U. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- V. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- W. ASTM E413 - Classification for Rating Sound Insulation; 2022.

- X. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- Y. GA-216 - Application and Finishing of Gypsum Panel Products; 2021.
- Z. GA-600 - Fire Resistance and Sound Control Design Manual; 2021.
- AA. UL (FRD) - Fire Resistance Directory; Current Edition.
- BB. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide data on metal framing, gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.
- B. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.
- C. Installer's Qualification Statement.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 5 years of experience.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
 - 1. Acoustic Attenuation: STC as indicated calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
 - 1. Acoustic Attenuation: STC of indicated calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- D. Fire-Resistance-Rated Assemblies: Provide completed assemblies with the following characteristics:

1. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
2. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.2 METAL FRAMING MATERIALS

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
 1. ClarkDietrich: www.clarkdietrich.com/#sle.
 2. MarinoWARE: www.marinoware.com/#sle.
- B. Non-structural Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
 1. Studs: C-shaped with knurled or embossed faces.
 - a. Products:
 - 1) MBA Building Supplies; ProSTUD: www.mbastuds.com/#sle.
 - 2) R-stud; R-stud: www.rstud.com/#sle.
 - 3) Super Stud Building Products, Inc; The EDGE: www.buysuperstud.com/#sle.
 2. Paired Studs for Sound-Rated Assemblies: Engineered single-piece assemblies comprised of paired studs coupled by sound isolators, designed to replace conventional side-by-side, parallel, double-wall partition framing.
 - a. Widths: As indicated on drawings.
 3. Runners: U shaped, sized to match studs.
 4. Ceiling Channels: C-shaped.
 5. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.
 6. Furring Members: U-shaped sections, minimum depth of 3/4 inch.
 7. Furring Members: Zee-shaped sections, minimum depth of 1 inch.
 8. Resilient Furring Channels: Single or double leg configuration; 1/2 inch channel depth.
 9. Sound Isolation Clips: Steel resilient clips, attaches to framing; improves noise isolation performance of wall and floor-ceiling assemblies.
 - a. Products:
 - 1) Kinetics Noise Control; Model IsoGrid..
 10. Sill Plate Isolation Pads: Acoustical separation between sole plate and subfloor.
- C. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.
 1. Products:
 - a. Same manufacturer as other framing materials.

- D. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection and prevent rotation of studs while maintaining structural performance of partition.
 - 1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.
 - 2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.
 - 3. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.
 - 4. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-resistance rating of the wall assembly.
 - a. Products:
 - 1) ClarkDietrich; BlazeFrame RipTrak: www.clarkdietrich.com/#sle.
 - 2) FireTrak Corporation; Posi Klip: www.fire-trak.com/#sle.
 - 3) MBA Building Supplies; Slotted Slip Track: www.mbastuds.com/#sle.
 - 4) Metal-Lite, Inc; The System: www.metal-lite.net/#sle.
- E. Deflection and Firestop Track: Intumescent strip factory-applied to track flanges expands when exposed to heat or flames to provide a perimeter joint seal.
 - 1. Products:
 - a. ClarkDietrich; BlazeFrame Firestop Deflection Track: www.clarkdietrich.com/#sle.
- F. Preformed Top Track Firestop Seal:
 - 1. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.
 - 2. Products:
 - a. Hilti, Inc; Top Track Seal CFS TTS: www.us.hilti.com/#sle.
 - b. Specified Technologies Inc; SpeedFlex TTG Track Top Gasket: www.stfirestop.com/#sle.
- G. Non-structural Framing Accessories:
 - 1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
 - 2. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
 - a. Materials: ASTM A36/A36M formed sheet steel support member with factory-welded ASTM A1003/A1003M steel plate base.
 - b. Height: 23-3/4 inches.
 - c. Products:
 - 1) ClarkDietrich; Pony Wall (PW): www.clarkdietrich.com/#sle.
 - 2) MidWall; Kneewall Steel Brace Kit: <https://www.kneewall.com/>.

3. Partition Gap Closures: For vertical junctions between partition walls and window mullions.
 - a. Material: Aluminum.
 - b. Finish: To match adjacent framing system.
 - c. Fit: Factory spring loaded.
 - d. Gasketing: Factory installed.
 - e. Acoustic Rating: 56 STC min.
 - f. Products:
 - 1) Gordon; Mullion Mate: www.gordon-inc.com/#sle.
 4. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.
 - a. Products:
 - 1) ClarkDietrich; FastBridge Clip (FB33): www.clarkdietrich.com/#sle.
- H. Grid Suspension Systems: Steel grid system of main tees and support bars connected to structure using hanging wire.
1. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
 2. Hanger Attachments to Concrete:
 - a. 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.
 - 1) Type: Postinstalled, chemical anchor or Postinstalled, expansion anchor.
 - b. 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.
 3. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
 4. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
 - a. Depth: 1-1/2 inches (38 mm).
 5. Products:
 - a. USG Corporation; Drywall Suspension System: www.usg.com/#sle.
 - b. [Chicago Metallic Corporation](#); Drywall Grid System.
 - c. [United States Gypsum Company](#); Drywall Suspension System.

2.3 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 - 1. American Gypsum Company: www.americangypsum.com/#sle.
 - 2. CertainTeed Corporation: www.certainteed.com/#sle.
 - 3. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
 - 4. USG Corporation: www.usg.com/#sle.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 - 2. Glass mat faced gypsum panels, as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
 - 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold resistant board is required at all locations.
 - 4. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 - 5. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Ceilings: 5/8 inch.
 - 6. Mold Resistant Paper Faced Products:
 - a. American Gypsum Company; M-Bloc Type X: www.americangypsum.com/#sle.
 - b. CertainTeed Corporation; M2Tech 5/8" Type X Moisture & Mold Resistant Drywall: www.certainteed.com/#sle.
 - c. USG Corporation; Sheetrock Brand Mold Tough Firecode SCX Panels 5/8 in. (15.9 mm): www.usg.com/#sle.
 - 7. Glass Mat Faced Products:
 - a. CertainTeed Corporation; 5/8" GlasRoc Interior Type X: www.certainteed.com/#sle.
 - b. Georgia-Pacific Gypsum; DensArmor Plus: www.gpgypsum.com/#sle.
 - c. USG Corporation; Sheetrock Brand Glass-Mat Panels Mold Tough Regular 5/8 in. (15.9 mm): www.usg.com/#sle.
- C. Abuse Resistant Wallboard:
 - 1. Surface Abrasion: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
 - 2. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
 - 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 4. Type: Fire-resistance-rated Type X, UL or WH listed.
 - 5. Thickness: 5/8 inch. Unless otherwise indicated.
 - 6. Edges: Tapered.

7. Paper-Faced Products:
 - a. American Gypsum Company; M-Bloc AR Type X:
www.americangypsum.com/#sle.
 - b. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold Guard Abuse-Resistant: www.gpgypsum.com/#sle.
 - c. USG Corporation; Sheetrock Brand Mold Tough AR Firecode X 5/8 in. (15.9 mm): www.usg.com/#sle.
- D. Backing Board For Wet Areas: One of the following products:
 1. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 2. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
 - a. Thickness: 1/2 inch.
 - b. Products:
 - 1) PermaBASE Building Products, LLC provided by National Gypsum Company; PermaBase Cement Board:
www.goldbondbuilding.com/#sle.
 - 2) USG Corporation; Fiberock Brand Aqua-Tough AR Interior Panels Regular 1/2 in. (12.7 mm): www.usg.com/#sle.
- E. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
 1. Application: Vertical surfaces behind thinset tile, except in wet areas.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 4. Type X Thickness: 5/8 inch.
 5. Edges: Tapered.
 6. Products:
 - a. American Gypsum Company; M-Bloc Type X:
www.americangypsum.com/#sle.
 - b. Georgia-Pacific Gypsum; ToughRock Mold-Guard Gypsum Board:
www.gpgypsum.com/#sle.
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Fire-Shield Gypsum Board:
www.goldbondbuilding.com/#sle.
- F. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 1. Application: Ceilings, unless otherwise indicated.
 2. Thickness: 1/2 inch, unless otherwise indicated.
 3. Edges: Tapered.

4. Products:
 - a. CertainTeed Corporation; Interior Ceiling Drywall:
www.certainteed.com/#sle.
 - b. Georgia-Pacific Gypsum; ToughRock Span 24 Ceiling Board:
www.gpgypsum.com/#sle.
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company;
Gold Bond High Strength LITE Gypsum Board:
www.goldbondbuilding.com/#sle.
 - d. USG Corporation; Sheetrock Brand UltraLight Panels 1/2 in. (12.7 mm):
www.usg.com/#sle.
- G. Acoustical Sound Dampening Wall and Ceiling Board: Two layers of heavy paper-faced, high-density gypsum board separated by a viscoelastic polymer layer and capable of achieving STC rating of 50 or more in typical stud wall assemblies as calculated in accordance with ASTM E413 and when tested in accordance with ASTM E90.
 1. Long Edges: Tapered.
 2. Products:
 - a. CertainTeed Corporation; SilentFX Quick Cut Type X Gypsum Board:
www.certainteed.com/#sle.
 - b. Gold Bond Building Products, LLC provided by National Gypsum Company;
Gold Bond SoundBreak XP Wall Board: www.goldbondbuilding.com/#sle.
 - c. PABCO Gypsum; QuietRock 545.
- H. Sound-Absorbing Gypsum Board Ceiling System: Perforated gypsum board with acoustic backer panels and spray-applied finish.
 1. Thickness, 2 layers Type X GWB: 5/8 inch each layer.
 2. Products:
 - a. Kinetics System AT001084 drawing number..
- I. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
 1. Application: Exterior sheathing, unless otherwise indicated.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
 4. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
 5. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 6. Core Type: Regular and Type X, as indicated.
 7. Type X Thickness: 5/8 inch.
 8. Edges: Square.
 9. Glass Mat Faced Products:
 - a. CertainTeed Corporation; GlasRoc 1/2" Exterior Sheathing:
www.certainteed.com/#sle.

- b. CertainTeed Corporation; GlasRoc Type X Exterior Sheathing: www.certainteed.com/#sle.
 - c. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gpgypsum.com/#sle.
 - d. Georgia-Pacific Gypsum; DensGlass Fireguard Sheathing: www.gpgypsum.com/#sle.
 - e. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Fire-Shield Sheathing: www.goldbondbuilding.com/#sle.
 - f. USG Corporation; Securock Brand UltraLight Glass-Mat Sheathing 1/2 in. (12.7 mm): www.usg.com/#sle.
 - g. USG Corporation; Securock Brand UltraLight Glass-Mat Sheathing Firecode X 5/8 in. (15.9 mm): www.usg.com/#sle.
- J. Shaftwall and Coreboard: Type X; 1 inch thick by 24 inches wide, beveled long edges, ends square cut.
- 1. Paper-Faced Type: Gypsum shaftliner board or gypsum coreboard as defined ASTM C1396/C1396M; water-resistant faces.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. Paper-Faced Products:
 - a. Georgia-Pacific Gypsum; ToughRock Shaftliner: www.gpgypsum.com/#sle.
 - b. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond Shaftliner XP: www.goldbondbuilding.com/#sle.
 - c. USG Corporation; Sheetrock Brand Gypsum Liner Panels 1 in. (25.4 mm) SLX: www.usg.com/#sle.

2.4 GYPSUM BOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; 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.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- C. Finishing Accessories: ASTM C1047, extruded aluminum alloy (6063 T5) or galvanized steel sheet ASTM A924/A924M G90, unless noted otherwise.
- 1. Types: As detailed or required for finished appearance.
 - 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
- D. Beads, Joint Accessories, and Other Trim: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
- 1. Corner Beads: Low profile, for 90 degree outside corners.
 - a. Products:

- 1) CertainTeed Corporation; No-Coat Drywall Corner:
www.certainteed.com/#sle.
 - 2) ClarkDietrich; Strait-Flex Big-Stick: www.clarkdietrich.com/#sle.
 2. L-Trim with Tear-Away Strip: Sized to fit 5/8 inch thick gypsum wallboard.
 3. Expansion Joints:
 - a. Fire-Resistance Rated: 1 hour when joint system tested in accordance with UL 2079.
 - b. Type: V-shaped PVC with tear away fins.
- E. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 1. Joint Tape:
 - a. Interior Gypsum Board: Tape compatible with XP system.
 - b. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
 - c. Tile Backing Panels: As recommended by panel manufacturer.
 2. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 3. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
 4. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - a. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas.
 - b. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges.
 - c. Fill Coat: For second coat.
 - d. Finish Coat: For third coat.
 - e. Skim Coat: For final coat of Level 5 finish.
 5. Joint Compound for Tile Backing Panels:
 6. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer and compatible with XP system.
 7. Joint Compound: Drying type, vinyl-based, ready-mixed.
- F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
- G. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.
- H. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.2 SHAFT WALL INSTALLATION

- A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
- B. Shaft Wall Liner: Cut panels to accurate dimensions and install sequentially between special friction studs.

3.3 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
 - 1. Level ceiling system to a tolerance of 1/1200.
 - 2. Install bracing as required at exterior locations to resist wind uplift.
- C. Studs: Space studs at 16 inches on center.
 - 1. Extend partition framing to structure in all locations.
 - 2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
 - 3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
 - 1. Orientation: Vertical.
 - 2. Spacing: As indicated.
- F. Acoustic Furring: Install resilient channels at maximum 24 inches on center. Locate joints over framing members.
- G. Sound Isolation Clips: Install sound isolation clips, and where applicable, associated furring sections and channels, in accordance with clip manufacturer's written instructions.
- H. Furring for Fire-Resistance Ratings: Install as required for fire-resistance ratings indicated and to GA-600 requirements.

- I. Blocking: Install wood blocking for support of:
 - 1. Framed openings.
 - 2. Wall-mounted cabinets.
 - 3. Plumbing fixtures.
 - 4. Toilet partitions.
 - 5. Toilet accessories.
 - 6. Wall-mounted door hardware.
 - 7. Stair handrails

3.4 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Place one bead continuously on substrate before installation of perimeter framing members.
 - 2. Place continuous bead at perimeter of each layer of gypsum board.
 - 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.5 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Double-Layer, Nonrated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- F. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.

1. Seal joints, cut edges, and holes with water-resistant sealant.
- G. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- H. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.

3.6 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as follows:
 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.7 JOINT TREATMENT

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 1. Level 5: Where indicated on Drawings.
 2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 3. Level 2: On backing board to receive tile finish.
 4. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction, concealed areas, and where indicated..
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
 2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
 3. Taping, filling, and sanding are not required at base layer of double-layer applications.
- E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

- F. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.8 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. 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.

3.9 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

This page intentionally left blank

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal partition, ceiling, and soffit framing.
- B. Framing accessories.

1.2 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- C. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
- E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- H. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- I. ASTM E413 - Classification for Rating Sound Insulation; 2022.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.
- B. Manufacturer Qualifications: Member of Steel Stud Manufacturers Association (SSMA): www.ssma.com/#sle.

PART 2 PRODUCTS

2.1 FRAMING MATERIALS

- A. Fire-Resistance-Rated Assemblies: Comply with applicable code .
- B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
 - 1. Studs: C-shaped with knurled or embossed faces.
 - a. Products:
 - 1) MarinoWARE; ViperStud Drywall Framing: www.marinoware.com/#sle.
 - 2. Paired Studs for Sound-Rated Assemblies: Engineered single-piece assemblies comprised of paired studs coupled by sound isolators, designed to replace conventional side-by-side, parallel, double-wall partition framing.
 - a. Widths: As indicated on drawings.
 - b. Products:
 - 1) MarinoWARE; SoundGuard Stud: www.marinoware.com/#sle.
 - 3. Runners: U-shaped, sized to match studs.
 - 4. Ceiling Channels: C-shaped.
 - 5. Resilient Furring Channels: Single or double leg configuration; 1/2 inch channel depth.
 - 6. Resilient Sound Isolation Clips: Steel resilient clips with molded rubber isolators, attaches to framing; improves noise isolation for areas between gypsum board assemblies and adjacent sources of noise.
 - a. Products:
 - 1) ClarkDietrich; Sound Clip (CDSC): www.clarkdietrich.com/#sle.
- C. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.
 - 1. Products:
 - a. MarinoWARE; Shaftwall: www.marinoware.com/#sle.
- D. Partition Head to Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and braced with continuous bridging on both sides.

- E. Deflection and Firestop Track: Intumescent strip factory-applied to track flanges expands when exposed to heat or flames to provide a perimeter joint seal.
 - 1. Products:
 - a. ClarkDietrich; BlazeFrame Firestop Deflection Track:
www.clarkdietrich.com/#sle.
- F. Non-Loadbearing Framing Accessories:
 - 1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
 - 2. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
 - a. Materials: ASTM A36/A36M formed sheet steel support member with factory-welded ASTM A1003/A1003M steel plate base.
 - b. Products:
 - 1) Clark Dietrich; Pony Wall (PW): www.clarkdietrich.com/#sle.
 - 3. Bracing and Bridging: ASTM A653/A653M G90 galvanized steel; for lateral bracing of wall studs with slots for engaging on-module studs.
 - 4. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.
 - 5. Fasteners: ASTM C1002 self-piercing tapping screws.
 - 6. Anchorage Devices: Powder actuated.
 - 7. Acoustic Insulation: ASTM C665; preformed mineral-fiber, friction fit type, unfaced; thickness as required for STC.
 - 8. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
 - 9. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic.
- G. Sound Isolation Tape: Elastomeric foam tape for sound decoupling.
 - 1. Surface Burning Characteristics: Provide assemblies with flame spread index of 75 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - 2. Tape Thickness: 1/4 inch.

2.2 FABRICATION

- A. Fabricate assemblies of framed sections to sizes and profiles required.
- B. Fit, reinforce, and brace framing members to suit design requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.

- B. Verify that rough-in utilities are in proper location.

3.2 INSTALLATION OF STUD FRAMING

- A. Comply with requirements of ASTM C754.
- B. Extend partition framing to structure where indicated and to ceiling in other locations.
- C. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
- D. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs as indicated.
- E. Align and secure top and bottom runners at 24 inches on center.
- F. At partitions indicated with an acoustic rating:
 - 1. Provide components and install as required to produce STC rating of rate indicated, based on published tests by manufacturer conducted in accordance with ASTM E90 with STC rating calculated in accordance with ASTM E413.
 - 2. Place one bead of acoustic sealant between runners and substrate , studs and adjacent construction.
 - 3. Place one bead of acoustic sealant between studs and adjacent vertical surfaces.
 - 4. Sound Isolation Tape: Apply to vertical studs and top and bottom tracks/runners in accordance with manufacturer's instructions.
- G. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- H. Install studs vertically at spacing indicated on drawings.
- I. Secure studs to tracks using fastener method. Do not weld.
- J. Stud splicing is not permissible.
- K. Fabricate corners using a minimum of three studs.
- L. Install double studs at wall openings, door and window jambs, not more than 2 inches from each side of openings.
- M. Brace stud framing system rigid.
- N. Coordinate erection of studs with requirements of door frames; install supports and attachments.
- O. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.

- P. Blocking: Use wood blocking secured to studs. Provide blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and opening frames.
- Q. Sound Isolation Clips: Mechanically attach to framing or structure with fasteners recommended by clip manufacturer. Install at spacing indicated on drawings.
- R. Furring: Coordinate with sound isolation clip spacing and locations. Lap splices a minimum of 6 inches.

3.3 CEILING AND SOFFIT FRAMING

- A. Comply with requirements of ASTM C754.
- B. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.
- C. Install furring independent of walls, columns, and above-ceiling work.
- D. Securely anchor hangers to structural members or embed them in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.
- E. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.
- F. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.
- G. Reinforce openings in suspension system that interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches past each opening.
- H. Laterally brace suspension system.

3.4 TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch in 10 feet.
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet.

END OF SECTION

This page intentionally left blank

SECTION 093000 - TILING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Tile for shower receptors.
- D. Cementitious backer board as tile substrate.
- E. Coated glass mat backer board as tile substrate.
- F. Stone thresholds.
- G. Ceramic accessories.
- H. Ceramic trim.
- I. Non-ceramic trim.

1.2 REFERENCE STANDARDS

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2019.
- B. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2017.
- C. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 2017.
- D. ANSI A108.1c - Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2021).
- E. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship; 2019.
- F. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesive or Water Cleanable Tile-Setting Epoxy Adhesive; 2019.

- G. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 2021.
- H. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grout Epoxy; 1999 (Reaffirmed 2019).
- I. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2019).
- J. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2019).
- K. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 2017 (Reaffirmed 2022).
- L. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2018.
- M. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar; 1999 (Reaffirmed 2019).
- N. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2021).
- O. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2020.
- P. ANSI A108.20 - American National Standard Specifications for Exterior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs; 2020.
- Q. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2021.
- R. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2019.
- S. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2019.
- T. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2014 (Reaffirmed 2019).

- U. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2014 (Reaffirmed 2019).
- V. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2019.
- W. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2022.
- X. ASTM C847 - Standard Specification for Metal Lath; 2018.
- Y. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2018.
- Z. ASTM D4068 - Standard Specification for Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane; 2017 (Reapproved 2022).
- AA. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2021.
- BB. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2022.
- CC. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- DD. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2021.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- B. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- C. Samples
 - 1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
 - 2. Metal edge strips in 6-inch (150-mm) lengths.

- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Installer's Qualification Statement:
 - 1. Submit documentation of National Tile Contractors Association (NTCA) or Tile Contractors' Association of America (TCAA) accreditation.
- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Tile: 3 percent of each size, color, and surface finish combination.

1.5 QUALITY ASSURANCE

- A. Maintain one copy of and ANSI A108/A118/A136 and TCNA (HB) on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- C. Installer Qualifications:
 - 1. Company specializing in performing tile installation, with minimum of five years of documented experience.
 - a. Accredited Five-Star member of the National Tile Contractors Association (NTCA) or Trowel of Excellence member of the Tile Contractors' Association of America (TCAA).

1.6 MOCK-UPS

- A. See Section 014000 - Quality Requirements for general requirements for mock-up.
- B. Construct tile mock-up as directed by Architect, incorporating all components specified for the location.
 - 1. Minimum size of mock-up is 3 sf.
 - 2. Provide one mockup for each type of tile, floors and walls.
 - 3. Approved mock-up may remain as part of work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.8 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

PART 2 PRODUCTS

2.1 TILE

- A. Ceramic Mosaic Tile: ANSI A137.1 standard grade.
 - 1. Refer to Materials Legend for size, color, locations, Manufacturer and model.
- B. Ceramic Wall Tile: ANSI A137.1 standard grade.
 - 1. Refer to Materials Legend for size, color, locations, Manufacturer and model.
 - 2. Grout Width: 1/16"
- C. Ceramic Tile Base: ANSI A137.1 standard grade.
 - 1. Refer to Materials Legend for size, color, locations, Manufacturer and model.
 - 2. Grout Width: 1/16"
- D. Quarry Tile: ANSI A137.1 standard grade.
 - 1. Refer to Materials Legend for size, color, locations, Manufacturer and model.
- E. Porcelain Tile: ANSI A137.1 standard grade.
 - 1. Refer to Materials Legend for size, color, locations, Manufacturer and model.
 - 2. Grout Width: 1/8"

2.2 TRIM AND ACCESSORIES

- A. Ceramic Accessories: Glazed finish, same color and finish as adjacent field tile; same manufacturer as tile.
- B. Pre-Formed Accessories To Be Covered with Tile: High density expanded polystyrene with ANSI A118.10 waterproofing finish or membrane.
 - 1. Products:
 - a. LATICRETE International, Inc; LATICRETE HYDRO BAN Pre-Sloped Shower Pan: www.laticrete.com/#sle.
- C. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
 - 1. Manufacturers: Same as for tile.
- D. Non-Ceramic Trim: Satin natural anodized extruded aluminum, for setting using tile mortar or adhesive.
 - 1. Applications:

- a. Open edges of wall tile.
 - b. Wall corners, outside.
 - c. Expansion and control joints, floor and wall.
 - d. Floor to wall joints.
 - e. Borders and other trim as indicated on drawings.
 2. Manufacturers:
 - a. Schluter-Systems: Rondec: www.schluter.com/#sle.
- E. Thresholds: Full width of wall or frame opening; beveled edge on both long edges; without holes, cracks, or open seams.
1. Thickness: 1/2 inch.
 2. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch (1.5 mm) above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less above adjacent floor surface.
 3. Material: Marble, honed finish.
 - a. ASTM C 503/C 503M, with a minimum abrasion resistance of 12 according to ASTM C 1353 or ASTM C 241/C 241M and with honed finish.
 4. Applications:
 - a. At doorways where tile terminates.

2.3 SETTING MATERIALS

- A. Provide setting and grout materials from same manufacturer.
- B. Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15.
1. Applications: Use this type of bond coat where Large and Heavy Tile (LHT) mortar is indicated.
 2. Products:
 - a. LATICRETE International, Inc; MULTIMAX LITE: www.laticrete.com/#sle.
- C. Polymer Modified Adhesive Mortar: ANSI A118.4H and A118.11
1. Applications: Large format wall and floor tile.
 2. Products:
 - a. LATICRETE INTERNATIONAL INC; LHT PLUS.
- D. Epoxy Adhesive and Mortar Bond Coat: ANSI A118.3.
1. Applications: All locations unless tile is classified as large or heavy tile.
 2. Products:
 - a. LATICRETE International, Inc; LATICRETE LATAPOXY 300 Adhesive: www.laticrete.com/#sle.
- E. Mortar Bed Materials: Pre-packaged mix of Portland cement, sand, latex additive, and water.
1. Products:

- a. LATICRETE International, Inc; LATICRETE 3701 Fortified Mortar Bed:
www.laticrete.com/#sle.

2.4 GROUTS

- A. Provide setting and grout materials from same manufacturer.
- B. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
 3. Color(s): As selected by Architect from manufacturer's full line.
 4. Products:
 - a. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout:
www.laticrete.com/#sle.
- C. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
 1. Applications: Floors.
 2. Color(s): As selected by Architect from manufacturer's full line.
 3. Products:
 - a. LATICRETE International, Inc; LATICRETE SPECTRALOCK PRO Premium Grout: www.laticrete.com/#sle.
- D. Stain Resistant Grout Additive: Liquid admixture for sanded and unsanded cement-based grouts; mix with dry grout material in place of water.

2.5 Maintenance Materials

- A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
 1. Applications: Between tile and plumbing fixtures.
 2. Color(s): As selected by Architect from manufacturer's full line.
 3. Products:
 - a. LATICRETE International, Inc; LATICRETE LATASIL: www.laticrete.com/#sle.
- B. Tile Sealer: Stain protection for quarry tile tile.
 1. Products:
 - a. Custom Building Products; Aqua Mix Enrich 'N' Seal:
www.custombuildingproducts.com/#sle.
- C. **Grout Release: Temporary, water-soluble pre-grout coating. product formulated to protect exposed surfaces of unglazed or unpolished floor tile against adherence of mortar and grout; compatible with tile, mortar and grout products.**

2.6 ACCESSORY MATERIALS

- A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
 - 1. Crack Resistance: No failure at 1/8 inch gap, minimum.
 - 2. Fluid or Trowel Applied Type:
 - a. Material: Synthetic rubber or Acrylic.
 - b. Thickness: 20 mils, maximum.
 - c. Products:
 - 1) LATICRETE International, Inc; LATICRETE Blue 92 Anti-Fracture Membrane: www.laticrete.com/#sle.
- B. Waterproofing Membrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
 - 1. Crack Resistance: No failure at 1/16 inch gap, minimum; comply with ANSI A118.12.
 - 2. Fluid or Trowel Applied Type:
 - a. Material: Synthetic rubber.
 - b. Thickness: 25 mils, minimum, dry film thickness.
 - c. Products:
 - 1) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com/#sle.
 - 2) Substitutions: See Section 016000 - Product Requirements.
- C. Waterproofing Membrane at Showers and Tiled Tubs: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
 - 1. Fluid or Trowel Applied Type:
 - a. Material: Synthetic rubber.
 - b. Material: Acrylic.
 - c. Thickness: 25 mils, minimum, dry film thickness.
 - d. Products:
 - 1) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com/#sle.
- D. Waterproofing Membrane Under Thick Mortar Bed at Showers and Tiled Tubs:
 - 1. Material: Chlorinated polyethylene sheet, 40 mils thick, minimum; complying with ASTM D4068.
 - 2. Products:
 - a. Noble Company; Chloraloy Shower Pan Liner: www.noblecompany.com/#sle.
- E. Reinforcing Mesh: 2 by 2 inch size weave of 16/16 wire size; welded fabric, galvanized.

- F. Metal Lath: ASTM C847 Flat diamond mesh, of weight to suit application, galvanized finish.
- G. Underlayment at Floors: Specifically designed for bonding to thin-set setting mortar; not primarily a waterproofing material and having the following characteristics:
- H. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 7/16 inch thick; 2 inch wide coated glass fiber tape for joints and corners.
 - 1. Products:
 - a. Custom Building Products; WonderBoard Lite Backerboard:
www.custombuildingproducts.com/#sle.
 - 2. Locations: showers, wet areas.
- I. Backer Board: Coated glass mat type complying with ASTM C1178/C1178M; inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.
 - 1. Standard Type: Thickness 1/2 inch.
 - 2. Fire Resistant Type: Type X core, thickness 5/8 inch.
 - 3. Location: non wet areas.
- J. Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for tiling installation by testing for moisture and alkalinity (pH).
 - 1. Test as Follows:
 - a. Alkalinity (pH): ASTM F710.
 - b. Internal Relative Humidity: ASTM F2170.
 - c. Moisture Vapor Emission: ASTM F1869.
 - 2. Obtain instructions if test results are not within limits recommended by tiling material manufacturer and setting material manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.
- E. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.3 INSTALLATION - GENERAL

- A. Install tile and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.20, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners neatly. Align wall joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles square.
- F. Install ceramic accessories rigidly in prepared openings.
- G. Install non-ceramic trim in accordance with manufacturer's instructions.
- H. Install thresholds where indicated.
- I. Sound tile after setting. Replace hollow sounding units.
- J. Keep control and expansion joints free of mortar, grout, and adhesive.
- K. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- L. Grout tile joints unless otherwise indicated.
- M. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.4 CLEANING

- A. Clean tile and grout surfaces.
1. Remove grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.5 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.
- B. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.6 SCHEDULE

Location	sloped slab	Waterproofing	Uncoupling Membrane	Mortar	Grout	Sealer
Shower, Wet Floor Areas Mosaic Tile	slope with Modified Mortar Bed	Laticrete Hydro Ban		Laticrete Latapoxy 300 Adhesive	Laticrete Spectralock Pro	
Kitchen Floors Quarry Tile		Laticrete Hydro Ban	Laticrete Blue 92 Anti-Fracture Membrane	Laticrete Latapoxy 300 Adhesive	Laticrete Spectralock Pro	tile sealer
Floor Areas Large Format tile Toilet Rms		Laticrete Hydro Ban	LATICRETE Blue 92 Anti-Fracture Membrane	Laticrete LHT Plus	Laticrete Spectralock Pro	
Shower Walls, Wet Walls		Laticrete Hydro Ban		Laticrete Latapoxy 300 Adhesive	Laticrete Spectralock Pro	
Non-Wet Walls				Multimax Lite	Laticrete Permacolor	

CSArch
Project No. 108-2303.00

Newburgh Enlarged City School District
New CTE Building

END OF SECTION

SECTION 095100 - ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.
- C. Supplementary insulation above ceiling.

1.2 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- B. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- E. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2022.
- F. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate grid layout and related dimensioning.
- B. Product Data: Provide data on suspension system components and acoustical units.

- C. Samples: Submit two samples 4 by 4 inch in size illustrating material and finish of acoustical units.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Manufacturer's qualification statement.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.5 QUALITY ASSURANCE

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acoustic Tiles/Panels:
 - 1. Armstrong World Industries, Inc: www.armstrongceilings.com/#sle.
- B. Suspension Systems:
 - 1. Same as for acoustical units.

2.2 Performance Requirements

- A. Fire-Resistance Rating: Class A in accordance with test procedures in ASTM E84.
 - 1. Flame spread index of 25 or less and smoke developed index of 50 or less (UL labeled)

2.3 ACOUSTICAL UNITS

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Panels, Type ACT-1: Painted mineral fiber, with the following characteristics:
 - 1. Classification: ASTM E1264 Type III.
 - a. Form: 2, water felted.
 - b. Pattern: C E.
 - 2. Size: 24 by 24 inches.
 - 3. Thickness: 3/4 inch.
 - 4. Panel Edge: Square.
 - 5. Suspension System: Exposed grid.
 - 6. Products:
 - a. Armstrong World Industries, Inc; School Zone Fine Fissured:
www.armstrongceilings.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- C. Acoustical Panels, Type ACT-2: Painted mineral fiber, with the following characteristics:
 - 1. Classification: ASTM E1264 Type III.
 - a. Form: 2, water felted.
 - b. Pattern: C E.
 - 2. Size: 24 by 48 inches.
 - 3. Thickness: 3/4 inch.
 - 4. Panel Edge: Square.
 - 5. Suspension System: Exposed grid.
 - 6. Products:
 - a. Armstrong World Industries, Inc; School Zone Fine Fissured:
www.armstrongceilings.com/#sle.
- D. Acoustical Panels, Type APC-3: , with the following characteristics:
 - 1. Classification: ASTM E1264 Type XX.
 - a. Pattern: "A" - perforated, regularly spaced large holes.
 - 2. Size: 24 by 48 inches.
 - 3. Thickness: 3/4 inch
 - 4. Panel Edge: Square.
 - 5. Color: White.
 - 6. Suspension System: Exposed grid.
 - 7. Products:
 - a. Armstrong; Ceramaguard.

2.4 SUSPENSION SYSTEM(S)

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.

1. Materials:
 - a. Steel Grid: ASTM A653/A653M, G30 coating, unless otherwise indicated.
- B. Exposed Suspension System: Hot-dipped galvanized steel grid with steel cap.
 1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
 2. Profile: Tee; 15/16 inch face width.
 3. Finish: Baked enamel.
 4. Color: White.
 5. Products:
 - a. Armstrong; Prelude XL.

2.5 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Hold-Down Clips: Manufacturer's standard clips to suit application.
- D. Perimeter Moldings: Same metal and finish as grid.
 1. Size: As required for installation conditions and specified Seismic Design Category.
 2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
 3. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.
- E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.2 Preparation

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

3.3 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Install in bed of acoustical sealant.
 - 2. Use longest practical lengths.
 - 3. Overlap and rivet corners.
- E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.

3.4 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.
 - 2. Double cut and field paint exposed reveal edges.
- F. Where round obstructions occur, provide preformed closures to match perimeter molding.
- G. Install hold-down clips on panels within 20 ft of an exterior door.

3.5 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.6 CLEANING

- A. Clean surfaces.
- B. Replace damaged or abraded components.

END OF SECTION

SECTION 096466 - WOOD ATHLETIC FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wood athletic flooring.
- B. Subflooring.
- C. Sleepers.
- D. Resilient cushioning.
- E. Sheet vapor retarder.
- F. Floor finishes.
- G. Surface finishing.

1.2 REFERENCE STANDARDS

- A. MFMA (SPEC) - Guide Specifications for Maple Flooring Systems; current edition.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meetings: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

1.4 SUBMITTALS

- A. Product Data: Provide data for flooring, floor finish materials, and resilient cushion.
- B. Shop Drawings: Indicate floor joint pattern and termination details.
 - 1. Indicate provisions for expansion and contraction, wall base, and game insert or socket devices.
 - 2. Indicate size and type fasteners and anchors.
 - 3. Indicate location, size, design, and color of game markings.
- C. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- D. Manufacturer's Instructions: Indicate standard and special installation procedures.

- E. Maintenance Data: Include maintenance procedures and recommended maintenance materials.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with MFMA (SPEC).
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section.
 - 1. Member mill of the Maple Flooring Manufacturers Association, Inc (MFMA).
- C. Installer Qualifications: Company specializing in installing products specified in this section.
 - 1. MFMA accredited and approved by flooring manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and store off the floor in a well-ventilated, weather-tight space.

1.7 FIELD CONDITIONS

- A. Do not install wood flooring until wet construction work is complete and permanent heat and air conditioning is installed and operating.
- B. Maintain room temperature between 55 degrees F and 75 degrees F and relative humidity between 35 to 50 percent for a period of seven days prior to delivery of materials to installation space, during installation, and after installation.
- C. Acclimate wood flooring materials to installation space a minimum of 48 hours prior to installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Wood Athletic Flooring:
 - 1. Robbins Sports Surfaces; Bio-Channel Star: www.robbinsfloor.com/#sle.

2.2 Wood Athletic Flooring

- A. General: Wood athletic flooring, system components provided by single manufacturer.

- B. Application: Gymnasium.
- C. System Description:
 - 1. Fixed, resilient system, wood strip flooring.

2.3 Components

- A. Wood Strip Flooring:
 - 1. Provide MFMA grade-marked flooring, stamped as manufactured by MFMA member mill.
 - 2. Species: Northern hard maple, kiln dried; tongue and groove edges, end matched.
 - 3. **Grade: First.**
 - 4. Moisture Content: 7 to 9 percent.
 - 5. Thickness: 25/32 inch.
 - 6. Width: 2-1/4 inches.
- B. Sleepers: Manuf. standard.
- C. Subflooring: One layer of 3/4 inch thick plywood, APA rated, exposure 1, minimum span rating of 32/16.
- D. Resilient Cushioning: Manufacturer's standard rubber pads, factory-applied to bottom side of sleepers.
 - 1. Thickness: 9/16 inch.
- E. Vapor Retarder: Polyethylene sheet, 6 mil thick; 2 inch wide tape for sealing sheet seams.
- F. Fasteners and Anchors: Manufacturer's standard type and size to suit application.

2.4 Finishes

- A. Floor Finishes: Types recommended by flooring manufacturer and complying with MFMA specifications.
 - 1. Sealer: Water based urethane.
 - 2. Finish Coats: Water based urethane; high gloss.
 - 3. Game Marking Paint: Compatible with sealer and finish coats; colors as indicated on drawings.

2.5 ACCESSORIES

- A. Ventilating Base: Molded rubber, 4 inch high with a 3 inch toe, pre-molded outside corners; black color.
- B. Edge Strip: Angle; mill finish aluminum.

- C. Transition Strip: Same species and finish as flooring material; profiles indicated.
- D. Adhesives: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting this work.
- B. Verify that concrete subfloor surface is smooth and flat to plus or minus 1/4 inch in 10 feet.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
 - 1. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
- D. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Prepare substrate to receive wood flooring in accordance with manufacturer's and MFMA instructions.
- B. Vacuum clean substrate.

3.3 INSTALLATION

- A. Place vapor retarder over concrete surface, overlap seams a minimum of 6 inches and seal with tape.
- B. Resilient Underlayment: Install in accordance with manufacturer's instructions.
- C. Sleepers with Plywood Subfloor: Install per manufacturer requirements.
- D. Wood Flooring:
 - 1. Install in accordance with manufacturer's and MFMA instructions.
 - 2. Lay flooring parallel to length of main playing area. Blind nail or staple to subfloor.
- E. Install base at floor perimeter to cover expansion space in accordance with manufacturer's instructions. Miter inside corners.
- F. Install floor sockets and inserts to a depth sufficient to ensure flush top surface with floor surface.

G. Finishing:

1. Mask off adjacent surfaces before beginning sanding.
2. Sand flooring to smooth even finish with no evidence of sander marks. Remove dust by vacuum.
3. Apply finishes in accordance with floor finish manufacturer's and MFMA instructions.
4. Apply one sealer coat and three finish coats.
5. Apply first coat, allow to dry, then buff lightly with recommended pad to remove irregularities. Vacuum clean and wipe with damp, lint-free cloth before applying succeeding coats.
6. Apply game lines/markers in accordance with layout indicated on drawings.
7. Apply last coat of finish.

3.4 CLEANING

- A. Clean floor surfaces in accordance with floor finish manufacturer's instructions.

3.5 PROTECTION

- A. Prohibit traffic on finished floor for 72 hours after installation.
- B. Place protective coverings over finished floors; do not remove coverings until Date of Substantial Completion.

END OF SECTION

This page intentionally left blank

SECTION 096500 - RESILIENT FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient sheet flooring.
- B. Resilient tile flooring.
- C. Static control resilient tile flooring.
- D. Resilient base.
- E. Resilient stair accessories.
- F. Installation accessories.

1.2 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
- B. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2018).
- C. ASTM F1344 - Standard Specification for Rubber Floor Tile; 2021a.
- D. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2020.
- E. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.
- F. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing; 2019.
- G. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

1.3 SUBMITTALS

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- B. Shop Drawings: Indicate floor patterns.

- C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Verification Samples: Full-size units of each color and pattern of floor tile required.
- E. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- F. Installer's Qualification Statement.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Flooring Material: 1 carton of each type and color.
 - 2. Extra Wall Base: 1 carton of each type and color.
 - 3. Extra Stair Materials: Quantity equivalent to 5 percent of each type and color.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Do not double stack pallets.

1.6 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.1 SHEET FLOORING

- A. Vinyl Sheet Flooring - Type HMO-1:
 - 1. Manufacturers:
 - a. Armstrong Flooring; Natralis: www.armstrongflooring.com/#sle.
 - 2. Minimum Requirements: Comply with ASTM F1913.
 - 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 - 4. Thickness: 0.080 inch nominal.
 - 5. Sheet Width: 72 inch minimum.
 - 6. Seams: Heat welded.
 - 7. Color: As indicated on drawings.
- B. Welding Rod: Solid bead in material compatible with flooring, produced by flooring manufacturer for heat welding seams, and in color matching field color.

2.2 TILE FLOORING

- A. Vinyl Tile - Type LVT-1: Luxury Vinyl Tile.
 - 1. Manufacturers:
 - a. Mannington Commercial; Groove: www.manningtoncommercial.com/#sle.
 - 2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
 - 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 - 4. Plank Tile Size: ___ by ___ inch.
 - 5. Color: As indicated on drawings.
- B. Rubber Tile - RT-1: Homogeneous, color and pattern throughout thickness.
 - 1. Manufacturers:
 - a. Roppe Corporation; Marbleized: www.roppe.com/#sle.
 - 2. Minimum Requirements: Comply with ASTM F1344, of Class corresponding to type specified.
 - 3. Size: 24 by 24 inch nominal.
 - 4. Total Thickness: 3.5 mm.
 - 5. Texture: Hammered.
 - 6. Color: As indicated on drawings.
- C. Static Control Tile - Type SDT-1: Homogeneous; color and pattern throughout thickness.
 - 1. Manufacturers:
 - a. Armstrong Excelon SDT.

2. Minimum Requirements: Vinyl composition tile complying with ASTM F1066, Class 2.
3. Electrical Resistance:
 - a. Dissipative Tile: Resistance between 1.0 megohms and 1000 megohms as tested in accordance with ASTM F150.
4. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
5. Tile Size: 12 by 12 inch.
6. Total Thickness: 0.125 inch.
7. Color: As indicated on drawings.

2.3 STAIR COVERING

- A. Stair Treads: Rubber; full width and depth of stair tread in one piece; tapered thickness.
 1. Manufacturers:
 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 3. Nominal Thickness: 0.1875 inch.
 4. Nosing: Square.
 5. Texture: Smooth.
 6. Color: As indicated on drawings.
- B. Stair Stringers: Full height in one piece and in maximum available lengths, matching treads in material and color.
 1. Nominal Thickness: 0.080 inch.

2.4 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; style as scheduled.
 1. Manufacturers:
 - a. RB-2: Johnsonite, a Tarkett Company; Vent Cove: www.johnsonite.com/#sle.
 - b. RB-1: Roppe Corporation; Pinnacle Cove Base: www.roppe.com/#sle.
 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 3. Height: 4 inch.
 4. Thickness: 0.125 inch.
 5. Finish: Satin.
 6. Length: Roll.
 7. Color: See materials legend .
 8. Accessories: Premolded external corners and internal corners.

2.5 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Moldings, Transition and Edge Strips: Same material as flooring.
- D. Copper Grounding Strips: Type and size as recommended by static control flooring manufacturer.
- E. Floor Polish for Static Control Flooring: Fluid-applied polish, intended to protect electrical properties of flooring, as recommended by static control flooring manufacturer.
- F. Sealer and Wax: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate.
- E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.2 Installation - General

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 - 1. Spread only enough adhesive to permit installation of materials before initial set.
 - 2. Place copper grounding strip in conductive adhesive and apply additional adhesive to top side of strip before installing static control flooring. Allow strip to extend beyond flooring in accordance with static control flooring manufacturer's instructions.
 - 3. Fit joints and butt seams tightly.
 - 4. Set flooring in place, press with heavy roller to attain full adhesion.

- D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Resilient Strips: Attach to substrate using adhesive.
- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- G. At movable partitions, install flooring under partitions without interrupting floor pattern.
- H. Install feature strips and logos where indicated.

3.3 Installation - Sheet Flooring

- A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.
- B. Seal seams by heat welding where indicated.

3.4 Installation - Tile Flooring

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Install plank tile with a random offset of at least 6 inches from adjacent rows.

3.5 Installation - Resilient Base

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.6 Installation - Stair Coverings

- A. Install stair coverings in one piece for full width and depth of tread.
- B. Install stringers configured tightly to stair profile.
- C. Adhere over entire surface. Fit accurately and securely.

3.7 CLEANING AND PROTECTION

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.
- C. Floor Polish: Remove soil, adhesives, and blemishes from floor tile surface before applying liquid floor polish.
 - 1. Apply one coat.

3.8 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

This page intentionally left blank

SECTION 096700 - FLUID-APPLIED FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fluid-applied flooring and base.

1.2 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2021.
- B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2022.
- C. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

1.3 SUBMITTALS

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.
- B. Samples: Submit two samples, illustrating color and pattern for each floor material for each color specified.
- C. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and application rate for each coat.
- E. Manufacturer's Qualification Statement.
- F. Applicator's Qualification Statement.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Top Coat Materials: 2 gallons.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section.
 - 1. Approved by manufacturer.
- C. Supervisor Qualifications: Trained by product manufacturer , under direct full time supervision of manufacturer's own foreman.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resin materials in a dry, secure area.
- B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.6 FIELD CONDITIONS

- A. Maintain minimum temperature in storage area of 55 degrees F.
- B. Store materials in area of installation for minimum period of 24 hours prior to installation.
- C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

PART 2 PRODUCTS

2.1 Fluid-Applied Flooring SYSTEMS

- A. Fluid-Applied Flooring: Four component troweled mortar system consisting of an epoxy resin, amine Curing agent, pigments and graded aggregates.
 - 1. System Thickness: 1/4 inch.
 - 2. Texture: Smooth.
 - 3. Sheen: Gloss.
 - 4. Color: As selected by Architect.
 - 5. Top Coat: Stonkote GS4.
 - 6. Products:
 - a. Stonhard; Stonclad GS: www.stonhard.com/#sle.

2.2 ACCESSORIES

- A. Base Caps: Zinc with projecting base of 1/8 inch; color as selected.

- B. Cant Strips: Molded of flooring resin material.
- C. Primer: Type recommended by fluid-applied flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test as Follows:
 - a. Alkalinity (pH): ASTM F710.
 - b. Internal Relative Humidity: ASTM F2170.
 - c. Moisture Vapor Emission: ASTM F1869.
 - 2. Obtain instructions if test results are not within limits recommended by fluid-applied flooring manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
- B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.
- C. Vacuum clean substrate.
- D. Apply primer to surfaces required by flooring manufacturer.

3.3 INSTALLATION - Accessories

- A. Install cant strips at base of walls where flooring is to be extended up wall as base.
- B. Install terminating cap strip at top of base; attach securely to wall substrate.

3.4 INSTALLATION - FLOORING

- A. Apply in accordance with manufacturer's instructions.
- B. Apply each coat to minimum thickness required by manufacturer.
- C. Finish to smooth level surface.
- D. Cove at vertical surfaces.

3.5 PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Barricade area to protect flooring until fully cured.

END OF SECTION

SECTION 098316 - - SPRAY ACOUSTIC TREATMENT

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 spray applied acoustic finish system.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For the following products:
 - 1. Sample of finished product on rigid backing indicating finished texture.

1.4 Quality Assurance

- A. Applicator: Licensed by manufacturer.
- B. Manufacturer must subscribe to independent laboratory follow-up inspection services of Underwriters Laboratories. Each bag shall be labeled accordingly.
- C. Mockups: Provide a full-thickness finish mockup to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select representative surfaces and conditions for application of each type of gypsum veneer plaster and substrate.
 - 2. Provide mockups of ceilings in sizes of at least 100 sq. ft. (9 sq. m).
 - 3. Apply according to requirements for the completed Work, after permanent lighting and other environmental services have been activated.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written recommendations.

1.6 Delivery, Storage and Handling

- A. Deliver in original, unopened containers bearing name of manufacturer, product identification and reference to U.L. testing.
- B. Store materials dry, off ground and under cover.
- C. Protect liquid adhesive from freezing.

PART 1 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain products from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials that comply with a Class A finish.
 - 1. Flame Spread Index: 5. Per ASTM E-84/UL 723.
 - 2. Smoke Developed: 5. Per ASTM E-84/UL 723
- B. Manufacturer's written certification that product contains no asbestos, fiberglass or other man-made mineral fibers.

2.3 SPRAY ACOUSTIC FINISH – Type 1

- A. Basis-of-Design Product: Subject to compliance with requirements, provide International Cellulose Corporation; SonaSpray FC or equal.
 - 1. Color: To be selected by architect. Dark Gray.
 - 2. Texture Finish: Smooth. Finish achieved by hand troweling to smooth out finish.
 - 3. Thickness: 0.50 inches.
 - 4. NRC: 0.65.

2.4 ACCESSORIES

- A. Provide primers or tie coats as recommended by the manufacturer to ensure product installation success. Primers and tie coats are to be included with this product design.

PART 2 EXECUTION

3.1 Examination

- A. Examine surfaces and report unsatisfactory conditions in writing. Do not proceed until unsatisfactory conditions are corrected.

- B. Verify surfaces to receive spray insulation to determine if priming/sealing is required to ensure bonding and/or to prevent discoloration caused by migratory stains.

3.2 Preparation

- A. Provide masking, drop cloths or other satisfactory coverings for materials/surfaces that are not to receive insulation to protect from over-spray.
- B. Coordinate installation of the sprayed cellulose fiber with work of other trades.
- C. Prime all surfaces as required by manufacturer's instructions or as determined by examination.
- D. Clean all deck prior to start of work to ensure starting with a clean substrate. All surfaces to be primed to stop rust bleeding thru finished surface. Primer to be compatible with acoustic system.

3.3 Installation

- A. Average to a thickness of $\frac{3}{4}$ inch to achieve minimum NRC of 0.80. Addendum 2.
- B. Install spray applied acoustical finish according to manufacturer's recommendations.
- C. Apply spray material to metal deck only, protect structure from overspray.
- D. Cure material with continuous natural or mechanical ventilation.
- E. Remove and dispose of over spray.

END OF SECTION

This page intentionally left blank

SECTION 099000 - PAINTING AND COATING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Interior painting and coating systems.
- C. Exterior painting and coating systems.
- D. Scope:
 - 1. Finish surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - a. Exterior:
 - 1) Metal, Miscellaneous: Iron, ornamental iron, structural iron and steel, and other ferrous metal.
 - b. Interior:
 - 1) Concrete, Walls and Ceilings: Cast-in-place concrete, precast concrete, unglazed brick, fiber cement board, tilt-up, and plaster.
 - 2) Concrete Masonry Units: Concrete, split face, scored, smooth, high density, low density, and fluted.
 - 3) Metal: Aluminum and galvanized.
 - 4) Metal, Galvanized: Ceilings and ductwork.
 - 5) Metal: Structural steel columns, joists, trusses, beams, miscellaneous and ornamental iron, structural iron, and other ferrous metal.
 - 6) Drywall: Walls, ceilings, gypsum board, and similar items.

1.2 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- C. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.3 SUBMITTALS

- A. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Product characteristics.

2. Surface preparation instructions and recommendations.
3. Primer requirements and finish specification.
4. Storage and handling requirements and recommendations.
5. Application methods.
6. Clean-up information.

B. Applicator's qualification statement.

C. Maintenance Data: Submit coating maintenance manual including finish schedule showing where each product/color/finish was used, product technical data sheets, safety data sheets (SDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
2. Label each container with color in addition to manufacturer's label.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

1.5 MOCK-UPS

- A. Provide one accent wall as directed by Architect to demonstrate color and finish.
- B. Locate where directed by Architect.
- C. Mock-up may remain as part of the work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, product name, product code, color designation, VOC content, batch date, environmental handling, surface preparation, application, and use instructions.
- C. Paint Materials: Store at a minimum of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.
- D. Handling: Maintain a clean, dry storage area to prevent contamination or damage to materials.

1.7 FIELD CONDITIONS

- A. Do not apply materials when environmental conditions are outside the ranges required by manufacturer.
- B. Follow manufacturer's recommended procedures for producing the best results, including testing substrates, moisture in substrates, and humidity and temperature limitations.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Products: Subject to compliance with requirements, provide Sherwin-Williams Company (The) products indicated; www.sherwin-williams.com/#sle.

2.2 PAINTINGS AND COATINGS

- A. General:
 - 1. Provide factory-mixed coatings unless otherwise indicated.
 - 2. Do not reduce, thin, or dilute coatings or add materials to coatings unless specifically indicated in manufacturer's instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes 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.
 - 2. 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.
- C. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

2.3 Paint Systems - Exterior

- A. Metal, Miscellaneous: Iron, ornamental iron, structural iron and steel, ferrous metal.
 - 1. Alkyd Systems, Water-Based:
 - a. Semi-Gloss Finish:
 - 1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com/#sle.
 - a) 5 mils wet, 2 mils dry per coat.

- 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Water Based Alkyd Urethane Enamel Semi-Gloss, B53-1150 Series: www.sherwin-williams.com/#sle.
 - a) 4 to 5 mils wet, 1.4 to 1.7 mils dry per coat.

2.4 Paint Systems - INTERIOR

- A. Concrete, Walls and Ceilings: Poured concrete, precast concrete, unglazed brick, cement board, tilt-up, cast-in-place concrete, and plaster.
 1. Latex Systems:
 - a. Flat Finish Finish High Performance (HP):
 - 1) 1st Coat: Sherwin-Williams Loxon Concrete and Masonry Primer Sealer, LX02W50 Series: www.sherwin-williams.com/#sle.
 - 2) 2nd and 3rd Coat: Sherwin-Williams CONFLEX CF15W0051 Series.
- B. Masonry CMU: Concrete, split face, scored, smooth, high density, low density, and fluted.
 1. Latex Systems:
 - a. Eg-Shel/Satin Finish High Performance (HP):
 - 1) 1st Coat: Sherwin-Williams PrepRite Block Filler, B25W25: www.sherwin-williams.com/#sle.
 - a) 75 to 125 sq ft/gal.
 - 2) 2nd and 3rd Coat: Sherwin-Williams ProMar 200 HP Zero VOC Eg-Shel, B20-1950 Series: www.sherwin-williams.com/#sle.
 - a) 4 mils wet, 1.7 mils dry per coat.
- C. Metal: Aluminum and galvanized.
 1. Alkyd Systems, Water-Based:
 - a. Low Sheen Finish:
 - 1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com/#sle.
 - a) 5 mils wet, 2 mils dry per coat.
 - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Water Based Alkyd Urethane Enamel Low Sheen, B53-1250 Series: www.sherwin-williams.com/#sle.
 - a) 4 to 5 mils wet, 1.4 to 1.7 mils dry per coat.
- D. Metal, Galvanized: Ceilings and ductwork.
 1. Dryfall Waterborne Topcoats:
 - a. Eg-Shel Finish:
 - 1) 1st and 2nd Coat: Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, B42-82 Series: www.sherwin-williams.com/#sle.
 - a) 6 mils wet, 1.9 mils dry per coat.

- E. Metal: Structural steel columns, joists, trusses, beams, miscellaneous and ornamental iron, structural iron, and ferrous metal.
 - 1. Latex Systems:
 - a. Eg-Shel/Satin Finish:
 - 1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com/#sle.
 - a) 5 mils wet, 2 mils dry per coat.
 - 2) 2nd and 3rd Coats: Sherwin-Williams Pro Industrial Acrylic Gloss, B66-600 Series: www.sherwin-williams.com/#sle.
 - a) 2 to 4 mils dry per coat.
- F. Drywall: Walls, ceilings, gypsum board, and similar items.
 - 1. Latex Systems:
 - a. Eg-Shel Finish:
 - 1) 1st Coat: Sherwin-Williams ProMar 200 Zero VOC Interior Latex Primer, B28W2600: www.sherwin-williams.com/#sle.
 - a) 4 mils wet, 1.5 mils dry per coat.
 - 2) 2nd and 3rd Coat: Sherwin-Williams ProMar 200 Zero VOC Eg-Shel, B20-2600 Series: www.sherwin-williams.com/#sle.
 - a) 4 mils wet, 1.7 mils dry per coat.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove mildew from impervious surfaces by scrubbing with solution of water and bleach. Rinse with clean water and allow surface to dry.
- D. Masonry: Remove efflorescence and chalk.

- E. Gypsum Board: Fill minor defects with filler compound; sand smooth and remove dust prior to painting.
- F. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- G. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Prime bare steel surfaces.
 - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended by paint manufacturer and blast cleaning according to SSPC-SP 6. Protect from corrosion until coated.

3.3 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions.
- C. Apply coatings at spread rate required to achieve manufacturer's recommended dry film thickness.
- D. Regardless of number of coats specified, apply additional coats until complete hide is achieved.

3.4 Priming

- A. Apply primer to all surfaces unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.
- B. Primers specified in painting schedules may be omitted on items factory primed or factory finished items if acceptable to top coat manufacturers.

3.5 Cleaning

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.6 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

This page intentionally left blank

SECTION 101100 - VISUAL DISPLAY BOARDS - ASI

PART 1 GENERAL

1.1 Section Includes

- A. Porcelain enamel markerboards.

1.2 Reference Standards

- A. ANSI A208.1 - American National Standard for Particleboard; 2022.
- B. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

1.3 Submittals

- A. Product Data: Manufacturer's published data on porcelain enamel steel markerboard, trim, and accessories.
- B. Shop Drawings: Indicate wall elevations, dimensions, joint locations, special anchor details.
- C. Samples: Color charts for selection of color and texture of chalkboard, porcelain enamel steel markerboard, glass markerboard, tackboard, tackboard surface covering, and trim.
- D. Samples: Two, 2 by 2 inches in size illustrating materials and finish, color, and texture of porcelain enamel chalkboard, porcelain enamel markerboard, glass markerboard, tackboard, tackboard surface covering, trim, and tackstrip.
- E. Manufacturer's printed installation instructions.
- F. Maintenance Data: Include data on regular cleaning, stain removal.
- G. Executed warranty.

1.4 Quality Assurance

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.5 Delivery, Storage, and Handling

1.6 Warranty

- A. Manufacturer's Standard Limited Lifetime Warranty: On porcelain writing surface, for life of building, under normal usage and maintenance, and when installed in accordance with manufacturer's instructions and recommendations. Warranty covers replacement of defective material but does not include cost of removal or reinstallation.

PART 2 PRODUCTS

2.1 Manufacturers

- A. ASI Visual Display Products, located at 1102 Ave T, Grand Prairie, TX 75050. Tel: 833-632-0878. Web: www.asi-visualdisplayproducts.com.

2.2 Porcelain Enamel Markerboards

A. Markerboard Panel:

1. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, manufactured in accordance with Porcelain Enamel Institute's PEI-1002 specification consisting of sandwich-type construction of face panel with fired-on vitreous finish, core, and balancing rear sheet.
2. Face Sheet Writing Surface:
 - a. Polyvision e3 CeramicSteel, ultra-smooth writing surface; scratch, stain, bacteria, and fire resistant. Continuous coil-coating process, consisting of steel core of light gauge covered on both sides with thin enamel coatings for thickness of 0.014 inch.
 - b. Color: White High Gloss.
3. Core Material:
 - a. Particleboard: ANSI A208.1; wood set with waterproof resin binder, sanded faces.
 - b. Thickness: 7/16-inch particleboard, laminated under heat and pressure to face panel and rear sheet, utilizing adhesives that ensure rupturing of component materials before failure of joint contact surfaces.
4. Writing Surface Backing:
 - a. Polyvinyl backer moisture barrier; no adhesive required or recommended.
 - 1) Polyvinyl backer moisture barrier standard on all panels with exception to butt-joint (splined-edge markerboards) or horizontal sliders where galvanized back steel is used at minimum 28 gauge.
5. Panel Size:
 - a. Overall Thickness: 1/2 inch.

- b. Height: 48 inches.
 - c. Width: as indicated.
- 6. Trim: As indicated below under Trim and Accessories.
- 7. Accessories: As indicated below under Trim and Accessories.

2.3 Trim and Accessories

- A. Trim Series 9800 Knock Down (Multi-Panel/Combo Unit):
 - 1. Material: ASTM B221, extruded from aluminum alloy 6063-T5, 0.062-inch clear anodized finish, free from extruding draw marks and surface scratches.
 - 2. Exposed Frame Width: 3/4 inch.
 - a. Corner Style: Square.
- B. Accessories:
 - 1. Marker/Chalk Tray: ASI 544212, angle box style tray complete with end caps.
 - 2. Markers: Include.
 - 3. Marker Caddy: Include.
 - 4. Cloth: Include.
 - 5. Map Rail: ASI 51, 1-inch (25 mm) wide map rail with natural cork insert and end caps, and two map hooks per 4-foot (1219 mm) length.
- C. Installation Method: Easi-Install L-clips.

PART 3 EXECUTION

3.1 Examination

- A. Verify existing conditions and field dimensions meet manufacturer's requirements before starting work.
- B. Verify field measurements are as indicated on drawings.
- C. Verify internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.
- D. Verify flat wall surface for frameless, adhesive-applied boards.

3.2 Preparation

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under project conditions.

3.3 Installation

- A. Install in accordance with manufacturer's written instructions.

- B. Install with top of marker tray at 30 inches above finished floor.
- C. Secure units level and plumb.

3.4 Cleaning

- A. Clean board surfaces in accordance with manufacturer's instructions.

3.5 Protection

- A. Cover with protective cover, taped to frame.
- B. Protect finishes until completion of project.
- C. Remove temporary protective cover at Date of Substantial Completion.
- D. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 101419 - DIMENSIONAL LETTER SIGNAGE

PART 1 GENERAL

1.1 Section Includes

- A. Dimensional letter signage.

1.2 Submittals

- A. Product Data: Manufacturer's product literature for each type of dimensional letter sign, indicating style, font, colors, locations, and overall dimensions of each sign.
- B. Shop Drawings:
 - 1. Include dimensions, locations, elevations, materials, text and graphic layout, and attachment details.
 - 2. Show locations of electrical service connections.
- C. Samples: Submit one sample of each type of dimensional letter sign of size similar to that required for project, indicating sign style, font, and method of attachment.
- D. Manufacturer's qualification statement.

1.3 Quality Assurance

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.4 Delivery, Storage, and Handling

- A. Package dimensional letter signs as required to prevent damage before installation.
- B. Store under cover and elevated above grade.
- C. Store tape adhesive at a normal room temperature of 68 to 72 degrees F.

1.5 Field Conditions

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain minimum ambient temperature during and after installation.

PART 2 PRODUCTS

2.1 Dimensional Letters

- A. Applications: Building identification.
 - 1. Use individual metal letters.
 - 2. Mounting Location: Exterior as indicated on drawings.
- B. Metal Letters:
 - 1. Material: Aluminum sheet, fabricated reverse channel.
 - 2. Thickness: 1/8 inch minimum.
 - 3. Letter Height: As indicated on drawings.
 - 4. Text and Typeface:
 - a. Character Font: Helvetica, Arial, or other sans serif font.
 - b. Character Case: Upper case only.
 - 5. Finish: As selected by Architect from manufacturer's full range.
 - 6. Color: As selected.
 - 7. Mounting: Concealed screws.

2.2 Accessories

- A. Concealed Screws: Noncorroding metal; stainless steel.

PART 3 EXECUTION

3.1 Examination

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that electrical service is correctly sized and located to accommodate dimensional letter signs.
- C. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.2 Installation

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.
- C. Protect from damage until mm-dd-yyyy; repair or replace damaged items.

END OF SECTION

SECTION 101423 - PANEL SIGNAGE

PART 1 GENERAL

1.1 Section Includes

- A. Panel signage.

1.2 Reference Standards

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.3 Submittals

- A. Product Data: Manufacturer's product literature for each type of panel sign, indicating styles, font, foreground and background colors, locations, and overall dimensions of each sign.
- B. Shop Drawings:
 - 1. Include dimensions, locations, elevations, materials, text and graphic layout, attachment details, and schedules.
 - 2. Schedule: Provide information sufficient to completely define each panel sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - a. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
 - b. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
 - c. Submit for approval by Owner through Architect prior to fabrication.
- C. Samples: Submit one sample of each type of sign, of size similar to that required for project, indicating sign style, font, and method of attachment.
- D. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

1.4 Quality Assurance

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.5 Delivery, Storage, and Handling

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store under cover and elevated above grade.
- D. Store tape adhesive at normal room temperature.

1.6 Field Conditions

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain minimum ambient temperature during and after installation.

PART 2 PRODUCTS

2.1 Manufacturers

- A. Panel Signage:
 - 1. Best Sign Systems, Inc: www.bestsigns.com/#sle.
 - 2. FASTSIGNS International, Inc: www.fastsigns.com/#sle.
 - 3. Mohawk Sign Systems, Inc: www.mohawksign.com/#sle.

2.2 Regulatory Requirements

- A. Accessibility Requirements: Comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most restrictive requirements.

2.3 Panel Signage

- A. Panel Signage:
 - 1. Application: Room and door signs.
 - 2. Description: Flat signs with engraved panel media, tactile characters.
 - 3. Sign Size: 4 inches by 6 inches.
 - 4. Total Thickness: 1/8 inch.
 - 5. Sign Edges: Squared.
 - 6. Letter Edges: Squared.
 - 7. Corners: Squared.
 - 8. Color and Font, unless otherwise indicated:

- a. Character Font: Helvetica, Arial, or other sans serif font.
- b. Character Case: Upper and lower case (title case).
- c. Background Color: As scheduled.
- d. Character Color: Contrasting color.
- 9. Material: One-piece injection molded acrylic plastic with raised letters and braille.
- 10. Profile: Flat panel without frame.
- 11. Tactile Letters: Raised 1/32 inch minimum.
- 12. Braille: Grade II, ADA-compliant.
- 13. One-Sided Wall Mounting: Tape adhesive.

2.4 Accessories

- A. Exposed Screws: Chrome plated.
- B. Tape Adhesive: Double-sided tape, permanent adhesive.

PART 3 EXECUTION

3.1 Examination

- A. Verify that substrate surfaces are ready to receive work.
- B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.2 Installation

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.
- C. Locate panel signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

END OF SECTION

This page intentionally left blank

SECTION 101430 - ILLUMINATED SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Illuminated signs.
 - a. Exterior, Building mounted.

1.2 ACTION SUBMITTALS

- A. Product Data: Modular signs.
- B. Product Data Submittals:
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, power requirements and finishes.
- C. Shop Drawings: For modular signs.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include power diagrams.
 - 3. Show message list, typestyles, graphic elements, and layout for each sign.
- D. Samples for Initial Selection: For each type of modular sign, exposed component, and exposed finish.
 - 1. Include representative Samples of available typestyles and graphic symbols.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs.

PART 2 PRODUCTS

2.1 ILLUMINATED SIGNS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ASI Sign Systems, Inc.
 - 2. Best Sign Systems, Inc.
 - 3. Or equal.

- B. Sign System: Sign with removable inserts for graphics and copy attached to a receiver frame system using clips, splines, or comparable method. Provide system with modular increments of height and width, permitting assembly of units with multiple inserts of varying size.
 - 1. Sign Size: As indicated.
 - 2. Location: West Façade, refer to building elevations.
 - 3. Provide tamper-resistant feature requiring special tool to change inserts.
 - 4. Backer Panel: Shaped, decorative backing panel mounted behind modular signage system as indicated.
 - 5. Power signs with 120 volt supply.
- C. Inserts:
 - 1. Type: Rigid plastic for applied graphics.
 - 2. Finish: Anodized or Painted, to be selected by the Architect.
 - 3. Color and Pattern: as indicated.
- D. Graphics and Copy:
 - 1. Surface Applied: Silk-screen or Direct print.
- E. End Caps and Trim:
 - 1. Side Trim: Continuous aluminum trim attached to message-strip receiver frame.
 - 2. Profile: as indicated.
- F. Mounting:
 - 1. Perpendicular Wall Mount: Provide bracket designed to support signs perpendicular to wall surface, and to suit mounting conditions. Attach with screws or other method capable of supporting weight of sign. Factory finish to match sign-background color unless otherwise indicated.
- G. Accessories: Provide accessories needed to provide a complete installation.

2.2 MATERIALS

- A. Aluminum Extrusions: ASTM B221 (ASTM B221M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

2.3 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined. Use concealed fasteners and anchors unless indicated to be exposed.

2.4 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. 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.
- C. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting finishes on raised features unless otherwise indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install signs using mounting methods indicated and in accordance with manufacturer's written instructions.
- B. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.

3.3 ADJUSTING AND CLEANING

- A. Touch up factory-applied finishes to restore damaged or soiled areas.
- B. Remove temporary protective coverings and strippable films as signs are installed.

END OF SECTION

This page intentionally left blank

SECTION 101453 – TRAFFIC SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes regulatory signs, sign posts and mounting.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 033000: Cast-in-Place Concrete Site Work.
- C. Section 312000: Earthwork.

1.3 REFERENCES

- A. National Manual of Uniform Traffic Control Devices", latest edition, and the "NYS Supplement
- B. New York State Department of Transportation Specification Section 730

1.4 SUBMITTALS

- A. Product Data: Provide data on regulatory signs, custom signs, sign posts and mounting.
- B. Shop Drawings: Indicate color, wording, lettering size and style, overall sign size, construction details and installation details for each type of sign.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Regulatory signs: Dimensions and details as specified by NYSDOT Standard Specifications Section 645, latest edition, and the "National Manual of Uniform Traffic Control Devices", latest edition, the "NYS Supplement" and custom signs as noted on the sign schedule. Provide sign face, size, color and mounting as indicated on the sign schedule.
- B. Exterior regulatory sign posts: NYSDOT Standard Specifications Section 730, 3" galvanized "U" channel.
- C. Welded steel plate: 1/4" x 8" x 24"

2.2 MANUFACTURERS

- A. Signage and graphics shall be manufactured by Seton Name Plate Company, Branford, Connecticut, or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install signs in the locations and quantities as shown on the Contract Drawings.
- B. Regulatory post mounted signs shall be mounted on galvanized steel post, 84" from finish grade to the bottom of sign or as indicated on the Contract Drawings and shall comply with all NYSDOT specifications. Mounting height may be adjusted only in accordance with provisions outlined in the "National Manual of Uniform Traffic Control Devices", latest edition, and the "NYS Supplement".
- C. Where shown on the Contract Drawings, signs shall be surface mounted using adequate and appropriate fasteners.
- D. Protect surfaces and finishes from abrasion and other damage during handling and installation.
- E. Replace damaged or faulty signs.

END OF SECTION 101453

SECTION 102113.19 - PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Solid plastic toilet compartments, including shower and changing compartments.
- B. Urinal and vestibule screens.

1.2 REFERENCE STANDARDS

- A. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.4 SUBMITTALS

- A. Product Data: Provide data on panel construction, hardware, and accessories.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- C. Manufacturer's Installation Instructions: Indicate special procedures.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Solid Plastic Toilet Compartments:
 - 1. Scranton Products; Hiny Hiders Partitions: www.scrantonproducts.com/#sle.

2.2 PLASTIC TOILET COMPARTMENTS

- A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286; floor-mounted unbraced. Scope: Toilet Partitons, Shower and Changing spaces.
 - 1. Color: Single color as selected.

2. Doors:
 - a. Thickness: 1 inch.
 - b. Width: 24 inch.
 - c. Width for Handicapped Use: 36 inch, out-swinging.
 - d. Height: 55 inch, unless otherwise detailed.
3. Panels:
 - a. Thickness: 1 inch.
 - b. Height: 55 inch, unless otherwise detailed.
 - c. Depth: As indicated on drawings.
4. Pilasters:
 - a. Thickness: 1 inch.
 - b. Width: As required to fit space; minimum 3 inch.
5. Screens: Without doors; to match compartments; mounted to wall with two panel brackets.

2.3 ACCESSORIES

- A. Pilaster Shoes: Stainless steel, satin finish, 3 inches high; concealing floor fastenings.
 1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: Extruded aluminum, anti-grip profile.
 1. Size: Manufacturer's standard size.
- C. Wall and Pilaster Brackets: Stainless steel; continuous type.
- D. Attachments, Screws, and Bolts: Stainless steel , tamper proof type.
 1. For attaching panels and pilasters to brackets: Through-bolts and nuts ; tamper proof.
- E. Hinges: Stainless steel, manufacturer's standard finish.
- F. Door Hardware: Stainless steel, manufacturer's standard finish.
 1. Door Latch: Slide type with exterior emergency access feature.
 2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
 3. Provide door pull for outswinging doors.
- G. Coat Hook: One per compartment, mounted on door.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.

- B. Verify correct spacing of and between plumbing fixtures.

3.2 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.3 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

This page intentionally left blank

SECTION 102123 - CUBICLE CURTAINS AND TRACK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface mounted overhead curtain track and guides.
- B. Cubicle curtains.

1.2 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2019.

1.3 SUBMITTALS

- A. Product Data: Provide data for curtain fabric characteristics.
- B. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.
- C. Samples: Submit two fabric samples, 4 by 4 inch in size illustrating fabric color.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention .
- E. Maintenance Data: Include recommended cleaning methods and materials and stain removal methods.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Accept curtain materials on site and inspect for damage.
- B. Store curtain materials on site and deliver to Owner for installation when requested.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Cubicle Track and Curtains:
 - 1. Construction Specialties, Inc; Track Systems: www.c-sgroup.com/#sle.

2.2 TRACKS AND TRACK COMPONENTS

- A. Tracks: Extruded aluminum sections; one piece per track run.
 - 1. Profile: Channel.
 - 2. Mounting: Surface.
 - 3. Structural Performance: Capable of supporting vertical test load of 50 lbs without visible deflection of track or damage to supports, safely supporting moving loads, and sufficiently rigid to resist visible deflection and without permanent set.
 - 4. Track End Stop: To fit track section.
 - 5. Track Bends: Minimum 12 inch radius; fabricated without deformation of track section or impeding movement of carriers.
 - 6. Suspension Rods: Tubular steel sections, sized to support design loads and designed to receive attachment from track and ceiling support.
 - 7. Escutcheons: Where suspension rod meets finished ceiling or structure, provide escutcheons to match rod finish.
 - 8. Finish on Exposed Surfaces: White enamel.
- B. Curtain Carriers: Nylon rollers, size and type compatible with track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal.
- C. Wand: Aluminum, attached to lead carrier, for pull-to-close action.
- D. Installation Accessories: Types required for specified mounting method and substrate conditions.

2.3 CURTAINS

- A. Cubicle Curtains:
 - 1. Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - 2. Inherently flame resistant or flameproofed; capable of passing NFPA 701 test.
 - 3. Material: See Material Legend for Manuf and Products.
 - 4. Color/Pattern: Refer to Material Legend on the drawings for patterns and color .
 - 5. Open Mesh Cloth: Open weave to permit air circulation; flameproof material, manufacturer's standard color.
 - 6. Attachment of Curtain Fabric to Open Mesh Cloth: Manufacturer's standard sewn seam.
- B. Curtain Fabrication:
 - 1. Width of curtain to be 10 percent wider than track length.
 - 2. Length of curtain to end 15 inches above finished floor.
 - 3. Include open mesh cloth at top 20 inches of curtain for room air circulation, attached to curtain as specified above.

4. Curtain Heading: Fabric band matching curtain panel with metal grommet holes for carriers spaced 6 inches on center.
5. Seams and Hems: Manufacturer's standard fabrication method for securely sewn and finished seams and hems.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and supports above ceiling are ready to receive work of this Section.
- B. Verify that field measurements are as indicated.

3.2 INSTALLATION

- A. Install curtain track to be secure, rigid, and true to ceiling line.
- B. Secure track to ceiling system.
- C. Install end cap and stop device.
- D. Install curtains on carriers ensuring smooth operation.

END OF SECTION

This page intentionally left blank

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES - ASI

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Custodial accessories.
- B. Feminine hygiene vendors and disposals.
- C. Grab bars.
- D. Healthcare accessories.
- E. Mirrors.
- F. Shower and tub accessories.

1.2 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015a (Reapproved 2019).
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- D. ASTM C1036 - Standard Specification for Flat Glass; 2021.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.4 SUBMITTALS

- A. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- B. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: American Specialties, Inc:
www.americanspecialties.com/#sle.

2.2 Custodial Accessories

- A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets.
 - 1. Locations: Provide one unit per custodian closet or custodian storage room.
 - 2. Mop/broom Holders: Cadmium-plated steel spring-loaded rubber cam holders at shelf front.
 - 3. Products:
 - a. Model 1308-3 - 4 Hooks, 3 Holders - Shelves/Utility Hook and Mop Strip - Surface-mounted.

2.3 Feminine Hygiene Vendors and Disposals

- A. Sanitary Napkin Disposal Unit: Stainless steel, self-closing door, locking bottom panel with full-length heavy-duty stainless steel multi-staked piano hinge, removable receptacle.
 - 1. Cabinet and Door: Fully welded, 22 gauge, 0.03 inch thick sheet.
 - 2. Products:
 - a. Model 20852 - Roval Collection - Sanitary Waste Receptacle - Surface-mounted.

2.4 Grab Bars

- A. Grab Bars: Type 304 stainless steel.
 - 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 lbf, minimum.
 - b. Tubing Thickness: 18 gauge, 0.05 inch.
 - c. Flange Thickness: 11 gauge, 0.125 inch
 - d. Clearance: 1-1/2 inch clearance between wall and inside of grab bar.
 - e. Length and Configuration: As indicated in product listing.

2.5 Healthcare Accessories

- A. Narcotics Cabinets:
 - 1. Shelves: Adjustable, 20 gauge, 0.0375 inch stainless steel; provide two shelves.

2. Doors: 18 gauge, 0.05 inch stainless steel, No.4 satin finish; paddle type tumbler locked latch with two point security bolts.
 3. Cabinet: 20 gauge, 0.0375 inch stainless steel, joints welded, sight-exposed welds finished to match sheet finish.
 4. Hinges: Heavy-duty stainless steel multi-staked piano hinge, 3/16 inch diameter barrel, full length of cabinet; hinge leaves spot-welded to door and cabinet body.
 5. Products:
 - a. Model 0546 - Security Medicine Cabinet - Wall-Mounted.
- B. Folding Shower Seat: Wall-mounted; welded tubular seat frame, structural support members, swing-down legs, hinges, and mechanical fasteners of Type 304 stainless steel, rectangular seat.
1. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of white color.
 2. Size: ADA Standards compliant.
 3. Products:
 - a. Model 8203 - 18 inches wide - Folding Shower Seat, Rectangular Solid Phenolic seat - White, ADA.

2.6 Mirrors

- A. Mirrors: Stainless steel framed, 1/4 inch thick tempered safety glass, ASTM C1048.
1. Channel Frame: One piece roll formed 20 gauge, 0.0375 inch, 1/2 inch by 1/2 inch Type 304 stainless steel channel that encases mirror and backing with tight mitered corners, and tamperproof hanging system; satin finish.
 2. Products:
 - a. Model 0620 Series - Stainless Steel Chan-Lok Frame - Plate Glass Mirror-Channel Frame.

2.7 Shower and Tub Accessories

- A. Shower/Changing Area Curtain Rod: Stainless steel tube, 1 inch OD, 0.04 inch wall thickness, satin-finished, with 3 inch OD, minimum 0.04 inch thick satin-finished stainless steel flanges, for installation with exposed fasteners.
1. Products:
 - a. Model 1204-2 - Shower Curtain Rod - 1-1/4 inch OD Bar - Stainless Steel.
- B. Shower/Changing Area Curtain:
1. Material: Opaque vinyl, 0.008 inch thick, matte finish, with antibacterial treatment, flameproof and stain resistant.
 2. Size: 36 by 72 inches, hemmed edges.
 3. Grommets: Stainless steel; pierced through top hem on 6 inch centers.
 4. Color: White.

5. Shower Curtain Hooks: Chrome-plated or stainless steel spring wire designed for snap closure.
6. Products:
 - a. Model 1200-V - Shower Curtain - 8 gauge (0.008 inch) White Vinyl.
 - b. Model 1200-SHU - Shower Curtain Hook - Stainless Steel.

2.8 Materials

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 1. Grind welded joints smooth.
 2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.
- B. Keys: Provide 4 keys for each accessory to Owner; master key lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.
- F. Adhesive: Two component epoxy type, waterproof.
- G. Fasteners, Screws, and Bolts: Hot dip galvanized; tamperproof; security type.

2.9 Finishes

- A. Stainless Steel: Satin finish, unless otherwise noted.
- B. Back paint components where contact is made with building finishes to prevent electrolysis.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

3.4 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

This page intentionally left blank

SECTION 104400 - FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire blankets.
- C. Fire extinguisher cabinets.
- D. Accessories.

1.2 REFERENCE STANDARDS

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).
- B. FM (AG) - FM Approval Guide; Current Edition.
- C. NFPA 10 - Standard for Portable Fire Extinguishers; 2022.
- D. UL (DIR) - Online Certifications Directory; Current Edition.

1.3 SUBMITTALS

- A. Product Data: Provide extinguisher operational features.
- B. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.4 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Activar Construction Products Group, Inc. - JL Industries; Cosmic Extinguisher - Multipurpose Chemical: www.activarcpg.com/#sle.
- B. Fire Extinguisher Cabinets and Accessories:
 - 1. Activar Construction Products Group, Inc. - JL Industries; Ambassador Series: www.activarcpg.com/#sle.

2.2 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 - 1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 - 1. Cartridge Operated: Spun shell.
 - 2. Class: A:B:C type.
 - 3. Size: 10 pound.
 - 4. Finish: Baked polyester powder coat, color as selected.
 - 5. Temperature range: Minus 65 degrees F to ____ degrees F.

2.3 FIRE EXTINGUISHER CABINETS

- A. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.
- B. Cabinet Construction: Non-fire rated.
 - 1. Formed primed steel sheet; 0.036 inch thick base metal.
- C. Fire Rated Cabinet Construction: One-hour fire rated.
 - 1. Steel; double wall or outer and inner boxes with 5/8 inch thick fire barrier material.
- D. Cabinet Configuration: Semi-recessed type.
 - 1. Size to accommodate accessories.
 - 2. Trim: Flat square edge, with 2 inch wide face, minimum.
- E. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinges.

- F. Door Glazing: Acrylic plastic, clear, 1/8 inch thick, flat shape and set in resilient channel glazing gasket.
- G. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- H. Fabrication: Weld, fill, and grind components smooth.
- I. Finish of Cabinet Interior: White colored enamel.

2.4 ACCESSORIES

- A. Fire Blanket: Fire retardant treated wool; red, 62 by 84 inch size.
- B. Extinguisher Brackets: Formed steel, chrome-plated.
- C. Lettering: FIRE EXTINGUISHER decal, or vinyl self-adhering, pre-spaced black lettering in accordance with authorities having jurisdiction (AHJ).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure rigidly in place.
- C. Place extinguishers in cabinets.

END OF SECTION

This page intentionally left blank

SECTION 105113 - METAL LOCKERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal lockers.
- B. Locker benches.

1.2 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021a.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's published data on locker construction, sizes, and accessories.
- B. Shop Drawings: Indicate locker plan layout, numbering plan.
- C. Full Size Sample: One full-size locker of each construction specified for evaluation of construction.
- D. Samples: Submit two samples 3 by 6 inches in size showing color and finish of metal locker material.
- E. Manufacturer's Installation Instructions: Indicate component installation assembly.
- F. Sample Warranty: For special warranty.

1.4 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.5 COORDINATION

- A. Coordinate sizes and locations of bases for metal lockers.

- B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Faulty operation of latches and other door hardware.
 - 2. Damage from deliberate destruction and vandalism is excluded.
 - 3. Warranty Period for Welded Metal Lockers: Lifetime from date of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Metal Lockers:
 - 1. List Industries, Inc; Marquis Booksafe III – Unibody All-Welded Locker:
www.listindustries.com/#sle.

2.2 LOCKER APPLICATIONS

- A. Student Lockers (LK1): Metal lockers, free-standing for base indicated on drawings.
 - 1. Configuration: Single tier.
 - 2. Fittings: Size and configuration as indicated on drawings.
 - a. Hooks: One double prong.
 - 3. Ventilation: Louvers at top and bottom of door panel.
 - 4. Locking: Padlock hasps, for padlocks provided by Owner.
 - a. Locking Action: Positive, automatic type, whereby locker may be locked when open, then closed without unlocking.
 - 5. Provide sloped top.
 - 6. Color: To be selected from manufacturer's full range by Architect.
- B. Student Lockers (LK2): Metal lockers, free-standing for base indicated on drawings.
 - 1. Configuration: Two tier.

2. Fittings: Size and configuration as indicated on drawings.
 - a. Hooks: One double prong.
 3. Ventilation: Louvers at top and bottom of door panel.
 4. Locking: Padlock hasps, for padlocks provided by Owner.
 - a. Locking Action: Positive, automatic type, whereby locker may be locked when open, then closed without unlocking.
 5. Provide sloped top.
 6. Color: To be selected from manufacturer's full range by Architect.
- C. Student Lockers (LK3): Metal lockers, free-standing for base indicated on drawings.
1. Configuration: Three tier.
 2. Fittings: Size and configuration as indicated on drawings.
 - a. Hooks: One double prong.
 3. Ventilation: Louvers at top and bottom of door panel.
 4. Locking: Padlock hasps, for padlocks provided by Owner.
 - a. Locking Action: Positive, automatic type, whereby locker may be locked when open, then closed without unlocking.
 5. Provide sloped top.
 6. Color: To be selected from manufacturer's full range by Architect.
- D. Athletic Lockers (LK4): Metal lockers, wall mounted for base indicated on drawings.
1. Configuration: Two tier.
 2. Fittings: Size and configuration as indicated on drawings.
 - a. Hooks: One single prong.
 3. Ventilation: Perforated side panels and doors.
 4. Locking: Padlock hasps, for padlocks provided by Owner.
 - a. Locking Action: Positive, automatic type, whereby locker may be locked when open, then closed without unlocking.
 5. Provide sloped top.
 6. Color: To be selected from manufacturer's full range by Architect.
- E. Student Lockers (LK5): Metal lockers, free-standing for base indicated on drawings.
1. Configuration: Two tier.
 2. Fittings: Size and configuration as indicated on drawings.
 - a. Hooks: One double prong.
 3. Ventilation: Louvers at top and bottom of door panel.
 4. Locking: Padlock hasps, for padlocks provided by Owner.
 - a. Locking Action: Positive, automatic type, whereby locker may be locked when open, then closed without unlocking.
 5. Provide sloped top.
 6. Color: To be selected from manufacturer's full range by Architect.

2.3 METAL LOCKERS

- A. Accessibility: Design units 5% of each type as 'accessible' to comply with ICC A117.1 and ADA Standards.
- B. Locker Case Construction:
 - 1. Heavy-Duty, Welded Construction: Made of formed and welded together sheet steel; metal edges finished smooth without burrs; baked enamel or powder coat finished inside and out.
 - a. Assembly: Do not use bolts, screws, or rivets to assemble locker bodies.
 - b. Locker Body Components: Formed and flanged from steel sheet of the following type and minimum thicknesses:
 - 1) Unperforated Steel Sheet: Commercial Steel (CS), Type B, supplied for exposed applications and complying with ASTM A1008/A1008M and the following:
 - a) Uncoated.
 - 2) Body and Shelves: 16 gauge, 0.0598 inch.
 - 3) Backs: 18 gauge, 0.0478 inch.
 - 4) Base: 16 gauge, 0.0598 inch.
 - a) Height: 4 inches.
 - c. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.
 - 1) Door Frame: 14 gauge, 0.0747 inch, minimum.
 - d. Provide filler strips where indicated or required, securely attached to lockers.
- C. Doors: Channel edge; welded construction, manufacturer's standard stiffeners, grind and finish edges smooth.
 - 1. Door Thickness: 16 gauge, 0.0598 inch, minimum.
 - 2. Form recess for operating handle and locking device.
- D. Latches and Door Handles: Manufacturer's standard.
 - 1. Latching: Manufacturer's standard for locking arrangement selected.
 - a. Three-Point Lift Handle Gravity Latch: Pocket-mounted, provide for doors 18 inches or taller.
 - 1) Handle Pocket, Recess: Stainless steel flush-mounted cup recessed into face of door.
- E. Hinges: Heavy-duty, 7-knuckle type; two for doors under 42 inches high; three for doors over 42 inches high.
- F. Sloped Top: 20 gauge, 0.0359 inch, with closed ends.
- G. Trim: 20 gauge, 0.0359 inch.
- H. Coat Hooks: Stainless steel or zinc-plated steel.

- I. Number Plates: Provide oval shaped aluminum plates. Form numbers 1 inch high of block font style with ADA designation, in contrasting color.
- J. Finish: Baked enamel or powder coat.
 - 1. Color: Custom color match.
- K. Locks: By owner.

2.4 Locker Benches

- A. Locker Benches: Stationary type; bench top of laminated birch; painted steel pedestals.
 - 1. Accessibility: Comply with ICC A117.1 and ADA Standards.
- B. Locker Bench Support Brackets: Welded structural aluminum single arm floor mount pedestal bench support brackets; pre-drilled for bench top material attachment and for wall anchorage.
 - 1. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 2. Load Capacity per Bracket: 400 pounds.
 - 3. Finish: Clear anodized.
 - 4. Bracket Spacing: 36 inches on center, maximum. Project-specific spacing to be determined based on field measurements.
 - 5. Bracket-to-Wall Attachment: Fasteners/anchors recommended by bracket manufacturer for wall construction conditions encountered.
 - 6. Products:
 - a. Rakks/Rangine Corporation; Bench Support Brackets:
<http://www.rakks.com/#sle>.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that prepared bases are in correct position and configuration.
- B. Verify bases and embedded anchors are properly sized.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Place and secure on prepared base.
- C. Install lockers plumb and square.
- D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 pounds.

- E. Bolt adjoining locker units together to provide rigid installation.
- F. Install end panels and filler panels.
- G. Install fittings if not factory installed.
- H. Replace components that do not operate smoothly.

3.3 CLEANING

- A. Clean locker interiors and exterior surfaces.

END OF SECTION

SECTION 105300 - – PREMANUFACTURED CANOPY

PART 1: GENERAL

1.1 Description of Work

- A. Work in this section includes furnishing and installation of extruded aluminum overhead hanger rod style canopies as manufactured by Mapes Industries Inc.
- B. Related Items and Considerations
 - 1. Flashing of various designs may be required. Generic flashing supplied by Mapes. Specialty flashing to be supplied by installer.
 - 2. Determine wall construction, make-up and thickness.
 - 3. Ensure adequate wall condition to carry canopy loads where required.
 - 4. Consider water drainage away from canopy where necessary.
 - 5. Any necessary removal or relocation of existing structures, obstructions or materials.

QUALITY ASSURANCE

- A. Products meeting these specifications established standard of quality required as manufactured by Mapes Industries, Inc. Lincoln, Nebraska 1-888-273-1132.

FIELD MEASUREMENT

- A. Confirm dimensions prior to preparation of shop drawings when possible.
- B. If requested, supply manufacturer s standard literature and specifications for canopies.
- C. Submit shop drawings showing structural component locations/positions, material dimensions and details of construction and assembly.

PERFORMANCE REQUIREMENTS

- A. Canopy must conform to local building codes.
- B. PE Stamped calculations are required and must be signed and sealed by an engineer licensed within the state canopy is installed.

DELIVER, STORAGE, HANDLING

- A. Deliver and store all canopy components in protected areas.

PART 2: PRODUCTS

6.1 Basis of Design: Super Lumideck by:

- A. Mapes Canopies
Lincoln, Nebraska
Phone: 1-888-273-1132.
Fax: 1-877-455-6572.

MATERIALS

- A. Decking shall consist of a 2 3/4" Extruded .078" Decking.
- B. Intermediate framing members shall be extruded aluminum, alloy 6063-T6, in profile and thickness shown in current Mapes brochures.
- C. Hanger rods and attachment hardware shall be a standard finish.
- D. Fascia shall be standard extruded 12" Smooth Face style.

FINISHES

- A. Finish type shall be 2-Coat Kynar Finish.

FABRICATION

- A. All Mapes Super Lumideck extruded aluminum canopies are shipped with the materials precut to size for field assembly.
- B. All connections shall be mechanically assembled utilizing 3/16 fasteners with a minimum shear stress of 350 lb. Pre-welded or factory-welded connections are not acceptable.
- C. Concealed drainage. Water shall drain from covered surfaces into intermediate trough and be directed to Front Scupper.

PART 3: EXECUTION

10.1 Inspection

- A. Confirm that surrounding area is ready for the canopy installation.
- B. Installer shall confirm dimensions and elevations to be as shown on drawings provided by Mapes Industries.

- C. Erection shall be performed by an approved installer and scheduled after all concrete, masonry and roofing in the area is completed

INSTALLATION

- A. Installation shall be in strict accordance with manufacturer's shop drawings. Particular attention should be given to protecting the finish during handling and erection.

AFTER INSTALLATION, ENTIRE SYSTEM SHALL BE LEFT IN A CLEAN CONDITION.

END OF SECTION

This page intentionally left blank

SECTION 105500 - POSTAL SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mail Distribution Slots.

1.2 SUBMITTALS

- A. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, maintenance information.
- B. Shop Drawings: Indicate plans for each unit or groups of units, front elevations with compartment layout and model number, overall dimensions, rough-in opening sizes, construction and anchorage details.
- C. Samples: Submit two sets of manufacturer's available colors.

PART 2 PRODUCTS

2.1 MAIL DISTRIBUTION BOXES

- A. Basis of Design Manufacturer:
 - 1. **Materials: Steel.**
 - 2. **Finish: Powder Coat, color to be selected by Architect.**
 - 3. **Slot Quantity:**
 - 4. **Configuration: See Drawings.**

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION

- A. Install per details.

END OF SECTION

This page intentionally left blank

SECTION 107501 - FLAGPOLES

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes flagpole material and installation.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 03 30 00: Cast in Place Concrete.

1.3 SUBMITTALS

- A. Shop Drawings: Show fabrication details and connections to adjacent work.
- B. Product Data: Catalog sheets, specifications, and installation instructions for flagpoles specified.
- C. Contract Closeout Submittals:
 - 1. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Owner and Engineer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Eder Flag, 1000 W. Rawson Avenue, Oak Creek, WI 53154, (800) 558-6044, www.ederflag.com
- B. Morgan-Francis Flagpoles & Accessories, 9850 East 30th Street, Indianapolis, IN 46229, (800) 814-9568, www.morgan-francis.com.
- C. Colonial Flag & Specialty Co., 9390 South 300 West, Sandy, UT 84070, (800) 782-0500, www.colonialflag.com.
- D. Eagle Mountain Flag & Flagpole Co., P.O. Box 500, Wimberley, TX 78676, (800) 385-5605, www.eaglemountainflag.com.
- E. Approved equivalent.

2.2 FLAGPOLES

- A. Flagpoles:
 - 1. Style: Round Tapered Aluminum.
 - 2. Halyard Type: Internal halyard system with single sheave revolving non-fouling internal truck, cast aluminum body, 26 stainless steel ball bearings, 2-1/2" diameter

- plated steel sheave with gearless, self-locking direct drive winch with six tumbler cylinder lock, crank and stainless-steel aircraft cable
3. Exposed Height: 35 feet.
 4. Overall Height: 38'-6"
 5. Base Diameter: 7 inches.
 6. Wall Thickness: .188 inch.
 7. Finish: 100 grit polish.
 8. Shoe Base / Collar: Aluminum. Color, size and finish to match flagpole.
 9. Suitable for US Flag size: 6 x 10 feet.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install the work of this Section in accordance with Contract Drawings and the manufacturer's printed instructions, unless otherwise indicated.

END OF SECTION 107501

SECTION 108213 - ROOF SCREENS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Stand-alone roof equipment screens and supporting steel framework. Screens shall be designed to attach to the roof structure and not the equipment being screened.
- B. Roof screen accessories.

1.2 COORDINATION

- A. Coordinate Work with other operations and installation of roofing materials to avoid damage to installed insulation and membrane materials.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- B. Shop Drawings: Layout and erection drawings showing typical cross sections and dimensioned locations of all frames and base supports. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

1.4 INFORMATIONAL SUBMITTALS

- A. Design Calculations: Structural design calculations for structural components and components resisting wind loads with seal and signature of professional engineer licensed in the State of New York.
- B. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with a minimum five years documented experience in producing pre-manufactured metal-framed equipment screens.
- B. Design Qualifications: Provide structural design calculations stamped by a professional engineer licensed in the state in which this project is located.
- C. Welders: AWS certified within previous 12 months.
- D. Pre-Installation Meeting:
 - 1. Convene at job site, at least seven calendar days prior to scheduled beginning of construction activities of this section, to review requirements of this section.
 - 2. Require attendance by representatives of the installing subcontractor (who will represent the system manufacturer), the mechanical subcontractors and other entities affected by construction activities of this section.
 - 3. Notify Architect four calendar days in advance of scheduled meeting date.
- E. DELIVERY, STORAGE, AND HANDLING
- F. Deliver materials to the project site clearly marked for proper identification.
- G. Receive, handle and store materials in conformance with the manufacturers printed instructions.
- H. Store products under cover, in manufacturer's unopened packaging until ready for installation.
- I. Protect materials from exposure to moisture.
- J. Store materials in a dry, warm, ventilated weathertight location.
- K. Protect metal fabrications from damage by exposure to weather.

1.6 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 absolute limits.
- B. Field Measurements: Verify roof screen dimensions and conditions of the 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 equipment enclosure without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 WARRANTY

- A. Panel Finish:
 - 1. Provide written warranty stating that the paint finish applied on all equipment enclosure panels will be warranted against chipping, peeling, cracking, fading, or blistering for the coverage period of up to twenty (20) years, see panel manufacturer warranty for coverage details.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Design Loads: Comply with Building Code for site location and building height.
 - 1. Design to resist ASCE 7 - Minimum Design Loads for Buildings and Other Structures, using the latest published ASCE version.
 - 2. Design all materials, assembly and attachments to resist snow, wind, suction and uplift loading at any point without damage or permanent set.
- B. Structural Design: Prepare structural design calculations for screen framing and attachment to structure including reactions at base supports for verification of roof structure by Architect.
- C. All welds to be performed by an AWS certified welder. Valid certification to be provided.

2.2 MANUFACTURERS

- A. Basis of Design: RoofScreen Mfg.; 7.2 Rib Panel.

2.3 MATERIALS

- A. Square Base Supports: Weldments fabricated from cold rolled steel conforming to ASTM A 1008, fabricated with pre-punched holes in base plate for fastening to roof structure. After fabrication, apply minimum 2 to 4 mil baked on powder coat primer.
- B. Square Base Support Extensions: Fabricated from same material and finish as base supports.
- C. Square Base Cap: Weldments fabricated from AISI Type 304 stainless steel with mill finish, and fabricated to overlap base support and flashing boot a minimum of 2 inches (51 mm). Provide moment resisting adjustable connection to attach framing to base cap.

- D. Square Post Support: (Max insulation thickness plus 12 inches) (305 mm) tall weldments fabricated from galvanized steel tube conforming to ASTM A 500 and cold rolled steel plate conforming to ASTM A36, fabricated with pre-punched holes in base plate for fastening to roof structure. After fabrication, apply minimum 2 to 4 mil shop primer to base plate and weld.
- E. Square Post Cap: Saddle - ASTM 1008 CRS, 11ga. Hot-dip galvanized. Connective tube- ASTM A513, 14ga. Hot-dip galvanized. Fabricated to overlap base support and flashing boot a minimum of 2 inches (51 mm).
- F. Square Galvanized Roof Flashing: Fabricated from galvanized sheet steel, 24 gauge, conforming to ASTM A 653/A 653M. Provide with galvanized sheet steel, 24 gauge (ASTM A 653/A 653M) base flange that extends a minimum of 4 inches (102 mm) onto the roof surface on all four sides. Riser shall be tapered to allow easy fit over Square Base Supports with minimal gap at top of flashing. Solder all seams for water tightness.
- G. Roof Flashing: Refer to Division 07 section that specifies the roof membrane.
- H. Base Cap Gasket: EPDM with self-adhesive closed cell foam.
- I. Framing: Carbon or galvanized steel structural tubing in manufacturer's standard sizes, conforming to ASTM A 500 and/or ASTM A787 with manufacturer's standard galvanized coating conforming to ASTM A 1057. Provide with wall thickness as determined by structural calculations.
- J. Connector Fittings: Fabricated from AISI Type 304 stainless steel with mill finish.
- K. Steel Girts: Steel tube conforming to ASTM A 500 and/or A 787, with a G90 hot-dip galvanized coating.
- L. Steel Hat Channel: Steel sheet conforming to ASTM A 653, Class SS, with a G90 hot-dip galvanized coating per ASTM A 1057.
- M. Hardware: Bolts, nuts and washers: 18-8 stainless steel.
- N. Self-Drilling Screws: Carbon steel with factory applied protective coating conforming to ASTM B 117 salt spray testing.
- O. Welding Materials: AWS D1.1; type required for materials being welded.
- P. Panel:
 - 1. Profile:
 - a. Rib Panel.
 - 2. Base Metal:
 - a. Minimum 24 gauge Galvalume steel sheet, AZ50, conforming to ASTM A 792 for painted and unpainted panels.
 - 3. Finish:

- a. PVDF fluoropolymer, 1 mil, 2 coat, 70 percent.
 - b. Color as selected by Architect from manufacturer's standard color range, 20 colors minimum.
 - c. Coat reverse side with off-white primer coat.
4. Panel Fasteners: No. 14 self-tapping sheet metal screw. Color coat heads to match panel color.
5. Panel Trim: Same material and finish as panel. Configuration as shown on Drawings

2.4 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- E. Fabricate system components so that portions of screen can be dismantled for repairs to equipment being screened and for future roof replacement.
- F. Trim and Closures: Fabricated from 24 gauge metal and finished with the manufacturer's standard coating system.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine area where work will be installed to verify the installation can be performed in accordance with the Drawings and structural calculation requirements without interference from other equipment or trades.
- B. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Do not begin installation until conditions have been properly prepared.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects.
- C. Provide for erection loads, and for sufficient temporary bracing to maintain indicated alignment until completion of erection and installation of permanent attachments.
- D. Anchor fabrications to structure as indicated.
- E. Separate dissimilar metals and use gasketed fasteners, isolation shim, or isolation tape to eliminate possibility of corrosive or electrolytic action between metals.
- F. Exercise care when installing components so as not to damage finish surfaces. Touch up as required to repair damaged finishes.
- G. Install flashing boots at base supports as required to provide a watertight connection. Install as recommended by the roof membrane manufacturer.
- H. Remove all protective masking from material immediately after installation.
- I. CLEANING AND PROTECTION
- J. Remove all protective masking from framing and trim material immediately after installation. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. Maintain in a clean condition during construction.
- K. Protect installed products until completion of project.
 - 1. Ensure that finishes and structure of installed systems are not damaged by subsequent construction activities.
 - 2. If minor damage to finishes occurs, repair damage in accordance with manufacturer's recommendations; provide replacement components if repaired finishes are unacceptable to Architect.
- L. Prior to Substantial Completion: Remove dust or other foreign matter from component surfaces; clean finishes in accordance with manufacturer's instructions.
- M. Replace metal wall panels and framing members that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 113013 - RESIDENTIAL APPLIANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Kitchen appliances.
- B. Laundry appliances, including commercial washer and dryer.

1.2 REFERENCE STANDARDS

- A. ICC (IMC)-2021 - International Mechanical Code; 2021.
- B. ICC (IRC)-2021 - International Residential Code for One- and Two-Family Dwellings; 2021.
- C. UL (DIR) - Online Certifications Directory; Current Edition.
- D. UL 2158A - Clothes Dryer Transition Duct; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.
- B. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

PART 2 PRODUCTS

2.1 KITCHEN APPLIANCES

- A. Provide Equipment Eligible for Energy Star Rating: Energy Star Rated.
- B. Refrigerator: Free-standing, top-mounted freezer, and frost-free.

1. Energy Usage: Minimum 20 percent more energy efficient than energy efficiency standards set by U.S. Department of Energy (DOE).
2. Exterior Finish: Stainless steel, color as indicated.
3. Manufacturers: Basis of Design: See Equipment Schedule on Drawings.

2.2 LAUNDRY APPLIANCES

- A. Provide Equipment Eligible for Energy Star Rating: Energy Star Rated.
- B. Clothes Washer: Top-loading stationary commercial.
 1. Size: Large capacity.
 2. Controls: Solid state electronic.
 3. Finish: Painted steel , color white.
 4. Manufacturers: Basis of Design: See Equipment Schedule on drawings.
- C. Clothes Dryer: Electric, stationary, commercial.
 1. Size: Large capacity.
 2. Controls: Solid state electronic, with electronic moisture-sensing dry control.
 3. Temperature Selections: One.
 4. Finish: Painted steel , color white.
 5. Manufacturers: Basis of Design: See Equipment Schedule on Drawings.

2.3 Accessories

- A. Dryer Vent Assembly: Comply with ICC (IMC)-2021 and ICC (IRC)-2021.
 1. Exhaust Duct: Aluminum ribbon, 4-inch diameter, comply with UL 2158A.
 - a. Elbows: 26-gauge, 0.018-inch aluminized steel; 45 degree angle, nonsectioned curve; 4-inch diameter.
 - b. Clamps: Stainless steel, 3-1/2 to 4-3/4-inch diameter range.
 2. Wall Termination: 26-gauge, 0.018-inch aluminized steel with rain drip edge, rubber magnetic bumpers, angled damper, and removable backing plate; 6-1/2 inches wide by 6.45 inches tall.
 3. Roof Termination: 26-gauge, 0.018-inch aluminized steel with seamless hood and watertight collar; 5 inches tall with 6.44-inch wide opening.
 4. Pest Protection Gate: 26-gauge, 0.018-inch zinc-coated steel, vertical bar gate, manufacturer's recommended size to fit termination.
 5. Finish for Exposed Metals: Mill finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify utility rough-ins are provided and correctly located.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.3 ADJUSTING

- A. Adjust equipment to provide efficient operation.

3.4 CLEANING

- A. Remove packing materials from equipment and properly discard.
- B. Wash and clean equipment.

END OF SECTION

This page intentionally left blank

SECTION 114000 – FOOD SERVICE EQUIPMENT

PART 1- GENERAL

1.1 SECTION INCLUDES:

- A. Foodservice Equipment as listed in the itemized specifications and listed on the contract drawings.

1.2 DEFINITIONS:

- A. Furnish -- Supply and deliver to the project site, ready for unloading, unpacking, setup, assembly, and installation.
- B. Install -- Will include the actual unloading, unpacking, assembly, erecting/setting in place, leveling, anchoring, protecting, cleaning, and related operations on the equipment to be made ready for utility connections by other trades as indicated.
- C. Contractor -- All references to Contractor in this Section 114000 shall refer to the Food Service Equipment Contractor (abbreviated as F.S.E.C.). Reference to any other contractor or subcontractor, shall be specific as such:
 - 1. General Contractor (abbreviated as GC)
 - 2. Plumbing Contractor (abbreviated as PC)
 - 3. Electrical Contractor (abbreviated as EC)
 - 4. Mechanical Contractor (abbreviated as MC)

1.3 RELATED SECTIONS:

- A. Refer to General Conditions, Supplementary Conditions, and applicable provisions for additional instructions.
- B. Refer to Mechanical Section for applicable provisions and sections regarding mechanical services, including, but not limited to, rough-ins, grease traps, steam traps, drain traps, atmospheric vents, valves, pipes and pipe fittings, ductwork, and other materials necessary to complete final connections to individual items as specified in this Section.
- C. Refer to Electrical Section for applicable provisions and sections regarding electrical services, including, but not limited to, rough-ins, wiring, disconnects, and other materials necessary to complete final connections to individual items as specified in this Section.
- D. Work included in other Sections will include provision of any wall, floor, and/or ceiling/roof openings, penetrations, recesses, sleeves, conduits, and equipment pads as required for

installation of items included in this section. Also sealing of these openings, penetrations, recesses, sleeves, etc., after installation of the equipment items as required. Such work is not included in this Section. Mounting and installation of gas regulators, gas hoses, gate valves, water hammer arrestors, back flow preventers, water filters, faucets, lever drains, and drain lines, and pressure-reducing valves will be performed by the plumbing contractor. Such work is not included in this section.

- E. Work included: The F.S.E.C. is responsible for installation of the walk-in cooler/freezer and refrigeration systems, and installation of the new hoods. The F.S.E.C. is responsible for mounting any hand sinks or water filter systems sink on the wall. Supply and deliver all items on the drawings and in the following specifications to the project site, ready for unloading, unpacking, setup, assembly, and installation. Include the actual unloading, unpacking, assembly, erecting/setting in place, leveling, anchoring, protecting, cleaning, and related operations on the equipment to be made ready for utility connections by other trades as indicated. F.S.E.C. is to confirm the ability and sizing of equipment to be installed and access into the space.

1.4 STANDARDS, LAWS, AND ORDINANCES:

- A. Standards: Except and unless otherwise noted, comply with the following standards as applicable to the manufacture, fabrication, and installation of the work of this Section:
 - 1. American with Disabilities Act (ADA): Comply with requirements, as applicable to this Project.
 - 2. National Sanitation Foundation (NSF): Comply with the latest Standards and Revisions established by NSF for equipment and installation. Provide NSF seal of approval on each applicable manufactured item, and on items of custom fabricated work.
 - 3. Underwriters Laboratories (UL): For electrical components and assemblies provide either UL labeled and registered products or, where no labeling service is available, recognized markings to indicate listing in the UL Recognized Component Index.
 - 4. National Fire Protection Association (NFPA): Comply with the applicable sections of the current NFPA codes for exhaust hood, ventilators, duct and fan materials, hood wet chemical fire suppression systems, construction, and installation, as well as any local codes and standards.
 - 5. Wet chemical fire suppression systems for exhaust hoods/ventilators shall comply with UL 300 Standard or most current standard.
 - 6. National Electrical Manufacturers Association (NEMA): Comply with the most current

codes or standards.

7. American Gas Association (AGA): Comply with AGA standards for gas heated equipment and provide equipment with the AGA seal. Automatic safety pilots are to be provided on all equipment whenever available.
8. American National Standards Institute (ANSI): Comply with current standards for gas-burning equipment and provide labels indicating name of testing agency. Comply with current codes and standards for L.P. gas cylinder connections, and with applicable standards of the Compressed Gas Association for compressed gas piping. Follow codes for water connection air gaps and vacuum breakers.
9. American Society of Mechanical Engineers (ASME): Comply with ASME Boiler Code requirements for steam generating and steam heated equipment. Provide ASME inspection stamp and registration with National Board.
10. American Society for Testing and Materials (ASTM): Comply with current requirements for flat glass. Comply with codes for heat-treated flat glass, Kind HS, Kind FT coated, and uncoated glass.
11. National Electric Code (NEC): Comply with current NFPA codes for electrical wiring and devices included with foodservice equipment, and applicable NEMA and NECA standards.
12. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration systems, components, and installation.
13. Air Conditioning and Refrigeration Institute (ARI): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration systems, components, and installation.
14. Refrigeration Service Engineers Society (RSES): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration systems, components, and installation.
15. No CFC refrigerants shall be allowed on this project under any circumstances. HFC refrigerants and components shall be used where available. R290 refrigerant should be used where possible.
16. All refrigeration components installation, repairs, and/or associated work on any refrigeration system, self-contained or remote, shall be performed by a Certified Refrigeration

Mechanic.

17. All applicable local codes, standards, and regulations and any special local or job site conditions shall be complied with.

1.5 SUBSTITUTIONS:

- A. All substitutions for itemized equipment specified will require prior approval of the Food-service Consultant and owner. Such requests must be made in writing no later than ten (10) business days prior to the bid due date. If approved, an addendum will be issued to all bidders at least five (5) business days prior to bid due date. All requests for substitutions shall comply with conditions and requirements as stated in Section 1.6 below.
- B. If custom fabricated items are submitted, and accepted as a substitute for standard manufactured items, these items shall meet the specifications of the specified manufactured items, in general, the fabrication section of this document.

1.6 APPROVED SUBSTITUTIONS OR ALTERNATES:

- A. Substitutions approved by addendum as noted in Section 1.5, and/or any alternate manufacturers listed in the Itemized Specifications, may be utilized, with the following conditions:
 1. The contract documents are designed and engineered using the primary specified manufacturer and model. The Food Service Equipment Contractor shall assume total responsibility for any deviations required due to the utilization of a substitution/alternate manufacturer or model, including but not limited to, fitting alternates into the available space, providing directions to the General Contractor for required changes, and assuming any associated cost for utility, building, architectural, or engineering changes.
 2. The submittal of an alternate manufacturer or model shall indicate agreement to the above stated conditions. At the Owner's sole discretion, failure to comply with any of these conditions, or to supply complete and correct data information shall result in the Food Service Equipment Contractor being required to provide the originally specified manufacturer and model at no additional cost to the owner.
 3. Inclusion of an alternate manufacturer in the Itemized Specifications is not intended to indicate that there is an equal alternate unit to match every primary specified unit. It shall be the responsibility of the Food Service Equipment Contractor to ensure that the alternate unit submitted matches the primary specified unit, including all listed options and accessories, and meets the other project conditions.

4. The Food Service Equipment Contractor shall be responsible for supplying the model, which is equal to the primary specified model regarding general function, features, options, sizes, accessories, utility requirements, finish, operation, and listing approvals. If it is determined by the owner, or their appointed representative, at any time during the construction and installation prior to the final acceptance of the project, that the substitution / alternate model submitted is not equal to the primary specified model, the Food Service Equipment Contractor shall assume all associated costs, and implications required to replace the model submitted with the originally specified brand and model.
5. The Food Service Equipment Contractor's bid will clearly list any substitutions or alternates to be used, including the manufacturer and model number. The proposal shall also include a manufacturer's specification/data sheet for each substitution / alternate, with any, and all deviations between the specified manufacturer and the alternate manufacturer itemized and listed. Submittal of a manufacturer's specification sheets, only, shall not be acceptable as the data sheet. Complex alternates such as utility distribution systems, exhaust hoods, walk-in coolers/freezers, custom fabricated items, etc., will require shop drawings specific to this project.
6. Manufacturers not approved for substitutions, or listed as an approved alternate will not be permitted, unless submitted for prior approval as described above in Section 1.5, paragraph A.

1.7 SUBMITTALS:

A. Rough-In Drawings:

1. The Food Service Equipment Contractor shall be solely responsible for the accuracy of the information provided in the submittal packages.
2. In the event utility rough ins have been accomplished before a contract is awarded to the Food Service Equipment Contractor, the F.S.E.C. shall check the existing facility and adjust their equipment to suit job site conditions and utilities where possible. If this is not possible, immediately send a letter with reasons, possible solutions, and any costs associated with the proposed solutions to the owner and Foodservice Consultant.
3. Submit required number of sets as directed by the architect for approval. After approval, reproduce, and supply the required number of distribution prints for the other trades for construction purposes.
4. If the architect utilizes an electronic submittal service or process, after approval, supply the required number of distribution prints for the other trades for construction

purposes.

5. Submit minimum 3/8 inch per foot scale rough-in drawings for approval. These drawings shall be dimensioned; showing location of ducts, stubs, floor, and wall sleeves for ventilation, plumbing, steam, electrical, refrigeration lines, and concrete base/recess/curb dimensions as required for equipment. Drawings shall be submitted in a minimum of 24" x 36" format.
6. Verify mechanical, electrical, ventilating rough in, and sleeve penetration locations at project site as required.

B. Shop Drawings:

1. Submit shop drawing sets as directed by the architect for approval. After approval, reproduce, and supply the required number of distribution prints for the other trades for construction purposes.
2. Submit CAD shop drawings in PDF format for items of custom fabrication included in this contract. Shop drawings shall be submitted at minimum 3/4 inch per foot scale, and shall show dimensions, materials, construction details, installation, and relation to adjoining work or equipment requiring cutting or close fitting. Shop drawings shall also indicate all reinforcing, anchoring, and related work required for the complete installation of these items. Drawings shall be submitted in a minimum of 24" x 36" format.
3. Before proceeding with the fabrication of any item, the Food Service Equipment Contractor will verify all necessary dimensions and details with all job site dimensions and conditions considered.

C. Submittals:

1. Submit an Equipment Manual with a cover sheet, and detailed information on every item included in the Itemized Equipment List. This information shall include but not limited to item and model numbers, basic description, quantity required, all options and accessories to be provided, exact utility requirements, manufacturer specification sheets, reference to specific shop drawings, etc. Mark each data sheet with the applicable project equipment item number. Highlight model numbers and/or accessories on each sheet for a clear indication of what is included in the submittal. Each data sheet includes NEMA plug and receptacle configuration for applicable items. Every cover sheet and associated detailed submittal shall provide sufficient and complete information to verify that the Food Service Equipment Contractor is providing each item in compliance with the Contract documents.

2. Architect / Foodservice Consultant review of shop drawings, and equipment manuals is for general conformance and compliance with the design concept, and contract documents. Markings, and / or comments shall not be construed as relieving the Food Service Equipment Contractor from compliance with the contract documents. The Food Service Equipment Contractor remains solely responsible for all details and accuracy and for performing their work in a safe, satisfactory, and professional manner.

1.8 OPERATION AND MAINTENANCE MANUALS:

- A. Operation and Maintenance Manuals: The Food Service Equipment Contractor will supply a set of manuals for items of standard manufacture on, or before, the date of final acceptance of installation by the owner. Manuals are to be in alphabetical order according to the manufacturer. Each set should include a blank page for quick reference, clearly marked, separating each manual and / or section within the binder. Electronic versions are acceptable unless printed versions are required by the architect, owner, or construction manager.
- B. Submit with the operation and maintenance manuals a list of local service agencies complete with telephone numbers, address, and e-mail information for the authorized agencies to perform the warranty work.
- C. Provide a letter of warranty in the front of the manual complying with Section 1.14. This letter must include the actual date the warranty begins, and list all labor, service, workmanship, and factory warranty periods.

1.9 AS BUILT AND RECORD DOCUMENTS:

- A. Maintain one record set of Foodservice Equipment Plans with any related corrections, revisions, additions, deletions, changes, future items, etc. noted during construction and installation.
- B. Provide final sets of shop drawings and equipment manuals with any related corrections, revisions, additions, deletions, changes, future items, etc. noted during construction and installation as specifications record set.
- C. These documents shall be provided to the owner before the date of final acceptance of installation.

1.10 DISCREPANCIES

- A. If discrepancies are discovered between the drawings and the specifications, the F.S.E.C. will notify the Food Service Consultant in writing of any discrepancies discovered and await

clarification prior to proceeding with the items or areas in question.

1.11 FOOD SERVICE EQUIPMENT CONTRACTOR QUALIFICATIONS:

- A. Submit evidence of compliance with the following qualifications and conditions.
 - 1. Manufacturers' authorized dealer, able to purchase, distribute, and install all items specified with this project.
 - 2. Seven (7) years minimum continuous operation under the same company name and ownership.
 - 3. Successfully completed at least eight (8) installations of similar scope and size during the last two (2) years. Provide references with contact information for verification.
 - 4. Maintain an installation staff or have access to qualified personnel with a minimum of seven (7) years' experience in the installation of comparable size and scope projects.
 - 5. Maintain a staff or have access to personnel experienced in the preparation of professional shop drawings and submittals as outlined in related sections.
 - 6. Maintain or have access to manufacturers authorized service personnel together with readily available stock of repair, and replacement parts.
 - 7. Maintain or have access to a fabrication shop with NSF and UL standards and officially listed with labeling requirements. If the fabricator is a subcontractor for the F.S.E.C., they shall have ten (10) years minimum experience in the fabrication of comparable size, scope, and level of quality projects. The Food Service Equipment Contractor shall submit the fabrication shop company name and credentials to the Foodservice Consultant and owner, who shall have the right of approval or disapproval of this fabricator.
- B. Any subcontractors employed by Food Service Equipment Contractor for this project shall comply with these same qualification requirements.
- C. The Architect, and/or Foodservice Consultant for the project shall approve the Food Service Equipment Contractor.

1.12 PRODUCT HANDLING:

- A. Storage of Materials, Equipment, and Fixtures. The Food Service Equipment Contractor is responsible for receiving and warehousing equipment and fixtures and holding items until

the job site is ready for delivery and installation.

- B. Handling Materials and Equipment. Verify and coordinate conditions at the job site, particularly door, and/or wall opening sizes and clearances, to assure access for all equipment. Pieces too large for existing site conditions shall be hoisted, crane-lifted, or otherwise handled as required. All special handling equipment charges shall be arranged for and paid for by the Food Service Equipment Contractor and are to be included in the bid price, unless conditions change at the job site, after acceptance of bid through no fault of the F.S.E.C.

1.13 PRODUCT PROTECTION:

- A. The Food Service Equipment Contractor is responsible during the progress of the project to protect their equipment against theft or damage, until final acceptance by the owner. Items should not be delivered to the job site before the site is ready for installation, unless at the request of the owner or the construction manager. All scheduled deliveries should be signed for, and the delivery condition noted by the owner or the construction manager.
- B. Protect all items before, during, and after installation and protect the associated work and materials of the other trades.

1.14 WARRANTIES:

- A. Unless otherwise noted, items furnished shall be fully guaranteed against defects in workmanship and material(s) for two (2) full years from the date of the first event to occur of the following: Start-up for intended use by the owner/operator, Substantial completion of installation of kitchen equipment contract package as agreed to by the owner, or final acceptance of installation by the owner. Should a Temporary Certificate of Occupancy be issued for partial completion of work, the items furnished within that designated area shall be under warranty from the date of issue of the certificate. The Food Service Equipment Contractor or their service agent will make repairs and replacements without charge to the owner within a reasonable time.

1.15 SCHEDULE:

- A. Contract acceptance constitutes a guarantee that the contractor can and will obtain materials, equipment, and workforce upon notice to proceed to permit overall completion of the entire building project on schedule. The contractor shall coordinate their work with the progress schedule as prepared and updated periodically by the General Contractor, or the Construction Manager.
- B. Anticipated delays, not through fault of the Food Service Equipment Contractor, shall be noted in a written notification to the Foodservice Consultant, and the Architect immediately

upon the realization by F.S.E.C. that delays are possible, likely, or probable.

- C. Extra charges from rush orders, special handling, overnight UPS/FedEx, air shipments, etc., to meet the required schedule will be paid by the Food Service Equipment Contractor, if insufficient time is allowed in placing factory orders.
- D. Failure of manufacturers to meet promised delivery dates will not grant relief to the Food Service Equipment Contractor for failure to meet schedules unless it can be proven in writing with supporting data (i.e., proof of dates orders were placed) that orders were received by the manufacturer with reasonable lead times.

PART 2 - EQUIPMENT

2.1 GENERAL:

Refer to schedule on Foodservice Drawings and Section 4, Itemized Specifications, included in this Section.

2.2 MATERIALS:

A. Quality Standards for Metals:

- 1. Stainless Steel: Type 302/304, #4 finish where exposed, #2B finished where not exposed.
- 2. Steel Sheet: Hot-rolled carbon steel.
- 3. Galvanized Steel Pipe: Welded or seamless, schedule 40, galvanized or heavier.
- 4. Steel Structural Members: Hot rolled or cold formed, carbon steel unless stainless steel is indicated.

B. Quality Standards for Plastic Laminates:

- 1. Comply with current NSF Standards.
- 2. Applied directly over 3/4" thick close-grained plywood, Grade A/B, or better of selected, smooth, sanded stock to ensure a smooth ripple-free laminated surface. OSB, MDF, or particleboard panels are not considered acceptable. If specified plywood substrate is unavailable, submit specifications and sample of alternate material for approval.

3. Adhere to substrate materials with manufacturer recommended waterproof and heat-proof contact cements only.
4. Exposed faces and edges shall be faced with 1/8" thick material. Corresponding backs are to be covered with approved backing material. No unfinished exposed plywood surfaces will be acceptable.
5. All plastic laminate surfaces are to be finished without waves and unsightly joints.
6. Color and texture as selected by the Architect/Interior Designer.

C. Insulation:

1. For low temperature applications, such as ice bins, cold pans, or fabricated under counter freezers or refrigerators, use urethane, rigid board foam, or foamed-in-place; not less than two (2) inches thick, except that vertical surfaces of cold pans and ice bins may be one (1) inch thick. Insulation shall be bonded at joints with urethane or polyurethane expanding foam to fill all voids and prevent condensation on exterior. Polystyrene foam will not be acceptable.
2. For heated type applications, use mineral wool, a minimum of one (1) inch thick.
3. All insulation shall be fully encased, or enclosed.

D. Joint Materials:

1. Sealants: Silicone based, liquid elastomeric sealant, non-solvent release type. Sealants shall be NSF listed, and FDA approved for use in food zones. Installation shall comply with applicable requirements of NSF Standards.
2. Gaskets: Solid or hollow neoprene or PVC light grey, self-adhesive or prepared for either adhesive application or mechanical attachment.

E. Paints and Coatings:

1. Provide the types of painting and coating materials which, after drying or curing, are suitable for use in conjunction with foodservice and which are durable, non-toxic, non-dusting, non-flaking, mildew resistant, and comply with all governing regulations for foodservice.
2. Pretreatment. All metal surfaces to be painted are to be cleaned and/or chemically etched as per the recommendations of the manufacturer for the finish coating that is

to be applied.

3. Raw metal surfaces are to be coated with suitable primer/filler paint before application of finish coat.
4. Sound Deadener: NSF listed sound deadening material, latex sound deadener, for internal surfaces of metal work, and underside of metal counters, dish tables, sink bowls, and drain boards. Install "tacky tape" between work top, and underbracing, or framing.

2.3 FABRICATED COUNTERS, TABLES, AND METAL PRODUCTS:

A. General Fabrication Requirements:

1. Remove burrs from sheared edges of all sheet metal to eliminate cutting hazard. Maintain flat, smooth surfaces without damage to finish.
2. Reinforce metal at locations of hardware and accessory attachments wherever metal is less than 14-gauge thickness or requires mortised or recessed installation. Weld in place on concealed side of work. Reinforcements will not show on finished, exposed surfaces.
3. Exposed screws or bolt heads, rivets, or butt joints filled with solder are not acceptable. Where fasteners are permitted, provide Phillips head or oval head machine screws. Cap threads with acorn nuts, unless fully concealed and inaccessible. Provide nuts and lock washers where necessary or indicated. Match fastener material and finish with finish of metal being fastened.
4. Where components of fabricated metal work are indicated to be galvanized or steel and involve welding of the metal, complete the fabrication, and clean all welding slag, then paint with a high-grade aluminum color, rust-preventative spray paint.
5. Welding and Soldering:
 - a. Welding: All welded parts shall be non-porous and free from imperfections, pits, cracks, or discolorations. Stainless steel joints and seams shall be heli-arc welded, ground smooth and polished to a No. 4 finish. Welds of galvanized steel shall be ground smooth.
 - b. Materials 18-gauge or heavier shall be welded. Seams and joints are to be shop welded or soldered as indicated. Welds must be ground smooth and polished to match the original finish.

- c. Where galvanizing has been burned off, the weld shall be cleaned and then painted with a high-grade aluminum color, rust-preventative spray paint.
 6. Provide removable panels for access to mechanical and electrical service connections and components concealed inside equipment, but only where other means of access is not possible, and not indicated through other work.
 7. Where ends of equipment, rear or end splashes, shelves, etc., are open after fabrication, they are to be enclosed by forming metal and welding, adding filler sections, if necessary, to close entire opening flush to walls, adjacent fixtures, or equipment.
 8. Coved Corners: Stainless steel foodservice equipment shall have a minimum of 1/4" radius coves in horizontal and vertical corners, and intersections, and are to be constructed to NSF standards.
 9. Set each item of non-mobile and non-portable equipment securely in place, level and adjust to correct height. Anchor to supporting substrate where indicated and where required for sustained operation and use without shifting or dislocation. Conceal anchorages where possible. Where indicated or required for safety of equipment operator, anchor equipment to floor or wall. Where equipment is indicated to be anchored to floor, provide legs with adjustable flanged feet. Install two anchors on each foot.
 10. Quality of Work: All work to be of the highest quality in the trade. Field verify all dimensions before fabricating, adjust where necessary to conform to building and job site conditions, neatly fit around pipes, offsets, and other obstructions. Fabricate only in accordance with approved shop drawings.
 11. The approved manufacturers for this section are the following: **Custom Metals** of Whitman, MA, **SML Fabrication** of Quebec, Canada, and **Glastender** of Saginaw, MI. All others will be rejected.
 12. All items are to be UL listed and NSF certified. All items must have a visible NSF label on each piece of equipment. If equipment has an electrical component, these items must have a visible UL label in addition to the NSF label.
- B. Metal and Gauges:
1. Unless otherwise indicated in Itemized Equipment Specifications, fabricate exposed metalwork of stainless steel, and fabricate the following components from the gauges of metal as indicated:

- a. 14-gauge 304 stainless steel with #4 finish for all sinks; drain boards, table and counter tops, reinforcements, gusset plates, and hat channels.
- b. 16-gauge 304 stainless steel with #4 finish for all wall shelves, under shelves, inserts, trays, single-pan drawers, or door fronts.
- c. 18-gauge 304 stainless steel with #4 finish for all wall cabinets, table, counter base cabinets, skirting, enclosure panels, trim strips, and corners, double-pan drawer fronts or doors, hoods, ventilators, access panels, or covers.
- d. Type 304 stainless steel is to be used as the standard construction.

C. Fabrication Methods:

- 1. Fabricate metal work surfaces by forming, and welding to provide seamless construction, using welding rods matching sheet metal, or welding on stainless steel using stainless steel filler rods, grinding, and polishing to match surrounding surfaces. Where necessary for disassembly, provide waterproof field joints with gasket and concealed bolting. If field-welded field joint is indicated, provide a straight, smooth, edge.
- 2. Reinforce work surfaces at a minimum 24 inches on center in both directions with galvanized or stainless steel structural members as indicated.

D. Top Construction:

- 1. All tops, unless otherwise indicated, shall be constructed of 14-gauge stainless steel. Exterior edges not adjacent to walls or other equipment shall be turned down 1 1/2" with 1/2" 45-degree turn in. Tops adjacent to walls shall be turned up 6" with 45-degree angle to wall and down 3/4". Tops adjacent to other equipment shall be flanged straight down 2". Sound deadening material shall be provided between frame members and stainless-steel tops.
- 2. The edges of dish table tops not adjacent to walls shall be turned up 3" and rolled down 1-1/2" with corners bull nosed. Dish table tops adjacent to walls shall be turned up 6" back 2" on a 45-degree angle and down 3/4". All horizontal edges and internal corners of dish tabletops shall be coved on a 5/8" minimum radius. Ends of backsplashes shall be closed, welded, ground smooth and polished.
- 3. Edges of preparation counter tops, with sinks, not adjacent to walls shall have non-spill edge, unless specified otherwise. Preparation counter tops, with sinks, adjacent to walls shall be turned up to 6", back 2" on a 45-degree angle and straight down 3/4". All horizontal edges and internal corners of preparation counter

tops shall be coved on a 5/8" minimum radius. Ends of backsplashes shall be closed, welded, ground smooth and polished. Backsplashes of counter tops with sinks shall be pierced on 8" centers over sinks.

4. All tops shall be reinforced on the underside with enclosed channels running from front to back with center bracing where required to hold tops flat.
5. Metal tops shall be one-piece welded construction, including joints only where necessary.
6. Fasten tops to supporting frames, cabinet bases, or structural members with stainless steel welded stud bolts and stainless-steel cap nuts.
7. Professionally designed bolt together field joints, trim strip, or other commercial joint material to suit requirements shall be used only where it is specified.
8. Welded Field Joints, where specified, will be welded, ground, and polished to match surrounding surfaces. Excessive distortion from the welding will not be acceptable.

E. Structural Components:

1. Unless otherwise indicated, provide framing of minimum 1-1/4" O.D. round pipe or tubing, with mitered and welded joints and gusset plates, ground smooth. Provide 16-gauge stainless steel tube for exposed or concealed framing.
2. Where indicated, enclosed bracing channels of 1" x 4" x 1" are to be used, of material specified, 14-gauge, and attached to tops as outlined in other sections.

F. Field Joints:

1. For any field joint required because of size of a particular item, use a butt-joint, reinforced with formed angles of same material on underside, attached with stud bolts. If bolt together joint is required, provide with concealed stainless-steel bolts and nuts, with waterproof gasket between angles, and seal with food grade and NSF-listed silicone sealant. If specified as field-welded joint, weld and fill with stainless steel filler rod, grind, and polish to match surrounding material.
2. Field joints shall be located for practical construction with sizes convenient for shipping and entry into building spaces. All field joints shall be fully continuous welded with the same type of metal, ground smooth and polished to the original finish of the metal.

G. Open Pipe Bases:

1. All open bases shall be constructed of 1-5/8" OD 16-gauge stainless steel tubular up-rights and cross braces fully welded together, ground smooth and polished. Top of cross braces shall 12" above floor.
2. Uprights shall be fitted on the floor with adjustable, stainless-steel feet as specified inserted into uprights with inside threads to eliminate any possibility of threading collecting dirt and other matter. The tops of legs shall be fitted into die-stamped fully enclosed stainless-steel gussets welded to the reinforcing channels on the underside of stainless-steel tops.
3. Use stainless steel adjustable bullet feet or stainless steel adjustable flanged feet with mounting holes as indicated. Legs are to be spaced sufficiently close enough together to support the weight of items on top of table or counter, and in no case more than 5'-0" on center.
4. Tables 6'-0" long and under shall have four (4) legs and tables 7'-0" long shall have six (6) legs. Legs on dish tables shall be spaced not more than 5'-0" apart unless specified otherwise.

H. Cabinet Bases and Bodies:

1. All cabinet bodies and bases shall be enclosed with 18-gauge stainless steel. Exterior vertical corners shall be square. Bodies and bases shall be mounted on high sanitary adjustable counter legs with toe kicks unless otherwise noted.

I. Legs & Cross rails:

1. Equipment legs and cross rails shall be 1-5/8" O.D., 16-gauge type 304 stainless steel tubing. Fit legs with stainless steel adjustable bullet feet or stainless steel adjustable flanged feet with mounting holes as indicated. Cross rails are to be notched at end and welded to legs as specified. All welds are to be continuous, ground smooth, and polished to match surrounding material. Tack welds are not acceptable. Where flanged feet are specified, anchor to floor with either expanding, driven in stainless steel pins or stainless-steel lag bolts with expanding anchors as indicated.
2. Stainless Steel Gussets to be 16-gauge stainless steel exterior, to accept 1-5/8" O.D. stainless steel tubing, with Allen set screw for fastening and adjustment. Reinforced with 12-gauge mild steel insert welded in interior. To be welded to framing members as indicated.

3. Legs shall be fastened to equipment with gussets, as follows:
 - a. Sinks to have gussets welded to stainless steel channels, 14-gauge or heavier, anchored to either drain boards, or sink bowls as indicated, with stainless steel welded stud bolt.
 - b. Metal Top Tables and Dish Tables to have gussets welded to stainless steel channels, unless otherwise indicated, 14-gauge or heavier, anchored to top with stainless steel welded stud bolts.
 - c. Wood Top Tables to have gussets welded to stainless steel channels, 14-gauge or heavier, anchored to underside of top with stainless steel screws through slotted holes to allow for top expansion.

J. Casters:

1. Type and size as specified on drawings and specifications, NSF approved, not less than 5" diameter; heavy-duty ball-bearing, solid or disc wheel with non-marking grease proof rubber, neoprene or polyurethane wheel as specified. The minimum width of tread shall be 1-3/16". Minimum weight capacity shall be 250 pounds per caster unless otherwise noted in itemized specifications.
2. Unless otherwise indicated, each equipment item on casters is to be supplied with two (2) swivel-type casters and two (2) swivel-type casters with foot brakes. Brakes are to be on front casters for equipment against walls and on opposing corners of equipment not normally against walls.

K. Shelves:

1. All under shelves and interior shelves shall be constructed of 18-gauge stainless steel.
2. Under shelves on open base tables shall be welded to the legs.
3. Construct solid shelves under pipe base tables of 16-gauge stainless steel, with 1-1/2" turn-down front and ends, bottom edges turned in additional 2" @ 45-degrees, and 1-1/2" turn-up at rear, unless indicated otherwise. Notch and fully welded to pipe legs as necessary, ground smooth and polished to match surrounding material. Tack welds are not acceptable. In fixtures with enclosed bases, turn up shelves at both rear and sides.

4. Interior shelves of cabinet bodies and bases shall be adjustable and removable unless specified otherwise. Sides and rear edges of shelves shall be turned up and front turned down. Shelves shall be braced on the underside. Where plumbing and other appurtenances pass through counter bases, open chases, shall be provided to accommodate piping.
5. Elevated Shelves: All elevated shelves shall be constructed of 16-gauge stainless steel and shall be turned down 1-1/2" with 1/2" 45 degree turn in on front and ends. Freestanding shelves, unless specified otherwise, shall be mounted on 1 5/8" OD stainless steel tubular uprights mounted to counter tops.

L. Sinks:

1. All sinks shall be constructed of 14-gauge stainless steel having back, bottom and front formed of one (1) continuous sheet of metal with ends and partitions welded in place. All vertical and horizontal corners of sink compartments shall be coved with metal on a 5/8" (minimum) radius. Bottom of sinks are to be creased and pitched toward drains.
2. Sink inserts shall be constructed the same as specified for sinks above with coved corners. Sink inserts shall be welded integral with stainless steel tops. Fully fabricated 14-gauge Stainless Steel construction. Deep Drawn or stamped bowls not acceptable. Sink bottoms are to be creased and pitched toward drains.
3. Partitions to be double thick, 1" minimum space between walls. Multiple compartments shall be continuous on the exterior with stainless steel apron.
4. Cove interior vertical and horizontal corners of each tub not less than 5/8-inch radius, die formed. Outer ends of drain boards to have roll rim risers not less than 3 inches high.
5. Punch rear splashes with holes for faucets as indicated 2-1/2" below top edge. Verify center-to-center spacing with faucet specified.

M. Plumbing Fixtures:

1. Where exposed or semi-exposed, provide piping in bright chrome plated brass or polished stainless steel and copper where not exposed. PVC is not acceptable for cold water drains (ice bins, soda fountains, condensate from refrigeration) unless where allowed by local codes. PVC is not acceptable on any drains where hot water will flow or for pressured water lines.

2. Vacuum Breakers: Provide with foodservice equipment items where specified.
3. Unless otherwise indicated, furnish lever or twist waste drains as specified on all sinks, with removable flat strainers and 2" IPS outlet size. If basket drains are specified, will be all stainless-steel construction.
4. Handle (lever or twist, as specified) to extend to front edge of sink. Handle to be supported and protected by stainless steel bracket where indicated. No riveting, screws, or soldering permitted to fit drains to sinks, with all parts of drains easily removable for servicing and replacement.
5. Water pans for hot food tables shall be fitted with 1" drains with chrome-plated brass standpipes or manifolded together to a single gate valve for draining as indicated.
6. All faucets furnished with equipment included in this Section shall comply with current NSF and Lead-Free Standards. No lead products are acceptable on this project and need to conform to lead testing per NYSOCCRR sub part 67-4. When the itemized specifications list a faucet by manufacturer and model, the Contractor shall verify that the listed faucet complies with this requirement. If the listed faucet does not comply, the Contractor shall notify Foodservice Consultant immediately and submit for approval a similar model, which does comply, from the same manufacturer where possible. Provide mounting kit for all splash mounted faucets to the plumber for installation. Mounting kits depend on faucet requirements.

N. Electrical Materials and Components:

1. Provide standard materials, devices and components as recommended by the manufacturer or fabricator, selected, and installed in accordance with NEMA standards and recommendations as required for safe, efficient use, and operation.
2. Components shall bear the UL label, or be UL recognized, with the whole item being UL listed.
3. Confirm all electrical requirements for project, including but not limited to, actual voltages available, single, or three-phase availability, etc.
4. Electrical work for custom fabricated equipment shall be completely pre-wired to a junction or pull box mounted on the equipment, all wires clearly marked and labeled for outlet or item served. Counters should be wired for a single connection point at the job site wherever possible and specified. Verify local requirements for UL Listing on complete assembly and provide if required.

5. Custom fabricated refrigeration units shall be provided with vapor proof light fixtures with shatterproof polycarbonate lamp shields and automatic switches. All wiring shall be concealed if possible.
6. Controls, Switches, and Receptacles: Provide recognized commercial grade signal lamps, switches, controls, and switches as indicated. All such units to be complete with pilot lights, permanent signs, and graphics to assist the user of each item. Provide stainless steel cover plates on all electrical boxes and switches; these are always to be located out of heat zones, easily accessible, and in locations that prevent accidental contact by staff.
7. Convenience Outlets and Power Receptacles:
 - a. Make cutouts and install appropriate boxes or outlets in fabricated fixtures complete with wiring, conduit, outlet, and stainless-steel cover plate.
 - b. GFCI outlets shall be furnished where adjacent to sink compartments as per the National Electrical Code.
8. Plugs and Cords: Where cords and plugs are provided, they shall comply with National Electrical Manufacturers Association (NEMA) requirements. Indicate NEMA configuration for each applicable item.
9. Heating Equipment:
 - a. Electric heating equipment shall be so installed as to be readily cleanable or removable for cleaning.
 - b. Steam heated custom fabricated equipment shall be a steam coil/heat exchanger design, and will include all necessary control valves, components, and moisture trap located and shall be installed and located in an accessible position.
10. Motors are to be enclosed type, except drip-proof type where not exposed to dust or moisture condition. Ball bearings or sleeve bearings are acceptable on small-timer motors; moisture resistant windings, horsepower, and duty-cycle ratings as indicated.
11. Internal Wiring of Fixtures and Equipment:
 - a. The F.S.E.C. shall be responsible for internal wiring of electrical devices built into fabricated equipment items. Wiring to be enclosed in metal conduit or an electrical chase where indicated, to an accessible pull-box, with all wires clearly labeled. For any item shipped in sections, all wiring shall be properly connected

internally to a single connection point and verified by the F.S.E.C.

- b. Furnish dishwashers, and conveyors internally wired to junction box, or distribution panel as specified; including all required switches, motors, immersion heaters, solenoids, and other components required for proper operation.
- c. Where light fixtures are specified or detailed as part of counters, cases, or fixtures; light fixtures, lamps, and shields shall be furnished and installed. If fluorescent light fixtures are specified, warm white lamps are to be used unless otherwise specified and ballasts shall be included. Shatter shields shall be provided for all light fixtures.
- d. All wiring shall conform to the National Electrical Code and shall be UL listed.
- e. Exposed flexible steel conduit on kitchen equipment shall be neoprene jacketed Seal-Tite conduit equal to Anaconda type UA/UL approved, complete with approved liquid-tight connectors on each end and designed to provide electrical grounding continuity.
- f. Exposed electrical conduit used in kitchen wet area applications, except for flexible connections, shall be rigid galvanized steel. Thin wall conduit (EMT) shall not be permitted for wet areas. Exposed outlet boxes shall be liquid-tight type, with threaded hubs.

O. Enclosures:

- 1. Provide enclosures, including panels, housings, skirts, trim panels, operating components, mechanical, and electrical devices associated with the foodservice equipment unless specifically indicated otherwise.

P. Doors:

- 1. Metal doors shall be double-cased stainless steel, 18-gauge with corners welded, ground smooth and polished. The inner pan shall be fitted tightly into outer pan with a sound-deadening material such as Styrofoam used as a core. The two pans shall be tack welded together and joints sealed. Door thickness to be 3/4".
- 2. Wood doors are to be constructed as detailed. If Formica or other plastic surfaces are used, sides and backs must be laminated as specified on plans or specifications.
- 3. Hinged Door Hardware: Hinged doors shall be mounted with heavy duty NSF approved hinges with pulls. Catches shall be heavy-duty magnetic type, unless otherwise

indicated.

4. Sliding Door Hardware: Sliding doors shall be mounted on large, quiet ball bearing rollers with quiet nylon wheels in 14-gauge stainless steel overhead tracks. Rollers to be easily replaceable and doors to be removable without the use of tools (lift out).
5. All hardware used must be identified with the manufacturer's brand name, and part number on shop drawings so that broken or worn parts may be easily obtained and replaced.

Q. Drawer Assemblies:

1. Assemblies shall consist of removable drawer body mounted in a ball bearing slide assembly with fully enclosed housing. Slide assembly consists of one pair of 200-pound capacity, 300 series stainless steel, full extension, side-mounting, self-closing type, with stainless steel ball-bearings and positive stops. Drawers have side and back enclosure panels, front spacer angle, two drawer carrier angles, secured to slides and stainless-steel front. Drawer pulls shall be stainless steel full grip type with frame beveled edge.
2. Unless otherwise indicated, drawers for general storage are to have a removable 20" x 20" x 5" deep stainless-steel pan. Drawers intended to hold food products are to be designed to hold standard 12" x 20" stainless steel food pans up to 4" deep in a stainless-steel assembly.
3. Drawer fronts are double-pan construction, $\frac{3}{4}$ " thick, and 18-gauge stainless steel, welded, ground, and polished. The back pan is tightly in-fitted, tack welded, and sealed. Sound deaden with rigid insulation material.
4. Provide drawers with replaceable soft neoprene bumpers or for refrigerated drawers, a full perimeter soft gasket.

R. Sound Deadening:

1. Sound deaden underside of metal tops, drain boards, under shelves, cabinet interior shelves, etc., above the underbracing, reinforcing, or framing only.
2. Sound Deadener: NSF listed sound deadening material, latex sound deadener for internal surfaces of metal work, and underside of metal counters, dish tables, sink bowls, and drain boards. Install "tacky tape" between work top, and underbracing, or framing.

S. Serving Counter Fabrication:

1. Tops are a minimum of 14-gauge 300 series stainless steel with not less than a #4 finish with 2" square turndown on all sides. Corners are fully welded and polished. The tops are attached to the cabinet body so that no spot weld marks appear.
2. Cabinet bodies are heavy gauge 300 series stainless steel panelized construction, 14-gauge stainless steel vertical channel supports at all tray slide bracket locations and additional galvanized channel supports as per detail shown below.
3. Starting at the base of the unit, the unit shall have a 2 " high x minimum 4" wide, 14-gauge galvanized supports running from front to rear at each leg location. Located left to right on back of the shelf nosing and across the rear of the unit are approx. 1/2 "x 2" galvanized supports. All the base bracing shall be closed off to prevent vermin from entering.
4. Inside the unit behind the end mullion, there are 20-gauge galvanized inserts to match the width of the mullion and close off any gaps. Should the unit have a work shelf on the operator side a 14-gauge backer shall be installed, so that any screws to hold the shelf in place are penetrating the 14-gauge backer.
5. In the inside rear of the unit, there are to be minimum 4" wide "C" Shaped 14-gauge 300 series stainless steel vertical supports, installed at each end of the unit, and where any attachment is made for tray slide, additional supports shall be installed vertical so that the spacing from center to center does not exceed 16" inches. Across the top of the vertical support and around the perimeter of the top, unit shall have 1/2" x 2" 20 gauge "C" shaped supports. Unit top shall have top support where needed.
6. All open shelf areas shall be the full width and depth of the base area. No cavities shall be created in the construction of the body that is not accessible without the use of tools.
7. All supports and body panels shall be welded together in a unitized or panelized body construction.
8. All units include a 300 series stainless steel built-in under shelf with utility access holes and grommeted black covers. Intermediate under shelves where required are welded in position. Under shelf shall run the full distance of the unit, less the material thickness of the end panels and shall be full depth, less the material thickness of the back panel.
9. Casters are secured to a 2" x 4", minimum 14 gauge galvanized inverted channel that runs front to back.

10. Interior cabinets have a choice of stainless steel or powder coated material as determined by the consultant or architect. If a powder coat is chosen, then galvanized will be used in lieu of stainless steel in the construction of the base.
11. Exterior finish can be a choice of plastic laminate veneered to body panels, removable laminated panels, powder coat paint finish, or a variety of millwork options as specified.
12. All powder coat painting must be conducted in-house at the approved manufacturer's facility to ensure quality control.
13. Tray Slides: Before fabrication of counters with tray slides, verify size and shape of tray to be used. Edge of tray shall not overhang outer support/slider by more than 2". If the edge of tray exceeds this dimension, notify Architect, in writing, for evaluation and adjustment if necessary. Tray slide to be capable of supporting 300 pounds per linear foot, live load.
14. All equipment must bear labeling and be approved by the U.L. for safety and sanitation and must be built in an ISO 9001:2000 approved manufacturing facility. Compliance with the National Sanitation Foundation's (NSF) standards 2, 4 and 7 shall be confirmed by U.L. Sanitation or other nationally known and respected third-party testing facilities.

2.4 REFRIGERATION:

A. General:

1. All refrigerant and associated components shall comply with the latest code requirements and shall comply with the latest Federal Regulations for energy efficiency. Walk-In coolers or freezers need to include the following: automatic door closing device, power air curtains on doors, heated triple pane windows on cooler and freezer doors, high efficiency lighting or automatic light switches, R-25 insulation in cooler walls, doors, and ceilings, R-32 insulation in freezer walls, doors, and ceilings, and R-28 insulation in walk-in cooler and freezer floors. Condensing units shall be equipped with PSC fan motors and evaporator fans shall utilize the ECM type fan motors. Refrigerants must comply with the latest type required by Federal Regulations and use R290 refrigerant where possible.
2. Wiring for walk-in refrigerator and freezer cabinets shall be UL approved type from exterior junction box to internal components, with insulation, unless local codes require metallic conduit (EMT or Greenfield). For freezer applications, Seal-Tite Flex or approved equal shall be used. Lighting receptacles, and door switches shall be

mounted weatherproof boxes. All penetrations to be insulated with expanding foam and sealed to prevent condensation moisture buildup.

3. Furnish either single, or multiple condensing units, or a rack refrigeration system as specified and/or recommended by the manufacturer for the items on the equipment schedule. Furnish all components necessary for a complete installation of the system, including coils, receivers, compressors, motors, motor starters, mounting bases, vibration isolation units, fans, dryers, valves, piping, insulation, gauges, winter control equipment, etc.
4. All refrigerant and associated components shall comply with the latest code requirements. No CFC refrigerants or associated components shall be allowed on this Project. HFC refrigerants and components shall be used where available. HCFC refrigerants and components, with a minimum 2010 phase-out date and intermediate replacement refrigerants, are to be used only when HFC refrigerants are not available.
5. The minimum outdoor operating ambient temperature for design of units is -10 degrees Fahrenheit, unless otherwise specified. The maximum indoor design temperature for operation of compressor units is 95 degrees Fahrenheit. The maximum outdoor ambient design temperature shall not be less than 100 degrees Fahrenheit. Special attention is to be given to conditions at mounting locations of condensing units, such as sun exposure, restricted airflow and ventilation, fences, walls, roof color, and materials.

B. Components:

1. Expansion Valves: Remote refrigeration system shall be complete with thermostatic expansion valves at the evaporator coils.
2. Thermometers: Fabricated refrigerated compartments to be fitted with either flush dial or digital thermometers as specified on individual items. Thermometers shall be adjustable and calibrated after installation. Accuracy to be +/- 2 degrees Fahrenheit.
3. Hardware: Refrigerator hardware for fabricated refrigerator compartments shall be heavy-duty components, NSF Listed. Use self-closing, heavy duty edge mount style hinges, with Spring Kit. Latches to be magnetic edge mount type, with cylinder locks, unless specified or detailed otherwise. All doors and drawers for walk-in coolers/freezers and reach-in refrigerated compartments, both fabricated and standard shall be fitted with cylinder locks.

C. Cold Pans:

1. Ice pans, refrigerated pans, and cabinets shall be provided with breaker strips or other insulation where adjoining top or cabinet face materials to prevent transfer of cold and possible condensation problems.
2. All open top mechanically cooled custom fabricated, standard buy-out refrigerators, and / or cold pans shall comply with the latest NSF Standard #9 requirements.

D. Refrigerated Equipment Ventilation:

1. Adequate ventilation shall be provided for custom fabricated equipment with integral refrigeration condensing units, both built-in and drop-in. If flow through ventilation cannot be provided, provide flow direction partitions and an additional fan capable of cooling the condensing unit. If in the opinion of the Food Service Equipment Contractor or Refrigeration Subcontractor additional room ventilation is required to ensure correct operating temperatures of standard buy-out, custom fabricated, remote refrigeration condensing units, or compressor rack assemblies, they shall so state in a letter to the Architect for evaluation and decision.

2.5 MISCELLANEOUS:

- A. Reasonable quietness of operation of equipment is expected, and the Foodservice Contractor will be required to replace or repair any equipment producing excessive noise at no expense to the owner. This includes but is not limited to bumpers and gaskets for doors and drawers, and sound deadening or insulation where specified and practical.
- B. Manufactured Equipment Items: Furnish items as scheduled, or herein specified. Verify dimensions, spaces, rough in, and service requirements, as well as electrical characteristics before ordering. Provide trim, accessories, and miscellaneous items for complete installation.
- C. Nameplates: Whenever possible, locate nameplates and labels on manufactured items in an accessible position, but not within the normal view of customers.
- D. All items must have a visible NSF label on each piece of equipment. If equipment has an electrical component, these items must have a visible UL label in addition to the NSF label.

PART 3- EXECUTION

3.1 SITE EXAMINATION:

- A. Verify site conditions under the provisions of the General Conditions, Supplementary Conditions, and applicable provisions of other Sections. Notify the Architect, in writing, of

unsatisfactory conditions for proper installation of foodservice equipment specified in this section.

- B. Verify that all required service utilities are available, and of the correct characteristics in the required locations. Notify the Architect, in writing, of any problems or conflicts with food-service equipment specified in this section.
- C. Verify wall, column, door, window, and ceiling locations and dimensions. Fabrication and installation should not proceed until dimensions and conditions have been verified and coordinated with fabrication details.
- D. Verify that necessary wall reinforcement or backing has been provided for wall-mounted equipment. Coordinate with General Contractor for placement of such backing during wall construction.
- E. Verify that ventilation ducts are of the correct characteristics and in the required locations.

3.2 SUPERVISION:

- A. A competent supervisor representing the Food Service Equipment Contractor shall be always present during progress of the F.S.E.C.'s work.
- B. A competent supervisor representing the Food Service Equipment Contractor shall be always present during work by any of the F.S.E.C.'s subcontractors.

3.3 SITE CLEANUP:

- A. Throughout the progress of their work, the Food Service Equipment Contractor shall keep their working area free from debris, and shall remove all trash, rubbish, etc., daily. At no time is the F.S.E.C. to allow any trash, debris, rubbish, crating, boxes, packaging, etc. to accumulate at the job site. At the completion of their work, the F.S.E.C. shall leave the premises in a clean and finished condition.

3.4 INSTALLATION:

- A. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved. Install items as per each manufacturer's installation manual.
- B. Set each item of non-mobile and non-portable equipment securely in place, leveled, and adjusted to correct height. Anchor where indicated, and where required for sustained operation and use without unnecessary movement. Conceal anchors wherever possible. Adjust counter tops and other work surfaces to a level tolerance of (+/-) 1/16" or better.

- C. Complete field assembly joints in all by welding, bolting / gasketing or as otherwise indicated and specified. Grind all welds smoothly and restore the finish to match surrounding materials as specified.
- D. Provide anchors, supports, bracing, clips, attachments, etc., as required to comply with the local seismic restraint requirements.
- E. Verify, and coordinate mounting heights of all wall shelves and equipment with equipment located below for proper clearances.
- F. Insulate contact points between dissimilar metals to prevent electrolysis. Cut, punch, and drill components for outlets, fixtures, piping, conduit, and fittings as required. Coordinate with other trades and provide holes in food service equipment for plumbing and electrical service to and through the fixtures as required or indicated. This includes welded sleeves, collars, ferrules, or escutcheons. These services are to be located so that they do not interfere with intended use, and / or servicing of the fixture.
- G. Provide sealants and gaskets around each unit to make joints airtight, waterproof, vermin-proof, and sanitary for cleaning purposes. At internal corner joints, apply sealant or gaskets to form a sanitary cove. The shape exposed surfaces of sealant slightly concave. Sealant filled or gasketed joints will be acceptable up to 3/8" joint width. Wider joints are to be provided with a matching metal closure or trim strip with sealant application to each side of strip.

3.5 ADJUSTING:

- A. Repair or replace equipment that is found to be defective in its operation, including units that are operating with excessive noise or vibration.
- B. Test and adjust equipment, controls, and safety devices to ensure proper working order and conditions.

3.6 CLEANING AND RESTORING FINISHES:

- A. Restore damaged finishes, polish exposed metal surfaces, and touch-up painted surfaces. Replace work, which cannot be successfully restored.
- B. After completion of installation, and completion of other major work in foodservice areas, remove all protective coverings, films, etc., and clean foodservice equipment.
- C. Clean and polish glass, plastic, hardware, accessories, fixtures, and fittings and leave in a condition ready for the owner to sanitize and use.

3.7 EQUIPMENT START-UP, TESTING, AND DEMONSTRATION:

- A. Prior to final connections by other trades, the Food Service Equipment Contractor is responsible for inspecting and verifying the readiness of all utilities. F.S.E.C. to coordinate a site meeting with all trades required to review and approve all rough-in and accessory items that meet the equipment requirements per the manufacturer's recommendations. A written report shall be submitted by the F.S.E.C. to the architect and/or consultant.
- B. The Food Service Equipment Contractor is to test and start up **all** equipment prior to the equipment demonstration. Any problems shall be addressed prior to the training and a written report shall be submitted by the F.S.E.C. to the architect and/or consultant.
- C. The Food Service Equipment Contractor is to make arrangements for a demonstration of foodservice equipment operation and maintenance in advance with the owner / operator. This training session for all equipment should be provided on one day or a few consecutive days pending approval by the owner/operator. Demonstrate all equipment to familiarize the owner / operator with operation and maintenance procedures including periodic preventative maintenance measures required. Include an explanation of service requirements, and simple on-site service procedures as well as information concerning the name, address, and telephone number of a qualified local source of service. The individual performing the demonstration should be knowledgeable of the operating and service aspects of the equipment. The F.S.E.C. shall provide a written attendance sheet of all attendees including owner/operator, F.S.E.C. representative, and all equipment demonstrators. Failure to provide this submittal will hinder the closeout of the project.

PART 4 - ITEMIZED SPECIFICATIONS:

CAFÉ EQUIPMENT

ITEM: 100

MANUFACTURER: CONTINENTAL REFRIGERATOR

MODEL: MC4NSSD

DESCRIPTION: MILK COOLER (2 REQUIRED)

Milk Cooler, forced air, dual access, drop-down doors, flat top carton capacities hold (12) 13" x 13" x 11" or (8) 19" x 13" x 11" milk crates, self-latching doors/lids with safety bumpers, cylinder lock, heavy-duty epoxy coated wire floor racks, electronic control, exterior digital thermometer, auto defrost, stainless steel interior and exterior with reinforced stainless-steel floor, 2" polyurethane foam

insulation throughout, R290 Hydrocarbon refrigerant, snap in door gaskets, floor drain, 1/3 HP, 5" casters, UL and NSF listed.

- 120/60/1
- Self-Contained refrigeration
- Low profile evaporator for dual access of crates.
- Wrap around bumper.
- Floor lock
- Exterior digital thermometer
- Six-years parts and labor warranty
- Seven-year compressor warranty
- Two-year door gasket warranty

ITEM: 101

MANUFACTURER: DUKE MANUFACTURING

MODEL: TST-74SS

DESCRIPTION: HOT FOOD STATION (2 REQUIRED)

Thurmaduke Four Section Waterless Hot Food Unit, 36" high counter, 14-gauge stainless steel top, individual touch screen controls, black silicone liners, stainless steel enclosed cabinet body with reinforced cut-out for drop-in, stainless-steel legs with adjustable feet, casters with brakes and stainless-steel legs with adjustable feet, and locking device with stainless pin and latch under both ends of countertop.

- 120/208/60/1
- Exterior removable laminate décor panel trimmed in stainless on cabinet front and milk cooler end. Laminate to be Wilson art #7990 "Mission Maple".
- 10" Solid stainless-steel tray slide with two (2) rub rails, mounted to be an integral part of the cabinet on fixed brackets with a rear turn up on tray slide. The tray slide is mounted at 34" AFF and has an internal locking device with stainless steel pin and latch line up device mounted under tray slide.
- 1" Recessed top for sheet pans
- Storage compartment on operator's side without center shelf
- Expressions style IBC station with electrical cord cover
- Mounted body pilasters on front and rear of serving lines between units that join.
- Stainless steel adjustable kickplate to be mounted with stainless steel fasteners 1/2" above the floor. Stainless steel pilaster shall be used behind the gaps in the units, so the kick plates appear to be continuous. Kick plates are removable for movement of unit and mounted on the front and milk cooler side of the unit.
- (12) Vollrath Model #30042, Super Pan V Food Pan, full size, 4" deep, 14-quart capacity, 22-gauge, 300 series stainless steel, reinforced pour corners, reverse formed flattened edges, anti-jamming design, NSF, Made in USA.

- (12) Vollrath Model #30062, Super Pan V Food Pan, full size, 6" deep, 22-gauge, 21-quart capacity, 300 series stainless steel, reinforced pour corners, reverse formed flattened edges, anti-jamming design, NSF, Made in USA.
- (12) Vollrath Model #77250, Super Pan V Steam Table Pan Cover, stainless, full size, reinforced flat solid, fits all full-size pans, NSF.
- (12) Vollrath Model #30242, Super Pan V Food Pan, 1/2 size, 4" deep, 6.7-quart capacity, 22-gauge, 300 series stainless steel, reinforced pour corners, reverse formed flattened edges, anti-jamming design, NSF, Made in USA.
- (12) Vollrath Model #30262, Super Pan V Food Pan, 1/2 size, 6" deep, 10-quart capacity, 22-gauge, 300 series stainless steel, reinforced pour corners, reverse formed flattened edges, anti-jamming design, NSF, Made in USA.
- (12) Vollrath Model #75120, Super Pan V Steam Table Pan Cover, stainless, 1/2 size, reinforced flat solid, fits all half-size pans, NSF.

ITEM: 102

MANUFACTURER: DUKE MANUFACTURING

MODEL: TS422-74

DESCRIPTION: BREATH GUARD (2 REQUIRED)

Contemporary field shield, adjustable from full-service to self-service, single shelf, vertical and fixed end enclosures, stainless steel finished posts mounted through countertop with mounting flange, 3/8" glass over-shelf and guard, and 1/2" glass ends. All glass is tempered and polished with rounded edges.

- Led light mounted under the shelf, wired to a switch on the counter.
- Stainless steel post and frame finish.

ITEM: 103

MANUFACTURER: DUKE MANUFACTURING

MODEL: TST-32SS

DESCRIPTION: UTILITY COUNTER (2 REQUIRED)

Thurmaduke Solid Top Unit, 36" high utility counters, 14-gauge stainless steel tops, stainless steel enclosed cabinet body, full length undershelf without center shelf, casters with brakes and stainless-steel legs with adjustable feet, and locking device with stainless pin and latch under both ends of countertop.

- 120/60/1
- Exterior removable laminate décor panel trimmed in stainless on cabinet front and exposed exterior. Laminate to be Wilson art #7990 "Mission Maple".

- 10" Solid stainless-steel tray slide with two (2) rub rails, mounted to be an integral part of the cabinet on fixed brackets with a rear turn up on tray slide. The tray slide is mounted at 34" AFF and has an internal locking device with stainless steel pin and latch line up device mounted under tray slide.
- Mounted body pilasters on front and rear of serving lines between units that join.
- Duplex NEMA #5-20R Receptacle with cover, mounted in apron of the serving side of the counter.
- Storage compartment on operator's side without center shelf
- Stainless steel adjustable kickplate to be mounted with stainless steel fasteners 1/2" above the floor. Stainless steel pilaster shall be used behind the gaps in the units, so the kick plates appear to be continuous. Kick plates are removable for movement of unit and mounted on the front of the unit.

ITEM: 104

MANUFACTURER: DUKE MANUFACTURING

MODEL: TFCP-60-N7

DESCRIPTION: COLD FOOD STATION (2 REQUIRED)

Thurmaduke Flush mount, Cold Food Station, four section, 60" long, 36" high counter, 14-gauge stainless steel top, stainless steel enclosed cabinet body, reinforced cut out for drop-in, stainless steel mechanical four section cold pan, under-storage with hinged stainless steel louvered compressor compartment, 1" drain line and valve extended to condensate evaporator, casters with brakes, stainless-steel legs with adjustable feet, and locking device with stainless pin and latch under both ends of counter top.

- 120/60/1
- Exterior removable laminate décor panel trimmed in stainless on cabinet front and exposed exterior. Laminate to be Wilson art #7990 "Mission Maple".
- 10" Solid stainless-steel tray slide with two (2) rub rails, mounted to be an integral part of the cabinet on fixed brackets with a rear turn up on tray slide. The tray slide is mounted at 34" AFF and has an internal locking device with stainless steel pin and latch line up device mounted under tray slide.
- Flush mount, cold pan unit, four section, stainless steel construction, digital control, self-contained refrigeration, single drain plumbed to condensate evaporator manifolded to each well, UL and NSF listed.
- Provide a compressor compartment with hinged louvered door panel and provide proper ventilation for compressor. Louvered door shall have a magnetic catch on the top and the bottom of the door panel.
- On / Off Switch on apron wired to units and lights to be located without removing louvered panel.
- Mounted body pilasters on front and rear of serving lines between units that join.
- One-year parts and labor warranty
- Five-year compressor warranty

- Stainless steel adjustable kickplate to be mounted with stainless steel fasteners 1/2" above the floor. Stainless steel pilaster shall be used behind the gaps in the units, so the kick plates appear to be continuous. Kick plates are removable for movement of unit and mounted on the front of the unit.
- (6) Vollrath Model #30042 Super Pan V Full Size Food Pan, 4" deep, 22-gauge 300 series stainless steel, reinforced pour corners, reverse formed flattened edges, anti-jamming design, NSF
- (6) Vollrath Model #30062 Super Pan V Full Size Food Pan, 6" deep, 22-gauge 300 series stainless steel, reinforced pour corners, reverse formed flattened edges, anti-jamming design, NSF
- (6) Vollrath Model #77250 Super Pan V Steam Table Pan Cover, Stainless, full size, NSF
- (6) Vollrath Model #30242 Super Pan V Half Size Food Pan, 4" deep, 22-gauge 300 series stainless steel, reinforced pour corners, reverse formed flattened edges, anti-jamming design, NSF
- (6) Vollrath Model #30262 Super Pan V Half Size Food Pan, 4" deep, 22-gauge 300 series stainless steel, reinforced pour corners, reverse formed flattened edges, anti-jamming design, NSF
- (6) Vollrath Model #75120 Super Pan V Steam Table Pan Cover, Stainless, 1/2 size, NSF

ITEM: 105

MANUFACTURER: DUKE MANUFACTURING

MODEL: TS422-60

DESCRIPTION: BREATH GUARD (2 REQUIRED)

Contemporary field shield, adjustable from full-service to self-service, single shelf, vertical and fixed end enclosures, stainless steel finished posts mounted through countertop with mounting flange, 3/8" glass over-shelf and guard, and 1/2" glass ends. All glass is tempered and polished with rounded edges.

- Led light mounted under the shelf, wired to a switch on the counter.
- Stainless steel post and frame finish.

ITEM: 106

MANUFACTURER: DUKE MANUFACTURING

MODEL: TST-18SS

DESCRIPTION: UTILITY COUNTER (2 REQUIRED)

Thurmaduke Solid Top Unit, 36" high utility counters, 14-gauge stainless steel tops, stainless steel enclosed cabinet body, full length undershelf without center shelf, casters with brakes and stainless-steel legs with adjustable feet, and locking device with stainless pin and latch under both ends of countertop.

- 120/60/1

- Exterior removable laminate décor panel trimmed in stainless on cabinet front and exposed exterior. Laminate to be Wilson art #7990 "Mission Maple".
- 10" Solid stainless-steel tray slide with two (2) rub rails, mounted to be an integral part of the cabinet on fixed brackets with a rear turn up on tray slide. The tray slide is mounted at 34" AFF and has an internal locking device with stainless steel pin and latch line up device mounted under tray slide.
- Mounted body pilasters on front and rear of serving lines between units that join.
- Duplex NEMA #5-20R Receptacle with cover, mounted in apron of the serving side of the counter.
- Storage compartment on operator's side without center shelf
- Stainless steel adjustable kickplate to be mounted with stainless steel fasteners 1/2" above the floor. Stainless steel pilaster shall be used behind the gaps in the units, so the kick plates appear to be continuous. Kick plates are removable for movement of unit and mounted on the front of the unit.

ITEM: 107

MANUFACTURER: DUKE MANUFACTURING

MODEL: TST-46SS

DESCRIPTION: CONDIMENT COUNTER

Thurmaduke Solid Top Unit, 36" high utility counters, 14-gauge stainless steel tops, stainless steel enclosed cabinet body, full length undershelf without center shelf, casters with brakes and stainless-steel legs with adjustable feet, and locking device with stainless pin and latch under both ends of countertop.

- 120/60/1
- Exterior removable laminate décor panel trimmed in stainless on cabinet front and exposed exterior. Laminate to be Wilson art #7990 "Mission Maple".
- Mounted body pilasters on front and rear of serving lines between units that join.
- Storage compartment on operator's side with hinged locking doors with removable and adjustable center shelf.
- Stainless steel adjustable kickplate to be mounted with stainless steel fasteners 1/2" above the floor. Stainless steel pilaster shall be used behind the gaps in the units, so the kick plates appear to be continuous. Kick plates are removable for movement of unit and mounted on the front of the unit.

ITEM: 108

MANUFACTURER: DUKE MANUFACTURING

MODEL: TST-46SS

DESCRIPTION: CONDIMENT COUNTER

Thurmaduke Solid Top Unit, 36" high utility counters, 14-gauge stainless steel tops, stainless steel enclosed cabinet body, full length undershelf without center shelf, casters with brakes and stainless-steel legs with adjustable feet, and locking device with stainless pin and latch under both ends of countertop.

- 120/60/1
- Exterior removable laminate décor panel trimmed in stainless on cabinet front and exposed exterior. Laminate to be Wilson art #7990 "Mission Maple".
- Mounted body pilasters on front and rear of serving lines between units that join.
- Storage compartment on operator's side with hinged locking doors with removable and adjustable center shelf.
- Stainless steel adjustable kickplate to be mounted with stainless steel fasteners 1/2" above the floor. Stainless steel pilaster shall be used behind the gaps in the units, so the kick plates appear to be continuous. Kick plates are removable for movement of unit and mounted on the front of the unit.

ITEM: 109

MANUFACTURER: DUKE MANUFACTURING

MODEL: TCS-30SS

DESCRIPTION: CASHIER STATION (2 REQUIRED)

Thurmaduke Solid Top Unit, 36" high utility counter, 14-gauge stainless steel top, stainless steel enclosed cabinet body with partial under shelf, stainless steel tube foot rest, casters with brakes and stainless-steel legs with adjustable feet, and locking device with stainless pin and latch under the countertop.

- 120/60/1 with cord and plug wired to two (2) Duplex outlets in the base.
- Exterior removable laminate décor panel trimmed in stainless on cabinet front and exposed exterior. Laminate to be Wilson art #7990 "Mission Maple".
- 10" Solid stainless-steel tray slide with two (2) rub rails, mounted to be an integral part of the cabinet on fixed brackets with a rear turn up on tray slide. The tray slide is mounted at 34" AFF and has an internal locking device with stainless steel pin and latch line up device mounted under tray slide.
- Mounted body pilasters on front and rear of serving lines between units that join.
- Cash drawer with stainless steel face and frame with stainless liner on roller slides, with lock and black pull handle.
- 2 3/4" Round cut out with grommet.
- (2) Duplex NEMA #5-20R Receptacles with cover, mounted in the base of cashier section and a CAT5e data box for the POS system.

- Stainless steel adjustable kickplate to be mounted with stainless steel fasteners ½" above the floor. Stainless steel pilaster shall be used behind the gaps in the units, so the kick plates appear to be continuous. Kick plates are removable for movement of unit and mounted on the two exposed sides of the unit.

ITEM: 110

MANUFACTURER: DUKE MANUFACTURING

MODEL: TST-60SS

DESCRIPTION: TRASH STATION

Thurmaduke Solid Top Unit, 36" high utility counters, 14-gauge stainless steel tops, stainless steel enclosed cabinet body, full length undershelf without center shelf, casters with brakes and stainless-steel legs with adjustable feet, and locking device with stainless pin and latch under both ends of countertop.

- 120/60/1
- Exterior removable laminate décor panel trimmed in stainless on cabinet front and exposed exterior. Laminate to be Wilson art #7990 "Mission Maple".
- Mounted body pilasters on front and rear of serving lines between units that join.
- Trash compartment on customer side with hinged locking doors. The 14-gauge stainless steel top includes two (2) 8" round openings with 4" back and side splash to contain spills. The counter also includes two (2) 40-gallon trash cans with dollies for large capacity trash or recycling, corner bumpers, four (4) locking, non-marking casters and two (2) soft-close hinged doors.
- (2) Backsplash labels – Verify label text with the owner.
- Stainless steel adjustable kickplate to be mounted with stainless steel fasteners ½" above the floor. Stainless steel pilaster shall be used behind the gaps in the units, so the kick plates appear to be continuous. Kick plates are removable for movement of unit and mounted on the front of the unit.

ITEM: 111

MANUFACTURER: STERIL SIL

MODEL: E1-CRT36-3V

DESCRIPTION: SILVERWARE CART (3 REQUIRED)

Provide the following Silverware holding system for each unit.

Tray and silverware cart, all welded, enclosed stainless-steel construction on three (3) sides with open front, corner bumpers, locking and non-marking casters, flexible configurations for top section, vertical stop at center of tray shelf, and integrated handle grasps.

- (1) MODEL #E1-FTA-1V Flat top adapter.

- (2) Model #E1-BS6OE-RP Drop-in silverware baskets complete with six (6) BLACK cylinders, flanged body for dispenser cut out, drop-in handle, unit at rest raises cylinders for easy removal.
- (12) BLACK Silverware cylinders. Additional baskets for back-up.
- (1) Model #E1-BS6OE-RP Drop-in silverware baskets complete with six (6) BLACK cylinders, flanged body for dispenser cut out, drop-in handle, unit at rest raises cylinders for easy removal. Additional baskets for back-up
- Locking casters on front of unit.
- Laminate exterior to be Wilsonart #7990 "Mission Maple". Laminate panels edges are not to be exposed. Construct in a way that the laminate edges are protected or recessed into the sides of the exterior of the cart.
- Made in the U.S.A.

ITEM: 112

MANUFACTURER: CONTINENTAL REFRIGERATOR

MODEL: D2RINSSRT

DESCRIPTION: ROLL-THRU REFRIGERATOR

Refrigerator, roll-thru, double section, self-contained expansion-valve refrigeration using R290 hydrocarbon refrigerant, automatic electric condensate evaporator, stainless steel exterior and interior, 3" polyurethane foam insulation throughout, standard depth cabinet, full-height solid doors with locks and vertical workflow handles, door hinges are self-closing with a hold open feature, welded corners on all doors, snap in door gaskets, LED lighting, electronic temperature control with exterior digital display, Hi-Low alarm, stainless steel ramps, UL and NSF listed.

- 120/60/1
- Six-year parts and labor warranty
- Seven-year compressor warranty
- Two-year door gasket warranty
- (2) Channel Manufacturing, Model #AXD-UTR-14, Pan Rack, heavy-duty series, 21" wide x 26" deep x 64" high, all aluminum welded construction, end load, 4" Angle Spacing, (15) tiers to hold (1) 18" x 26" or (2) 12" x 20" steam table pans per shelf, 5" x 2" heavy-duty swivel plate casters with Zerk grease fitting style, NSF listed, Made in USA.
 - o Perimeter Bumpers
 - o 5" Heavy-duty casters with brakes
 - o Lifetime warranty against rust and corrosion
- (24) Vollrath Model #5315, Wear-Ever Sheet Pan, full size, 18" wide x 26" deep x 1" high, 12-gauge 3000 series aluminum, open bead, natural finish, NSF, Made in USA.

ITEM: 113

MANUFACTURER: CONTINENTAL REFRIGERATOR

MODEL: DL1WI-SS-RT

DESCRIPTION: ROLL-THRU HEATED CABINET

Designer Line Series Heated Cabinet, roll-thru, single section, stainless-steel exterior and interior with 3" polyurethane foam insulation throughout, stainless steel reinforced floor, standard depth cabinet, accommodates sheet pans or hotel pans, full height doors with locks and vertical workflow handles, door hinges are self-closing with a hold open feature, welded corners on all doors, snap in door gaskets and lock, LED lighting, and electronic controls with exterior digital thermometer, UL and NSF listed.

- 208/60/1 with cord and plug
- Right hinge doors
- Three-year parts and labor warranty
- Two-year door gasket warranty
- (1) Channel Manufacturing, Model #AXD-UTR-14, Pan Rack, heavy-duty series, 21" wide x 26" deep x 64" high, all aluminum welded construction, end load, 4" Angle Spacing, (15) tiers to hold (1) 18" x 26" or (2) 12" x 20" steam table pans per shelf, 5" x 2" heavy-duty swivel plate casters with Zerk grease fitting style, NSF listed, Made in USA.
 - o Perimeter Bumpers
 - o 5" Heavy-duty casters with brakes
 - o Lifetime warranty against rust and corrosion
- (12) Vollrath Model #5315, Wear-Ever Sheet Pan, full size, 18" wide x 26" deep x 1" high, 12-gauge 3000 series aluminum, open bead, natural finish, NSF, Made in USA.

ITEM: 114

DESCRIPTION: SPARE NUMBER

ITEM: 115

MANUFACTURER: CONTINENTAL REFRIGERATOR

MODEL: DL1WI-SS

DESCRIPTION: ROLL-IN HEATED CABINET

Designer Line Series Heated Cabinet, single section, stainless-steel exterior and interior with 3" polyurethane foam insulation throughout, stainless steel reinforced floor, standard depth cabinet, accommodates sheet pans or hotel pans, full height door with lock and vertical workflow handle, door hinges are self-closing with a hold open feature, welded corners on all doors, snap in door gaskets and lock, LED lighting, and electronic controls with exterior digital thermometer, UL and NSF listed.

- 208/60/1 with cord and plug
- Three-year parts and labor warranty

- Two-year door gasket warranty
- (2) Channel Manufacturing, Model #AXD-UTR-14, Pan Rack, heavy-duty series, 21" wide x 26" deep x 64" high, all aluminum welded construction, end load, 4" Angle Spacing, (15) tiers to hold (1) 18" x 26" or (2) 12" x 20" steam table pans per shelf, 5" x 2" heavy-duty swivel plate casters with Zerk grease fitting style, NSF listed, Made in USA.
 - o Perimeter Bumpers
 - o 5" Heavy-duty casters with brakes
 - o Lifetime warranty against rust and corrosion
- (12) Vollrath Model #5315, Wear-Ever Sheet Pan, full size, 18"wide x 26"deep x 1"high, 12-gauge 3000 series aluminum, open bead, natural finish, NSF, Made in USA.

ITEM: 116

MANUFACTURER: CONTINENTAL REFRIGERATOR

MODEL: DL2WI-SS

DESCRIPTION: ROLL-IN HEATED CABINET

Designer Line Series Heated Cabinet, double section, stainless-steel exterior and interior with 3" polyurethane foam insulation throughout, stainless steel reinforced floor, standard depth cabinet, accommodates sheet pans or hotel pans, full height doors with lock and vertical workflow handle, door hinges are self-closing with a hold open feature, welded corners on all doors, snap in door gaskets and lock, LED lighting, and electronic controls with exterior digital thermometer, UL and NSF listed.

- 208/60/1 with cord and plug
- Door hinged on the right.
- Three-year parts and labor warranty
- Two-year door gasket warranty
- (2) Channel Manufacturing, Model #AXD-UTR-14, Pan Rack, heavy-duty series, 21" wide x 26" deep x 64" high, all aluminum welded construction, end load, 4" Angle Spacing, (15) tiers to hold (1) 18" x 26" or (2) 12" x 20" steam table pans per shelf, 5" x 2" heavy-duty swivel plate casters with Zerk grease fitting style, NSF listed, Made in USA.
 - o Perimeter Bumpers
 - o 5" Heavy-duty casters with brakes
 - o Lifetime warranty against rust and corrosion
- (24) Vollrath Model #5315, Wear-Ever Sheet Pan, full size, 18"wide x 26"deep x 1"high, 12-gauge 3000 series aluminum, open bead, natural finish, NSF, Made in USA.

ITEM: 117

MANUFACTURER: CONTINENTAL REFRIGERATOR

MODEL: D2RINSS

DESCRIPTION: ROLL-IN REFRIGERATOR (2 REQUIRED)

Refrigerator, roll-in, double section, self-contained expansion-valve refrigeration using R290 hydro-carbon refrigerant, automatic electric condensate evaporator, stainless steel exterior and interior, 3" polyurethane foam insulation throughout, standard depth cabinet, full-height solid doors with locks and vertical workflow handles, door hinges are self-closing with a hold open feature, welded corners on all doors, snap in door gaskets, LED lighting, electronic temperature control with exterior digital display, Hi-Low alarm, stainless steel ramps, UL and NSF listed.

- 120/60/1
- Six-year parts and labor warranty
- Seven-year compressor warranty
- Two-year door gasket warranty
- (4) Channel Manufacturing, Model #AXD-UTR-14, Pan Rack, heavy-duty series, 21" wide x 26" deep x 64" high, all aluminum welded construction, end load, 4" Angle Spacing, (15) tiers to hold (1) 18" x 26" or (2) 12" x 20" steam table pans per shelf, 5" x 2" heavy-duty swivel plate casters with Zerk grease fitting style, NSF listed, Made in USA.
 - o Perimeter Bumpers
 - o 5" Heavy-duty casters with brakes
 - o Lifetime warranty against rust and corrosion
- (24) Vollrath Model #5315, Wear-Ever Sheet Pan, full size, 18"wide x 26"deep x 1"high, 12-gauge 3000 series aluminum, open bead, natural finish, NSF, Made in USA.

ITEM: 118

MANUFACTURER: CUSTOM METALS

MODEL: FS-TCS32120-US-OS

DESCRIPTION: THREE COMPARTMENT SINK

Three Compartment Sink shall be custom built as per General Specifications, approximately 10'0" x 2'8" x 34" high to work surface, 14 gauge 304 stainless steel top with raised rolled edge and rounded corners, provide an 8" rear backsplash with enclosed ends, (3) 24"x 28" x 16" deep sink bowls with continuous front, lever waste handle bracket for lever waste and overflow, stainless steel under shelf with 2" up-turn at rear and ends mounted under left and right drain boards, balance of the unit to have cross rails with stainless steel gussets, legs, and flanged feet on front corner legs with bullet feet on rear and centers.

- Provide (2) 12" deep louvered wall shelves with 2" rear upturn, tight to the wall.
- Coordinate over shelves with pre-rinse faucet.
- Lever-waste and overflow to be installed by sink manufacturer.
- Secure flanged feet to the floor with stainless steel fasteners
- Seal the unit to the wall.

- (1) Krowne Metal Corporation Model #17-109WL, Krowne Royal Series, pre-rinse Assembly, with add-on faucet, wall mount, 8" centers, spring action flexible gooseneck, 38" stainless steel hose with 15" overhang and 1.2 GPM spray head, built in check valves, 2.0 GPM add-on faucet with 12" swing spout, quarter-turn ceramic cartridge valves, includes wall bracket and mounting kit, chrome plated brass base, low lead compliant, includes internal check valves to prevent backflow and cross contamination, NSF listed.
 - 3 Year warranty
 - E-Z Install Water Line Kit, wall mount, 3/8", 30" long, includes mounting, stainless steel finish.
- (1) Krowne Metal Corporation Model #14-812L, Krowne Royal Series Faucet, splash-mounted, 8" centers, 12" swing spout, quarter-turn ceramic cartridge valve, low lead compliant, with built-in check valve, NSF listed.
 - Wrist Handle Kit
 - 3 Year warranty
 - E-Z Install Water Line Kit, wall mount, 3/8", 30" long, includes mounting, stainless steel finish.
- (3) Krowne Metal Corporation Model #22-201, Krowne Twist Waste with 1-1/4" overflow outlet, 3" sink opening, 2" NPS male threaded with 1-1/2" female threaded drain outlet, 1-1/2" reducer with rubber washer, 4-1/2" flange, stainless steel strainer, flange and handle, NSF listed.
 - Overflow Head fits 1-7/8" opening, low lead compliant.
 - Overflow Elbow fits 1-7/8" opening, low lead compliant.

ITEM: 119

MANUFACTURER: METRO

MODEL: MX-G SERIES

DESCRIPTION: POT & PAN RACK (2 REQUIRED)

Each unit is to consist of four (4) posts, four (4) shelves, and four (4) locking casters.

- (3) Model #MX2448G Metro-Max I Shelf, 48" wide x 24" deep, removable open grid polymer mats with Microban antimicrobial protection, reinforced type 304 stainless steel corners, wedge connectors with quick adjust corner releases, NSF.
- (4) Model #MX74UP Metro-Max I Post, 74" high, open pole for use with stem casters, polymer construction with built in Microban antimicrobial product protection, NSF.
- (4) Model #5PCBX Stem Caster, brake, 5" diameter, polyurethane wheel tread with donut bumpers.
- (2) Model #XTR2448XE Cutting Board and Tray Drying Rack System thirty-four (34) tray capacity, 6" up-rights with 1 1/8" spacing, mounts on 48" wide x 24" deep frame, taupe epoxy, NSF.
- (1) Model #XTR2448XEa Cutting Board and Tray Drying Rack System fourteen (14) tray capacity, 6" up-rights with 3" spacing, mounts on 48" wide x 24" deep frame, taupe epoxy, NSF.
- (1) Model #XDRIIP Adjustable drip tray. Provide removable drip pan as part of this item.
- Verify shelf spacing with owner.
- (2) Vollrath Model #8002410, Super Pan 1/1 Food Pan, 2 1/2" deep, low-temp polycarbonate clear plastic, top flange corners with concave indentation, anti-jamming, ramped sides, reverse form

flattened edge, framing shoulder, interchanges with SPV stainless steel pan line, NSF, made in USA.

ITEM: 120

MANUFACTURER: RATIONAL

MODEL: ICP 6-FULL/6FULL E

DESCRIPTION: VENTLESS COMBI OVEN (2 REQUIRED)

Two iCombi Pro 6-full size combination ovens, double stack, Rational intelligent connectable cooking system with four assistants: iDensity Control, iCooking Suite, iProduction Manager, and iCare System, full-size, electric, cooking controls with 6 operating modes, (5) cooking methods, (3) manual operation modes: combi-Steamer, Convection Oven, or Combination. Each oven has a capacity of (6) 18"x26" or (12) 12"x20" pan capacity, core temperature probe with 6-point measurement, 85° to 572°F temperature range, hand shower with automatic retracting system, comes with (3) grid shelves, quick clean, care control, eco mode, ethernet interface and Wi-Fi interface, NSF and UL listed.

Provide the following:

- 208/60/3
- Energy Star
- Requires ethernet connection.
- The door is to be hinged on the right.
- Rational Certified Installation with Pre-Installation Site Survey, including stacking kit and installation of stacking kit, water filter system, and commissioning.
- F.S.E.C. is responsible in coordination with Rational, to provide water samples or test results from a recent water sample.
- Water Filtration Double Cartridge System with (2) additional cartridges
- Certified installation of water filter system.
- Certified Chef training
- Mobile oven stand on adjustable height casters, with stacking kit and safety set.
- Installation Kits
- (12) Stainless steel grid shelves with K-12 promotion
- (12) Fry Baskets with K-12 promotion
- Fully automatic cleaning system including deliming of the steam generator.
- Auto Dose System for integrated autonomous cleaning which includes (2) Cleaner Cartridges and (2) Care Cartridges
- (2) Box of 6 Cleaner Cartridges
- (2) Box of 6 Care Cartridges
- Condensation breaker
- USB data memory stick
- Ultra-Vent Plus Ventless Recirculating Condensation Hood, with HEPA filter for smoke capture, filters smoke, 120/50/60/1.

- Certified Installation for Ultra-Vent Plus, including (4) HEPA Filters
- Positioning aid for core temperature probe
- Two-year parts and labor warranty
- Five-year steam generator warranty
- (24) Vollrath Model #9002P, Wear-Ever Sheet Pan, full size, 18"wide x 26"deep x 1"high, 18-gauge aluminum alloy, natural finish, perforated, Made in USA.
- (12) Vollrath Model #30023, Super Pan V Food Pan, perforated, full size, 2-1/2" deep, 22-gauge, 300 series stainless steel, anti-jamming design with reinforced pour corners, NSF, Made in USA.

ITEM: 121

MANUFACTURER: IMC TEDDY

MODEL: CSW-1SX

DESCRIPTION: HAND SINK

Hand Sink, wall model approximately 10" x 13 1/2" x 5 1/2" sink bowl with inverted "V" edge, 8" integral backsplash, 304 stainless steel all welded construction, one (1) hole for splash-mounted faucet, 6" apron, includes faucet, basket drain, mounting bracket and clip with hardware, stainless steel, and NSF listed.

- P-Trap Assembly
- Model EFD-1SG Electronic Faucet, splash type, gooseneck, with metering/check valve.
- Sink apron with solid bottom cover, to hide all utilities. Apron extends 12" AFF floor.
- Mount and seal to the wall.
- Coordinate with P.C. to make sure utilities and censored faucet components fit within the stainless-steel enclosure provided with the sink.

ITEM: 122

MANUFACTURER: CUSTOM METALS

MODEL: FS-PT3072-US

DESCRIPTION: PREP TABLE

Work Table shall be custom built as per General Specifications, approximately 6'0" x 2'6" x 34" high to work surface, 14-gauge 304 stainless steel top with marine edge, 6" high backsplash with fully enclosed ends. Provide 16"x 20" x 12" deep sink bowl with removable bowl cover, with a cover holder mounted under the countertop between the sink bowl and the legs, lever waste and bracket, and a 12" plumbing chase from directly under the sink to the floor to conceal the supply lines. This chase shall have a removable access panel. Provide one (1) 20"x 20" x 5" stainless steel drawer with lock on anti-slam slides with 1/2" Richlite cutting board mounted under the drawer. The cutting board shall have a handle slot to easily remove the boards from under the drawer. Provide stainless

steel gussets and legs with flanged feet on front ends, bullet feet on balance, and a full-length stainless steel under shelf under the entire unit with a 2" rear up-turn and drain access. The undershelf is to be extended and attached to the undershelf on Item #123. Provide common top/end caps to fasten Item #122 and #123 to appear as one unit.

- Flanged feet on front corner legs only.
- Secure flanged feet to the floor with stainless steel fasteners.
- Fasten and seal Item #122 to Item #123 with stainless steel fasteners.
- (1) Krowne Metal Corporation Model #15-512L, Krowne Royal Series Faucet, deck-mounted, 8" centers, 12" swing spout, quarter-turn ceramic cartridge valve, low lead compliant, with built in check valve, NSF listed.
 - Wrist Handle Kit
 - 3 Year warranty
 - Royal Series Deck Mounting Kit, long style; (2) 3-1/2" brass nipples, (2) brass locknuts, (2) brass washers.
- (1) Krowne Metal Corporation Model #22-201, Krowne Twist Waste with 1-1/4" overflow outlet, 3" sink opening, 2" NPS male threaded with 1-1/2" female threaded drain outlet, 1-1/2" reducer with rubber washer, 4-1/2" flange, stainless steel strainer, flange and handle, NSF listed.
 - Overflow Head fits 1-7/8" opening, low lead compliant.
 - Overflow Elbow fits 1-7/8" opening, low lead compliant.

ITEM: 123

MANUFACTURER: CUSTOM METALS

MODEL: FS-WT3072-US

DESCRIPTION: WORK TABLE (3 REQUIRED)

Work Table shall be custom built as per General Specifications, approximately 6'0" x 2'6" x 34" high to work surface, 14-gauge 304 stainless steel top with marine edge, 6" high backsplash with fully enclosed ends. Provide one (1) 20"x 20" x 5" stainless steel drawers with lock on anti-slam slides with 1/2" Richlite cutting board mounted under the drawers. The cutting boards shall have a handle slot to easily remove the boards from under the drawers. Provide two (2) GFCI #5-20R receptacles mounted in the backsplash, which is to be factory installed and wiring is to be concealed and connected into a junction box mounted underneath the under shelf or in a chase. Provide stainless steel gussets and legs with flanged feet on front ends, bullet feet on balance, full-length stainless steel under shelf with a 2" rear up-turn. The undershelf is to be extended and attached to the undershelf of the unit behind it. Provide common top/end caps to fasten the two tables to appear as one unit.

- Flanged feet on front corner legs only.
- Secure flanged feet to the floor with stainless steel fasteners.

ITEM: 124

MANUFACTURER: CONTINENTAL REFRIGERATOR

MODEL: D2FENSS

DESCRIPTION: REACH-IN FREEZER

Freezer, reach-in, extra wide, double section, self-contained expansion-valve refrigeration using R290 hydrocarbon refrigerant, automatic electric condensate evaporator, unit can be operated as low as -10°F, stainless steel exterior and interior, 3" polyurethane foam insulation throughout, standard depth cabinet, full-height solid doors with locks and vertical workflow handles, door hinges are self-closing with a hold open feature, welded corners on all doors, snap in door gaskets, LED lighting, electronic temperature control with exterior digital display, Hi-Low alarm, UL and NSF listed.

- 120/60/1
- 6" Stainless steel legs
- Six-year parts and labor warranty
- Seven-year compressor warranty
- Two-year door gasket warranty

ITEM: 125

MANUFACTURER: STERIL SIL

MODEL: MTC-56-2

DESCRIPTION: TRASH STATION (3 REQUIRED)

MTC56-2 Mobile Trash/Recycling Counter. The counter is heavy duty, mobile and easily cleaned with fully framed construction with stainless steel body panels inside and out. The 14-gauge stainless steel top includes two (2) 8" round openings with 4" back and side splash to contain spills. The counter also includes two (2) 40-gallon trash cans with dollies for large capacity trash or recycling, corner bumpers, four (4) locking, non-marking casters and two (2) soft-close hinged doors.

- (2) Backsplash labels – Verify label text with the owner.
- Verify hole size with owner.
- Provide (3) additional trash cans with dollies.
- Laminate exterior to be Wilsonart #7990 "Mission Maple". Laminate panels edges are not to be exposed. Construct in a way that the laminate edges are protected or recessed into the sides of the exterior of the cart.

ITEM: 126

MANUFACTURER: METRO

MODEL: MQ-G SERIES

DESCRIPTION: DRY STORAGE SHELVING (1 LOT REQUIRED)

Each unit is to consist of four (4) posts and five (5) shelves.

- (5) Model #MQ2436G Metro-Max Q Shelf, 36" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (5) Model #MQ2442G Metro-Max Q Shelf, 42" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (15) Model #MQ2448G Metro-Max Q Shelf, 48" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (25) Model #MQ2454G Metro-Max Q Shelf, 54" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (40) Model #MQ86PE Metro-Max Q Post, 86" high, adjustable foot, epoxy coated steel with built in Microban antimicrobial product protection, NSF.
- Use "S" hooks in front corners where possible.
- Verify sizes with site conditions and verify shelf spacing with owner.

COLD AND DRY STORAGE EQUIPMENT

ITEM: 200

MANUFACTURER: ARCTIC INDUSTRIES

MODEL: #189409v6

DESCRIPTION: WALK-IN COOLER / FREEZER

General –The overall size of the walk-in box shall be approximately 25'1" x 22' 8" x 8'6 1/4" Tall. The cooler and freezer compartment interior dimensions are as shown in the drawings. Verify size and shape as shown on the plan. Walk-ins shall be constructed of prefabricated modular panels as manufactured by Artic Industries, Miami, Florida. All insulated panel structures to be set up at factory prior to shipment, checked for structural and quality accuracy, photo-graphed prior to shipment. They shall be designed for easy and accurate field assembly, future enlargement by the addition of panels, or dismantling should relocation to an alternate site be desired. Construction shall be in strict compliance with NSF Standard 7 and UL. This unit shall be provided with internal diamond treadplate ramps to create a smooth transition between the walk-in floor and building floor.

Panel Construction - All panels shall consist of interior and exterior metal surfaces precision roll formed to exact dimensions with double 90° edges to enhance overall panel rigidity. The finished

metal surfaces shall be fitted with a teardrop profile gasket and placed in precision-tooled fixtures where they are injected with Foamed-in-Place urethane insulation. Curing of the insulating core shall take place at a controlled temperature within the foaming fixture to provide permanent adhesion to the metal surfaces, to allow uniform foam expansion and to maximize finished panel strength. Panel edges shall have a molded urethane tongue and groove profile of insulation factor equal to core material to accurately align panels during installation and to assure an airtight seal. No structural wood, steel, straps, or other non-insulating materials shall be used in panel construction. Finished panels must be UL classified building units and each should bear the Underwriters Laboratory label.

Finished panels will be 4" thick and will be provided in 11 ½", 23", 34 ½" and 46" widths to conform to project drawings. Corner panels shall be one piece 90° angled construction and shall measure 12" x 12" or 12" x 6 ½" where required. For units with multiple compartments, specially designed "Tee" panels shall be provided to form partition wall to outside wall junctures. "Tee" panels shall measure 23" x 12" or 23" x 6 ½" where required. All panels shall be interchangeable with like panels or standard doorframe sections for fast and easy assembly.

Floor Construction – Where prefabricated floor panels are required, they shall be of similar design to other panels and shall incorporate a fully die formed ¼" NSF coved radius at all interior floor to wall junctures. Floor panels shall be reinforced with ¾" exterior grade plywood and shall be capable of supporting evenly distributed loads up to 1300 pounds per square foot or more. Floor to be: 16-gauge Stainless Steel with non-skid strips in the aisle ways.

Door Construction - Entrance doors are constructed like other panels and shall be flush mount, magnetic in-fitting type. Door sections shall be constructed to conform to Underwriters Laboratories Standards for electrical safety and shall bear all appropriate UL listing labels. The perimeter of the door and frame shall be built of a fiberglass reinforced plastic (FRP) pultrusion weighing not less than 8.4#/lineal foot. All pultrusion's shall be non-conductive, non-corrosive, rust proof and listed by the National Sanitation Foundation. Doorjamb shall house a doorframe heater circuit, and a magnet attracting stainless steel trim strip. The doorframe shall be equipped with flexible bellows type vinyl door gasket with magnetic core, and flexible EPDM (ethylene propylene diene monomer) door sweep. Standard door frame sections 46", 57 ½" or 69" wide shall be equipped with a LED vapor proof light fixture and globe pre-wired to a rocker type light switch with pilot light. An aluminum braided heater wire with integral circuit closure providing activation while the refrigerated room is within operating temperature and a 14-gauge stainless steel threshold plate shall also be included in all door frames.

The door hardware shall be die cast zinc with brushed satin finish. Doors shall be mounted with three (3) heavy-duty cam lift hinges. The pull handle assembly shall incorporate a keyed cylinder lock and an inside safety release handle to prevent personnel entrapment. A hydraulic closer device shall assist positive door closing and sealing.

Walk-In Monitoring System Modularm 75LC: System to have an easy-to-read LCD display with high and low alarm set points with audible and visual alerts for alarm conditions. The system shall include

Autoset Technology for automatic set point control. The system shall have an integrated, push-button light switch with on/off indicator light. The system shall comply with the latest federal energy requirements by incorporating an automatic lighting shut-off. The system shall be supplied with dry contacts for connection to equipment that requires dry contacts such as building monitoring systems, dialers, etc. A magnetic contact, MC-1, shall be installed on the door for auto light feature and door "open" monitoring. The system to be supplied interior press button light switch and panic alarm with constant burning backlight, IP-1. The system should include a Motion detector, MD-1, to reset the light timer when motion is present. Both digital displays should be in the exterior entrance door panel frame when one or more doors are on a partition wall.

Doors to be:

Exterior entrance doors, 36" x 78" (swing as shown on drawing) to include:

- Door Closer
- Foot treadle
- Door Kick plate, 1/10" aluminum tread plate, 36" High on interior and exterior of each door
- Cam lift hinges (3)
- Deadbolt key/padlock handle with inside safety release
- Magnetic gasket
- Single Sweep gasket
- Switch with pilot light.
- Monitoring System
- 14"x 24" Vision Window, heated
- Stainless steel finish interior and exterior

Finishes - The interior and exterior finish on all panel surfaces may be manufactured from any combination of the following premium grade aluminum or steel materials. The gauge or thickness of the metal material listed is rated prior to embossing.

- Exposed Exterior walls: 16-gauge #304 textured stainless steel with #3 finish.
- Interior walls: 26-gauge stucco embossed white.
- Interior ceilings: 26-gauge stucco embossed white.
- Un-exposed exterior to be 26-gauge stucco embossed galvanized.

Insulation - Insulation shall be 4" thick high-pressure impingement mixed (HPIM) foamed-in-place urethane, minimum density of 2.4 pound per cubic foot, fully heat cured, and bonded to metal finishes. The insulation shall be manufactured using HCFC-141b expanding agent, which has an ozone depletion rating of 0.1 and a global warming rating of 0.05. The thermal conductivity ("K" factor) shall not exceed 0.133 BTU/Hour/Square Foot/Degree Fahrenheit/Inch of Thickness across the entire width of the panel. Overall coefficient of heat transfer ("U" factor) shall not exceed .033 and the resistance to heat penetration ("R" factor) shall not be less than 30. The insulation shall have a 97% closed cell structure to prevent absorption of liquids. The finished aluminum panel (not just the core material) shall be listed by Underwriters Laboratories as a Class 1 (UL-723) building material and demonstrate

a flame spread rating of 20 or less and smoke developed of 350 or less in accordance with ASTM-E84 Standards. This rating is not intended to reflect hazards presented by this or any other material under actual fire conditions. Foam used shall be Factory Mutual listed.

Panel Assembly - Assembly of Walk-In shall be accomplished using cam-action locking mechanisms precisely positioned along the outside tongue or groove edges of each panel to exactly correspond with a matching mechanism in the adjacent panel. Cam lock spacing on vertical joints shall not exceed 46" and at junction of vertical and horizontal joints by 23". Cam locks shall be foamed-in-place and anchored securely in the panel by steel "wings" integral to the lock housing. Cam locks shall be operated through access ports using a hex wrench, thereby pulling the panels together and establishing an airtight seal. All access ports shall be located on the walk-in interior to facilitate assembly when close to building structures and shall be covered by vinyl snap-in caps after final assembly. Complete step-by-step assembly instructions, and erection drawings shall be supplied by the manufacturer.

Walk-In Accessories for each compartment:

- (3) LED 48" Light fixtures in cooler compartment, high output, for low temperature applications.
- (2) LED 48" Light fixtures in freezer compartment, high output, for low temperature applications.
- LED Vapor-proof light in each door frame
- (2) Backing for power air curtain on exterior of cooler and freezer: Berner Model #SLC-07-1036A-SS complete with cord and plug for receptacle built into the door panel.
- Non-skid strips (in aisles only)
- Exposed exterior to have two-tier bumper rails mounted at 12" AFF and 36" AFF.
- Exterior corners at building walls to be sealed with full-height stainless steel closure strips.
- Provide stainless steel closure panels between walk-in and ceiling.
- Heated pressure relief port on freezer sections

Warranty - Insulated panel products are to be warranted for a period of ten (10) years after the date of installation to the original user should the panels be installed properly and be used under normal service conditions. After an inspection authorized by the manufacturer, should any part of the product prove to be defective in material or workmanship, it will be repaired or replaced free of charge, F.O.B. factory. This warranty does not apply to accessories or components supplied but manufactured by other companies who furnish their own warranties.

F.S.E.C. shall provide an installation workmanship warranty of three (3) years from the date of installation.

All refrigeration equipment shall comply with the Federal Regulations for energy efficiency. Walk-In coolers or freezers need to include the following: automatic door closing device, strip curtains on hinged doors, heated triple pane windows on cooler and freezer doors, high efficiency lighting or automatic light switches, R-25 insulation in cooler walls, doors, and ceilings, R-32 insulation in freezer walls, doors, and ceilings, and R-28 insulation in walk-in cooler and freezer floors.

Prior to turning on refrigeration systems, F.S.E.C. to "test" the walk-in boxes to verify they are air tight. A smoke test, flood light test, or other means of similar testing is required. If an air-tight test is not performed, the F.S.E.C. will provide a letter of workmanship warranty for a period of five (5) years covering any defects or air leaks in the walk-in unit.

ITEM: 200.1

MANUFACTURER: BERNER

MODEL: SLC07-1042A-SS

DESCRIPTION: POWER AIR CUTRAIN (2 REQUIRED)

Sanitation Series Low Profile Air Curtain, 36" wide, unheated, 1/5 H.P motor, for doors up to 7' high, exterior mounting, UL listed.

- 120/60/1 with cord and plug
- Stainless-steel exterior finish
- Door Sensor
- Five-year parts warranty

ITEM: 201 & 202

MANUFACTURER: OMNITEMP

MODEL: ZB15KCE-TF5 / KMP232MA-S2D

DESCRIPTION: WALK-IN COOLER REFRIGERATION

Walk-In cooler will be provided with a condensing unit and evaporator for refrigerating equipment in accordance with ASHRAE standards. All systems shall be supplied with complete controls for a working system. Each system shall consist of a new compressor unit mounted on a structural stainless-steel base with cover and winter controls.

Compressor units shall be accessible preassembled remote, scroll type, air-cooled units for outdoor installation with matching evaporator. Condensers shall be equipped with EC fan motors and evaporator fans shall utilize the ECM type two-speed fan motors. All refrigeration equipment shall comply with the Federal Regulations for energy efficiency. Walk-In cooler system is designed to operate with 100% automatic redundancy with one coil for the cooler.

A single rack system is to be manufactured to hold the cooler compressor units in one (1) housing. The curb is to be provided by others and coordinated by the F.S.E.C. Refrigeration systems are to be mounted on the roof of the building. Coordinate location with Architect and General Contractor.

Medium temperature unit shall utilize R-448a refrigerant. The manufacturer calculates heat loads and provide systems with a minimum of 105% of needed capacity to maintain holding temperature 35° F in coolers. Calculations shall take into consideration box ambient, refrigeration system ambient, airflow, and exposure to sunlight and altitude. Interconnection of refrigeration lines, insulation, and electrical wiring shall be accomplished by the appropriate trades and shall be a portion of the Kitchen Equipment Contract.

The refrigeration system on the walk-in will be equipped with an on-demand defrost controller factory mounted to the evaporator coil(s). The system will be custom designed for Omnitemp refrigeration systems to control the electric expansion valve in response to true evaporator superheat and return air temperature. Power wiring for the evaporator coils will be provided by the E.C. as required. Off cycle and electric defrost is also available. Provide heater as required so product does not freeze.

Additionally, a refrigeration system containing an on-demand controller will consist of the following factory-mounted parts:

- Electronic controller board with three- digit LED and push button panel interface for setup
- Three solid state temperature sensors
- Pressure transducer
- External relay to control liquid line solenoid valve or compressor contactor
- Electric expansion valve
- 24V transformer

The Smart board will contain three (3) relay outputs: defrost heater (20A), evaporator fan (10A) and alarm (5A). The board will include connection points for alarm systems provided by others.

Medium temperature systems come with one (1) preprogramed defrost per day if it needs to run in safe mode and to ensure oil return to the compressor if no demand defrosts are required. All other defrosts are by demand which will be activated by the three (3) factory mounted sensors on the evaporator coil.

COOLER CONDENSER:

Compressors shall be scroll type and shall operate on R-448A refrigerant. Multiple compressors shall be used to satisfy load requirements. Small loads shall be combined in a multiplex arrangement and satisfied using a single compressor. Each compressor unit shall also include dual pressure control, sight glass, liquid line drier and suction and discharge vibration eliminators. Provide two (2) ZB15KCE-TF5 Medium temperature, 35° F, pre-assembled remote, scroll outdoor remote refrigeration condensers (2.00 H.P.) with voltage to be 208/3. Low pressure bypass and ambient safety accessories are to be provided on the outdoor condensing units to protect them under extreme outside temperatures of approximately -20 F.

COOLER EVAPORATOR:

Evaporator Coils - Matching evaporators shall be provided as required to complete the system. Evaporators shall be provided with mounted expansion valve and room thermostat. Evaporators shall be provided with a smart controller system. Evaporators shall be off cycle, electric or reverse cycle defrost. Provide one (1) KMP232MA-S2D evaporator unit and voltage of 208/1. Low profile evaporator coil with expansion valve, thermostat, and solenoid factory mounted. Evaporators shall be forced air type designed for ceiling installation. Air discharge shall be parallel to the walk-in ceiling. Fan motors, guards, multi-fin, and tube-type coil shall be housed in heavy gauge aluminum housing. Unit shall have drain pan with suitable drainpipe connection. Defrost shall be initiated only when required by demand defrost settings and temperature terminated with built-in fail-safe control. All cooler systems are equipped with an "off cycle" timer to maximize heat transfer and maintain optimum energy efficiency. Evaporators shall be U.L. listed.

MONITORING:

The system shall be provided with means to monitor the refrigeration systems via the SmartVap controller, which is an on-demand or adaptive control board.

- The system goes into defrost only when needed.
- Saves energy by adapting to the load and cooling required.
- Includes remote monitoring and communication capabilities.
 - Ability to view and control system operation remotely.
 - Remotely download temperature and alarm report history.
 - Remotely view and change system parameters and alarm settings.
 - Advanced alarm notification via text and/or e-mail for up to five recipients.

Multiple refrigeration systems are to be monitored, provide Cate5e or Cat6 cable from the evaporators to a network switch (which requires 120v receptacle), and then to the Edge Manager (which requires 120v receptacle) for monitoring of multiple systems with a single IP address.

Network coordination and owner IT department will be required for final operation and installation.

Piping Specifications:

- All refrigeration piping will be performed by the Food Service Equipment Contractor. This Contractor will install all components and piping per the manufacturer's recommendations.
- Line sizes must be appropriately sized for the length of run. If units have reverse-cycle defrost, liquid line shall be upsized one nominal size.
- FSEC will make all final connections to the evaporator and the condenser, charge and test the operation of the system.
- Copper drain lines, heated and insulated where needed, installed by the Food Service Equipment Contractor.

Electrical Specifications:

- Electrical Contractor is to provide final electrical connection to the condenser, evaporator, air curtain, and lights. Coordinate location with the General Contractor.

- Provide Cat5 or Cat 6 cable from the evaporator to the building internet network or Food Service director's office for monitoring of the refrigeration system, to be installed by the E.C.

Wiring:

- All interior wiring shall be "liquidtight" fittings and sealed to prevent water migration.
- The use of Romex, BX, MC Cable is prohibited and shall be deemed to not meet specifications.
- All control wiring and inter-wiring to be done by the Food Service Equipment Contractor.

Warranty:

The successful bidder shall provide written warranties that specify, subject to normal and accepted use, at a minimum:

- Five Year Compressor Warranty
- Three Year Service / Workmanship Warranty on refrigeration installation.
- One Year Manufacturer's Warranty on all other components.

ITEM: 203 & 204

MANUFACTURER: OMNITEMP

MODEL: ZF15K4E-TF5 / KMP316VE-S2D

DESCRIPTION: WALK-IN FREEZER REFRIGERATION

Walk-In Freezer will be provided with a condensing unit and evaporator for refrigerating equipment in accordance with ASHRAE standards. All systems shall be supplied with complete controls for a working system. Each system shall consist of a new compressor unit mounted on a structural stainless-steel base with cover and winter controls.

Compressor units shall be accessible preassembled remote, scroll type, air cooled units for outdoor installation with matching evaporator. Condensers shall be equipped with EC fan motors and evaporator fans shall utilize the ECM type two-speed fan motors. All refrigeration equipment shall comply with the Federal Regulations for energy efficiency.

A single rack system is to be manufactured to hold the cooler compressor units in one (1) housing. The curb is to be provided by others and coordinated by the F.S.E.C. Refrigeration systems are to be mounted on the roof of the building. Coordinate location with Architect and General Contractor.

Low temperature unit shall utilize R-448a refrigerant. The manufacturer calculates heat loads and provide systems with a minimum of 105% of needed capacity to maintain holding temperature -10° F in freezers. Calculations shall take into consideration box ambient, refrigeration system ambient, airflow, and exposure to sunlight and altitude. Interconnection of refrigeration lines, insulation, and

electrical wiring shall be accomplished by the appropriate trades and shall be a portion of the Kitchen Equipment Contract.

The refrigeration system on the walk-in will be equipped with an on-demand defrost controller factory mounted to the evaporator coil(s). The controller will be custom designed for Omnitemp refrigeration systems to control the electric expansion valve in response to true evaporator superheat and return air temperature. Power wiring for the evaporator coils will be provided by the E.C. as required. Off cycle and electric defrost is also available.

Additionally, a refrigeration system containing an on-demand controller will consist of the following factory-mounted parts:

- Electronic controller board with three- digit LED and push button panel interface for setup
- Three solid state temperature sensors
- Pressure transducer
- External relay to control liquid line solenoid valve or compressor contactor
- Electric expansion valve
- 24V transformer

The Smart Controller board will contain three (3) relay outputs: defrost heater (20A), evaporator fan (10A) and alarm (5A). The board will include connection points for alarm systems provided by others.

Low temperature systems come with two (2) preprogrammed defrost per day if it needs to run in safe mode and to ensure oil return to the compressor if no demand defrosts are required. All other defrosts are by demand which will be activated by the three (3) factory mounted sensors on the evaporator coil.

The Smart Controller system will: Float the head pressure, reduce system refrigerant charge by a minimum of one third, and reduce the defrost time when hot gas is used to defrost the coil. Any proposed alternatives must perform the energy-saving functions of all three features.

FREEZER CONDENSER:

Compressors shall be hermetic/scroll type and shall operate on R-448A refrigerant. Multiple compressors shall be used to satisfy load requirements. Small loads shall be combined in a multiplex arrangement and satisfied using a single compressor. Each compressor unit shall also include dual pressure control, sight glass, liquid line drier and suction and discharge vibration eliminators. One (1) ZF15K4E-TF5 Low temperature, -10-degree Fahrenheit, pre-assembled remote, scroll type outdoor remote refrigeration condenser (5.0 H.P.) and voltage to be 208/3. Provide and install stainless-steel housing, low ambient controls, and a roof mounting curb. Low temperature units also are to include evaporator drain line heaters (by others). Low pressure bypass and ambient safety accessories are to be provided on the outdoor condensing units to protect them under extreme outside temperatures of approximately -20 F.

FREEZER EVAPORATOR:

Matching evaporators shall be provided as required to complete the system. Evaporators shall be provided with mounted expansion valve and room thermostat. Evaporators shall be provided with the On-Demand Defrost Control System. Evaporators shall be off cycle, electric or reverse cycle defrost. Provide one (1) KLP316VE-S2D evaporator unit with voltage of 208/1. Low profile evaporator coil with expansion valve, thermostat, and solenoid factory mounted. Evaporators shall be forced air type designed for ceiling installation. Air discharge shall be parallel to the walk-in ceiling. Fan motors, guards, multi-fin, and tube-type coil shall be housed in heavy gauge aluminum housing. Unit shall have drain pan with suitable drainpipe connection. Freezer evaporators shall utilize electric defrost and heated drain pan. Defrost shall be initiated only when required by demand defrost settings and temperature terminated with built-in fail-safe control. Evaporators shall be U.L. listed.

MONITORING:

The system shall be provided with means to monitor the refrigeration systems via the SmartVap controller, which is an on-demand or adaptive control board.

- The system goes into defrost only when needed.
- Saves energy by adapting to the load and cooling required.
- Includes remote monitoring and communication capabilities.
 - Ability to view and control system operation remotely.
 - Remotely download temperature and alarm report history.
 - Remotely view and change system parameters and alarm settings.
 - Advanced alarm notification via text and/or e-mail for up to five recipients.

Multiple refrigeration systems are to be monitored, provide Cate5e or Cat6 cable from the evaporators to a network switch (which requires 120v receptacle), and then to the Edge Manager (which requires 120v receptacle) for monitoring of multiple systems with a single IP address.

Network coordination and owner IT department will be required for final operation and installation.

Piping Specifications:

- All refrigeration piping will be performed by the Food Service Equipment Contractor. This Contractor will install all components and piping per the manufacturer's recommendations.
- Line sizes must be appropriately sized for the length of run. If units have reverse-cycle defrost, liquid line shall be upsized one nominal size.
- FSEC will make all final connections to the evaporator and the condenser, charge and test the operation of the system.
- Copper drain lines, heated and insulated where needed, installed by the Food Service Equipment Contractor.
- The heat tape is to be powered from a separate circuit provided by the E.C. and connected by the F.S.E.C.

Electrical Specifications:

- Electrical Contractor is to provide final electrical connection to the condenser, evaporator, air curtain, and lights. Coordinate location with the General Contractor.
- Provide Cat5 or Cat 6 cable from the evaporator to the building internet network or Food Service director's office for monitoring of the refrigeration system, to be installed by the E.C.

Wiring:

- All interior wiring shall be "liquidtight" fittings and sealed to prevent water migration.
- The use of Romex, BX, MC Cable is prohibited and shall be deemed to not meet specifications.
- All control wiring and inter-wiring to be done by the Food Service Equipment Contractor.

Warranty:

The successful bidder shall provide written warranties that specify, subject to normal and accepted use, at a minimum:

- Five Year Compressor Warranty
- Three Year Service / Workmanship Warranty on refrigeration installation.
- One Year Manufacturer's Warranty on all other components.

ITEM: 205

MANUFACTURER: OMNITEMP

MODEL: OTB2-AC-H-3-0-3-4

DESCRIPTION: REFRIGERATION RACK SYSTEM

A single rack system is to be manufactured to hold the cooler and freezer compressor units in one housing. The refrigeration system is to be mounted on the roof of the building as shown in the drawings.

The refrigeration package shall be pre-engineered, and factory assembled air-cooled unit. The system shall be housed in a weather-protected compact powder coated steel frame. The entire housing shall be brushed stainless steel. The unit shall include an air-cooled aluminum fin copper tube condenser. The exterior housing shall feature stainless-steel one-piece louvers. Lifting points shall be integrated in the frame component. Condenser fan motors shall be mounted within the enclosure. The condenser intake surface shall be protected with stainless steel expanded metal guard to protect against vandalism and hail damage. Each unit shall be equipped with a ball-bearing fan motor, suction filter, sight glass, liquid filter, liquid line inlet and outlet valve, defrost cycle and high-pressure super-hose connections. Each unit shall be equipped with fan motor cycling controls and / or head pressure regulator where required for low ambient conditions. All refrigerant lines shall be extended to outside the housing in a neat and orderly manner. All tubing shall be securely supported and anchored with non-corrosive coated clamps. The package shall have a factory-mounted and pre-wired control panel, with main disconnect where required, circuit breakers, contractors wired for single-point connection.

Provide side access for the refrigeration lines and provide a 24" stand as part of the rack system, to be fastened to the pad.

- 120/208/3
- Curbs and wind restraints are to be supplied and installed by other trades.

ITEM: 206

MANUFACTURER: METRO

MODEL: MQ-G SERIES

DESCRIPTION: WALK-IN COOLER SHELVING (1 LOT REQUIRED)

Each unit is to consist of four (4) posts and four (4) shelves.

- (12) Model #MQ2448G Metro-Max Q Shelf, 48" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (16) Model #MQ2454G Metro-Max Q Shelf, 54" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (16) Model #MQ2460G Metro-Max Q Shelf, 60" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (44) Model #MQ74PE Metro-Max Q Post, 74" high, adjustable foot, epoxy coated steel with built in Microban antimicrobial product protection, NSF.
- Use "S" hooks in front corners where possible.
- Verify sizes with site conditions and verify shelf spacing with owner.

ITEM: 207

MANUFACTURER: CHANNEL

MODEL: AXD-UTR-14

DESCRIPTION: SHEET PAN RACK (5 REQUIRED)

Channel Manufacturing, Model #AXD-UTR-14, Pan Rack, heavy-duty series, 21" wide x 26" deep x 64" high, all aluminum welded construction, end load, 4" Angle Spacing, (15) tiers to hold (1) 18" x 26" or (2) 12" x 20" steam table pans per shelf, 5" x 2" heavy-duty swivel plate casters with Zerk grease fitting style, NSF listed, Made in USA.

- Perimeter Bumpers
- 5" Heavy-duty casters with brakes
- Lifetime warranty against rust and corrosion

ITEM: 208

MANUFACTURER: METRO

MODEL: MQ-G SERIES

DESCRIPTION: WALK-IN FREEZER SHELVING (1 LOT REQUIRED)

Each unit is to consist of four (4) posts and four (4) shelves.

- (8) Model #MQ2436G Metro-Max Q Shelf, 36" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (8) Model #MQ2442G Metro-Max Q Shelf, 42" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (16) Model #MQ2448G Metro-Max Q Shelf, 48" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (8) Model #MQ2460G Metro-Max Q Shelf, 60" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (40) Model #MQ74PE Metro-Max Q Post, 74" high, adjustable foot, epoxy coated steel with built in Microban antimicrobial product protection, NSF.
- Use "S" hooks in front corners where possible.
- Verify sizes with site conditions and verify shelf spacing with owner.

ITEM: 209

DESCRIPTION: SPARE NUMBER

ITEM: 210

DESCRIPTION: SPARE NUMBER

ITEM: 211

MANUFACTURER: CHANNEL

MODEL: PT2448

DESCRIPTION: PLATFORM TRUCK (2 REQUIRED)

Stocking platform truck, smooth deck, 24" wide, 50" long, powder coated steel construction with capacity of 2,000 pounds of distributed weight, removable handle, (2) 6" x 2" rigid plate casters and (2) 6" swivel casters.

- Lifetime warranty against rust and corrosion

ITEM: 212

MANUFACTURER: CHANNEL

MODEL: US1827-3

DESCRIPTION: UTILITY CART (3 REQUIRED)

Utility cart, (3) shelves, 31" long, 19" wide, 34" tall, all welded stainless-steel construction with capacity of 500 pounds distributed weight, 5" swivel non-marking plate casters, corner bumpers.

- Lifetime warranty against rust and corrosion

ITEM: 213

MANUFACTURER: METRO

MODEL: MQ-G SERIES

DESCRIPTION: DRY STORAGE SHELVING (1 LOT REQUIRED)

Each unit is to consist of four (4) posts and five (5) shelves.

- (5) Model #MQ2442G Metro-Max Q Shelf, 42" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (25) Model #MQ2448G Metro-Max Q Shelf, 48" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (5) Model #MQ2460G Metro-Max Q Shelf, 60" wide x 24" deep, removable open grid polymer with Microban antimicrobial protection, epoxy coat steel frame, wedge connectors with quick adjust corner releases, NSF.
- (28) Model #MQ74PE Metro-Max Q Post, 74" high, adjustable foot, epoxy coated steel with built in Microban antimicrobial product protection, NSF.
- Verify sizes with site conditions and verify shelf spacing with owner.

ITEM: 214

MANUFACTURER: IMC TEDDY

MODEL: CMSC-R

DESCRIPTION: MOP SINK WITH CABINET

Combination Mop and Storage Cabinet, 46 ½" wide x 30" deep x 84" tall, mop storage on left with 23 ½" wide x 19" front-to-back mop sink, hinged door, includes wall-mounted utility spray assembly, storage cabinet on right with two (2) fixed shelves, ramp for mop bucket, top compartment includes one (1) fixed shelf notched for mop handles, 18-gauge stainless steel construction, and NSF listed.

- Door on top
- Flat Top
- Locking doors
- Middle shelf in storage area
- Anti-splash sink

ITEM: 215

DESCRIPTION: WASHER / DRYER COMBO (NOT IN CONTRACT - BY OTHERS)

ITEM: 216

MANUFACTURER: CUSTOM METALS

MODEL: FS-MWT2448-US

DESCRIPTION: MOBILE LINEN TABLE

Mobile work table shall be custom built as per General Specifications, approximately 4'0" x 2'0" x 34" high to work surface, 14-gauge 304 stainless steel top with square edge and bull-nosed corners, turn-down on all four sides. Provide stainless steel gussets and legs on swivel-stopper casters with brakes, and full-length stainless steel under shelf with turn-down on all sides.

CULINARY CLASSROOM EQUIPMENT

ITEM: 300

MANUFACTURER: COMMERCIAL STAINLESS

MODEL: FS-TWS32132-US

DESCRIPTION: TEACHER'S WORK STATION

Work station shall be custom built as per General Specifications, approximately 11'0" x 2'8" x 34" high to work surface, 14-gauge 304 stainless steel top with square edge and turn-down on all sides. Provide an 8" round trash hole with a slight bend-down in the counter top over the left

compartment, this trash compartment is to be lined with stainless steel and have an open front frame, provide a stack of three (3) 20"x 20" x 5" stainless steel drawers with locks on anti-slam slides, double hinged doors with lock, latches, and catches with a removable and adjustable center shelf, and a duplex receptacles mounted in the base for the undercounter refrigerator. Provide stainless steel gussets and legs with bullet feet, and exterior of the cabinet on all sides to be a polish stainless steel, NSF and UL listed.

- Provide allowance for Item #301 undercounter refrigerator.
- Allowance in left section for "Slim Jim" garbage can to fit under the countertop and behind the door.
- Provide two receptacles for the refrigerator.
- Stainless steel adjustable kickplate to be mounted with stainless steel fasteners 1/2" above the floor on all sides, except the rear side where the refrigerator slides under the counter. Stainless steel kick plates shall be continuous. Kick plates are removable.

ALTERNATE MANUFACTURER: CUSTOM METALS

ITEM: 301

MANUFACTURER: RANDELL

MODEL: FX-2WS-290

DESCRIPTION: TEACHER'S REFRIGERATED WORK STATION

FX Series Flexible Refrigerator or Freezer Work Table, low-height, 43" wide, 5.0 cubic feet, (2) drawers with removable ABS inserts, (2) self-contained refrigeration systems with electronic controls (40° refrigerator, -5° freezer), finished top, stainless-steel exterior and interior, 3 1/2" casters, R290 Hydrocarbon refrigerant, (2) 1/4 HP compressors and UL and NSF listed.

- 120/60/1
- Drawer Locks
- One-year parts, labor, and compressor warranty
- Two-year labor warranty
- Five-year compressor warranty
- Coordinate height of unit with height of worktable

CULINARY LAB EQUIPMENT

ITEM: 400

DESCRIPTION: SPARE NUMBER

ITEM: 401

MANUFACTURER: CUSTOM METALS

MODEL: FS-SDT3096-US

DESCRIPTION: SOILED DISH TABLE

Soiled dish table to be custom built as per General Specifications. Dish table section shall be approximately 8'0" x 2'6" x 34" high to work surface, 14-gauge 304 stainless steel top with raised rolled edge and rounded corners, provide an 8" rear backsplash with capped ends at the dishwasher. Provide partial length under shelf with 2" rear and side upturn up to the pre-rinse sink, with cross rails on the sides and rear of the balance, stainless steel gussets, legs, and flanged feet on front ends with bullet feet on rear and centers. Pre-rinse faucet is to be mounted in a recessed section on the backsplash.

- Provide a raised flat section in the backsplash to mount the pre-rinse faucet.
- Provide 20" x 20" x 6" pre-rinse sink with removable rack slide with drain strainer.
- Secure flanged feet to the floor with stainless steel fasteners
- Seal unit to the wall and to the dishwasher.
- Secure table to the dishwasher with stainless steel fasteners
- Krowne Metal Corporation Model #17-202WL, Krowne Royal Series pre-rinse assembly, single hole deck mount, double pantry, spring action flexible gooseneck, 38" stainless steel hose with 15" overhang and 1.2 GPM spray head, built in check valves, includes wall bracket and mounting kit, chrome plated brass base, low lead compliant, includes internal check valves to prevent backflow and cross contamination, NSF listed.
 - 3 Year warranty

ITEM: 401.1

MANUFACTURER: CUSTOM METALS

MODEL: FS-SLDRS48

DESCRIPTION: DISH TABLE SORTING SHELF

Slanted dish rack wall shelf to hold (2) dish racks, shall be custom built as per General Specifications, approximately 4'0", 16-gauge 304 stainless steel with drip trough and drip tube on left front corner, and 2" up-turn at rear to be tight to the wall.

- Verify mounting height with owner.
- Coordinate wall backing with General Contractor

ITEM: 402

MANUFACTURER: HOBART

MODEL: AM16T

DESCRIPTION: DISHWASHER

Dishwashing Machine, door type, tall chamber (27"), high temp sanitizing, sixty (60) racks per hour, straight-thru installation, user-friendly smart touchscreen controls, Wi-Fi connectivity with Smart Connect app, Sense-A-Temp booster, electric tank heat, pumped rinse and drain, self-draining high efficiency wash pump with stainless steel impeller, "X" shaped revolving interchangeable upper and lower anticlogging wash arms, auto-fill, two-stage filtration, various timed wash cycles including pot and pan cycle, scrap screen and basket, 3 sided door with actuated start, pillarless opening, stainless steel tank, tank shelf, chamber, trim panels, frame, and feet, vent fan control, sheet pan rack, UL and NSF listed.

- 208/3
- Door lock kit
- Drain water tempering kit.
- Water Hammer Arrestor – Assembly includes $\frac{3}{4}$ " brass pressure regulator, pressure gauge, shock arrestor and garden hose adapter.
- Touch Screen Guard
- Factory Startup with Certified Factory Installation
- (3) Six-pan racks to hold sheet pans
- One-year parts and labor warranty
- (6) Vollrath Model #TR3, Traex Full Size Peg Rack, 3 $\frac{1}{4}$ " max inside height, (9) rows x (9) rows with 1-7/8" peg spacing, open bottom and sidewall, handles on all (4) sides, co-polymer plastic, full size (19 $\frac{3}{4}$ " x 19 $\frac{3}{4}$ ") double wall construction, snap-fit extenders, Royal Blue, NSF, Made in USA.
- (6) Vollrath Model #TR2, Traex Full Size Flatware Rack, full size, 19 $\frac{3}{4}$ " wide x 19 $\frac{3}{4}$ " deep x 4" high, (compartment 3 $\frac{1}{4}$ " tall), handles on all (4) sides, double wall construction, co-polymer plastic, Royal Blue, NSF, Made in USA.

ITEM: 403

MANUFACTURER: CADDY CORPORATION

MODEL: CH-C-W-48-SD-48

DESCRIPTION: CONDENSATE HOOD

This series hood is a Type II condensate hood for exhaust only. The hood shall have the size, shape, and performance specified in the contract documents. The Hood section is approximately 4'0" x 4'0" x 2'6" high with (1) 7" x 70" exhaust collar exhausting a total of 6001,125 CFM. Exhaust duct collar to be fully welded 4" high with a 1" flange. Duct sizes and static pressure requirements are shown on the contract drawings. Unit has a removable stainless-steel sliding damper.

Construction shall be 100 percent with type 304 stainless steel and #4 finish. Construction shall be dependent on structural application to minimize distortion and other defects. All seams, joints, and

penetrations of the hood enclosure to the lower outermost perimeter shall have a liquid and airtight continuous external and internal weld in accordance with the current NFPA regulations. Hood shall be a wall type with fully welded 10-gauge corner hanging angles. Corner hanging angles have a slot pre punched at the factory. The ventilator is to be equipped with necessary hanger brackets welded in place by the manufacturer at front and rear for suspending from overhead structure. The hood shall be provided with a full perimeter condensate gutter on all sides and one corner shall be equipped with a drain on the right rear side.

- Provide closure panels constructed with the same material as the hood to close off space between the top of hood and ceiling as required for field installation.
- Exhaust Fan is to be coordinated with the CFM requirements of the Hood.
- Note: Exhaust air fan not to be provided under this contract but shall be coordinated with the CFM requirements of this unit.
- E.C. is to connect the dishwasher to hood exhaust fan for automatic activation.
- Center hood over the dishwasher.
- Seal the bottom of hood to the building wall.

ITEM: 404

MANUFACTURER: CUSTOM METALS

MODEL: FS-CDT3010851-US

DESCRIPTION: CLEAN DISH TABLE

Clean dish table to be custom built as per General Specifications, table shall be approximately 9'0" x 2'6" x 4'3" x 34" high to work surface, 14-gauge stainless steel top with raised rolled edges, corners bull nosed, provide an 8" back-splash with capped ends at the dishwasher, stainless steel legs, full length stainless steel under shelf with a 2" upturn at rear and ends. Provide the table with stainless steel gussets, legs, flanged feet on front legs only, and bullet feet on the balance.

- Secure flanged feet to the floor with stainless steel fasteners
- Seal unit to the wall and to the dishwasher.
- Secure table to the dishwasher with stainless steel fasteners

ITEM: 404.1

MANUFACTURER: CUSTOM METALS

MODEL: FS-SWS66

DESCRIPTION: DISH TABLE SORTING SHELF

Slanted dish rack wall shelf to hold (3) dish racks, shall be custom built as per General Specifications, approximately 5'6", 16-gauge 304 stainless steel with drip trough and drip tube on left front corner, and 2" up-turn at rear to be tight to the wall.

- Verify mounting height with owner.
- Coordinate wall backing with General Contractor

ITEM: 405

MANUFACTURER: METRO

MODEL: MX-G SERIES

DESCRIPTION: POT & PAN SHELVING

The unit is to consist of four (4) posts, four (4) shelves, and four (4) locking casters.

- (3) Model #MX2448G Metro-Max I Shelf, 48" wide x 24" deep, removable open grid polymer mats with Microban antimicrobial protection, reinforced type 304 stainless steel corners, wedge connectors with quick adjust corner releases, NSF.
- (4) Model #MX74UP Metro-Max I Post, 74" high, open pole for use with stem casters, polymer construction with built in Microban antimicrobial product protection, NSF.
- (4) Model #5PCBX Stem Caster, brake, 5" diameter, polyurethane wheel tread with donut bumpers.
- (2) Model #XTR2448XE Cutting Board and Tray Drying Rack System thirty-four (34) tray capacity, 6" up-rights with 1 1/8" spacing, mounts on 48" wide x 24" deep frame, taupe epoxy, NSF.
- (1) Model #XTR2448XEa Cutting Board and Tray Drying Rack System fourteen (14) tray capacity, 6" up-rights with 3" spacing, mounts on 48" wide x 24" deep frame, taupe epoxy, NSF.
- (1) Model #XDRIIP Adjustable drip tray. Provide removable drip pan as part of this item.
- (1) Vollrath Model #8002410, Super Pan 1/1 Food Pan, 2 1/2" deep, low-temp polycarbonate clear plastic, top flange corners with concave indentation, anti-jamming, ramped sides, reverse form flattened edge, framing shoulder, interchanges with SPV stainless steel pan line, NSF, made in USA.
- Verify shelf spacing with owner.

ITEM: 406

MANUFACTURER: RUBBERMAID

MODEL: FG2643-GRAY

DESCRIPTION: MOBILE TRASH CAN WITH LID

Food Processing Container, without lid, 44-gallon, 24" diameter x 31 1/2" high, with "Inedible" black imprint, reinforced rims, built in handles, double rimmed base, high-impact plastic construction, gray, NSF, Made in USA

- Model #FG2640 Black Brute Dolly, 18 1/4" deep x 6 5/8" high, heavy duty 3" casters, 250-pound capacity, NSF, Made in the USA.
- Model FG2645 Gray Brute container lid, 24 1/2" deep x 1 1/2" high, NSF, Made in the USA.

ITEM: 407

MANUFACTURER: CUSTOM METALS

MODEL: FS-TCS33114-US-OS

DESCRIPTION: THREE COMPARTMENT SINK

Three Compartment Sink shall be custom built as per General Specifications, approximately 9'6" x 2'9" x 34" high to work surface, 14 gauge 304 stainless steel top with raised rolled edge and rounded corners, provide an 8" rear backsplash with enclosed ends, (3) 22"x 28" x 16" deep sink bowls with continuous front, lever waste handle bracket for lever waste and overflow, stainless steel under shelf with 2" up-turn at rear and ends mounted under right drain board, open front with cross rails under the left drainboard for garbage can, balance of the unit to have cross rails with stainless steel gussets, legs, and flanged feet on front corner legs with bullet feet on rear and centers.

- Provide (2) 12" deep louvered wall shelves with 2" rear upturn, tight to the wall.
- Coordinate over shelves with pre-rinse faucet.
- Lever-waste and overflow to be installed by sink manufacturer.
- Secure flanged feet to the floor with stainless steel fasteners
- Seal the unit to the wall.
- (1) Krowne Metal Corporation Model #17-109WL, Krowne Royal Series, pre-rinse Assembly, with add-on faucet, wall mount, 8" centers, spring action flexible gooseneck, 38" stainless steel hose with 15" overhang and 1.2 GPM spray head, built in check valves, 2.0 GPM add-on faucet with 12" swing spout, quarter-turn ceramic cartridge valves, includes wall bracket and mounting kit, chrome plated brass base, low lead compliant, includes internal check valves to prevent backflow and cross contamination, NSF listed.
 - 3 Year warranty
 - E-Z Install Water Line Kit, wall mount, 3/8", 30" long, includes mounting, stainless steel finish.
- (1) Krowne Metal Corporation Model #14-812L, Krowne Royal Series Faucet, splash-mounted, 8" centers, 12" swing spout, quarter-turn ceramic cartridge valve, low lead compliant, with built-in check valve, NSF listed.
 - Wrist Handle Kit
 - 3 Year warranty
 - E-Z Install Water Line Kit, wall mount, 3/8", 30" long, includes mounting, stainless steel finish.
- (3) Krowne Metal Corporation Model #22-201, Krowne Twist Waste with 1-1/4" overflow outlet, 3" sink opening, 2" NPS male threaded with 1-1/2" female threaded drain outlet, 1-1/2" reducer with rubber washer, 4-1/2" flange, stainless steel strainer, flange and handle, NSF listed.
 - Overflow Head fits 1-7/8" opening, low lead compliant.
 - Overflow Elbow fits 1-7/8" opening, low lead compliant.

ITEM: 408

MANUFACTURER: IMC TEDDY

MODEL: CSW-1S-APRON

DESCRIPTION: HAND SINK

Hand Sink, wall model approximately 10" x 13 ½" x 5 ½" sink bowl with inverted "V" edge, 8" integral backsplash, 304 stainless steel all welded construction, one (1) hole for splash-mounted faucet, 6" apron, includes faucet, basket drain, mounting bracket and clip with hardware, stainless steel, and NSF listed.

- P-Trap Assembly
- Model EFD-1SG Electronic Faucet, splash type, gooseneck, with metering/check valve.
- Sink apron with solid bottom cover, to hide all utilities. Apron extends 12" AFF floor.
- Mount and seal to the wall.
- Coordinate with P.C. to make sure utilities and censored faucet components fit within the stainless-steel enclosure provided with the sink.

ITEM: 409

MANUFACTURER: METRO

MODEL: MX-G SERIES

DESCRIPTION: POT & PAN SHELVING

The unit is to consist of four (4) posts, four (4) shelves, and four (4) locking casters.

- (3) Model #MX2448G Metro-Max I Shelf, 48" wide x 24" deep, removable open grid polymer mats with Microban antimicrobial protection, reinforced type 304 stainless steel corners, wedge connectors with quick adjust corner releases, NSF.
- (4) Model #MX74UP Metro-Max I Post, 74" high, open pole for use with stem casters, polymer construction with built in Microban antimicrobial product protection, NSF.
- (4) Model #5PCBX Stem Caster, brake, 5" diameter, polyurethane wheel tread with donut bumpers.
- (2) Model #XTR2448XE Cutting Board and Tray Drying Rack System thirty-four (34) tray capacity, 6" up-rights with 1 1/8" spacing, mounts on 48" wide x 24" deep frame, taupe epoxy, NSF.
- (1) Model #XTR2448XEa Cutting Board and Tray Drying Rack System fourteen (14) tray capacity, 6" up-rights with 3" spacing, mounts on 48" wide x 24" deep frame, taupe epoxy, NSF.
- (1) Model #XDRIP Adjustable drip tray. Provide removable drip pan as part of this item.
- (1) Vollrath Model #8002410, Super Pan 1/1 Food Pan, 2 ½" deep, low-temp polycarbonate clear plastic, top flange corners with concave indentation, anti-jamming, ramped sides, reverse form flattened edge, framing shoulder, interchanges with SPV stainless steel pan line, NSF, made in USA.
- Verify shelf spacing with owner.

ITEM: 410

DESCRIPTION: SPARE NUMBER

ITEM: 411

MANUFACTURER: FOOD WARMING EQUIPMENT

MODEL: PHU-12

DESCRIPTION: PROOFING CABINET

Proofer/Heated Holding Cabinet, mobile, full height, insulated, (12) pair adjustable tray slides 4 ½" OC, (12) 18" x 26" or (24) 12" x 20" pan capacity, (1) field reversible door with recessed antimicrobial handle, built-in humidifier, individual controls for temperature and moisture, removable water reservoir, recessed hand grip on each side of unit, stainless steel interior and exterior, 5" casters (2) rigid & (2) swivel with brakes, UL and NSF listed.

- 120/60/1
- Manual Control
- Magnetic Door Latch
- Dutch doors hinged on the right.
- Full Perimeter Bumper
- Two-year parts warranty
- One-year labor warranty

ITEM: 412

MANUFACTURER: CADDY CORPORATION

MODEL: PB-C-W-108-ND-60

DESCRIPTION: EXHAUST HOOD

Provide Caddy Exhaust Hood per detail drawings as shown on plans and in accordance with the following specifications:

The dry filter type hood is a Type I, commercial kitchen, U.L. 710 listed ventilator canopy, approved for use over 400° F and 600° F. Ventilator canopy shall be size, and shape as shown on drawing and shall be complete with grease filters, grease trough, removable grease cup, and without a fire damper in exhaust duct. This non compensating exhaust only ventilator canopy is intended for use over light to heavy-duty types of cooking appliances. The hood shall have the size, shape, and performance specified in the contract documents. The hood section is approximately 10' 0" x 5' 0" x 24" high with (1) 10" x 15" exhaust collar. The total exhaust is a total of 1,890 CFM. Exhaust duct collars to be fully welded with 4" high and a 1" flange. Ventilator canopy is to include temperature sensors in the duct to sense heat from cooking equipment and automatically energize the exhaust and makeup air systems per IMC-2006 507.2.1.1. Control wiring to include a 15-minute delay timer to

allow cooking equipment to cool down after cooking is completed to prevent fans from cycling on/off. This heat sensor is to be exposed in the duct area of the hood to promote faster response times and facilitate cleaning. Wiring from the sensor to the utility cabinet control panel shall be factory installed in the unit and will require field connections between the hood sections. Duct sizes and static pressure requirements are shown on the contract drawings. Unit shall have a fire cabinet mounted on the side complete with an electrical control system. Makeup air is to be provided through a plenum on the front of the hood and the hood is to be pre-piped for the fire suppression system.

The electrical control system is to be in the fire cabinet and is designed to thermostatically activate the exhaust fan for an exhaust hood, whenever elevated temperatures are sensed in the exhaust system. This option will meet the requirements of IMC 507.2.1.1 by providing a thermostat mounted in the duct area of the hood to sense increased exhaust temperatures. Controls shall be listed by ETL or UL. The control enclosure shall be NEMA 1 rated and listed for installation inside of the exhaust hood utility cabinet. The control enclosure shall be constructed of stainless steel. Thermostat located in the duct area shall be chrome plated to match the hood. The thermostat is factory set at an activation temperature of 105°F. Once the exhaust temperature reaches the set-point, then the normally open contacts will close, and the exhaust and supply fan will be activated. The panel will also contain a timer to prevent cycling of the fans after the cooking appliances have been turned off and the heat in the exhaust system is reduced. The timer shall contain one instantaneous contact and one delayed contact. Time shall be adjustable from 1.5 to 60 minutes. The timer is factory set to hold the fans on for five (5) minutes after a drop in temperature below set point occurs but can be adjusted. The panel is factory pre-wired to shut down supply fans in a fire condition. There is also a factory pre-wire option to turn the exhaust fans on in a fire condition. Provide a light and fan switch mounted on the face of the hood, pre-wired to the control panel.

Entire ventilator canopy shall be constructed of a minimum of 18-gauge type high grade, corrosive resistant, non-magnetic stainless steel on all surfaces. All exterior joints and seams shall be continuously welded liquid tight, ground smooth, and polished to the original finish. Construction to conform to NFPA 96 standards and shall meet UL 710 standards for operation. Ventilator canopy is constructed using the standing seam method for optimum strength. Construction shall be dependent on structural application to minimize distortion and other defects. All seams, joints, and penetrations of the hood enclosure to the lower outermost perimeter that directs and captures grease laden vapor and exhaust gases shall have a liquid tight continuous external weld in accordance with the current NFPA regulations. The ventilator is to be equipped with necessary hanger brackets welded in place by the manufacturer at front and rear for suspending from overhead structure. The hood shall have a double wall insulated front. Grease trough is concealed within the ventilator and slopes to a removable grease cup located at the end of the ventilator canopy. The ventilator canopy shall be complete with UL Listed stainless steel non loading baffle grease filters running the full length of the canopy. UL vapor proof LED light fixtures shall be installed and pre-wired to a junction box and face mounted switch and temperature only demand control.

The wall backsplash panels are to be aesthetically pleasing and span between hood and floor and the length of the unit including the fire cabinet. Wall panels to be constructed with the same material, finish, and grain as the hood. Panels should go behind the hood a minimum of two (2) inches and the hood should be sealed to the wall. FSEC is responsible for providing cut-outs in the stainless panels to accommodate any utilities coming out of the wall under the hood. Include divider bars and end trim for securing wall paneling to wall.

Provide closure panels constructed with the same material as the hood to close off space between the top of hood and ceiling as required for field installation.

Exhaust fans are to be coordinated with the CFM requirements of the hood.

Note: Exhaust and supply fans are to be provided and installed by a separate contractor and are to be coordinated with the CFM and power requirements of the unit.

The hood shall be both UL and NSF rated per the most current codes and regulations.

FSEC is responsible for verifying and coordinating the exhaust duct riser location with the ceiling joists and all other site conditions.

ITEM: 413

MANUFACTURER: ANSUL

MODEL: R102

DESCRIPTION: FIRE SUPPRESSION SYSTEM

The Fire suppression system is to be mounted in cabinet at the end of the hood. Manual activation, along with means for simultaneous automatic shutting down of protected cooking equipment upon activation of said system to be included. System shall be designed to provide plenum and duct collar protection. All exposed piping to be stainless steel plated. The manufacturer shall build a fusible link detection system into ventilator sections. All exposed fusible links are to be recessed into the top of hoods with no visible conduit. Provision shall be made for manual actuation by readily accessible, and plainly marked remote manual release station in each cooking area, located no less than 54" and no more than 78" above floor. Pull station will be surface mounted and conduit for system shall be concealed in the ceiling as much as possible. The system is to be sized in accordance with most current UL Standards. The system shall be furnished and installed by an authorized distributor in the field in accordance with manufacturer's instructions and in accordance with UL listings and shall conform to current NFPA and local and/or state codes and standards. This shall include mounting of system units, remote manual releases, nozzles, actuating devices, and running of all pipe and control tubing appurtenant to systems. The system should shut down the make-up air system, if applicable, in case of activation but allow the exhaust fan to keep operating.

Unit shall be stored pressure type, of sufficient capacity as determined by published standards to provide high concentration of liquid agent in plenum areas and duct collars. Liquid agent to be stored in containers equipped with pressure gauge to verify operational readiness. Nozzles located in plenum and ductwork shall be capable of functioning with heavy accumulation of grease.

The gas shut-off valve shall be furnished by the F.S.E.C. and installed by the P.C. The F.S.E.C. is responsible for coordinating installation with all trades.

Micro-switches for electrical equipment shut off and/or actuation of fire alarm system shall be furnished as part of the fire protection system by the manufacturer and connected to the shunt trip provided and installed by the Electrical Contractor.

The Electrical Contractor is to interface with the building alarm system and/or the fire command station and the micro switches as specified as well as interconnections between system and UDS system.

All access openings, holes, sleeves, chases, etc. in the building structure necessary to permit piping and control tubing to be run between system unit, ventilator, and ductwork are to be provided by the General Contractor.

Provision shall be made to shut off the gas and electric supply to all cooking equipment upon actuation of the system.

The Electrical Contractor is to furnish and install a control relay to detect the operation of the system by connection to the Micro switches supplied by the Fire Protection System Contractor.

ITEM: 414

MANUFACTURER: BLODGETT

MODEL: HVH-100E-DBL

DESCRIPTION: DOUBLE CONVECTION OVEN

HydroVection Oven with Helix Technology, Electric, full size, double stacked, capacity (10) 18" x 26" pans, black glass doors, (4) halogen lamps, (20) stainless steel racks and (18) rack positions, cavity vent, SmartTouch2 7" touchscreen control, four speed auto-reversing fan motor with overload protection, (12) tubular heaters, 4" fillet core probe, side mounted hand shower, 304 stainless steel insulated interior liner, stainless steel front, top, sides, and back, 8 1/2" stainless steel legs with casters and stacking kit, ETL and NSF listed.

- 208/60/3 with cord set for each compartment
- (2) Side heat shields on left side of ovens
- (2) Backflow preventer

- (2) Water pressure regulator
- Model #QTCR-1-HV Optipure Multi-Stage Water Filtration System
- One-year parts and labor warranty

ITEM: 415

MANUFACTURER: RATIONAL

MODEL: ICP 6-FULL/6FULL E

DESCRIPTION: DOUBLE COMBINATION OVEN

Two iCombi Pro 6-full size combination ovens, double stack, Rational intelligent connectable cooking system with four assistants: iDensity Control, iCooking Suite, iProduction Manager, and iCare System, full-size, electric, cooking controls with 6 operating modes, (5) cooking methods, (3) manual operation modes: combi-Steamer, Convection Oven, or Combination. Each oven has a capacity of (6) 18"x26" or (12) 12"x20" pan capacity, core temperature probe with 6-point measurement, 85° to 572°F temperature range, hand shower with automatic retracting system, comes with (3) grid shelves, quick clean, care control, eco mode, ethernet interface and Wi-Fi interface, NSF and UL listed.

Provide the following:

- 208/60/3
- Energy Star
- Requires ethernet connection.
- The door is to be hinged on the right.
- Rational Certified Installation with Pre-Installation Site Survey, including stacking kit and installation of stacking kit, water filter system, and commissioning.
- F.S.E.C. is responsible in coordination with Rational, to provide water samples or test results from a recent water sample.
- Water Filtration Double Cartridge System with (2) additional cartridges
- Certified installation of water filter system.
- Certified Chef training
- Mobile oven stand on adjustable height casters, with stacking kit and safety set.
- Installation Kits
- (12) Stainless steel grid shelves with K-12 promotion
- (12) Fry Baskets with K-12 promotion
- Fully automatic cleaning system including deliming of the steam generator.
- Auto Dose System for integrated autonomous cleaning which includes (2) Cleaner Cartridges and (2) Care Cartridges
- (2) Box of 6 Cleaner Cartridges
- (2) Box of 6 Care Cartridges
- Condensation breaker
- USB data memory stick
- Positioning aid for core temperature probe

- Two-year parts and labor warranty
- (24) Vollrath Model #9002P, Wear-Ever Sheet Pan, full size, 18"wide x 26"deep x 1"high, 18-gauge aluminum alloy, natural finish, perforated, Made in USA.
- (12) Vollrath Model #30023, Super Pan V Food Pan, perforated, full size, 2-1/2" deep, 22-gauge, 300 series stainless steel, anti-jamming design with reinforced pour corners, NSF, Made in USA.

ITEM: 416

MANUFACTURER: METRO

MODEL: MQSEC55VE

DESCRIPTION: MOBILE SECURITY STORAGE

Each unit consists of four (4) posts with casters, four (4) shelves, cage enclosure with locking hasp. Metro-Max Q Security Unit, mobile, 52 3/4" wide x 27 13/16" deep x 67 13/16" high with two (2) Model #5PCX and (2) Model #5PCBX casters, NSF.

- (3) Model #MQ2448G Metro-Max Q Shelf, 48" wide x 24"deep, removable open grid polymer shelf mats on an epoxy coated steel frame with quick adjust corner releases, four (4) wedge connectors, Microban antimicrobial product protection, 600-pound capacity per shelf, NSF.
- Evenly space shelves inside unit.

ITEM: 417

MANUFACTURER: IMC TEDDY

MODEL: CSW-1S-APRON

DESCRIPTION: HAND SINK (3 REQUIRED)

Hand Sink, wall model approximately 10" x 13 1/2" x 5 1/2" sink bowl with inverted "V" edge, 8" integral backsplash, 304 stainless steel all welded construction, one (1) hole for splash-mounted faucet, 6" apron, includes faucet, basket drain, mounting bracket and clip with hardware, stainless steel, and NSF listed.

- P-Trap Assembly
- Model EFD-1SG Electronic Faucet, splash type, gooseneck, with metering/check valve.
- Sink apron with solid bottom cover, to hide all utilities. Apron extends 12" AFF floor.
- Mount and seal to the wall.
- Coordinate with P.C. to make sure utilities and censored faucet components fit within the stainless-steel enclosure provided with the sink.

ITEM: 418

MANUFACTURER: GLOBE

MODEL: SP40

DESCRIPTION: FLOOR MIXER

Planetary Mixer, bench model, 42-quart capacity, 3-speed, #12 hub, includes: stainless steel removable bowl guard with built-in ingredient chute, 40 quart stainless steel bowl, aluminum spiral dough hook, stainless steel wire whip and aluminum flat beater, interlocked bowl lift, gear-driven transmission, thermal overload protection, front-mounted touchpad controls with 60-minute digital timer and last batch recall, non-slip rubber feet, cast iron body, enamel gray finish, NSF and UL listed.

- 208/60/3
- Bowl Scraper
- Two-year parts and labor warranty

ITEM: 419

MANUFACTURER: CUSTOM METALS

MODEL: FS-PTS3096-US-OS

DESCRIPTION: BAKERY PREP TABLE

Prep Table shall be custom built as per General Specifications, approximately 8'0" x 2'6" x 34" high to work surface, and Marble top with square edge. Provide 16"x 20" x 12" deep sink bowl with removable poly sink cover, with a cover holder mounted under the countertop between the legs and the sink bowl, lever waste and bracket, and a 12" plumbing chase from directly under the sink to the floor to conceal the supply lines. This chase shall have a removable access panel. Provide one (1) 20"x 20" x 5" stainless steel drawer with lock on anti-slam slides with 1/2" Richlite cutting board mounted under the drawer. The cutting board shall have a handle slot to easily remove the boards from under the drawer. Provide stainless steel gussets and legs with flanged feet on front ends, bullet feet on balance, and a partial-length stainless steel under shelf under the drawer and under the sink areas with a 2" rear up-turn and drain access. Provide open under storage with rear cross bracing to allow for the (2) ingredient bins.

- Provide a 72" long table mounted, 12" deep solid over shelf with a 2" rear upturn.
- Seal shelf posts to backsplash on the table.
- Flanged feet on front corner legs only.
- Secure flanged feet to the floor with stainless steel fasteners.
- Allowance in undershelf for mobile ingredient binds.
- (1) Krowne Metal Corporation Model #15-512L, Krowne Royal Series Faucet, deck-mounted, 8" centers, 12" swing spout, quarter-turn ceramic cartridge valve, low lead compliant, with built in check valve, NSF listed.
 - Wrist Handle Kit
 - 3 Year warranty

- Royal Series Deck Mounting Kit, long style; (2) 3-1/2" brass nipples, (2) brass locknuts, (2) brass washers.
- (1) Krowne Metal Corporation Model #22-201, Krowne Twist Waste with 1-1/4" overflow outlet, 3" sink opening, 2" NPS male threaded with 1-1/2" female threaded drain outlet, 1-1/2" reducer with rubber washer, 4-1/2" flange, stainless steel strainer, flange and handle, NSF listed.
 - Overflow Head fits 1-7/8" opening, low lead compliant.
 - Overflow Elbow fits 1-7/8" opening, low lead compliant.

ITEM: 420

MANUFACTURER: CAMBRO

MODEL: IB36-148

DESCRIPTION: INGREDIENT BINS (2 REQUIRED)

Ingredient Bin, mobile, 21-gallon capacity, molded polyethylene with sliding cover, S-hook on front, four (4) 3" heavy duty casters (2 front swivel, 2 fixed), with bin securely attached to base plate, white with clear cover, NSF.

- (2) Camwear Scoop, 6 oz., polycarbonate, clear, NSF
- (2) Camwear Scoop, 12 oz., polycarbonate, clear, NSF
- (2) Camwear Scoop, 24 oz., polycarbonate, clear, NSF
- (2) Ingredient Bin Scoop Holder, 24 oz, white

ITEM: 421

MANUFACTURER: RUBBERMAID

MODEL: 1883459

DESCRIPTION: SLIM JIM TRASH CAN (13 REQUIRED)

Slim Jim, utility container, 13 gallon, 20 3/4" wide, 13 1/2" deep, 28 3/8" tall, slim profile, internal hinged lid, end step-on pedal, indoor resin material, made in the USA.

ITEM: 422

MANUFACTURER: CUSTOM METALS

MODEL: FS-WT3084-US-OS

DESCRIPTION: WORK TABLE W/ MARBLE TOP

Prep Table shall be custom built as per General Specifications, approximately 7'0" x 2'6" x 34" high to work surface, and Marble top with square edge. Provide stainless steel gussets and legs with

flanged feet on front ends, bullet feet on balance, and a partial-length stainless steel under shelf with a 2" rear up-turn. Provide open under storage with rear cross bracing to allow for the (2) ingredient bins.

- Provide an 84" long table mounted, 12" deep solid over shelf with a 2" rear upturn.
- Seal shelf posts to backsplash on the table.
- Flanged feet on front corner legs only.
- Secure flanged feet to the floor with stainless steel fasteners.
- Allowance in undershelf for mobile ingredient binds.

ITEM: 423

MANUFACTURER: CAMBRO

MODEL: IB36-148

DESCRIPTION: INGREDIENT BINS (2 REQUIRED)

Ingredient Bin, mobile, 21-gallon capacity, molded polyethylene with sliding cover, S-hook on front, four (4) 3" heavy duty casters (2 front swivel, 2 fixed), with bin securely attached to base plate, white with clear cover, NSF.

- (2) Camwear Scoop, 6 oz., polycarbonate, clear, NSF
- (2) Camwear Scoop, 12 oz., polycarbonate, clear, NSF
- (2) Camwear Scoop, 24 oz., polycarbonate, clear, NSF
- (2) Ingredient Bin Scoop Holder, 24 oz, white

ITEM: 424

MANUFACTURER: GLOBE

MODEL: S13

DESCRIPTION: FOOD SLICER

Premium Heavy Duty Slicer, manual, 13" steel knife with hardened edge, top-mounted removable sharpener, knife cover interlock, kickstand, tilting carriage accommodates up to 13 ¾" high, 8" diameter, 11" wide large products, advanced meat grip, seamless anodized aluminum base, 1/2 HP knife motor, UL and NSF listed, made in USA.

- 120/60/1
- Fence
- Vegetable Hopper
- Large Slicer Cover, constructed of heavy-duty plastic.
- Two-year parts and labor warranty.
- Lifetime sharpening stones warranty.

ITEM: 425

MANUFACTURER: CUSTOM METALS

MODEL: FS-MSS3030-US

DESCRIPTION: SLICER CART

Slicer Cart shall be custom built as per General Specifications, approximately 2'6" x 2'6" x 34" high to work surface, 14-gauge 304 stainless steel top with marine edge, turn-down on all four sides. Provide stainless steel gussets and legs on swivel-stopper casters with brakes, and full-length stainless steel under shelf with turn-down on all sides.

ITEM: 426

DESCRIPTION: SPARE NUMBER

ITEM: 427

MANUFACTURER: CUSTOM METALS

MODEL: FS-SWS33121-US

DESCRIPTION: STUDENT WORK STATION (2 REQUIRED)

Student station shall be custom built as per General Specifications, three-sided cabinet base construction, open on student side, approximately 10'1" x 2'9" x 34" high to work surface, 14-gauge 304 stainless steel single piece common top with marine edge, 6" backsplash with finished back, and an undershelf where shown.

Provide 16"x 20" x 12" deep sink bowl with removable poly bowl cover, cover holder under counter-top, lever waste and bracket. The sink shall have a separate cabinet area with hinged door. The cabinet base shall have a drain access hole.

Provide (1) 20"x 20" x 5" stainless steel drawer, complete with lock on anti-slam slides with 1/2" Richlite cutting board mounted under the drawer. The cutting board shall have a handle slot to easily remove the boards from under the drawer.

Provide stainless steel gussets and legs with flanged feet on front ends, bullet feet on balance, and a full-length stainless steel under shelf under the entire unit, where shown. The cabinet base under the drawer shall have a full undershelf, allowance for undercounter refrigerator, and allowance for ADA chair access and undershelf with drain access under the sink as shown.

- Provide continuous stainless steel kick plate on both ends, under the drawer section, under the sink section, and on the exposed interior.

- Flanged feet on front corner legs only.
- Secure flanged feet to the floor with stainless steel fasteners.
- (2) Krowne Metal Corporation Model #15-512L, Krowne Royal Series Faucet, deck-mounted, 8" centers, 12" swing spout, quarter-turn ceramic cartridge valve, low lead compliant, with built in check valve, NSF listed.
 - Wrist Handle Kit
 - 3 Year warranty
 - Royal Series Deck Mounting Kit, long style; (2) 3-1/2" brass nipples, (2) brass locknuts, (2) brass washers.
- (2) Krowne Metal Corporation Model #22-201, Krowne Twist Waste with 1-1/4" overflow outlet, 3" sink opening, 2" NPS male threaded with 1-1/2" female threaded drain outlet, 1-1/2" reducer with rubber washer, 4-1/2" flange, stainless steel strainer, flange and handle, NSF listed.
 - Overflow Head fits 1-7/8" opening, low lead compliant.
 - Overflow Elbow fits 1-7/8" opening, low lead compliant.

ITEM: 427.1

MANUFACTURER: CUSTOM METALS

MODEL: FS-UWS

DESCRIPTION: UTILITY WALL SYSTEM

Utility walls shall be custom built as per General Specifications, built-in chase ways, removable panels, and prefabricated wall sections coordinated with student station utilities. Field installation of the wall system is the responsibility of the F.S.E.C. The structure is configured to the exact size and shape of the student station and range. Interior chases run the entire length of the structure. Stainless steel cabinet base construction, approximately 23'4" x 1'0" wide x 48" high to the top, 16-gauge stainless steel single piece common top with turn down, and body to be 18-gauge stainless steel construction.

A 11" open zone is furnished behind the equipment to provide room for water lines, gas lines and hoses, electrical, and all utilities. Electrical boxes will be installed in the wall system, but the wiring is to be done in the field by the E.C. Dedicated chase locations for hot/cold water supply lines, conduits, and electrical lines are to be stubbed up from the floor and run as needed inside the wall.

- (4) Electrical Boxes
- (4) Plumbing access holes for hot/cold water lines to the sinks.
- Access panels on ends and equipment side.
- The front of wall shall be continuous stainless-steel finish with joiner strips at stainless sheet joints.
- F.S.E.C. is responsible for installing the wall system and coordinating with all the trades.
- See drawing for more details.

ITEM: 428

MANUFACTURER: CUSTOM METALS

MODEL: FS-SWS3384-US

DESCRIPTION: STUDENT WORK STATION (2 REQUIRED)

Student station shall be custom built as per General Specifications, three-sided cabinet base construction, open on student side, approximately 7'0" x 2'9" x 34" high to work surface, 14-gauge 304 stainless steel single piece common top with marine edge, 6" backsplash with finished back, and an undershelf where shown.

Provide 16"x 20" x 12" deep sink bowl with removable poly bowl cover, cover holder under counter-top, lever waste and bracket. The sink shall have a separate cabinet area with hinged door. The cabinet base shall have a drain access hole.

Provide (1) 20"x 20" x 5" stainless steel drawer, complete with lock on anti-slam slides with 1/2" Richlite cutting board mounted under the drawer. The cutting board shall have a handle slot to easily remove the boards from under the drawer.

Provide stainless steel gussets and legs with flanged feet on front ends, bullet feet on balance, and a full-length stainless steel under shelf under the entire unit, where shown. The cabinet base under the drawer shall have a full undershelf, allowance for undercounter refrigerator, and cabinet base with drain access for the sink as shown.

- Provide continuous stainless steel kick plate on both ends, under the drawer section, under the sink section, and on the exposed interior.
- Flanged feet on front corner legs only.
- Secure flanged feet to the floor with stainless steel fasteners.
- (2) Krowne Metal Corporation Model #15-512L, Krowne Royal Series Faucet, deck-mounted, 8" centers, 12" swing spout, quarter-turn ceramic cartridge valve, low lead compliant, with built in check valve, NSF listed.
 - Wrist Handle Kit
 - 3 Year warranty
 - Royal Series Deck Mounting Kit, long style; (2) 3-1/2" brass nipples, (2) brass locknuts, (2) brass washers.
- (2) Krowne Metal Corporation Model #22-201, Krowne Twist Waste with 1-1/4" overflow outlet, 3" sink opening, 2" NPS male threaded with 1-1/2" female threaded drain outlet, 1-1/2" reducer with rubber washer, 4-1/2" flange, stainless steel strainer, flange and handle, NSF listed.
 - Overflow Head fits 1-7/8" opening, low lead compliant.
 - Overflow Elbow fits 1-7/8" opening, low lead compliant.

ITEM: 428.1

MANUFACTURER: CUSTOM METALS

MODEL: FS-UWS

DESCRIPTION: UTILITY WALL SYSTEM

Utility walls shall be custom built as per General Specifications, built-in chase ways, removable panels, and prefabricated wall sections coordinated with student station utilities. Field installation of the wall system is the responsibility of the F.S.E.C. The structure is configured to the exact size and shape of the student station and range. Interior chases run the entire length of the structure. Stainless steel cabinet base construction, approximately 17'0" x 1'0" wide x 48" high to the top, 16-gauge stainless steel single piece common top with turn down, and body to be 18-gauge stainless steel construction.

A 11" open zone is furnished behind the equipment to provide room for water lines, gas lines and hoses, electrical, and all utilities. Electrical boxes will be installed in the wall system, but the wiring is to be done in the field by the E.C. Dedicated chase locations for hot/cold water supply lines, conduits, and electrical lines are to be stubbed up from the floor and run as needed inside the wall.

- (4) Electrical Boxes
- (4) Plumbing access holes for hot/cold water lines to the sinks.
- Access panels on ends and equipment side.
- The front of wall shall be continuous stainless-steel finish with joiner strips at stainless sheet joints.
- F.S.E.C. is responsible for installing the wall system and coordinating with all the trades.
- See drawing for more details.

ITEM: 429

MANUFACTURER: CADDY CORPORATION

MODEL: PB-C-I-60-ND-60

DESCRIPTION: EXHAUST HOOD (2 REQUIRED)

Provide Caddy Exhaust Hood per detail drawings as shown on plans and in accordance with the following specifications:

The dry filter type hood is a Type I, commercial kitchen, U.L. 710 listed ventilator canopy, approved for use over 400- and 600-degree F. Ventilator canopy shall be size and shape as shown on drawing and shall be complete with grease filters, grease trough, removable grease cup, and without a fire damper in exhaust duct. This non compensating exhaust only ventilator canopy is intended for use over light to heavy-duty types of cooking appliances. The hood shall have the size, shape, and performance specified in the contract documents. The hood sections are approximately 5' 0" x 5' 0" x 24" high with exhaust collars as shown on the detail drawings. The total of all sections is to exhaust a total of 2,100 CFM. Exhaust duct collar to be fully welded 4" high with a 1" flange. Ventilator

canopy is to include temperature sensors in the duct to sense heat from cooking equipment and automatically energize the exhaust and makeup air systems per IMC-2006 507.2.1.1. Control wiring to include a 15-minute delay timer to allow cooking equipment to cool down after cooking is completed to prevent fans from cycling on/off. This heat sensor is to be exposed in the duct area of the hood to promote faster response times and facilitate cleaning. Wiring from the sensor to the utility cabinet control panel shall be factory installed in the unit. Duct sizes and static pressure requirements are shown on the contract drawings. Unit shall have a fire cabinet mounted on the side complete with an electrical control system. Makeup air is to be provided through a plenum on the front of the hood and the hood is to be pre-pipped for the fire suppression system.

The electrical control system is to be in the fire cabinet and is designed to thermostatically activate the exhaust fan for an exhaust hood, whenever elevated temperatures are sensed in the exhaust system. This option will meet the requirements of IMC 507.2.1.1 by providing a thermostat mounted in the duct area of the hood to sense increased exhaust temperatures. Controls shall be listed by ETL or UL. The control enclosure shall be NEMA 1 rated and listed for installation inside of the exhaust hood utility cabinet. The control enclosure shall be constructed of stainless steel. Thermostat located in the duct area shall be chrome plated to match the hood. The thermostat is a factory set at an activation temperature of 105°. Once the exhaust temperature reaches the set-point, then the normally open contacts will close, and the exhaust and supply fan will be activated. The panel will also contain a timer to prevent cycling of the fans after the cooking appliances have been turned off and the heat in the exhaust system is reduced. The timer shall contain one instantaneous contact and one delayed contact. Time shall be adjustable from 1.5 to 60 minutes. The timer is factory set to hold then fans on for five (5) minutes after a drop in temperature below set point occurs but can be adjusted. The panel is factory pre-wired to shut down supply fans in a fire condition (tie into fire suppression system by others and field wired by others). There is also a factory pre-wire option to turn the exhaust fans on in a fire condition. Provide a light and fan switch mounted on the face of the hood, pre-wired to the control panel.

Entire ventilator canopy shall be constructed of a minimum of 18-gauge type high grade, corrosive resistant, non-magnetic stainless steel on all surfaces. All exterior joints and seams shall be continuously welded liquid tight, ground smooth, and polished to the original finish. Construction to conform to NFPA 96 standards and shall meet UL 710 standards for operation. Ventilator canopy is constructed using the standing seam method for optimum strength. Construction shall be dependent on structural application to minimize distortion and other defects. All seams, joints, and penetrations of the hood enclosure to the lower outermost perimeter that directs and captures grease laden vapor and exhaust gases shall have a liquid tight continuous external weld in accordance with the current NFPA regulations. The ventilator is to be equipped with necessary hanger brackets welded in place by the manufacturer at front and rear for suspending from overhead structure. The hood shall include an integral makeup air chamber welded and sealed to separate itself from the capture area. The hood shall have a double wall insulated front. Grease trough is concealed within the ventilator and slopes to a removable grease cup located at the end of the ventilator canopy. The ventilator canopy shall be complete with UL Listed stainless steel non loading baffle grease filters running the full length of the

canopy. UL vapor proof LED light fixtures shall be installed and pre-wired to a junction box and face mounted switch and temperature only demand control.

The rear of the hood shall be finished in stainless steel to match the rest of the hood.

Provide closure panels constructed with the same material as the hood to close off space between the top of hood and ceiling as required for field installation.

Exhaust fans are to be coordinated with the CFM requirements of the hood.

Note: Exhaust and supply fans are to be provided and installed by a separate contractor and are to be coordinated with the CFM and power requirements of the unit.

The hood shall be both UL and NSF rated per the most current codes and regulations.

F.S.E.C. is responsible for verifying and coordinating the exhaust duct riser location with the ceiling joists and all other site conditions.

ITEM: 429.1

MANUFACTURER: ANSUL

MODEL: R-102

DESCRIPTION: FIRE SUPPRERSSION SYSTEM (2 REQUIRED)

The Fire suppression system is to be mounted in cabinet at the end of the hood. Manual activation, along with means for simultaneous automatic shutting down of protected cooking equipment upon activation of said system to be included. System shall be designed to provide plenum and duct collar protection. All exposed piping to be stainless steel plated. The manufacturer shall build a fusible link detection system into ventilator sections. All exposed fusible links are to be recessed into the top of hoods with no visible conduit. Provision shall be made for manual actuation by readily accessible, and plainly marked remote manual release station in each cooking area, located no less than 54" and no more than 78" above floor. Pull station will be surface mounted and conduit for system shall be concealed in the ceiling as much as possible. The system is to be sized in accordance with most current UL Standards. The system shall be furnished and installed by an authorized distributor in the field in accordance with manufacturer's instructions and in accordance with UL listings and shall conform to current NFPA and local and/or state codes and standards. This shall include mounting of system units, remote manual releases, nozzles, actuating devices, and running of all pipe and control tubing appurtenant to systems. The system should shut down the make-up air system, if applicable, in case of activation but allow the exhaust fan to keep operating.

Unit shall be stored pressure type, of sufficient capacity as determined by published standards to provide high concentration of liquid agent in plenum areas and duct collars. Liquid agent to be stored in containers equipped with pressure gauge to verify operational readiness. Nozzles located in plenum and ductwork shall be capable of functioning with heavy accumulation of grease.

The gas shut-off valve shall be furnished by the F.S.E.C. and installed by the P.C. The F.S.E.C. is responsible for coordinating installation with all trades.

Micro-switches for electrical equipment shut off and/or actuation of fire alarm system shall be furnished as part of the fire protection system by the manufacturer and connected to the shunt trip provided and installed by the Electrical Contractor.

The Electrical Contractor is to interface with the building alarm system and/or the fire command station and the micro switches as specified as well as interconnections between system and UDS system.

All access openings, holes, sleeves, chases, etc. in the building structure necessary to permit piping and control tubing to be run between system unit, ventilator, and ductwork are to be provided by the General Contractor.

Provision shall be made to shut off the gas and electric supply to all cooking equipment upon actuation of the system.

The Electrical Contractor is to furnish and install a control relay to detect the operation of the system by connection to the Micro switches supplied by the Fire Protection System Contractor.

ITEM: 430

MANUFACTURER: VULCAN

MODEL: RANGE

DESCRIPTION: V6B36S (6 REQUIRED)

V Series Heavy Duty Range, gas, 36", six (6) 35,000 BTU open burners with lift-off burner heads, cast iron grates, individual pilots and controls for each burner, standard oven, stainless steel front, front top ledge, sides, burner box and stub back, stainless steel crumb tray, 6" adjustable legs, 260,000 BTU, NSF listed.

- Natural gas
- 1" pressure regulator with reducer
- 1 1/4" rear gas connection with cap and cover on both ends
- Single-deck height riser with removable shelf
- Extra oven rack
- One-year limited parts and labor warranty

- Krowne Metal Corporation Model #M10036K, Royal Series Gas Connector Kit, 1" connection, 36" hose length, stainless steel corrugated tubing and radial wrap with green antimicrobial PVC coating, (1) Quick-Disconnect, (1) full port gas valve, (2) 90° elbows, restraining cable adjustable with mounting hardware, 379,000 BTU per hour minimum flow capacity.
- Krowne Model #SW100 Swivel fitting

ITEM: 431

MANUFACTURER: CONTINENTAL REFRIGERATOR

MODEL: D27N-U

DESCRIPTION: UNDERCOUNTER REFRIGERATOR (6 REQUIRED)

Undercounter Refrigerator, reach-in, single section, one field reversible door, with vertical workflow handle, door hinges are self-closing with a hold open feature, snap in door gaskets, self-contained front breathing and rear mounted expansion-valve refrigeration system using R290 hydrocarbon refrigerant, automatic hot gas condensate evaporator, stainless steel exterior and interior, 2" polyurethane foam insulation, electronic temperature control with exterior digital display, Hi-Low alarm, UL and NSF listed.

- 120/60/1
- Door hinged on the left
- Door cylinder lock
- Energy Star
- Six-year parts and labor warranty
- Seven-year compressor warranty
- Two-year door gasket warranty

ITEM: 431.1

MANUFACTURER: CONTINENTAL REFRIGERATOR

MODEL: D27N-U

DESCRIPTION: UNDERCOUNTER REFRIGERATOR (6 REQUIRED)

Undercounter Refrigerator, reach-in, single section, one field reversible door, with vertical workflow handle, door hinges are self-closing with a hold open feature, snap in door gaskets, self-contained front breathing and rear mounted expansion-valve refrigeration system using R290 hydrocarbon refrigerant, automatic hot gas condensate evaporator, stainless steel exterior and interior, 2" polyurethane foam insulation, electronic temperature control with exterior digital display, Hi-Low alarm, UL and NSF listed.

- 120/60/1

- Door hinged on the right
- Door cylinder lock
- Energy Star
- Six-year parts and labor warranty
- Seven-year compressor warranty
- Two-year door gasket warranty

ITEM: 432

MANUFACTURER: CUSTOM METALS

MODEL: FS-SWS3384-US

DESCRIPTION: STUDENT WORK STATION (8 REQUIRED)

Student station shall be custom built as per General Specifications, three-sided cabinet base construction, open on student side, approximately 7'0" x 2'9" x 34" high to work surface, 14-gauge 304 stainless steel single piece common top with marine edge, 6" backsplash with finished back, and an undershelf where shown.

Provide 16"x 20" x 12" deep sink bowl with removable poly bowl cover, cover holder under countertop, lever waste and bracket. The sink shall have a separate cabinet area with hinged door. The cabinet base shall have a drain access hole.

Provide (1) 20"x 20" x 5" stainless steel drawer, complete with lock on anti-slam slides with ½" Richlite cutting board mounted under the drawer. The cutting board shall have a handle slot to easily remove the boards from under the drawer.

Provide stainless steel gussets and legs with flanged feet on front ends, bullet feet on balance, and a full-length stainless steel under shelf under the entire unit, where shown. The cabinet base under the drawer shall have a full undershelf, allowance for undercounter refrigerator, and cabinet base with drain access for the sink as shown.

- Provide continuous stainless steel kick plate on both ends, under the drawer section, under the sink section, and on the exposed interior.
- Flanged feet on front corner legs only.
- Secure flanged feet to the floor with stainless steel fasteners.
- (8) Krowne Metal Corporation Model #15-512L, Krowne Royal Series Faucet, deck-mounted, 8" centers, 12" swing spout, quarter-turn ceramic cartridge valve, low lead compliant, with built in check valve, NSF listed.
 - Wrist Handle Kit
 - 3 Year warranty
 - Royal Series Deck Mounting Kit, long style; (2) 3-1/2" brass nipples, (2) brass locknuts, (2) brass washers.

- (8) Krowne Metal Corporation Model #22-201, Krowne Twist Waste with 1-1/4" overflow outlet, 3" sink opening, 2" NPS male threaded with 1-1/2" female threaded drain outlet, 1-1/2" reducer with rubber washer, 4-1/2" flange, stainless steel strainer, flange and handle, NSF listed.
 - Overflow Head fits 1-7/8" opening, low lead compliant.
 - Overflow Elbow fits 1-7/8" opening, low lead compliant.

ITEM: 432.1

MANUFACTURER: CUSTOM METALS

MODEL: FS-UWS

DESCRIPTION: UTILITY WALL SYSTEM (2 REQUIRED)

Utility walls shall be custom built as per General Specifications, built-in chase ways, removable panels, and prefabricated wall sections coordinated with student station utilities. Field installation of the wall system is the responsibility of the F.S.E.C. The structure is configured to the exact size and shape of the student station and range. Interior chases run the entire length of the structure. Stainless steel cabinet base construction, approximately 17'0" x 1'0" wide x 48" high to the top, 16-gauge stainless steel single piece common top with turn down, and body to be 18-gauge stainless steel construction.

A 11" open zone is furnished behind the equipment to provide room for water lines, gas lines and hoses, electrical, and all utilities. Electrical boxes will be installed in the wall system, but the wiring is to be done in the field by the E.C. Dedicated chase locations for hot/cold water supply lines, conduits, and electrical lines are to be stubbed up from the floor and run as needed inside the wall.

- (4) Electrical Boxes
- (4) Plumbing access holes for hot/cold water lines to the sinks.
- Access panels on ends and equipment sides.
- F.S.E.C. is responsible for installing the wall system and coordinating with all the trades.
- See drawing for more details.

ITEM: 433

MANUFACTURER: CADDY CORPORATION

MODEL: PB-C-I-60-ND-60

DESCRIPTION: EXHAUST HOOD (4 REQUIRED)

Provide Caddy Exhaust Hood per detail drawings as shown on plans and in accordance with the following specifications:

The dry filter type hood is a Type I, commercial kitchen, U.L. 710 listed ventilator canopy, approved for use over 400- and 600-degree F. Ventilator canopy shall be size and shape as shown on drawing and shall be complete with grease filters, grease trough, removable grease cup, and without a fire damper in exhaust duct. This non compensating exhaust only ventilator canopy is intended for use over light to heavy-duty types of cooking appliances. The hood shall have the size, shape, and performance specified in the contract documents. The hood sections are approximately 5' 0" x 5' 0" x 24" high with exhaust collars as shown on the detail drawings. The total of all sections is to exhaust a total of 4,200 CFM. Exhaust duct collar to be fully welded 4" high with a 1" flange. Ventilator canopy is to include temperature sensors in the duct to sense heat from cooking equipment and automatically energize the exhaust and makeup air systems per IMC-2006 507.2.1.1. Control wiring to include a 15-minute delay timer to allow cooking equipment to cool down after cooking is completed to prevent fans from cycling on/off. This heat sensor is to be exposed in the duct area of the hood to promote faster response times and facilitate cleaning. Wiring from the sensor to the utility cabinet control panel shall be factory installed in the unit. Duct sizes and static pressure requirements are shown on the contract drawings. Unit shall have a fire cabinet mounted on the side complete with an electrical control system. Makeup air is to be provided through a plenum on the front of the hood and the hood is to be pre-piped for the fire suppression system.

The electrical control system is to be in the fire cabinet and is designed to thermostatically activate the exhaust fan for an exhaust hood, whenever elevated temperatures are sensed in the exhaust system. This option will meet the requirements of IMC 507.2.1.1 by providing a thermostat mounted in the duct area of the hood to sense increased exhaust temperatures. Controls shall be listed by ETL or UL. The control enclosure shall be NEMA 1 rated and listed for installation inside of the exhaust hood utility cabinet. The control enclosure shall be constructed of stainless steel. Thermostat located in the duct area shall be chrome plated to match the hood. The thermostat is a factory set at an activation temperature of 105°. Once the exhaust temperature reaches the set-point, then the normally open contacts will close, and the exhaust and supply fan will be activated. The panel will also contain a timer to prevent cycling of the fans after the cooking appliances have been turned off and the heat in the exhaust system is reduced. The timer shall contain one instantaneous contact and one delayed contact. Time shall be adjustable from 1.5 to 60 minutes. The timer is factory set to hold then fans on for five (5) minutes after a drop in temperature below set point occurs but can be adjusted. The panel is factory pre-wired to shut down supply fans in a fire condition (tie into fire suppression system by others and field wired by others). There is also a factory pre-wire option to turn the exhaust fans on in a fire condition. Provide a light and fan switch mounted on the face of the hood, pre-wired to the control panel and temperature only demand control.

Entire ventilator canopy shall be constructed of a minimum of 18-gauge type high grade, corrosive resistant, non-magnetic stainless steel on all surfaces. All exterior joints and seams shall be continuously welded liquid tight, ground smooth, and polished to the original finish. Construction to conform to NFPA 96 standards and shall meet UL 710 standards for operation. Ventilator canopy is constructed using the standing seam method for optimum strength. Construction shall be dependent on structural application to minimize distortion and other defects. All seams, joints, and penetrations of the hood

enclosure to the lower outermost perimeter that directs and captures grease laden vapor and exhaust gases shall have a liquid tight continuous external weld in accordance with the current NFPA regulations. The ventilator is to be equipped with necessary hanger brackets welded in place by the manufacturer at front and rear for suspending from overhead structure. The hood shall include an integral makeup air chamber welded and sealed to separate itself from the capture area. The hood shall have a double wall insulated front. Grease trough is concealed within the ventilator and slopes to a removable grease cup located at the end of the ventilator canopy. The ventilator canopy shall be complete with UL Listed stainless steel non loading baffle grease filters running the full length of the canopy. UL vapor proof LED light fixtures shall be installed and pre-wired to a junction box and face mounted switch.

The rear of the hood shall be finished in stainless steel to match the rest of the hood.

Provide closure panels constructed with the same material as the hood to close off space between the top of hood and ceiling as required for field installation.

Exhaust fans are to be coordinated with the CFM requirements of the hood.

Note: Exhaust and supply fans are to be provided and installed by a separate contractor and are to be coordinated with the CFM and power requirements of the unit.

The hood shall be both UL and NSF rated per the most current codes and regulations.

F.S.E.C. is responsible for verifying and coordinating the exhaust duct riser location with the ceiling joists and all other site conditions.

ITEM: 433.1

MANUFACTURER: ANSUL

MODEL: R-102

DESCRIPTION: FIRE SUPPRESSION SYSTEM (4 REQUIRED)

The Fire suppression system is to be mounted in cabinet at the end of the hood. Manual activation, along with means for simultaneous automatic shutting down of protected cooking equipment upon activation of said system to be included. System shall be designed to provide plenum and duct collar protection. All exposed piping to be stainless steel plated. The manufacturer shall build a fusible link detection system into ventilator sections. All exposed fusible links are to be recessed into the top of hoods with no visible conduit. Provision shall be made for manual actuation by readily accessible, and plainly marked remote manual release station in each cooking area, located no less than 54" and no more than 78" above floor. Pull station will be surface mounted and conduit for system shall be concealed in the ceiling as much as possible. The system is to be sized in accordance with most

current UL Standards. The system shall be furnished and installed by an authorized distributor in the field in accordance with manufacturer's instructions and in accordance with UL listings and shall conform to current NFPA and local and/or state codes and standards. This shall include mounting of system units, remote manual releases, nozzles, actuating devices, and running of all pipe and control tubing appurtenant to systems. The system should shut down the make-up air system, if applicable, in case of activation but allow the exhaust fan to keep operating.

Unit shall be stored pressure type, of sufficient capacity as determined by published standards to provide high concentration of liquid agent in plenum areas and duct collars. Liquid agent to be stored in containers equipped with pressure gauge to verify operational readiness. Nozzles located in plenum and ductwork shall be capable of functioning with heavy accumulation of grease.

The gas shut-off valve shall be furnished by the F.S.E.C. and installed by the P.C. The F.S.E.C. is responsible for coordinating installation with all trades.

Micro-switches for electrical equipment shut off and/or actuation of fire alarm system shall be furnished as part of the fire protection system by the manufacturer and connected to the shunt trip provided and installed by the Electrical Contractor.

The Electrical Contractor is to interface with the building alarm system and/or the fire command station and the micro switches as specified as well as interconnections between system and UDS system.

All access openings, holes, sleeves, chases, etc. in the building structure necessary to permit piping and control tubing to be run between system unit, ventilator, and ductwork are to be provided by the General Contractor.

Provision shall be made to shut off the gas and electric supply to all cooking equipment upon actuation of the system.

The Electrical Contractor is to furnish and install a control relay to detect the operation of the system by connection to the Micro switches supplied by the Fire Protection System Contractor.

ITEM: 434

DESCRIPTION: SPARE NUMBER

ITEM: 435

MANUFACTURER: CUSTOM METALS

MODEL: FS-MWT3096-US

DESCRIPTION: MOBILE WORK TABLE (2 REQUIRED)

Work Table shall be custom built as per General Specifications, approximately 8'0" x 2'6" x 34" high to work surface, 14-gauge 304 stainless steel top with square edge and bull-nosed corners, turn-down on all four sides. Provide two (2) 20"x 20" x 5" stainless steel drawers with locks on anti-slam slides with ½" Richlite cutting boards mounted under the drawers. The cutting boards shall have a handle slot to easily remove the boards from under the drawer. Provide stainless steel gussets and legs on swivel-stopper casters with brakes, and full-length stainless steel under shelf with turn-down on all sides.

ITEM: 436

MANUFACTURER: CADDY CORPORATION

MODEL: PB-C-W-138-ND-66

DESCRIPTION: EXHAUST HOOD

Provide Caddy Exhaust Hood per detail drawings as shown on plans and in accordance with the following specifications:

The dry filter type hood is a Type I, commercial kitchen, U.L. 710 listed ventilator canopy, approved for use over 400° F and 600° F. Ventilator canopy shall be size, and shape as shown on drawing and shall be complete with grease filters, grease trough, removable grease cup, and without a fire damper in exhaust duct. This non compensating exhaust only ventilator canopy is intended for use over light to heavy-duty types of cooking appliances. The hood shall have the size, shape, and performance specified in the contract documents. The hood overall size is approximately 25'10" x 5' 6" x 24" high with (1) 10" x 26" and (1) 10" x 19" exhaust collars. The total exhaust is a total of 5,635 CFM. Exhaust duct collars to be fully welded with 4" high and a 1" flange. Ventilator canopy is to include temperature sensors in the duct to sense heat from cooking equipment and automatically energize the exhaust and makeup air systems per IMC-2006 507.2.1.1. Control wiring to include a 15-minute delay timer to allow cooking equipment to cool down after cooking is completed to prevent fans from cycling on/off. This heat sensor is to be exposed in the duct area of the hood to promote faster response times and facilitate cleaning. Wiring from the sensor to the utility cabinet control panel shall be factory installed in the unit and will require field connections between the hood sections. Duct sizes and static pressure requirements are shown on the contract drawings. Unit shall have a fire cabinet mounted on the side complete with an electrical control system. Makeup air is to be provided through a plenum on the front of the hood and the hood is to be pre-piped for the fire suppression system. The hood sections shall also be continuous capture between the hood sections with a trim to cover the opening.

The electrical control system is to be in the fire cabinet and is designed to thermostatically activate the exhaust fan for an exhaust hood, whenever elevated temperatures are sensed in the exhaust system. This option will meet the requirements of IMC 507.2.1.1 by providing a thermostat mounted

in the duct area of the hood to sense increased exhaust temperatures. Controls shall be listed by ETL or UL. The control enclosure shall be NEMA 1 rated and listed for installation inside of the exhaust hood utility cabinet. The control enclosure shall be constructed of stainless steel. Thermostat located in the duct area shall be chrome plated to match the hood. The thermostat is factory set at an activation temperature of 105°F. Once the exhaust temperature reaches the set-point, then the normally open contacts will close, and the exhaust and supply fan will be activated. The panel will also contain a timer to prevent cycling of the fans after the cooking appliances have been turned off and the heat in the exhaust system is reduced. The timer shall contain one instantaneous contact and one delayed contact. Time shall be adjustable from 1.5 to 60 minutes. The timer is factory set to hold the fans on for five (5) minutes after a drop in temperature below set point occurs but can be adjusted. The panel is factory pre-wired to shut down supply fans in a fire condition. There is also a factory pre-wire option to turn the exhaust fans on in a fire condition. Provide a light and fan switch mounted on the face of the hood, pre-wired to the control panel and provide temperature only demand control.

Entire ventilator canopy shall be constructed of a minimum of 18-gauge type high grade, corrosive resistant, non-magnetic stainless steel on all surfaces. All exterior joints and seams shall be continuously welded liquid tight, ground smooth, and polished to the original finish. Construction to conform to NFPA 96 standards and shall meet UL 710 standards for operation. Ventilator canopy is constructed using the standing seam method for optimum strength. Construction shall be dependent on structural application to minimize distortion and other defects. All seams, joints, and penetrations of the hood enclosure to the lower outermost perimeter that directs and captures grease laden vapor and exhaust gases shall have a liquid tight continuous external weld in accordance with the current NFPA regulations. The ventilator is to be equipped with necessary hanger brackets welded in place by the manufacturer at front and rear for suspending from overhead structure. The hood shall have a double wall insulated front. Grease trough is concealed within the ventilator and slopes to a removable grease cup located at the end of the ventilator canopy. The ventilator canopy shall be complete with UL Listed stainless steel non loading baffle grease filters running the full length of the canopy. UL vapor proof LED light fixtures shall be installed and pre-wired to a junction box and face mounted switch.

The wall backsplash panels are to be aesthetically pleasing and span between hood and floor and the length of the unit including the fire cabinet. Wall panels to be constructed with the same material, finish, and grain as the hood. Panels should go behind the hood a minimum of two (2) inches and the hood should be sealed to the wall. FSEC is responsible for providing cut-outs in the stainless panels to accommodate any utilities coming out of the wall under the hood. Include divider bars and end trim for securing wall paneling to wall.

Provide closure panels constructed with the same material as the hood to close off space between the top of hood and ceiling as required for field installation.

Exhaust fans are to be coordinated with the CFM requirements of the hood.

Note: Exhaust and supply fans are to be provided and installed by a separate contractor and are to be coordinated with the CFM and power requirements of the unit.

The hood shall be both UL and NSF rated per the most current codes and regulations.

FSEC is responsible for verifying and coordinating the exhaust duct riser location with the ceiling joists and all other site conditions.

ITEM: 437

MANUFACTURER: CADDY

MODEL: WL-EGW-026

DESCRIPTION: UTILITY DISTRIBUTION SYSTEM

Provide Caddy Island Style Raceway UDS per detail drawings as shown on plans and in accordance with the following specifications approximately: 24' 10" long.

The Utility Distribution System (UDS) shall be a wall type. The system shall be UL Listed and manufactured in accordance with the latest edition of the codes listed in the General Specifications. Service risers and horizontal raceway with removable access panels are to be constructed of 16-gauge, type 304 stainless steel, with a #4 finish with a slanted top and bumper strip made of neoprene. The service risers will be able to accommodate both electrical and plumbing. Provide control tower at one end to include manual fuel reset station with delay/warning light, solid state whistle and main electrical service breaker with electrical shunt trip fire-fuel shut-off built in. The horizontal raceway will be divided into separate compartments for plumbing and electrical. The electrical chase will be a 9" x 13" cross-section housing and electrical link plate connection places will be located on the bottom of the electrical chase/housing. The plumbing chase will be a 17" x 9" cross-section with drops located through the bottom of the plumbing chase/housing. The unit shall have a watertight barrier between the plumbing and electrical compartment. Flanged interior pedestals are to be provided at each field joint on the horizontal chase. The UDS system shall be completely pre-wired and pre-plumbed for final connection points for electric, gas, and cold water for the equipment as shown in the drawing.

Plumbing:

The plumbing compartment shall be isolated from the electrical compartment. All piping and disconnects in the system shall be colored. Field joints shall be secured by tightening unions. All cold-water piping, including individual branch pipe connections, shall be hard temper type "L" copper tubing with copper sweat type solder fittings. Each branch connection shall be provided with brass double shut-off quick-disconnect, and flexible hose connector consisting of brass bellows type corrugated hose with braided stainless-steel restrainer and polytech coating allowing a smooth surface for cleaning. Gas piping will be required to be looped and shall be black iron pipe with welded thread to branch

connections and drip tee in service riser. All water lines shall be covered with 3/8" thermal closed cell pipe insulation per ASTM-E90-C. Provide quarter turn ball type shut-off valves for all gas and water main incoming services. Provide quarter turn ball type shut-off valves for gas branch piping to be connected to individual equipment. Provide main service fire-fuel shut-off for electric and gas services. The entire shut-off system shall be enclosed completely pre-wired and pre-plumbed, requiring only one final connection by electrical contractor from 120-volt power source in fire extinguishing system relay or micro-switch. gas solenoid valve shall be equipped with delay circuit to eliminate instantaneous power interruptions from causing nuisance pilot outages. Provide manual fuel reset station with delay, warning light and solid-state whistle. The water filter for the combination oven shall be surface mounted on the UDS by the manufacturer and connected to the plumbing. All plumbing drops are capped below the chase, ready for connection to any cooking appliance and provide at least two additional gas line drops of 1" for future equipment. All water and gas hoses shall be included with the UDS unit.

Electrical: Electrical compartment shall be completely enclosed sheet metal housing, accessible by removal of concealed screws. Internal electrical main feeders shall be cable bus type having balanced load and phases. Cable bus shall be manufactured from 100 percent copper cable and mounted on non-conductive insulators and equipped with connection lugs for individual breakers. Provide 16-gauge stainless steel link connection plate for each electrical connection equipped with point of use circuit breaker and matching receptacle. Each link plate connection plate, with an electrical connection of 120/1 Ø, will be provided with a ground fault current interrupter device, (GFCI). Individual branch connection plates shall be spaced on 12" centers, and readily interchangeable by maintenance personnel to facilitate changes, additions, and deletion of equipment. Field joints for branch circuit wiring shall be connected by wiring between insulated terminal strips. Terminal strips and branch wiring shall be numbered to simplify connections. Provide matching power supply cords (and/or pre-wired flexible conduit) with 120 volt and 250-volt cord sets over 60 amperes as required for the equipment. Provide quick-connect and quick disconnect means of separating each ground fault device, fire-fuel shutoff, and all control wiring from the modular energy distribution system to facilitate changing of connection plates for future additions, deletions, or changes of equipment. Provide duplex convenience outlets with breakers mounted in each service risers. Internal Service Panel for Appliance Receptacles shall include an incoming electrical service riser on the right end with a 50-amp main 120/208/3 shunt trip breaker. The unit will have individual branch breaker(s) for each equipment receptacle located either on the service riser or horizontal chase directly in line with the equipment receptacle. All electrical cords and plugs for the equipment shall be included with the UDS unit.

Performance:

At time of submittal, manufacturer must supply for approval a copy of U.L. test report and U.L. listing card for proper electrical services, according to amperages and voltages specified, and individual U.L. listing cards for component accessories such as U.L. listed power supply cords, U.L. recognized breaker actuators and AGA hoses and quick disconnect couplings.

Upon request of consultant, manufacturer must submit operating samples, drawings, and diagrams of component accessories for evaluation and approval prior to Equipment Contractor preparing his submittal.

Provide inspection of installation at initial equipment start-up by qualified factory technicians to ensure that connections have been correctly made and that unit is functioning properly.

F.S.E.C. is responsible for any interconnections on the UDS system if they are shipped in multiple sections. F.S.E.C. is also responsible for connecting the equipment to the system and testing the proper operation of the system and cooking appliances and submitting a written report stating such, prior to turning the unit over to the owner.

ITEM: 438

MANUFACTURER: ANSUL

MODEL: R102

DESCRIPTION: FIRE SUPPRESSION SYSTEM

The Fire suppression system is to be mounted in cabinet at the end of the hood. Manual activation, along with means for simultaneous automatic shutting down of protected cooking equipment upon activation of said system to be included. System shall be designed to provide plenum and duct collar protection. All exposed piping to be stainless steel plated. The manufacturer shall build a fusible link detection system into ventilator sections. All exposed fusible links are to be recessed into the top of hoods with no visible conduit. Provision shall be made for manual actuation by readily accessible, and plainly marked remote manual release station in each cooking area, located no less than 54" and no more than 78" above floor. Pull station will be surface mounted and conduit for system shall be concealed in the ceiling as much as possible. The system is to be sized in accordance with most current UL Standards. The system shall be furnished and installed by an authorized distributor in the field in accordance with manufacturer's instructions and in accordance with UL listings and shall conform to current NFPA and local and/or state codes and standards. This shall include mounting of system units, remote manual releases, nozzles, actuating devices, and running of all pipe and control tubing appurtenant to systems. The system should shut down the make-up air system, if applicable, in case of activation but allow the exhaust fan to keep operating.

Unit shall be stored pressure type, of sufficient capacity as determined by published standards to provide high concentration of liquid agent in plenum areas and duct collars. Liquid agent to be stored in containers equipped with pressure gauge to verify operational readiness. Nozzles located in plenum and ductwork shall be capable of functioning with heavy accumulation of grease.

Shut-off valve shall be furnished and installed by Caddy, in the UDS riser. The F.S.E.C. is responsible for coordinating installation with all trades.

Micro-switches for electrical equipment shut off and/or actuation of fire alarm system shall be furnished as part of the fire protection system by the manufacturer and connected to the shunt trip provided and installed by the Electrical Contractor.

The Electrical Contractor is to interface with the building alarm system and/or the fire command station and the micro switches as specified as well as interconnections between system and UDS system.

All access openings, holes, sleeves, chases, etc. in the building structure necessary to permit piping and control tubing to be run between system unit, ventilator, and ductwork are to be provided by the General Contractor.

Provision shall be made to shut off the gas and electric supply to all cooking equipment upon actuation of the system.

The Electrical Contractor is to furnish and install a control relay to detect the operation of the system by connection to the Micro switches supplied by the Fire Protection System Contractor.

ITEM: 439

MANUFACTURER: VULCAN

MODEL: V6B36S

DESCRIPTION: RANGE

V Series Heavy Duty Range, gas, 36", six (6) 35,000 BTU open burners with lift-off burner heads, cast iron grates, individual pilots and controls for each burner, standard oven, stainless steel front, front top ledge, sides, burner box and stub back, stainless steel crumb tray, 6" adjustable legs, 260,000 BTU, NSF listed.

- Natural gas
- 1" pressure regulator with reducer
- 1 1/4" rear gas connection with cap and cover on both ends
- Single-deck height riser with removable shelf
- Extra oven rack
- One-year limited parts and labor warranty
- Gas hose kit provided as part of the UDS system.
- Krowne Model #SW100 Swivel fitting

ITEM: 440

MANUFACTURER: T&S BRASS

MODEL: B-0610-JJ

DESCRIPTION: POT FILLER

Pot Filler Faucet, splash-mounted, 8" centers, vacuum breaker, flexible stainless-steel hose, 68" long, hooked nozzle with self-closing valve, "JJ" 1/2" IPS female inlets with loose key stops, built-in check valves.

- Model B-0166 hanger hook to be mounted as directed by the owner.
- Pot filler to be mounted and plumbed to the UDS system.

ITEM: 441

MANUFACTURER: VULCAN

MODEL: VCRG36T

DESCRIPTION: GRIDDLE

Griddle, countertop, gas, 36" wide x 20 1/2" deep cooking surface, 1" thick polished steel griddle plate welded to 3 1/4" stainless steel back, (3) burners, fully welded stainless and aluminized steel chassis frame, embedded mechanical snap action thermostat every 12", millivolt pilot safety, low profile, adjustable temperature 200 to 450 degrees, 4 1/2" grease can capacity, (1) drawer, stainless steel front, sides, and front top ledge, 4" adjustable legs, 75,000 BTU, and NSF listed.

- Natural gas with 3/4" regulator
- One-year parts and labor warranty

ITEM: 442

MANUFACTURER: VULCAN

MODEL: VCRB25

DESCRIPTION: CHARBROILER

Charbroiler, gas, countertop, 25 3/8", (4) 14,500 BTU cast iron burners, manual controls, low profile, reversible grates, full width grease drawer, stainless steel front, sides, and front top ledge, heavy-duty cast-iron char-radiants, standing pilot ignition system, under burner deflector system reflecting heat upwards, 4" adjustable legs, 58,000 BTU, and NSF listed.

- Natural gas with 3/4" regulator
- 4" Backsplash
- One-year parts and labor warranty

ITEM: 443

MANUFACTURER: CONTINENTAL REFRIGERATOR

MODEL: D60GN

DESCRIPTION: REFRIGERATED EQUIPMENT STAND

Griddle Stand, refrigerated, two drawers with polished chrome drawer handles which accommodate (3) 12"x20"x6" pans each, easy glide fully extendable drawers designed to accommodate 6" deep hotel pans side-by-side, drawers designed to hold 205 pounds, marine edge top, front breathing self-contained expansion-valve refrigeration using R290 hydrocarbon refrigerant, automatic hot gas condensate evaporator, stainless steel exterior and interior, high density polyurethane foam insulation, single piece snap in drawer gaskets, LED lighting, electronic temperature control with exterior digital display, Hi-Low alarm, ETL and NSF listed.

- 120/60/1
- 3" Casters
- Condensing unit on the right
- Integral heat shield
- Six-year parts and labor warranty
- Seven-year compressor warranty
- Two-year door gasket warranty

ITEM: 444

MANUFACTURER: IMC TEDDY

MODEL: ASFT-2460-PFG

DESCRIPTION: FLOOR TROUGH

Floor trough as shown on plan 24"x 60" x 6" deep, 14-gauge 304 stainless steel fully welded, water-tight and polished trough, with built-in pitch to a waste outlet with removable perforated waste basket the length of the center of the trough, 5" waste outlet with removable scrap basket, 4" OD tail-piece, coved corners, anchor straps, and anti-splash construction.

Grating is to be fiberglass PFG, fabricated with an anti-slip surface, "I" cross bars are 1" deep and are spaced 0.9" apart, and gray in color. Include Safe-T-Span pultruded trough grating, high strength, and high stiffness pultruded elements with a maximum of 70% and a minimum of 60% glass content (by weight) of continuous roving and continuous strand mat fiberglass reinforcements. Surface shall be provided with a surfacing veil to provide a resin rich surface which improves corrosion resistance and resistance to ultraviolet degradation. Bearing bars shall be interlocked and epoxied in place with a two-piece cross rod system to provide a mechanical and chemical lock. Cross rods should be below the walking surface of the grating. Grating shall be provided with a quartz grit bonded and baked to the top surface of the finished grating product. 1" high I-beam style bars are spaced on 1" centers (12 bars per foot). Bars are 0.6" wide with 0.4" spacing clearance for a 40% open area. The ratings are ADA compliant, NSF listed, and made in the USA.

- Verify the pour path with equipment and leg placement and adjust as required.

ITEM: 445

MANUFACTURER: GROEN – UNIFIED BRANDS

MODEL: TDH-48C

DESCRIPTION: TILTING KETTLE

Tilting kettle, gas powered, 48-gallon capacity, manual crank tilt, 2/3 jacket, IPX6 water rated electronic Classic controls 316 stainless steel liner, solid one-piece welded construction, floor mounted control console supports, all stainless-steel construction, reinforced bar rim, butterfly shaped pouring lip, electronic ignition, faucet bracket, UL and NSF Listed.

- 120/60/1
- Natural Gas Powered
- 2" Brush Set, includes kettle brush, drain valve brush, and paddle
- Etch marks in 1-gallon increments.
- Hinged cover kit
- Double pantry faucet with swing spout and mounting bracket
- Flanged Feet
- Provide cord and plug on unit.
- Made in the USA
- Factory authorized start-up
- Two-year parts and labor warranty
- Ten-year kettle and body warranty

ITEM: 446

MANUFACTURER: GROEN – UNIFIED BRANDS

MODEL: BPM-15GC

DESCRIPTION: TILTING BRAISING PAN

Tilting Braising Pan, gas, 15 gallon capacity, 8" deep pan, 35" pan height with 3" radius pan interior, 7 degree angle operation, IPX6 water rated electronic classic controls, thermostatically controlled for automatic shut-off, electric spark ignition, 5/8" clad cooking surface, easy manual hand tilt, spring-assisted cover with vent, cover with condensate drip shield, 5 gallon markings, food strainer, faucet bracket, 304 stainless steel solid one-piece welded construction with open leg frame, NSF listed.

- 120/60/1
- Natural Gas
- 2" Tangent draw-off valve with strainer
- Lip strainer

- Drain cup and hose assembly
- Double pantry faucet with swing spout and mounting bracket
- Casters with brakes
- Provide cord and plug on the unit.
- Gas hose kit is provided as part of the UDS system. Posi-set to be supplied with gas hose.
- Two-year parts and labor warranty with Start-up program

ITEM: 447

MANUFACTURER: RATIONAL

MODEL: ICP 6-FULL/6FULL E

DESCRIPTION: DOUBLE COMBINATION OVEN

Two iCombi Pro 6-full size combination ovens, double stack, Rational intelligent connectable cooking system with four assistants: iDensity Control, iCooking Suite, iProduction Manager, and iCare System, full-size, electric, cooking controls with 6 operating modes, (5) cooking methods, (3) manual operation modes: combi-Steamer, Convection Oven, or Combination. Each oven has a capacity of (6) 18"x26" or (12) 12"x20" pan capacity, core temperature probe with 6-point measurement, 85° to 572°F temperature range, hand shower with automatic retracting system, comes with (3) grid shelves, quick clean, care control, eco mode, ethernet interface and Wi-Fi interface, NSF and UL listed.

Provide the following:

- 208/60/3
- Energy Star
- Requires ethernet connection.
- The door is to be hinged on the right.
- Rational Certified Installation with Pre-Installation Site Survey, including stacking kit and installation of stacking kit, water filter system, and commissioning.
- F.S.E.C. is responsible in coordination with Rational, to provide water samples or test results from a recent water sample.
- Water Filtration Double Cartridge System with (2) additional cartridges
- Certified installation of water filter system.
- Certified Chef training
- Mobile oven stand on adjustable height casters, with stacking kit and safety set.
- Installation Kits
- (12) Stainless steel grid shelves with K-12 promotion
- (12) Fry Baskets with K-12 promotion
- Fully automatic cleaning system including deliming of the steam generator.
- Auto Dose System for integrated autonomous cleaning which includes (2) Cleaner Cartridges and (2) Care Cartridges
- (2) Box of 6 Cleaner Cartridges
- (2) Box of 6 Care Cartridges

- Condensation breaker
- USB data memory stick
- Positioning aid for core temperature probe
- Two-year parts and labor warranty
- (24) Vollrath Model #9002P, Wear-Ever Sheet Pan, full size, 18"wide x 26"deep x 1"high, 18-gauge aluminum alloy, natural finish, perforated, Made in USA.
- (12) Vollrath Model #30023, Super Pan V Food Pan, perforated, full size, 2-1/2" deep, 22-gauge, 300 series stainless steel, anti-jamming design with reinforced pour corners, NSF, Made in USA.

ITEM: 448

MANUFACTURER: BLODGETT

MODEL: DFG-100-ES DBL

DESCRIPTION: DOUBLE CONVECTION OVEN

Convection Oven, gas, double-deck, standard depth, five (5) 18" x 26" pans per compartment, two (2) speed fan, porcelain interior liner with coved corners, EZ slide rack with four chrome plated racks and eleven positions, porcelain crumb tray, interior lights, stainless steel front, sides and top, simultaneous operated glass doors with removable interior glass windows, flue connector, 110,000 BTU, and ETL and NSF listed.

- (2) 120/60/1
- Natural Gas
- Energy Star
- Gas manifold to provide single point gas connection.
- Solid State digital control with Cook and hold feature.
- Draft diverter for under a hood application
- Left side heat shield.
- Stainless steel legs
- Three-year parts, two-year labor warranty and five additional year door warranty on parts only
- Gas hose kit provided with UDS system.

ITEM: 449

DESCRIPTION: SPARE NUMBER

ITEM: 450

MANUFACTURER: IMC TEDDY

MODEL: ASFT-1230-PFG-ADA

DESCRIPTION: FLOOR TROUGH

Floor trough as shown on plan 12"x 30" x 6" deep, 14-gauge 304 stainless steel fully welded, water-tight and polished trough, with built-in pitch to a waste outlet with removable perforated waste basket the length of the center of the trough, 6 1/2" waste outlet with removable scrap basket, 4" OD tailpiece, coved corners, anchor straps, and anti-splash construction.

Grating is to be fiberglass PFG, fabricated with an anti-slip surface, "I" cross bars are 1" deep and are spaced 0.9" apart, and gray in color. Include Safe-T-Span pultruded trough grating, high strength, and high stiffness pultruded elements with a maximum of 70% and a minimum of 60% glass content (by weight) of continuous roving and continuous strand mat fiberglass reinforcements. Surface shall be provided with a surfacing veil to provide a resin rich surface which improves corrosion resistance and resistance to ultraviolet degradation. Bearing bars shall be interlocked and epoxied in place with a two-piece cross rod system to provide a mechanical and chemical lock. Cross rods should be below the walking surface of the grating. Grating shall be provided with a quartz grit bonded and baked to the top surface of the finished grating product. 1" high I-beam style bars are spaced on 1" centers (12 bars per foot). Bars are 0.6" wide with 0.4" spacing clearance for a 40% open area. The ratings are ADA compliant, NSF listed, and made in the USA.

ITEM: 451

MANUFACTURER: HOSHIZAKI

MODEL: KM-301BAJ

DESCRIPTION: ICE MACHINE

Ice Maker With Bin, Cube-Style, air-cooled, self-contained condenser, production capacity up to 290 pounds/24 hours at 70°/50°, 100 pounds built-in ice storage capacity, crescent style cube, front opening bin, stainless steel exterior, 6" painted legs, H-Guard Plus Antimicrobial, Ever-Check alert system, R-134a refrigerant, UL, NSF, and Energy Star listed.

- 120/60/1
- Water Filtration System
- Replacement Water Filter Cartridge
- One-year warranty on entire water filtration system
- Three-year parts and labor warranty on entire machine
- Five-year compressor parts warranty
- Five-year parts and labor warranty on evaporator
- Five-year parts on compressor and air-cooled condenser

ITEM: 452

MANUFACTURER: METRO

MODEL: MQSEC55VE

DESCRIPTION: MOBILE SECURITY STORAGE (2 REQUIRED)

Each unit consists of four (4) posts with casters, four (4) shelves, cage enclosure with locking hasp. Metro-Max Q Security Unit, mobile, 52 ¾" wide x 27 13/16" deep x 67 13/16" high with two (2) Model #5PCX and (2) Model #5PCBX casters, NSF.

- (3) Model #MQ2448G Metro-Max Q Shelf, 48" wide x 24" deep, removable open grid polymer shelf mats on an epoxy coated steel frame with quick adjust corner releases, four (4) wedge connectors, Microban antimicrobial product protection, 600-pound capacity per shelf, NSF.
- Evenly space shelves inside unit.

ITEM: 453

MANUFACTURER: CONTINENTAL REFRIGERATOR

MODEL: D2RINSS

DESCRIPTION: ROLL-IN REFRIGERATOR (2 REQUIRED)

Refrigerator, roll-in, double section, self-contained expansion-valve refrigeration using R290 hydro-carbon refrigerant, automatic electric condensate evaporator, stainless steel exterior and interior, 3" polyurethane foam insulation throughout, standard depth cabinet, full-height solid doors with locks and vertical workflow handles, door hinges are self-closing with a hold open feature, welded corners on all doors, snap in door gaskets, LED lighting, electronic temperature control with exterior digital display, Hi-Low alarm, stainless steel ramps, UL and NSF listed.

- 120/60/1
- Stainless steel ramps
- Three-year parts and labor warranty
- Five-year compressor warranty
- Two-year door gasket warranty
- Made in the USA
- (4) Channel Manufacturing, Model #AXD-UTR-14, Pan Rack, heavy-duty series, 21" wide x 26" deep x 64" high, all aluminum welded construction, end load, 4" Angle Spacing, (15) tiers to hold (1) 18" x 26" or (2) 12" x 20" steam table pans per shelf, 5" x 2" heavy-duty swivel plate casters with Zerk grease fitting style, NSF listed, Made in USA.
 - o Perimeter Bumpers
 - o 5" Heavy-duty casters with brakes
 - o Lifetime warranty against rust and corrosion
- (24) Vollrath Model #5315, Wear-Ever Sheet Pan, full size, 18" wide x 26" deep x 1" high, 12-gauge 3000 series aluminum, open bead, natural finish, NSF, Made in USA.

ITEM: 454

MANUFACTURER: CUSTOM METALS

MODEL: FS-WT3040-US

DESCRIPTION: WORK TABLE (2 REQUIRED)

Work Table shall be custom built as per General Specifications, approximately 3'4" x 2'6" x 34" high to work surface, 14-gauge 304 stainless steel top with square edge, 6" high backsplash with fully enclosed ends. Provide stainless steel gussets and legs with bullet feet, full-length stainless steel under shelf with a 2" rear up-turn.

- Provide fully enclosed rear of backsplash.

ITEM: 455

MANUFACTURER: CUSTOM METALS

MODEL: FS-PT3096-US

DESCRIPTION: PREP TABLE (2 REQUIRED)

Work Table shall be custom built as per General Specifications, approximately 8'0" x 2'6" x 34" high to work surface, 14-gauge 304 stainless steel top with marine edge, 6" high backsplash with fully enclosed ends. Provide 16"x 20" x 12" deep sink bowl with a poly removable bowl cover, with a cover holder mounted under the countertop between the legs and the sink bowl, lever waste and bracket. Provide stainless steel gussets and legs with flanged feet on front ends, bullet feet on balance, and a full-length stainless steel under shelf under the entire unit with a 2" rear up-turn and drain access.

- Flanged feet on front corner legs only.
- Secure flanged feet to the floor with stainless steel fasteners.
- Provide fully enclosed rear of backsplash.
- Seal the table to the wall.
- (2) Krowne Metal Corporation Model #15-512L, Krowne Royal Series Faucet, deck-mounted, 8" centers, 12" swing spout, quarter-turn ceramic cartridge valve, low lead compliant, with built in check valve, NSF listed.
 - Wrist Handle Kit
 - 3 Year warranty
 - Royal Series Deck Mounting Kit, long style; (2) 3-1/2" brass nipples, (2) brass locknuts, (2) brass washers.
- (2) Krowne Metal Corporation Model #22-201, Krowne Twist Waste with 1-1/4" overflow outlet, 3" sink opening, 2" NPS male threaded with 1-1/2" female threaded drain outlet, 1-1/2" reducer with rubber washer, 4-1/2" flange, stainless steel strainer, flange and handle, NSF listed.
 - Overflow Head fits 1-7/8" opening, low lead compliant.
 - Overflow Elbow fits 1-7/8" opening, low lead compliant.

ITEM: 456

MANUFACTURER: GLOBE

MODEL: SP20

DESCRIPTION: MIXER (2 REQUIRED)

Planetary Mixer, bench model, 20-quart capacity, 3-speed, #12 hub, includes: stainless steel removable bowl guard with built-in ingredient chute, 20 quart stainless steel bowl, aluminum spiral dough hook, stainless steel wire whip and aluminum flat beater, interlocked bowl lift, gear-driven transmission, thermal overload protection, front-mounted touchpad controls with 60-minute digital timer and last batch recall, non-slip rubber feet, cast iron body, enamel gray finish, NSF and UL listed.

- 120/60/1
- Bowl Scraper
- Two-year parts and labor warranty

ITEM: 457

MANUFACTURER: CHANNEL

MODEL: US1827-3

DESCRIPTION: UTILITY CART (4 REQUIRED)

Utility cart, (3) shelves, 31" long, 19" wide, 34" tall, all welded stainless-steel construction with capacity of 500 pounds distributed weight, 5" swivel non-marking plate casters, corner bumpers.

- Lifetime warranty against rust and corrosion

END OF SECTION 114000

SECTION 115001 - EDUCATIONAL LABORATORIES EQUIPMENT

PART 1 GENERAL

- 1.1 Section Includes Equipment for the following Laboratories. All equipment is scheduled on the drawings.
 - A. Barbering Lab..
 - B. Cosmetology Lab.
 - C. Vet Tech Lab.
 - D. Grooming Lab.
 - E. Auto Tech Lab.
 - F. Auto Body Lab.
 - G. HVAC Lab.
 - H. Electrical Shop Lab.
 - I. Construction Shop Lab.
 - J. Nursing Lab.
 - K. All other Labs except Welding Labs.
- 1.2 Submittals
 - A. Product Data: for all scheduled equipment..
 - B. Shop Drawings: Indicate all items built in to casework, recessed in walls, or surfacemounted, including all required blocking requirements. .
 - C. Samples: color charts for all equipment that comes in more than one color for selection by the Architect.
 - D. Manufacturer's Instructions: Indicate fabrication, coordination requirements. .
 - E. Operation and Maintenance Data.
 - F. Specimen warranty. Provide manufacturers standard warranty for all equipment and its finishes, if applicable.
 - G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project:

1. Spare Parts: provide spare parts if recommended by manufacturer.
2. Extra Stock Materials: provide extra stock for items that need to be replaced within the first 2 years of use, per manufacturers recommendations. Example: fuses, filters, etc.
3. Tools: One each of special tools required for maintenance.

1.3 Quality Assurance

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.
- B. Fabricator Qualifications: Company specializing in fabricating products specified in this section, with at least three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.4 Delivery, Storage, and Handling

- A. Deliver Equipment to project site.
- B. Store equipment under cover and elevated above grade. Storage shall be secure.

1.5 Field Conditions

- A. Install equipment once building is secure and temperature/humidity controlled.

1.6 Warranty

- A. Manufacturer Warranty: Provide minimum 2-year manufacturer warranty for equipment unless standard warranty is a longer duration. . Complete forms in Owner's name and register with manufacturer.
- B. Finish Warranty: Provide 5-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.1 Equipment Schedules: See drawings for equipment.

2.2 Systems

- A. Assembly:
 1. Factory assemble to the greatest extend possible.

2. Shop fabricate items to the greatest extent possible that are not factory assembled.

PART 3 EXECUTION

3.1 Installation

- A. Install in accordance with manufacturer's written instructions.

3.2 System Startup

- A. Prepare and start equipment and systems in accordance with manufacturers' instructions and recommendations.

3.3 Cleaning

- A. Clean all equipment..

3.4 Closeout Activities

- A. Demonstrate proper operation of equipment to Owner's designated representative.
- B. Training: Train Owner's personnel on operation and maintenance of system.
 1. Training Reference: Operation and maintenance manual and additional training materials as required.

3.5 Protection

- A. Protect installed equipment from subsequent construction operations.

END OF SECTION

This page intentionally left blank

SECTION 116623 - GYMNASIUM EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Basketball backboards, goals, and support framing.
- B. Floor sleeves for net and goal posts.
- C. Wall mounted protection pads.
- D. Scoreboard.
- E. Gym divider curtains.

1.2 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- B. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Large Components: Ensure that large components can be moved into final position without damage to other construction.
- B. Electrically Operated Equipment: Coordinate location and electrical characteristics of service connection.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's data showing configuration, sizes, materials, finishes, hardware, and accessories; include:
 - 1. Electrical characteristics and connection locations.

2. Fire rating certifications.
 3. Manufacturer's installation instructions.
- B. Shop Drawings: For custom fabricated equipment indicate, in large scale detail, construction methods; method of attachment or installation; type and gauge of metal, hardware, and fittings; plan front elevation; elevations and dimensions; minimum one cross section; utility requirements as to types, sizes, and locations.
- C. Erection Drawings: Detailed dimensional requirements for proper location of equipment.
- D. Samples: Submit samples of wall pad coverings in manufacturer's available range of colors.
- E. Operating and maintenance data for each operating equipment item.
- F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified with minimum three years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in manufacturer's original packaging with factory original labels attached.
- B. Store products indoors and elevated above floor; prevent warping, twisting, or sagging.
- C. Store products in accordance with manufacturer's instructions; protect from extremes of weather, temperature, moisture, and other damage.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. See drawings for sizes and locations, unless noted otherwise.
- B. Where mounting dimensions or sizes are not indicated, comply with applicable requirements of the following:
1. National Federation of State High School Associations (NFHS) sports rules.

- C. Provide mounting plates, brackets, and anchors of sufficient size and strength to securely attach equipment to building structure; comply with requirements of Contract Documents.
- D. Hardware: Heavy duty steel hardware, as recommended by manufacturer.
- E. Electrical Wiring and Components: Comply with NFPA 70; provide UL-listed equipment.
- F. Structural Steel Fabrications: Welded in accordance with AWS D1.1/D1.1M, using certified welders.

2.2 GYMNASIUM DIVIDER CURTAINS

- A. Gymnasium Divider Curtains:
 - 1. Curtain Material: Class A rated, self-extinguishing vinyl coated polyester complying with NFPA 101.
 - 2. Upper Section: 9 oz/sq yd vinyl mesh fabric.
 - a. Color: As selected by Architect.
 - b. Overall Curtain Height: As indicated on drawings.
 - 3. Lower Section: 18 oz/sq yd solid vinyl coated polyester.
 - a. Color: As selected by Architect.
 - b. Height Above Floor: Manufacturer's standard height.
 - 4. Operation: Side stacking.
 - 5. Width: As indicated on drawings.
 - 6. Manufacturers:
 - a. Draper, Inc; Walk Draw: www.draperinc.com/#sle.

2.3 BASKETBALL

- A. Basketball System: Backstop assembly, backboard, and goal.
- B. Ceiling-Suspended Backstop Assemblies: Capable of mounting both rectangular and fan-shaped backboards.
 - 1. Framing: Center strut; forward folding framing.
 - 2. Folding Control System: Electric hoist that folds backstop with 115 volt actuator, integral limit switches that provide automatic shut-off in both positions, and safety catch with automatic reset.
 - 3. Framing Color: Manufacturer's standard.
 - 4. Manufacturers:
 - a. Draper, Inc; TF-20: www.draperinc.com/#sle.
- C. Backboards: Tempered glass, rectangular shaped.
 - 1. Frame: Brushed aluminum edge, steel mounting.

2. Markings: Painted.
 3. Provide safety padding for bottom edge of backboard.
 4. Provide mounting kit.
 5. Color: As selected from manufacturer's standard selection.
- D. Goals: Steel rim, mounted to backboard, with attached nylon net; complete with mounting hardware.
1. Net Attachment Device: Tube-tie.
 2. Finish: Powder coat orange.

2.4 FLOOR-MOUNTED EQUIPMENT

- A. Floor Sleeves for Posts: Metal sleeve, with latch cover, cast into concrete subfloor to hold poles for nets and goals; installed flush with finish floor surface.
1. Latch Cover: Chrome plated, round; tamper resistant lock with key.
 2. Sleeve: Aluminum.
 3. Depth of Sleeve: 9 inches from floor surface to bottom, including latch cover.
 4. Manufacturers:
 - a. Draper, Inc.; 3 1/2" Floor Sleeve - 501006.

2.5 WALL PADDING

- A. Wall Padding: Foam filling bonded to backing board, wrapped in covering; each panel fabricated in one piece.
1. Surface Burning Characteristics: Flame spread index (FSI) of 25 or less, smoke developed index (SDI) of 450 or less, Class A, when tested in accordance with ASTM E84 as a complete panel.
 2. Flammability: Comply with NFPA 286.
 3. Covering: Vinyl-coated polyester fabric, mildew and rot resistant; stapled to back of board.
 - a. Color: As selected from manufacturer's standard range.
 - b. Texture: Embossed leather-look.
 - c. Fabric Weight: 14 oz/sq yd, minimum.
 4. Foam, Fire-Rated: Open cell polychloroprene (Neoprene), with 5.5 pcf nominal density.
 5. Foam Thickness: 2 inches.
 6. Backing Board: Plywood.
 - a. Thickness: 3/8 inch, minimum.
 7. Panel Dimensions: 24 inches wide by 72 inches long, including nailing/fastening margins.
 8. Mounting: Removable; Z-clips fixed to wall and to padding.
 9. Manufacturers:
 - a. Draper, Inc; EcoVision Wall Pad: www.draperinc.com/#sle.

- B. Specially Shaped Padding: Same construction as standard padding; custom fabricate to fit irregularly shaped members, areas, and protrusions in gymnasium as indicated; provide padding for:
 - 1. I-beams.
 - 2. Wall corners.
- C. Round Column Padding: Same construction as standard padding; made to fit; with grommet strip on each long side of pad, provide laces.

2.6 SCOREBOARD

- A. NEVCO; Indoor Multisport Model 2781-IC.
 - 1. Size: 10'x4'-11"x8".
 - 2. Colors:
 - a. Scoreboard Color: #141 Navy Blue.
 - b. Caption Color: Amber.
 - c. Custom Striping: mettalic Gold.
 - d. Provide componets for scorekeeper, remote wireless tablet and hard wired table.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Take field measurements to ensure proper fitting of work. If taking field measurements before fabrication will delay work, allow for adjustments within recommended tolerances.
- B. Inspect areas and conditions before installation, and notify Architect in writing of unsatisfactory or detrimental conditions.
- C. Do not proceed with this work until conditions have been corrected; commencing installation constitutes acceptance of work site conditions.
- D. Verify that electrical services are correctly located and have proper characteristics.

3.2 INSTALLATION

- A. Install in accordance with Contract Documents and manufacturer's instructions.
- B. Coordinate installation of inserts and anchors that must be built in to flooring or subflooring.
- C. Install equipment rigid, straight, plumb, and level.

- D. Secure equipment with manufacturer's recommended anchoring devices.
- E. Install wall padding securely, with edges tight to wall and without wrinkles in fabric covering.
- F. Separate dissimilar metals to prevent electrolytic corrosion.

3.3 ADJUSTING

- A. Verify proper placement of equipment.
- B. Verify proper placement of equipment anchors and sleeves, and use actual movable equipment to be anchored if available.
- C. Adjust operating equipment for proper operation; remove and replace equipment causing noise or vibration; lubricate equipment as recommended by manufacturer.

3.4 CLEANING

- A. Remove masking or protective covering from finished surfaces.
- B. Clean equipment in accordance with manufacturer's recommendations.

3.5 PROTECTION

- A. Protect installed products until Date of Substantial Completion.
- B. Replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 122400 - WINDOW SHADES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior manual roller shades.
 - 1. Blackout shades at Science Classrooms, Computer Classrooms.
 - 2. Filtering shades at all other locations, unless otherwise indicated.
- B. Provide shades at all window/storefront locations.

1.2 REFERENCE STANDARDS

- A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2019.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken with field conditions in place.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets, including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
- B. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.
- C. Selection Samples: Include fabric samples in full range of available colors and patterns.
- D. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.

- F. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this type with minimum three years of documented experience with shading systems of similar size and type.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- B. Handle and store shades in accordance with manufacturer's recommendations.

1.7 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
 - 1. Shade Hardware: 25 years.
 - 2. Fabric: 25 years.
 - 3. Aluminum and Steel Coatings: One year.

PART 2 PRODUCTS

2.1 Manufacturers

- A. Interior Manually Operated Roller Shades:
 - 1. Draper, Inc; Manual LightBloc FlexShade: www.draperinc.com/#sle.
- B. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2.2 Roller Shades

- A. General:

1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
 2. Provide shade system that operates smoothly when shades are raised or lowered.
- B. Interior Roller Shades - Basis of Design: Draper, Inc; Manual LightBloc FlexShade: www.draperinc.com/#sle.
1. Description: Single roller, manually operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and other components necessary for complete installation.
 - a. Drop Position: Regular roll.
 - b. Mounting: Wall mounted.
 - c. Roll Direction: Roll down, closed position is at window sill.
 - d. Size: As indicated on drawings.
 - e. Fabric: As indicated under Shade Fabric article.
 2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
 3. Roller Tubes: As required for type of shade operation; designed for removal without removing mounting hardware.
 - a. Material: Extruded aluminum or steel, with wall thickness and material selected by manufacturer.
 - b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 4. Hembars: Designed to maintain bottom of shade straight and flat, selected from manufacturer's standard options.
 5. Manual Operation:
 - a. Drive Chain: Continuous loop stainless steel beaded ball chain, 95 lb minimum breaking strength. Provide upper and lower limit stops.
 - 1) Polyester Chain Color: to be selected.
 - b. Shade Lift Assistance: Manufacturer's standard spring device contained in the idler end of roller tube to reduce force required to lift shades; as required based on shade weight.
 - c. Chain Retainer:
 - 1) Manufacturer's standard clip.
 6. Accessories:
 - a. Fascia: Extruded aluminum, size as required to conceal shade mounting, attachable to mounting end caps, without exposed fasteners; clear anodized finish.
 - 1) Color: to be selected..
 - b. Fasteners: Noncorrosive, and as recommended by shade manufacturer.

2.3 Shade Fabric

- A. Fabric for Light-Filtering Shades: Nonflammable, color-fast, impervious to heat and moisture, glare control, and able to retain its shape under normal operation.
 - 1. Manufacturers:
 - a. MechoShade Systems LLC; Soho - 1100 Series (1% open):
www.mechoshade.com/#sle.
 - 2. Material: Vinyl coated fiberglass.
 - 3. Performance Requirements:
 - a. Flammability: Pass NFPA 701 large and small tests.
 - b. Fungal Resistance: No growth when tested according to ASTM G21.
 - c. Solar Transmittance (Ts): 5.
 - d. Visible Light Transmittance (Tv): 5.
 - e. Solar Reflectance (Rs): 73.
 - 4. Openness Factor: 3%.
 - 5. Weight: 14.1 ounces per square yard.
 - 6. Color: As selected by Architect from manufacturer's full range of colors.
 - 7. Fabrication:
 - a. Fabric Orientation: Railroaded, fabric is turned 90 degrees off the roll.
- B. Fabric - Type RS2: Nonflammable, color-fast, impervious to heat and moisture, black out, and able to retain its shape under normal operation.
 - 1. Manufacturers:
 - a. MechoShade Systems LLC; Soho - 1100 Series (1% open):
www.mechoshade.com/#sle.
 - 2. Material: 100 percent polyester.
 - 3. Performance Requirements:
 - a. Fungal Resistance: No growth when tested according to ASTM G21.
 - b. Solar Transmittance (Ts): 0.
 - c. Visible Light Transmittance (Tv): 0.
 - d. Solar Reflectance (Rs): 70.
 - 4. Openness Factor: Opaque.
 - 5. Weight: 12.4 ounces per square yard.
 - 6. Color: As selected by Architect from manufacturer's full range of colors.
 - 7. Fabrication:
 - a. Fabric Orientation: Railroaded, fabric is turned 90 degrees off the roll.

2.4 Roller Shade FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
 - 1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window stool.
 - 2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb.

- C. Dimensional Tolerances: As recommended in writing by manufacturer.
- D. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Start of installation shall be considered acceptance of substrates.

3.2 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Replace shades that exceed specified dimensional tolerances at no extra cost to Owner.
- C. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.4 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

3.5 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

CSArch
Project No. 108-2303.00

Newburgh Enlarged City School District
Newburgh ECSD New CTE Building

END OF SECTION

SECTION 123200 - MANUFACTURED WOOD CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Manufactured custom casework, with cabinet hardware.

1.2 DEFINITIONS

- A. Exposed: Portions of casework visible when drawers and cabinet doors are closed, including end panels, bottoms of cases more than 42 inches above finished floor, tops of cases less than 72 inches above finished floor and all members visible in open cases or behind glass doors.
- B. Semi-Exposed: Portions of casework and surfaces behind solid doors, tops of cases more than 72 inches above finished floor and bottoms of cabinets more than 30 inches but less than 42 inches above finished floor.
- C. Concealed: Sleepers, web frames, dust panels and other surfaces not generally visible after installation and cabinets less than 30 inches above finished floor.

1.3 REFERENCE STANDARDS

- A. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- D. ASTM C1036 - Standard Specification for Flat Glass; 2021.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- F. AWI (QCP) - Quality Certification Program; Current Edition.
- G. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- H. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- I. BHMA A156.9 - Cabinet Hardware; 2020.

- J. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2020.
- K. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- B. Keying Conference: Conduct conference prior to ordering keys. Incorporate conference decisions into keying submittal.

1.5 SUBMITTALS

- A. Product Data: Component dimensions, configurations, construction details, joint details, attachments.
- B. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors and reinforcements, placement dimensions and tolerances, clearances required, and keying information.
- C. Samples for Finish Selection: Fully finished, for color selection. Minimum sample size: 2 inches by 3 inches.
 - 1. Plastic laminate samples, for color, texture, and finish selection.
- D. Casework Samples: Representative of types in the project.
 - 1. Base Cabinet: Cabinet with drawer and door and specified hardware.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Maintenance Data: Manufacturer's recommendations for care and cleaning.
- H. Finish touch-up kit for each type and color of materials provided.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Quality Certification: Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section.

- C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.
- B. Acceptance at Site:
 - 1. Do not deliver or install casework until the conditions specified under Part 3, Examination Article of this section have been met. Products delivered to sites that are not enclosed and/or improperly conditioned will not be accepted if warping or damage due to unsatisfactory conditions occurs.
- C. Storage:
 - 1. Store casework in the area of installation. If necessary, prior to installation, temporarily store in another area, meeting the environmental requirements specified under Part 3, "Site Verification of Conditions" Article of this section.

1.8 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion, at no additional cost to Owner. Defects include, but are not limited to:
 - 1. Ruptured, cracked, or stained finish coating.
 - 2. Discoloration or lack of finish integrity.
 - 3. Cracking or peeling of finish.
 - 4. Delamination of components.
 - 5. Failure of adhesives.
 - 6. Failure of hardware.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Plastic Laminate Casework:
 - 1. CiF Lab Solutions; Q-Series.
- B. Obtain casework from single source and manufacturer, unless otherwise indicated.

2.2 CASEWORK, GENERAL

- A. Quality Standard: AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Plastic Laminate Faced Cabinets: Custom Grade.

2.3 FABRICATION

- A. Assembly: Shop assemble casework items for delivery to site in units easily handled and to permit passage through building openings.
- B. Construction: As required for selected grade.
- C. Structural Performance: Safely support the following minimum loads:
 - 1. Base Units: 500 pounds per linear foot across the cabinet ends.
 - 2. Suspended Units: 300 pounds static load.
 - 3. Drawers: 125 pounds, minimum.
 - 4. Hanging Wall Cases: 300 pounds.
 - 5. Shelves: 100 pounds, minimum.
- D. Glazing for Doors: Clear tempered glass.
 - 1. Glazing: With gaskets and removable stops; minimize rattling and vibration.
- E. Fittings and Fixture Locations: Cut and drill components for fittings and fixtures.
- F. Hardware Application: Factory-machine casework members for hardware that is not surface applied.
- G. Access Panels: Where indicated, for maintenance of utility service and mechanical and electrical components.
- H. Removable back panels on indicated base cabinets. Provide partial height back panels at sink cabinets.
- I. Fixed panels at backs of open spaces between base cabinets.
 - 1. Provide cutouts for power receptacles where indicated on drawings.
- J. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- K. Scribes and Fillers: Panels of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.
- L. Apron Frames: Construction similar to other cabinets, with modifications.
 - 1. Frames fabricated from panels standard with the manufacturer. Include front and back panels, with drawer suspension framing mechanically fastened to support channels spanning between them.

- M. Countertop Panel-Type Supports: Materials similar to adjacent casework, 1-1/2 inch in width, with front-to-back and toe space dimensions matching base cabinet. Designed to be secured in a concealed fashion to countertop material. Include two leveling devices per support panel.

2.4 PLASTIC-LAMINATE-CLAD CASEWORK

- A. Plastic-Laminate-Clad Casework: Solid wood and wood panel construction; each unit self-contained and not dependent on adjacent units or building structure for rigidity; in sizes necessary to avoid field cutting except for scribes and filler panels. Include adjustable levelers for base cabinets.
 - 1. Style: Flush overlay. Ease doors and drawer fronts slightly at edges.
 - 2. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline.
 - a. Finish: Matte or suede, gloss rating of 5 to 20.
 - b. Surface Color and Pattern: As indicated on drawings.
 - c. Exposed Interior Surfaces: Thermally fused laminate.
 - 1) Color: White.
 - d. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

2.5 COUNTERTOPS

- A. Countertops: See Section 123600.
- B. Types: More than one type is required. See drawings for location of each type of countertop.

2.6 CABINET HARDWARE

- A. Comply with BHMA A156.9 requirements.
- B. Label Holders: Manufacturer's standard, sized to hold standard label cards, satin chromium plated over nickel on base material.
 - 1. Attachments: Wood screws, with finish matching label holders.
- C. Locks: Provide locks on casework drawers and doors, everywhere. Lock with 5 pin cylinder and 2 keys per lock.
 - 1. Hinged Doors: Cam type lock, satin chromium plated over nickel on base material.
 - 2. Framed Sliding Doors: Plunger-type sliding showcase lock, bright chromium plated over nickel on base material.
 - 3. Tall Hinged Doors: Three-point latching system.
 - 4. Keying: Key locks alike within a space; key each room separately.

- 5. Master Key System: All locks operable by master key.
- D. Shelves in Cabinets:
 - 1. Shelf Standards and Rests: Vertical standards with rubber button fitted rests, satin chromium plated over nickel on base material.
- E. Swinging Doors: Hinges, pulls, and catches.
 - 1. Hinges: Visible, number as required by referenced standards for width, height, and weight of door.
 - 2. Pulls: Chrome wire pulls, 4 inches wide.
 - 3. Catches: Magnetic.
- F. Sliding Doors: Pulls and track assemblies.
 - 1. Pulls: Steel, recessed circular design.
 - a. Steel Finish: Satin chromium plated over nickel.
 - 2. Track Assembly: Nylon track with solid bearing followers.
- G. Drawers: Pulls and slides.
 - 1. Pulls: Chrome wire pulls, 4 inches wide.
 - 2. Slides: Steel, full extension arms, ball bearings; self-closing; capacity as recommended by manufacturer for drawer height and width.

2.7 MATERIALS

- A. Adhesives Used for Assembly: Comply with VOC requirements for adhesives and sealants; see Section 016116.
- B. Wood-Based Materials:
 - 1. Solid Wood: Air-dried to 4.5 percent moisture content, then tempered to 6 percent moisture content before use.
- C. Solid Wood: Clear, dry, sound, plain sawn, selected for compatible species, grain and color, no defects.
- D. Semi-Exposed Solid Wood: Dry, sound, plain sawn, no appearance defects, any species similar in color and grain to exposed portions.
- E. Hardwood Plywood: Veneer core; HPVA HP-1 Grade as indicated; same species as exposed solid wood, clear, compatible grain and color, no defects. Band exposed edges with solid wood of same species as veneer.
- F. Concealed Solid Wood or Plywood: Any species and without defects affecting strength or utility.
- G. Hardboard: ANSI A135.4, Class 1, tempered.

- H. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications. complying with Grade requirements, and standard with the manufacturer.
- I. Stainless Steel Sheet: ASTM A666 Type 304.
- J. Glass: Fully tempered float; ASTM C1036, Type 1, Quality Q3; ASTM C1048, tempered using horizontal tempering and complying with ANSI Z97.1; 3/16 inch thick minimum; exposed edges ground, and cut or drilled to receive hardware; clear.

2.8 ACCESSORIES

- A. Plastic Edge Banding: Extruded PVC, convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness.
 - 1. Color: As selected by Architect from manufacturer's full range.
 - 2. Use at exposed edges.
- B. Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface.
- C. Sealant for Use in Casework Installation:
 - 1. Manufacturer's recommended type.

PART 3 EXECUTION

3.1 PREPARATION

- A. Large Components: Ensure that large components can be moved into final position without damage to other construction.

3.2 EXAMINATION

- A. Site Verification of Environmental Conditions:
 - 1. Do not deliver casework until the following conditions have been met:
 - a. Building has been enclosed (windows and doors sealed and weather-tight).
 - b. An operational HVAC system that maintains temperature and humidity at occupancy levels has been put in place.
 - c. Ceiling, overhead ductwork, piping, and lighting have been installed.
 - d. Installation areas do not require further "wet work" construction.
- B. For Base Cabinets Installation: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 1/2 inch leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.

- C. For Wall Cabinets Installation: Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:
 - 1. Maximum variation from plane of masonry wall exceeds 1/4 inch in 10 ft and 1/2 inch in 20 ft or more, and/or maximum variation from plumb exceeds 1/4 inch per story.
 - 2. Maximum Variation of finished gypsum board surface from true flatness: 1/8 inch in 10 feet in any direction.
- D. Verify adequacy of support framing and anchors.
- E. Verify that service connections are correctly located and of proper characteristics.

3.3 INSTALLATION

- A. Perform installation in accordance with manufacturer's instructions.
- B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.
- C. Set casework items plumb and square, securely anchored to building structure.
- D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.
- E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch. In addition, do not exceed the following tolerances:
 - 1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet.
 - 2. Variation of Bottoms of Wall Cabinets from Level: 1/8 inch in 10 feet.
 - 3. Variation of Faces of Cabinets from a True Plane: 1/8 inch in 10 feet.
 - 4. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch.
 - 5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch.
- F. Secure wall and floor cabinets to concealed reinforcement at gypsum board assemblies.
- G. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.
 - 1. Where base cabinets are installed away from walls or service space framing, anchor to floor at toe space at not more than 24 inches on center, and at sides of cabinets with not less than two fasteners per side.
- H. Wall Cabinets: Fasten to hanging strips, and/or wall substrates. Fasten each cabinet through back, near top, at not less than 16 inches on center.

- I. Install hardware uniformly and precisely.
- J. Countertops: Install countertops intended and furnished for field installation in one true plane, with ends abutting at hairline joints, and no raised edges.
- K. Replace units that are damaged, including those that have damaged finishes.

3.4 ADJUSTING

- A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.

3.5 CLEANING

- A. Clean casework and other installed surfaces thoroughly.

3.6 PROTECTION

- A. Do not permit finished casework to be exposed to continued construction activity.
- B. Protect casework and countertops from ongoing construction activities. Prevent workmen from standing on, or storing tools and materials on casework or countertops.
- C. Repair damage, including to finishes, that occurs prior to Date of Substantial Completion, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

END OF SECTION

This page intentionally left blank

SECTION 123553.13 - METAL LABORATORY CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal cabinets and cabinet hardware.
- B. Tables.
- C. Fixed- and adjustable-height workbenches.
- D. Acid storage cabinets.
- E. Solvent storage cabinets.
- F. Countertops.
- G. Laboratory sinks.
- H. Pegboards.
- I. Laboratory emergency equipment plumbing fixtures.
- J. Service fittings and outlets.

1.2 REFERENCE STANDARDS

- A. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- B. ANSI Z358.1 - American National Standard for Emergency Eyewash and Shower Equipment; 2014.
- C. ASTM A513/A513M - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing; 2020a.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021a.
- F. ASTM C1036 - Standard Specification for Flat Glass; 2021.

- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- H. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- I. ASTM D522/D522M - Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings; 2017 (Reapproved 2021).
- J. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- L. BHMA A156.9 - Cabinet Hardware; 2020.
- M. NFPA 30 - Flammable and Combustible Liquids Code; 2021, with Amendment.
- N. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- O. SEFA 1 - Laboratory Fume Hoods; 2010.
- P. SEFA 2 - Installations; 2010.
- Q. SEFA 3 - Laboratory Work Surfaces; 2010.
- R. SEFA 7 - Laboratory Fixtures; 2010.
- S. SEFA 8M - Laboratory Grade Metal Casework; 2016.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate installation of casework with related items.
 - 1. Service Fixtures: Coordinate location and characteristics of service connections.
 - 2. Equipment and Instruments: Coordinate installation of casework with equipment and scientific instruments.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- C. Keying Conference: Conduct conference prior to ordering keys. Incorporate conference decisions into keying submittal.

1.4 SUBMITTALS

- A. Product Data: Details of materials, component dimensions and configurations, construction details, joint details, attachments; manufacturer's catalog literature on hardware and keying, accessories, and service fittings, if any.
- B. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors and reinforcements placement dimensions and tolerances, clearances required, and utility locations, if any. Include coordinated information for laboratory equipment specified in another section and/or furnished by Owner.
- C. Samples For Color Selection: Color charts for each different finish material.
- D. Manufacturer's Installation Instructions.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.
- G. Maintenance Data: Manufacturer's recommendations for care and cleaning.
- H. Finish touch-up kit for each type and color of materials provided.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.
- B. Installer Qualifications: Factory certified by the manufacturer in performing work of the type specified in this section, with not less than five years of documented experience and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.

1.7 WARRANTY

- A. Manufacturer Warranty: Provide 5-year warranty against defects. Complete forms in Owner's name and register with manufacturer. Covered defects include, but are not limited to:
 - 1. Ruptured, cracked, or stained finish coating.
 - 2. Discoloration, or lack of finish integrity.
 - 3. Cracking or peeling of finish.
 - 4. Weld or any other structural failure.

5. Failure of hardware.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Metal Laboratory Casework:
 1. CiF Lab Solutions LP; S-Line Series: www.cifsolutions.com/#sle.
- B. Countertops:
 1. Durcon (Epoxy resin, Solid phenolic): www.durcon.com/#sle.
- C. Sinks and Cup Sinks:
 1. Durcon (Epoxy resin, Polyolefin): www.durcon.com/#sle.
- D. Water and Gas Service Fittings:
 1. Chicago Faucets, a Geberit company: www.chicagofaucets.com/#sle.
- E. Obtain casework from single source and manufacturer, unless otherwise indicated.

2.2 METAL LABORATORY CASEWORK

- A. Casework: Die-formed metal sheet; each unit self-contained and not dependent on adjacent units or building structure for rigidity; factory-fabricated, factory-assembled, and factory-finished.
 1. Style: Inset - square edge.
 2. Primary Cabinet Material: Cold-rolled steel.
 3. Structural Performance: In addition to the requirements of SEFA 3, SEFA 7 and SEFA 8M, provide components that safely support the following minimum loads, without deformation or damage:
 - a. Drawers: 100 pounds.
 4. Corners and Joints: Without gaps or inaccessible spaces or areas where dirt or moisture could accumulate.
 5. Edges and Seams: Smooth. Form counter tops, shelves, and drain boards from continuous sheets.
 6. Shelf Edges: Turned down 3/4 inch on each side and returned 3/4 inch front and back.
 7. Ends: Close open ends with matching construction.
 8. Welding: Electric spot welded; joints ground smooth and flush.
 9. Drawers and Doors: Fabricate drawer and door fronts of sandwiched sheets of sheet steel welded together and reinforced for hardware.
 - a. Fill with sound-deadening core.

10. Shelves: Adjustable and fixed shelves formed down 3/4 inch, returned back 7/8 inch, and up 1/4 inch into a channel shape, front and rear; formed down 3/4 inch at each end. Shelves over 42 inches long reinforced with a channel welded to underside of shelf.
 11. Glazing: Type and thickness standard with manufacturer.
 - a. Framed Doors: Tempered glass, with gaskets and removable stops; minimize rattling and vibration.
 12. Fittings and Fixture Locations: Cut and drill countertops, backs, and other casework components for service outlets and fixtures.
 13. Access Panels: Where indicated, for maintenance of utility service fixtures and fittings and mechanical and electrical components.
 14. Removable back panels on all base cabinets. Partial height back panels at sink cabinets.
 15. Fixed panels at backs of open spaces between base cabinets and at ends of utility spaces not otherwise enclosed.
 - a. Cutouts for power receptacles where indicated on drawings.
 16. Filler Panels: Flanged on both sides, of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.
 17. Separation: Use bituminous paint or non-conductive tape to coat metal surfaces in contact with cementitious materials, and to separate dissimilar metals.
- B. Acid Storage Cabinets: Construction identical to other cabinets, with following exceptions:
1. Completely lined with corrosion-resistant liner material; stainless steel fasteners for all connections and hardware inside cabinet.
 2. Shelves: Perforated or vented, rigid polypropylene.
 3. Bottom Pan: Liquid tight, polypropylene liner covering entire bottom of acid storage cabinet.
 4. Vents: Comply with SEFA 1.
 - a. Vent base cabinets through work surface with manufacturer's vent kit.
 - b. When acid storage cabinets are installed below fume hoods, provide louvered cabinet doors.
 - c. Seal penetrations with chemical resistant sealant.
- C. Solvent (Flammable and Combustible Liquids) Storage Cabinets: Construction identical to other cabinets, with following exceptions:
1. Construct to NFPA 30 and applicable OSHA requirements.
 2. Fire Resistance: Maximum internal temperature of 325 degrees F at the center, and 1 inch from top of the cabinet when cabinet is subjected to a ten minute fire test that simulates fire exposure of a standard time-temperature curve specified in ASTM E119.
 3. Steel sheet, 18 gauge, 0.0478 inch minimum thickness, double panel construction with 1-1/2 inch space between panels and electrical grounding connection.

4. Shelves: Full depth, adjustable sloped metal shelf.
 5. Bottom Pan: 2 inches deep liquid-tight pan covering entire bottom of cabinet.
 6. Cabinet Hardware: UL-listed.
 - a. Hinges: Full-length stainless steel continuous (piano) hinges.
 - b. Door Handles: Manufacturer's standard, with slip-resistant grip.
 - 1) Provide manufacturer's standard cylinder lock and key set.
 - c. Grounding screw-lug.
 7. Signage: Provide manufacturer's standard signage reading "FLAMMABLE - KEEP FIRE AWAY" or similar message in bright red color.
- D. Tables: Include adjustable height units.
1. Adjustable Height Table Construction: Manufacturer's standard, with countertop worksurfaces, unless noted otherwise.
 - a. Worksurface Support Frame: Telescoping from base frame.
 - b. Locking casters.
 - c. Worksurface: Matching adjacent countertop materials.
 - 1) Lift Capacity: 1,000 lb, evenly distributed on worksurface.
 - 2) Adjustability:
 - a) Total Range: 14 inches.
 - b) Manual Operation: Threaded fastener pins inserted into holes on 1 inch centers.
 - 3) Finish, Surface Color, and Texture: As selected by Architect from manufacturer's standard line.
 2. Primary Materials: Manufacturer's standard for each component.
 - a. Tubing: Hot-rolled steel, ASTM A513/A513M.
 - b. Sheet Metal: Cold-rolled steel, ASTM A1008/A1008M.

2.3 CABINET HARDWARE

- A. Manufacturer's standard styles, and as indicated below.
- B. Comply with BHMA A156.9 requirements.
- C. Finish of exposed stainless steel components: No.4 finish.
- D. Locks: On casework drawers and doors. Lock with 5 pin cylinder and 2 keys per lock.
 1. Hinged Doors: Cam type lock, bright chromium plated over nickel on base material.
 2. Framed Sliding Doors: Plunger-type sliding showcase lock, bright chromium plated over nickel on base material.
 3. Tall Hinged Doors: Three-point latching system.
 4. Keying: Key locks alike within a space; key each room separately.
 5. Master Key System: All locks operable by master key.

- E. Label Holders: Manufacturer's standard, sized to hold standard label cards for drawer fronts and cabinet doors indicated, stainless steel with No.4 finish.
 - 1. Attachments: Screws or rivets, with finish matching label holders.
- F. Shelves in Cabinets:
 - 1. Shelf Standards and Rests: Vertical standards with rubber button fitted rests, satin chromium plated over nickel on base material.
- G. Swinging Doors:
 - 1. Hinges: Butt, number as required by referenced standards for width, height, and weight of door.
 - a. Butt Hinges for Inset Doors: five-knuckle, projecting barrel, minimum 2-1/2 inches long. Stainless steel with No.4 finish.
 - 2. Catches: Magnetic.
 - 3. Pulls: Stainless steel wire pulls, 4 inches wide.
- H. Sliding Doors:
 - 1. Pulls: Steel, recessed circular design.
 - a. Steel Finish: Satin chromium plated over nickel on base material.
 - 2. Track Assembly: Nylon track with solid bearing followers.
- I. Drawers:
 - 1. Pulls: Stainless steel, 4 inches wide.
 - 2. Slides: Steel, full extension arms, ball bearings; capacity as recommended by manufacturer for drawer height and width.

2.4 COUNTERTOPS

- A. Countertops:
 - 1. Epoxy Resin Countertops: Filled epoxy resin molded into homogenous, non-porous sheets; no surface coating and color and pattern consistent throughout thickness; with integral or adhesively seamed components.
 - a. Flat Surface Thickness: 1 inch, nominal.
 - b. Surface Finish: Smooth, non-glare.
 - c. Color: to be selected by the Architect.
 - d. Exposed Edge Shape: 3/16 inch radius corner.
 - e. Back and End Splashes: Same material, same thickness; separate for field attachment.

2.5 SINKS

- A. Laboratory sinks.
 - 1. General: Manufacturer's adjustable support system for undermount sink installation.

2. Sink : Single-bowl.
 - a. Material: Epoxy.
 - b. Mounting: Drop-in.
 - c. Size: ____ inch wide by ____ inch front-to-back by ____ inch deep.
 - d. Outlet: 1-1/2 inch NPS outlet with tailpiece.
 - 1) Placement: Center.

2.6 PEGBOARDS

- A. Stainless steel pegboards with pre-drilled or punched holes in a staggered pattern, designed to accept removable gray polypropylene pegs. With each pegboard include a stainless steel drip-trough with drain outlet and matching diameter 36 inch long PVC drain hose.
 1. Size: 30 inches wide by 30 inches high.
 2. Accessories: Screen insert.

2.7 LABORATORY EMERGENCY EQUIPMENT Plumbing Fixtures

- A. General: Provide emergency equipment products complying with requirements of ANSI Z358.1.
- B. Eye/Face Wash Units: Deck-mounted units.
 1. Construction: Stainless steel.
 2. Twin eyewash heads with pop-off dust covers, internal flow control, and filter.
 3. Type: 90-Degree swing-down, designed for mounting behind the sink.
 - a. Plug-type valve designed to open orifice and activate water flow only when unit is swung down into operational position.
 4. Sign: Manufacturer's standard ANSI-compliant identification sign.

2.8 SERVICE FITTINGS

- A. General: Comply with requirements of SEFA 7.
- B. Gas Service Fittings and Fixtures.
 1. Laboratory Gas Fitting :
 - a. Valve: Forged or cast brass body, 90 degree inlet - outlet configuration, with polished chrome with clear epoxy coating finish.
 - b. Control: Ball valve.
 - c. Mounting: Panel (vertical surface).
 - d. Supply Gas: Natural Gas.
 - e. Inlet: 3/8 inch NPS NPT.
 - f. Outlet: Manufacturer's standard, with removable seven-serration hose end.
 - g. Handle: Manufacturer's standard four-arm handle with color-coded index disc.

C. Water Service Fittings and Fixtures.

1. Water Fitting Type: ____:
 - a. Basis of Design: Model _____ manufactured by _____.
 - b. Valve: Forged or cast brass body, 180 degree inlet - outlet configuration, with polished chrome finish.
 - c. Mounting: Deck (Horizontal surface) turret base, with escutcheon.
 - d. Inlet: 3/8 inch NPS NPT.
 - e. Outlet: Manufacturer's standard, with anti-splash serrated hose end.
 - f. Handle: Manufacturer's standard four-arm handle with color-coded index disc.

D. Electrical Fittings and Fixtures:

1. Electrical Fittings, General: Types indicated, for mounting on laboratory casework, including, as appropriate, grounding screws, and mounting accessories and fasteners.
2. Electrical Power Fitting :
 - a. General: 3-wire polarized receptacles meeting requirements of NFPA 70.
 - b. Mounting: Pedestal, surface-mounted.
 - c. Receptacles: Duplex, 5-20R, GFCI.
 - d. Orientation: Double face.
 - e. Voltage: 120 V.
 - f. Service: Normal power.
 - g. Receptacle Color: to be selected by the Architect.
 - h. See electrical drawings for circuiting.

2.9 MATERIALS

- A. Sheet Steel: High-strength low-alloy, cold rolled and leveled unfinished steel sheet, ASTM A1008/A1008M, Class 1 (matte) finish.
- B. Stainless Steel Sheet: ASTM A666, Type 304.
- C. Solid Epoxy Resin: Modified epoxy resin and non-asbestos inert fillers cast into sheets.
- D. Glass: Fully tempered float; ASTM C1036, Type 1, Quality Q3; ASTM C1048, tempered using horizontal tempering and complying with ANSI Z97.1; 3/16 inch thick minimum; exposed edges ground, and cut or drilled to receive hardware; clear.
- E. Sealant For Use in Casework Installation:
 1. One component, clear silicone base sealant, chemical curing complying with ASTM C920, Type S, Grade NS, Class 25, Use NT, when tested to glass and aluminum, anti-fungus composition.

2.10 FINISHES

- A. Sheet Steel Finish: Having chemical resistance equal to Level 0 (no change) or Level 1 (slight change of gloss or slight discoloration) according to SEFA 8M. Test applied finishes using procedures specified in ASTM D522/D522M.
 - 1. Coating Type, New Casework: Baked on epoxy; minimum two coats.
 - 2. Color: As selected from manufacturer's standard selection.
 - 3. Preparation: Degrease and phosphate etch, and prime.
- B. Stainless Steel Finish: No.4, brushed finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of support framing and anchors.
- B. Verify that service connections are correctly located and of proper characteristics.

3.2 INSTALLATION

- A. Perform installation in accordance with manufacturer's instructions and with SEFA 2.
- B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.
- C. Set casework items plumb and square, securely anchored to building structure, with no distortion.
 - 1. Base Cabinets: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 3/4 inch leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.
 - 2. Wall Cabinets: Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:
 - a. Maximum variation from plane of masonry wall exceeds 1/4 inch in 10 feet and 1/2 inch in 20 feet or more, and/or maximum variation from plumb exceeds 1/4 inch per story.
 - b. Maximum variation of finished gypsum board surface from true flatness exceeds 1/8 inch in 10 feet in any direction.
- D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.

- E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch. In addition, do not exceed the following tolerances:
 - 1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet.
 - 2. Variation of Bottoms of Upper Cabinets from Level: 1/8 inch in 10 feet .
 - 3. Variation of Faces of Cabinets from a True Plane: 1/8 inch in 10 feet.
 - 4. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch.
 - 5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch.
 - F. Separate dissimilar metals to prevent galvanic action.
 - G. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.
 - 1. Where base cabinets are installed away from walls or service space framing, anchor to floor at toe space at not more than 24 inches on center, and at sides of cabinets with not less than two fasteners per side.
 - H. Wall Cabinets: Fasten to hanging strips, and/or wall substrates. Fasten each cabinet through back, near top, at not less than 16 inches on center.
 - I. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
 - J. Vented Cabinets: Install in strict compliance with manufacturer's written installation instructions.
 - 1. Install vent kits and connect to exhaust system.
 - 2. Use only rigid materials for venting. No flexible materials permitted.
 - K. Replace units that are damaged, including those that have damaged finishes.
 - L. Coordinate installation of work of this section with installation of fume hoods and laboratory equipment.
 - M. Countertops: Install countertops in one true plane, with ends abutting at hairline joints, and no raised edges.
 - N. Deliver sinks, cup sinks, and service fittings in properly marked boxes, accompanied with written instructions, for supervised installation by appropriate trade contractor(s).
- 3.3 ADJUSTING
- A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.
- 3.4 CLEANING

- A. Clean casework and other installed surfaces thoroughly.

3.5 PROTECTION

- A. Do not permit finished casework to be exposed to continued construction activity.
- B. Protect casework and countertops from ongoing construction activities. Prevent installers from standing on or storing tools and materials on casework or countertops.
- C. Repair damage that occurs prior to Date of Substantial Completion, including finishes, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

END OF SECTION

SECTION 123600 - COUNTERTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Countertops for architectural cabinet work.
- B. Countertops for manufactured casework.
- C. Wall-hung counters and vanity tops.

1.2 REFERENCE STANDARDS

- A. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2020.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- C. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.
- D. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- F. AWI (QCP) - Quality Certification Program; Current Edition.
- G. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- H. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- I. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- J. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- K. PS 1 - Structural Plywood; 2019.
- L. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2021.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
- B. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.
- C. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- D. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- E. Installer's qualification statement.
- F. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- B. Quality Certification:
 - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.

1.5 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.

1.6 FIELD 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 absolute limits.

PART 2 PRODUCTS

2.1 COUNTERTOPS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
 - 1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
 - a. Manufacturers:
 - 1) Wilsonart: www.wilsonart.com/#sle.
 - b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - c. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
 - d. Surface Color and Pattern: As indicated on drawings.
 - 2. Exposed Edge Treatment: Molded PVC edge with T-spline, sized to completely cover edge of panel.
 - a. Color: As selected by Architect from the manufacturer's full line.
 - 3. Back and End Splashes: Same material, same construction.
 - 4. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Custom Grade.
- C. Wood Countertops: One-piece, glued-laminated under pressure.
 - 1. Thickness: 1-1/4 inch, minimum.
 - 2. Construction (Butcher Block): Maximum 1/2 inch thick strips glued perpendicular to surface.
 - 3. Species: Maple; clear grade.
 - 4. Exposed Edges: Rounded to approximately 3/8 inch radius.
 - 5. Back and End Splashes: Same material, same construction; 3/4 inch thick, square edges.
 - 6. Finish: Sanded smooth; two coat boiled linseed oil rubbed in with 48 hours between coats.
- D. Epoxy Resin Countertops: Filled epoxy resin molded into homogenous, non-porous sheets; no surface coating and color and pattern consistent throughout thickness; with integral or adhesively seamed components.
 - 1. Manufacturers:
 - a. Durcon, Inc: www.durcon.com/#sle.
 - 2. Flat Surface Thickness: 1 inch, nominal.
 - 3. Chemical-Resistance: Provide products that resist the following chemicals with not more than Moderate Effect when tested in accordance with NEMA LD 3:
 - 4. Flammability: Self-extinguishing, when tested in accordance with ASTM D635.

5. Surface Finish: Smooth, non-glare.
 6. Color: to be selected from black, gray, white..
 7. Exposed Edge Shape: 1/8 inch bevel chamfer.
 8. Exposed Edge Shape in Sink Areas: Built-up marine edge 1/4 inch higher than counter by 1 inch wide.
 9. Drip Edge: Drip groove 1/8 inch wide and deep, located 1/2 inch back from edge on underside of all exposed edges.
 10. Back and End Splashes: Same material, same thickness; separate for field attachment.
 11. Associated Window Sills: Same material.
 - a. Thickness: 3/4 inch.
 12. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.
- E. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
1. Flat Sheet Thickness: 1/2 inch, minimum.
 2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
 - a. Manufacturers:
 - 1) Dupont: www.corian.com/#sle.
 - 2) Formica Corporation: www.formica.com/#sle.
 - 3) Wilsonart: www.wilsonart.com/#sle.
 - b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - c. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
 - d. Color and Pattern: to be selected by Architect unless otherwise indicated..
 3. Other Components Thickness: 1/2 inch, minimum.
 4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge; use marine edge at sinks.
 5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
 6. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.
- F. Stainless Steel Countertops: , Type 304, stainless steel sheet; 16 gauge, 0.0625 inch nominal sheet thickness.
1. Finish: 4B satin brushed finish.
 2. Exposed Edge Shape: Straight turndown with return; 1-1/2 inch high face, 1/2 inch return to face of case ; reinforced with hardwood or steel.

3. Back and End Splashes: Same material; welded 1/4 inch radius coved joint to countertop; square top edge with 1 inch wide top surface and minimum 1/2 inch turndown.
4. Splash Dimensions: 4 inch high by 1 inch thick, unless otherwise indicated.

2.2 MATERIALS

- A. Extruded Aluminum: ASTM B211/B211M, 6463 alloy, T5 temper.
- B. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
- C. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- D. Joint Sealant: Mildew-resistant silicone sealant, white.

2.3 ACCESSORIES

- A. Fixed Top-Mounted Countertop Support Brackets:
 1. Material: Steel.
 2. Finish: Manufacturer's standard, factory-applied, textured powder coat.
 3. Color: Black.
 4. Products:
 - a. Rakks; Counter & Vanity Support Brackets.

2.4 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
 1. Join lengths of tops using best method recommended by manufacturer.
 2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
 1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
 2. Height: 4 inches, unless otherwise indicated.
- C. Solid Surfacing: Fabricate tops and wall panels up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

- D. Stainless Steel: Fabricate tops up to 144 inches long in one piece including nosings and back and end splashes; accurately fitted mechanical field joints in lengths over that dimension are permitted.
 - 1. Weld joints; grind smooth and polish to match.
 - 2. Provide stainless steel hat channel stiffeners, welded or soldered to underside, where indicated on drawings.
 - 3. Provide wall clips for support of back/end splash turndowns.
 - 4. Sound Deadening: Apply water resistant, fire resistant sound deadening mastic to entire bottom surface.
- E. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.
- C. Attach wood countertops using screws with minimum penetration into substrate board of 5/8 inch.
- D. Install porcelain slab countertops and grout in accordance with applicable requirements of ANSI A108.19, manufacturer's instructions, and TCNA (HB) recommendations.

- E. Attach stainless steel countertops using stainless steel fasteners and clips.
- F. Attach epoxy resin countertops using compatible adhesive.
- G. Seal joint between back/end splashes and vertical surfaces.

3.4 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

3.5 CLEANING

- A. Clean countertops surfaces thoroughly.

3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

This page intentionally left blank

SECTION 125713 - WELDING EQUIPMENT

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. Welding Booths including accessories.
 - 2. Gas Tank storage accessories.
 - a. Locations: Gas and Metal Stock Storage.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include furnished specialties and accessories.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
- C. Product Schedule: Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Ductwork and Electrical connections.
- B. Sample Warranty: For manufacturer's warranty.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Welding Booth Curtains: Two full size units.
- B. Deliver to site and install after building is secure and temperature controlled.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of that fail(s) in materials or workmanship within specified warranty period.
 - 1. Warranty Period: one year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Lincoln Electric Company.

2.2 WELDING BOOTH AND ACCESSORIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Lincoln Electric Company; Welding Booth or equal.
- B. Modular booths, 16 gauge steel construction, 6ft x 6ft & 4ft x 6ft side-to-side units. All adjacent booths share dividing panel. Layout per drawings.

- 1. Accessories:
 - a. Steel Welding Table
 - 1. 1/4" thick steel top with mechanical tubing frame and legs. Each leg has provisions for lagging table to floor.
 - 2. Adjustable post and welding fixture
 - 3. Sizes: 47" (4' wide booths), 58" (6' wide booths)
 - b. Welding Booth Curtain Kit
 - 1. Overlapping red-orange strip curtains.
 - 2. Sizes: 50" W x 66" H (4' wide booths), 74" W x 66" H (6' wide booths)
 - c. LED Light Kit
 - 1. LED Light Bars, including mounting hardware, connection cables and on/off switch. (120v / 1-ph)
 - d. Booth Assist Alert System.
 - 1. Control Panel
 - 2. Light Stack. Green indicator = Booth Occupied, Amber Indicator = Student is Welding, Red Indicator = Student Needs Support
 - 3. Weld Sensing PCB
 - e. Wall Mounted Fume Extraction System
 - 1. Wall-mount base unit with MERV 16 filter, mechanized filter cleaning, telescopic 5-8 ft. counter-weight fume extraction arm, 1 hp fan and manual start/stop control.

- C. Provide all components necessary to complete the assembly and installation.

2.3 WELDING GAS TANK ACCESSORIES

- A. Double Cylinder Brackets, steel, with chains, width 25 inches. Mount per drawings.

2.4 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install per manufactures instructions.

3.3 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 125713

SECTION 126613 - TELESCOPING BLEACHERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Telescoping bleachers.
- B. Electric motor operators, controls, and internal wiring.

1.2 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
- C. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2020.
- D. ASTM D2843 - Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics; 2022.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).
- G. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018, with Errata (2022).
- H. NFPA 102 - Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures; 2021.
- I. PS 1 - Structural Plywood; 2019.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage handling and requirements.
 - 3. Installation methods.
- B. Shop Drawings: Complete layout with dimensions, seat heights, row spacing and rise, aisle widths and locations, points of connection to substrate, assembly dimensions, and material types and finishes.
 - 1. Provide drawings customized to this project.

2. Include Professional Engineer certification.
 3. Wiring Diagrams: Show locations of motors, electrical wiring, and rough-in connections.
- C. Selection Samples: For each material for which color selection is required, submit samples, 2 by 2 inches in size, illustrating colors and finishes available.
- D. Operation and Maintenance Data: Manufacturer's operation and maintenance instructions, including annual inspection and maintenance and bi-annual inspection by a Professional Engineer or manufacturer factory service personnel.
- E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Manufacturer's installation crew.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store, in original packaging, under cover and elevated above grade.

1.6 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion. Replace parts that fail under normal use at no extra charge to Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Telescoping Bleachers:
 1. Hussey Seating Company; Maxam Wall Attached: www.husseyseating.com/#sle.

2.2 TELESCOPING BLEACHERS

- A. Telescoping Bleachers: Factory assembled tiered benches that retract horizontally into depth approximately the same as a single row depth, with fixed seats mounted on leading edge of platforms.
 1. Provide a design certified by a licensed Professional Engineer licensed in the State in which the Project is located.

2. Design to comply with applicable requirements of NFPA 102 and requirements of code authorities having jurisdiction; where conflicts between requirements occur, comply with whichever is more stringent.
 3. Design with solid fascia (riser) or seat fronts that conceal interior mechanisms when fully retracted, fitting tightly enough to prevent climbing up face; at front row provide key locked, hinged fascia (skirt) to cover gap between seat riser/fascia and floor.
 4. Standard Extension: Top row fixed to wall, forward extension (away from wall).
 5. Wheelchair Spaces: Allow portions of first row, as indicated, to be manually retracted without affecting other rows; provide removable railings at row two behind wheelchair spaces in compliance with ADA Standards.
 6. Wheelchair Spaces: Comply with ADA Standards as required for project.
 7. Operation: Motor operated.
- B. Design Loads: Design to withstand the following loading conditions:
1. Live Load on Structural Supports: 100 psf, minimum, of gross horizontal projection.
 2. Live Load on Seats and Walking Surfaces: 120 pounds per linear foot.
 3. Lateral Sway Stress on Structural Supports: 24 pounds per linear foot of seat plank.
 4. Perpendicular Sway Stress on Structural Supports: 10 pounds per linear foot of seat plank.
- C. Dimensions:
1. See drawings for overall dimensions.
 2. Rise Per Row: 10 inches.
 3. Row Depth: 22 inches.
 4. Seat Height Above Tread: 6 inches.
- D. Structural Supports: Steel or aluminum; manufacturer's standard wheeled carriages supporting each tier separately, with moving parts permanently lubricated and metal parts cushioned to prevent metal-to-metal contact during operation.
1. Design so that each row carriage so that it will individually support the design loads and is self supporting when fully assembled without dependence on platform panels or boards, seats, or fascia.
 2. Welding: In accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M.
 3. Bolting: Use lock-washers or locknuts.
 4. Wheels: Minimum 5 inch diameter by 1-1/8 inch wide, with non-marring rubber tires; ball, roller, or oil-impregnated metal bearings; minimum of 2 wheels at each floor support.
 5. Finish: Manufacturer's standard enamel or powder coating.
 6. Row Locking: Automatically mechanically lock each carriage to adjacent carriages when fully extended.
 7. Unlocking: Automatically unlock all rows before engaging retraction mechanism.

- E. Motor Operation: Manufacturer's standard drive mechanism, using motor adequately sized for the purpose.
 - 1. Provide UL listed electrical components and wiring.
 - 2. Controls: Start, Stop, Forward, and Reverse in a single control unit.
 - 3. Control Station: Removable plug-in low-voltage pendant station, with first-row plug-in location for each motor.
 - 4. Limit Switches: Automatically stop operation when unit has reached fully open or fully closed position.
 - 5. Provide all wiring internal to bleacher units, to junction box located where indicated; ensure that wiring is not energized except during operation.
 - 6. Electrical Characteristics: 120V, single phase, 60 Hz.
 - 7. Provide access to motor from front side of bleachers; a hinged front skirt or hinged section at least 30 inches wide is acceptable.

2.3 SEAT AND PLATFORM COMPONENTS

- A. Seat/Fascia Assembly: Continuous, molded UV-stabilized high-density polyethylene plastic, seat minimum 1 inch thick, textured finish, homogeneous color throughout, color as selected from manufacturer's standard selection; approximately 18 inch long sections independently removable with tongue-and-groove or rabbeted interlock at end joints.
 - 1. Shape: Ergonomically contoured, with internal ribs spaced for natural flexibility; rear edge cantilevered to provide toe room of not less than 3 inches; no openings to trap debris.
 - 2. Fire Retardance: Self-ignition temperature of 650 degrees F or greater when tested in accordance with ASTM D1929; smoke developed index of 450 or less, when tested in accordance with ASTM E84, or 75 or less when tested in thickness intended for use in accordance with ASTM D2843; and burning extent of 1 inch or less when tested in thickness intended for use in accordance with ASTM D635.
 - 3. Provide end caps of same material and finish on each exposed end.
 - 4. Supports: Internal steel reinforcement of each seat segment bolted to platform nose member; minimum two bolts per segment.
- B. Platform, Tread, and Step Structure: Plywood continuously supported on front and rear with side joints tongue-and-grooved.
 - 1. Plywood: PS 1, 5-ply southern pine or polyethylene-overlaid douglas fir or southern pine, Grade A-C.
 - 2. Plywood Thickness: 5/8 inch, minimum.
 - 3. Front (Nose), Rear, and Intermediate Supports: Steel channel or tube, hot-dipped galvanized.
 - 4. Provide end caps of same material and finish on each exposed end.
 - 5. Finish: High gloss clear urethane, both sides, unless polyethylene finished.

6. At bottom of aisles provide step in front of first riser, hinged to first platform to fold for storage.

2.4 HANDRAILS AND RAILINGS

- A. Provide the following railings:
 1. Aisle Handrails: Single post folding railing segment mounted at side of aisle at every other row beginning at row 2.
 2. End of Row Guardrails: Self-storing, at open ends of sections beginning at row 2.
 3. Height: 42 inches above adjacent platform or tread.
- B. Design handrails and railings to withstand the following loads:
 1. Concentrated Load on Handrails: 200 pounds in any direction.
 2. Concentrated Load on Guardrails: 200 pounds in any direction along top rail.
 3. Live Load on Handrails: 50 pounds per linear foot, applied in any direction.
 4. Live Load on Guardrails:
 - a. Horizontal: 50 pounds per linear foot, applied at the guardrail height.
 - b. Vertical: 100 pounds per linear foot, applied vertically to top of guardrail.
- C. Railing Construction: Round steel or aluminum pipe or tube, with formed elbows at corners and caps at ends of straight runs.
 1. Aluminum: 1.66 inches minimum outside diameter; natural anodized finish.
 2. Steel: 1-1/2 inch minimum outside diameter, with 11 gauge, 0.12 inch minimum wall thickness; textured powder coat epoxy finish.

2.5 ACCESSORIES

- A. Fillers and Closures:
 1. Top Row: Provide seat level rear filler panels to close openings between top row seat and wall; finish to match platforms.
 2. Vinyl Curtains: 18 ounce vinyl with grommets; color as selected from manufacturer's standard palette.
- B. Motion Monitor: Strobe light and warning horn rated at 150 dB, both of which operate continuously during movement of any section of bleachers; mount strobe light where it is clearly visible to entire bleacher installation.
- C. Scorer's Table: 8 feet wide by 15 inches deep; relocatable to any row of any section without mounting brackets.
- D. Fasteners: Provide hardware and fasteners in accordance with manufacturer's recommendations.
- E. Anchorage: As indicated on drawings; provide hardware in accordance with manufacturer's recommendations.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are consistent with those on the shop drawings.
- B. Verify that electrical rough-ins have been installed and are accessible.
- C. Do not begin installation until substrates have been properly prepared and area has been cleared of obstructions.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Do not field cut or alter seats, fascia, or structural members without approval.
- C. Provide manufacturer's field representative to inspect completed installation.

3.4 ADJUSTING

- A. Lubricate, test, and adjust each moving assembly to ensure proper operation in compliance with manufacturer's recommendations.

3.5 CLEANING

- A. Clean exposed and semi-exposed assembly surfaces.
- B. Touch up finishes on damaged or soiled areas.

3.6 CLOSEOUT ACTIVITIES

- A. Demonstration and Training: Provide manufacturer's field representative to demonstrate to and train Owner's operating personnel in proper operation of equipment.
 - 1. Location: On site using installed equipment.

2. Time: As agreed between Owner and Contractor.

3.7 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

END OF SECTION

This page intentionally left blank

SECTION 142100 - ELECTRIC TRACTION ELEVATORS

PART 1 GENERAL

1.1 Section Includes

- A. Electric traction elevator systems.

1.2 Reference Standards

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- C. AISC 360 - Specification for Structural Steel Buildings; 2022.
- D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- E. ASME A17.1 - Safety Code for Elevators and Escalators Includes Requirements for Elevators, Escalators, Dumbwaiters, Moving Walks, Material Lifts, and Dumbwaiters with Automatic Transfer Devices; 2022.
- F. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks Includes Inspection Procedures for Electric Traction and Winding Drum Elevators, Hydraulic Elevators, Inclined Elevators, Limited-Use/Limited-Application Elevators, Private Residence Elevators, Escalators, Moving Walks, and Dumbwaiters; 2020.
- G. ASME QEI-1 - Standard for the Qualification of Elevator Inspectors; 2018.
- H. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- I. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.
- J. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- K. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021a.
- L. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- M. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

- N. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- O. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).
- P. NEMA MG 1 - Motors and Generators; 2021.
- Q. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- R. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.

1.3 Administrative Requirements

- A. Coordination:
 - 1. Coordinate work with other installers to provide necessary conduits for proper installation of wiring, including but not limited to the following:
 - a. Elevator equipment devices remote from elevator machine room or hoistway.
 - b. Remote group automatic panel in lobby from controller cabinet.
 - c. Telephone service for machine room.
 - d. Elevator pit for lighting and sump pump.
 - e. Automatic transfer switch from controller cabinet.
 - f. Fire alarm panel from controller cabinet.
 - 2. Coordinate work with other installers for equipment provisions necessary for proper elevator operation, including but not limited to the following:
 - a. Automatic transfer switches with auxiliary contacts for emergency power transfer status indication.
 - b. Shunt trip devices for automatic disconnection of elevator power prior to fire suppression system activation; include provisions for shunt trip power monitoring.
 - c. Overcurrent protection devices selected to achieve required selective coordination.
- B. Preinstallation Meeting: Convene meeting at least one week prior to start of this work.
 - 1. Review schedule of installation, proper procedures and conditions, and coordination with related work.
 - 2. Review use of elevator for construction purposes, hours of use, scheduling of use, cleanliness of car, employment of operator, and maintenance of system.
- C. Construction Use of Elevator: Not permitted.

1.4 Submittals

- A. Product Data: Submit data on following items:

1. Signal and operating fixtures, operating panels, and indicators.
 2. Car design, dimensions, layout, and components.
 3. Car and hoistway door and frame details.
 4. Electrical characteristics and connection requirements.
- B. Shop Drawings: Include appropriate plans, elevations, sections, diagrams, and details on following items:
1. Elevator Equipment and Machines: Size and location of driving machines, power units, controllers, governors, and other components.
 2. Hoistway Components: Size and location of car machine beams, guide rails, buffers, ropes, and other components.
 3. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
 4. Individual weight of principal components; load reaction at points of support.
 5. Loads on hoisting beams.
 6. Clearances and over-travel of car and counterweight.
 7. Locations in hoistway and machine room of traveling cables and connections for car lighting and telephone.
 8. Location and sizes of hoistway and car doors and frames.
 9. Calculated heat dissipation of elevator equipment in machine room.
 10. Applicable seismic design data; certified by a licensed Professional Structural Engineer.
 11. Interface with building security system.
 12. Electrical characteristics and connection requirements.
 13. Indicate arrangement of elevator equipment and allow for clear passage of equipment through access openings.
- C. Samples: Submit samples illustrating car floor material, car interior finishes, car and hoistway door and frame finishes, and handrail material and finish in the form of cut sheets or finish color selection brochures.
- D. Installer's qualification statement.
- E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- F. Operation and Maintenance Data:
1. Parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
 2. Operation and maintenance manual.
 3. Schematic drawings of equipment and wiring diagrams of installed electrical equipment with list of corresponding symbols to identify markings on machine room and hoistway apparatus.

1.5 Quality Assurance

- A. Maintain one copy of each quality standard document on site.
- B. Installer Qualifications: Supervisor along with trained elevator installation personnel on staff of elevator equipment manufacturer.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.

1.6 Warranty

- A. Provide manufacturer's warranty for elevator operating equipment and devices for one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 Manufacturers

- A. Electric Traction Elevators:
 - 1. Otis Elevator Company; Gen3 Edge: www.otis.com/#sle.
- B. Source Limitations: Provide elevator and associated equipment and components produced by the same manufacturer as the other elevator equipment used for this project and obtained from a single supplier.

2.2 Electric Traction Elevators

- A. Electric Traction Passenger Elevator:
 - 1. Electric Traction Elevator Equipment:
 - a. Gearless Traction Machine: Single wrapped traction driving sheave, with dual brake.
 - 2. Interior Car Height: 93 inch.
 - 3. Electrical Power: 480 volts; alternating current (AC); three phase; 60 Hz.
 - 4. Rated Net Capacity: 3500 pounds.
 - 5. Rated Speed: 100 feet per minute.
 - 6. Hoistway Size: As indicated on drawings.
 - 7. Interior Car Platform Size: As indicated on drawings.
 - 8. Elevator Pit Depth: 60 inch.
 - 9. Travel Distance: As indicated on drawings.
 - 10. Number of Stops: As indicated on drawings.
 - 11. Traction Machine Location: Top of hoistway shaft.
- B. Electric Traction Freight Elevator:

1. Rated Net Capacity: 3,500 lb.

2.3 Components

A. Elevator Equipment:

1. Motors, Controllers, Controls, Buttons, Wiring, Devices, and Indicators: Comply with NFPA 70 requirements; see Section 260583 for additional information.
2. Guide Rails, Cables, Counterweights, Sheaves, Buffers, Attachment Brackets, and Anchors: Design criteria for components includes safety factors in accordance with applicable requirements of Elevator Code, ASME A17.1.
3. Buffers:
 - a. Spring type for elevators with speed less than or equal to 200 feet per minute.
4. Lubrication Equipment:
 - a. Provide grease fittings for periodic lubrication of bearings.
 - b. Grease Cups: Automatic feed type.
 - c. Lubrication Points: Visible and easily accessible.

B. Electrical Equipment:

1. Motors: NEMA MG 1.
2. Boxes, Conduit, Wiring, and Devices: Comply with NFPA 70 requirements; see Sections 260533.13 and 260583 for additional information.
3. Spare Conductors: Provide ten percent in extra conductors and two pairs of shielded audio cables in traveling cables.
4. Include wiring and connections to elevator devices remote from hoistway and between elevator machine room. Provide additional components and wiring to suit machine room layout. See Section 260583.

2.4 Performance Requirements

- A. Regulatory Requirements: Comply with ASME A17.1, applicable local codes, and authorities having jurisdiction (AHJ).
- B. Accessibility Requirements: Comply with ADA Standards.
- C. Perform structural steel design, fabrication, and installation in accordance with AISC 360.
- D. Comply with seismic design requirements in accordance with ASME A17.1, applicable local codes, and authorities having jurisdiction (AHJ).
 1. Comply with Elevator Safety Requirements for Seismic Risk Zone in accordance with ASME A17.1, ASCE 7, and other related requirements.
 - a. Project Seismic Risk: As indicated on drawings.
 2. Provide earthquake emergency operations in accordance with ASME A17.1 requirements.

3. Provide seismic switch in accordance with ASME A17.1 and ASCE 7 requirements.
- E. Perform welding of steel in accordance with AWS D1.1/D1.1M.
- F. Fabricate and install door and frame assemblies in accordance with NFPA 80 and complying with requirements of authorities having jurisdiction (AHJ).
- G. Perform electrical work in accordance with NFPA 70.

2.5 Operation Controls

- A. Elevator Controls: Provide landing operating panels, landing indicator panels, and _____.
 1. Landing Operating Panels: Metallic type, one for originating "Up" and one for originating "Down" calls, one button only at terminating landings; with illuminating indicators.
 2. Landing Indicator Panels: Illuminating.
 3. Comply with ADA Standards for elevator controls.
- B. Interconnect elevator control system with building security, fire alarm, card access, smoke alarm, and building management control systems.
- C. Door Operation Controls:
 1. Program door control to open doors automatically when car arrives at floor landing.
 2. Render "Door Close" button inoperative when car is standing at dispatch landing with doors open.
 3. Door Safety Devices: Moveable, retractable safety edges, quiet in operation; equipped with photo-electric light rays.
- D. Lobby Monitoring Panel:
 1. Locate status indicator and control panel for each individual elevator and group of elevators as indicated on drawings.
 2. Etch face plate markings in panel, and fill with paint of contrasting color.
 3. Include direction indicator displaying landing "Up" and "Down" calls registered at each landing floor.
 4. Include position and motion display for direction of travel of each elevator; display appropriate graphic characters on non-glare screen; indicate position of cars at rest and in motion.
 5. Include "Remove From Service" switch for each elevator that then calls car to ground floor and parks car with doors open.
 6. Include emergency power selector switch for each group of elevators that overrides automatic emergency power selection.
 7. Include "Firefighter's Service Switch" that manually recalls each elevator to main floor.

- E. Provide "Firefighter's Emergency Operation" in accordance with ASME A17.1, applicable building codes, and authorities having jurisdiction (AHJ).
 - 1. Designated Landing: Main Lobby.

2.6 Operation Control Type

- A. Single Automatic (Push Button) Operation Control: Applies to car in single elevator shaft.
 - 1. Refer to description provided in ASME A17.1.
 - 2. Set system operation so that momentary pressure of landing button dispatches car from other landing to that landing.
 - 3. Allow call registered by momentary pressure of landing button at any time to remain registered until car stops in response to that landing call.
 - 4. If elevator car door is not opened within predetermined period of time after car has stopped at terminal landing, allow car to respond to call registered from other landing.

2.7 Emergency Power

- A. Set up elevator operation to run with building emergency power supply when the normal building power supply fails and in compliance with ASME A17.1 requirements.
- B. Building Emergency Power Supply: Supplied by backup generator; provide elevator system components as required for emergency power characteristics with phase rotation the same as for normal power.
 - 1. Provide transfer switches and auxiliary contacts.
 - 2. Install connections to power feeders.
- C. Emergency Lighting: Comply with ASME A17.1 elevator lighting requirements.
- D. Provide operational control circuitry for adapting the change from normal to emergency power.
- E. Upon transfer to emergency power, advance one elevator at a time to a preselected landing, stop car, open doors, disable operating circuits, and hold in standby condition.

2.8 Materials

- A. Rolled Steel Sections, Shapes, Rods: ASTM A36/A36M.
- B. Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel), with matte finish.
- C. Stainless Steel Sheet: ASTM A666, Type 304; No. 4 Brushed finish unless otherwise indicated.

- D. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.
- E. Extruded Aluminum: ASTM B221 (ASTM B221M), natural anodized finish unless otherwise indicated.
- F. Aluminum Sheet: ASTM B209/B209M, 3105 alloy, O temper.
- G. Resilient Flooring: Vinyl tile flooring, see Section 096500.

2.9 Car and Hoistway Entrances

- A. Elevator, :
 - 1. Car and Hoistway Entrances:
 - a. Hoistway Fire Rating: 1 Hour.
 - b. Elevator Door Fire Rating: 1 Hour.
 - c. Framed Opening Finish and Material: Brushed stainless steel.
 - d. Car Door Material: Stainless steel, with rigid sandwich panel construction.
 - e. Hoistway Door Material: Stainless steel, with rigid sandwich panel construction.
 - f. Door Type: Double leaf.
 - g. Door Operation: Side opening, two speed.
 - h. Door Width: 36 inch.
 - i. Door Height: 84 inch.
 - j. Sills: Extruded aluminum.
 - B. Sills/Thresholds: Configure to align with frame return and coordinate with floor finish.
 - C. Gasketing: Provide acoustic-type gasketing at hoistway doors and frames to eliminate audible noise due to car activities in the hoistway and air pressure differential between hoistway and landing floors.

2.10 Car Equipment and Materials

- A. Elevator Car:
 - 1. Car Operating Panel: Provide main and auxiliary; flush-mounted applied face plate, with illuminated call buttons corresponding to floors served with "Door Open/Door Close" buttons, "Door Open" button, "Door Close" button, and alarm button.
 - a. Panel Material: Integral with front return; one per car.
 - b. Car Floor Position Indicator: Above door with illuminating position indicators.
 - c. Locate alarm button where it is unlikely to be accidentally actuated; not more than 54 inch above car finished floor.
 - 2. Flooring: Resilient vinyl tile.

3. Front Return Panel: Match material of car door.
4. Door Wall: Stainless steel.
5. Hand Rail: Aluminum, at three side walls. Provide open clearance space 1-1/2 inch (38 mm) wide to face of wall.
 - a. Aluminum Finish: Clear anodized.
6. Ceiling:
 - a. Canopy Ceiling: Plastic laminate on plywood.
 - b. Lighting: As selected from manufacturer's standard line.
7. Provide emergency access panel for egress from car at ceiling.

B. Car Accessories:

1. Certificate Frame: Stainless steel frame glazed with clear tempered glass, and attached with tamper-proof screws.
2. Protective Pads: Canvas cover, padded with impact-resistant fill material, sewn with piping edges; fire resistant in compliance with ASME A17.1; brass grommets for supports, covering side and rear walls and front return, with cut-out for control panel; provide one set for each elevator.
 - a. Color: Grey.
 - b. Provide at least 4 inch clearance from bottom of pad to finished floor.
 - c. Pad Supports: Stainless steel studs, and mounted from ceiling frame.

2.11 Finishes

- A. Clear Anodized Finish: Class I, AAMA 611 AA-M12C22A41 clear anodic coating with electrolytically deposited organic seal; not less than 0.7 mils, 0.0007 inch thick.

PART 3 EXECUTION

3.1 Examination

- A. Verify existing conditions before starting this work.
- B. Verify that hoistway, pit, and machine room are ready for work of this section.
- C. Verify hoistway shaft and openings are of correct size and within tolerance.
- D. Verify location and size of machine foundation and position of machine foundation bolts.
- E. Verify that electrical power is available and of correct characteristics.

3.2 Preparation

- A. Arrange for temporary electrical power for installation work and testing of elevator components. See Section 015000 - Temporary Facilities and Controls for additional requirements.
- B. Maintain elevator pit excavation free of water.

3.3 Installation

- A. Coordinate this work with installation of hoistway wall construction.
- B. Install system components, and connect equipment to building utilities.
- C. Provide conduit, electrical boxes, wiring, and accessories; see Sections 260533.13 and 260583.
- D. Mount machines and motors on vibration and acoustic isolators.
 - 1. Place on structural supports and bearing plates.
 - 2. Securely fasten to building supports.
 - 3. Prevent lateral displacement.
- E. Install hoistway, elevator equipment, and components in accordance with approved shop drawings.
- F. Install guide rails to allow for expansion and contraction movement of guide rails.
- G. Accurately machine and align guide rails, forming smooth joints with machined splice plates.
- H. Install hoistway door sills, frames, and headers in hoistway walls; grout sills in place, set hoistway floor entrances in alignment with car openings, and align plumb with hoistway.
- I. Fill hoistway door frames solid with grout.
- J. Structural Metal Surfaces: Clean surfaces of rust, oil, or grease; wipe clean with solvent; prime with two coats.
- K. Machine Room Components: Clean and degrease; prime one coat, finish with one coat of enamel.
- L. Wood Surfaces not Exposed to Public View: Finish with one coat primer; one coat enamel.
- M. Adjust equipment for smooth and quiet operation.

3.4 Tolerances

- A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1 and ASME A17.2.
- B. Car Movement on Aligned Guide Rails: Smooth movement, without any objectionable lateral or oscillating movement or vibration.

3.5 Field Quality Control

- A. Testing and inspection by regulatory agencies certified in accordance with ASME QEI 1 will be performed at their discretion.
 - 1. Schedule tests with agencies and notify Owner and Architect.
 - 2. Obtain permits as required to perform tests.
 - 3. Document regulatory agency tests and inspections in accordance with requirements.
 - 4. Perform tests required by regulatory agencies.
 - 5. Furnish test and approval certificates issued by authorities having jurisdiction (AHJ).
- B. Perform testing and inspection in accordance with requirements.
 - 1. Inspectors shall be certified in accordance with ASME QEI-1.
 - 2. Perform tests in accordance with ASME A17.2.
 - 3. Provide at least two weeks written notice of date and time of tests and inspections.
 - 4. Supply instruments and execute specific tests.
- C. Operational Tests:
 - 1. Perform operational tests in the presence of Owner and Architect.

3.6 Adjusting

- A. Adjust for smooth acceleration and deceleration of car to minimize passenger discomfort.
- B. Adjust with automatic floor leveling feature at each floor landing to reach 1/4 inch maximum from flush with sill.

3.7 Cleaning

- A. Remove protective coverings from finished surfaces.
- B. Clean surfaces and components in accordance with manufacturers written instructions.

3.8 Closeout Activities

- A. Demonstrate proper operation of equipment to Owner's designated representative.

- B. Training: Train Owner's personnel on cleaning and operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of two hours of training.

3.9 Protection

- A. Do not permit construction traffic within car after cleaning.
- B. Protect installed products until Date of Substantial Completion.
- C. Touch up, repair, or replace damaged products and materials before Date of Substantial Completion.

END OF SECTION