PART 1 - GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of Contract, including General Conditions apply to work of this Section.

B. Plumbing contractor shall supply and install new sanitary drainage & vent systems, complete to sanitary disposal systems, piping, kitchen piping and fixtures shall be routed to an on-site grease trap. Provide roof/storm drainage system, gas service for building, for the emergency generator, heating and kitchen cooking and kitchen preparation equipment, natural gas to hot water heaters. Domestic water services including street taps, RPZ valves, heated enclosure, meter vault per County Water Authority specifications, plumbing fixtures, piping and valve boxes. Provide and install compressed air reels, gauges, controls, and compressed air piping to air compressor. Install all kitchen and waste domestic hot, cold and hot water recirculation, piping. All kitchen equipment supplied by plumbing contractor as shown on the contract drawings. The Plumbing contractor shall furnish and install all fixtures, water closets, lavatories, urinals, showers, mop sink, service sink, domestic hot water heaters with expansion tank, shower, water coolers, eyewash, hose bibs, wall hydrants, floor drains, floor sinks, funnel drains, hot water temperature mixing valves, check valves, roof drains , hand sinks, pantry sink, cleanouts, truck fills, ceiling mounted compressed air reels, circulating pumps, water hammer arrestors, battery operated flush valves and faucets, and all piping valves fittings necessary to install a complete job in accordance with all specifications and drawings. Connection to equipment to be provided and installed by plumbing contractor. All electrical work installed with the plumbing work shall comply with the requirements of electrical specifications. Plumbing contractor shall prepare, pay for and obtain all permits and approvals as required. All systems shall be installed complete and in working order.

C. This contractor shall file and obtain all permits including those required for grease interceptor system including floor drains and piping. It is this contractor’s responsibility to create all drawings and file all paperwork required to obtain all approvals for waste plumbing, gas, and water systems.

D. Contractors shall furnish all tools, machinery, equipment, scaffolding, appurtenances and appliances necessary for the satisfactory handling and execution of their work.

E. The work under these contracts shall include all labor, materials and incidentals necessary to execute a complete workmanlike job in accordance with the requirements of the Code and all local authorities having jurisdiction.

F. All work shall be done in such locations and at such times as directed.

G. The contractors shall place and store his materials as directed.

H. The contractor shall at all times keep the premises free from accumulations of waste

material or rubbish caused by his machines, materials, employees, or work and shall pile in neat piles outside of each building as directed. He shall cooperate with all other trades appurtenant to his work. At the completion of the work, he shall remove all his tools, scaffolding and surplus materials.

I. Contractors shall be responsible for initiating, maintaining and supervising all safety precautions in accordance with O.S.H.A. requirements.

J. In the event that part of the building will be occupied during construction, the interior of the building will be separated and the Contractor will schedule his work accordingly.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03300 - Concrete.

B. Section 07620 - Flashing of mechanical work.

C. Section 09900 - Finish painting.

D. Section 15010S - General Provisions Sprinkler.

E. Section 15010H - General Provisions Mechanical.

F. Section 16010E - General Provisions Electrical.

1.03 DRAWINGS AND COORDINATION

A. It is not the intention of the drawings to show every item, piece of equipment and detail but rather to show systems to be installed. Provide systems with all appurtenant equipment to make a complete operating system.

B. Inspect the work area prior to commencing the job. Install work as closely as possible to layouts shown on drawings. Modify work as necessary to meet job conditions and to clear other equipment. Consult Architect before making changes, which affect the function or appearance of systems.

C. Dimensions, elevations and locations are shown approximately. Verify measurements in field and coordinate with other trades.

D. Architect reserves the right to order changes in layout of such items as piping and equipment if such changes do not substantially affect costs and if affected items have not been fabricated or installed.

E. In some cases, drawings are based on products of one manufacturer, as listed in the specifications. Be responsible for modifications made necessary by substitution of products of other manufacturers.

F. Do not install part of a system until all critical components of the system and related systems have been approved. Coordinate parts of system.

G. Coordinate work with work specified in other sections. Relocate work if required for proper installation and functioning of other systems.

H. Install products in accordance with manufacturers' instructions. Notify Architect if contract documents conflict with manufacturers' instructions. Comply with Architect's interpretations.

I. Provide and install all brackets, supports, anchors and frames required for installation of

work specified in this division.

J. Provide all cutting and patching, excavation and backfilling required for installation of work specified in this Division.

K. Provide and install all motor starters as required by equipment furnished under this contract.

1.04 PROJECT RECORD DRAWINGS

A. Submit shop drawings in accordance with Section 15011P.

B. Note that the General Conditions specify that project record drawings be prepared.

1.05 EQUIPMENT CLEARANCES

A. Deliver equipment knocked down if necessary.

B. Install equipment with adequate clearances for maintenance and operation both of the equipment and of adjacent equipment.

1.06 PRELIMINARY OPERATION

A. Provide start-up lubrication in accordance with manufacturer's recommendations. Operate mechanical systems with required supervision for at least 2 full days prior to substantial completion. Make necessary adjustments and check proper operation.

1.07 TESTS PRIOR TO SUBSTANTIAL COMPLETION

A. Tests shall be attended by representatives of mechanical subcontractors, equipped with instruments required to demonstrate proper functioning of systems, as specified. Demonstrate the following:
   1. Equipment installed and operating in accordance with manufacturer's specifications and instructions and with these specifications.
   2. Safety and temperature controls operating as specified.
   3. Systems properly flushed, cleaned and free of contaminants.
   4. Systems properly balanced.
   5. Motors equipped with proper overload protection and not operating under overload. Obtain ammeter readings.
   6. Instruments recording properly.

1.08 WARRANTY

A. Submit written warranty or warranties covering work specified in this division. Period: 1 year from the date of substantial completion of the building or of the equipment being warranted, whichever is later. Owner is to receive full use of equipment for period of warranty.

1.09 MAINTENANCE AND OPERATING INSTRUCTIONS

A. Submit three (3) typed copies of maintenance and operating instructions for equipment having moving parts and parts, which may reasonably be anticipated to require replacement.
   1. List replacement parts and order procedure.
   2. Include lubrication instructions and schedule, with types of lubricant to be used.
   3. Include maintenance and service procedures.

B. Instruct Owner's personnel in use of equipment specified in this Division.

C. Submit three (3) typed copies of maintenance and operating manuals for equipment specified in this Division.

1.10 MECHANICAL SYSTEMS IDENTIFICATION

A. See Section 15190P - Mechanical Identification.

1.11 FIELD QUALITY CONTROL

A. Test piping systems hydrostatically at 150% of expected working pressure unless otherwise specified.

B. Reports shall list system tested, date, results, description of correction of faults, and witnesses.

C. Maintain tests 4 hours, unless otherwise specified.

D. Perform preliminary tests before witnessed tests.

E. Give Architect 48 hours notice of tests. Architect will observe tests.

1.12 CODES AND ORDINANCES

A. Conform to the requirements of codes and ordinances of authorities having jurisdiction, as specified in the General Conditions. In particular, conform to the requirements of the State of New York Building Code.

B. Conform to the State of New York Building Code energy conservation requirements, including certification, labeling and maintenance instructions for equipment.

C. If Contract Documents conflict with codes and ordinances, notify Architect. If requirements of Contract Documents exceed requirements of codes and ordinances, comply with requirements of Contract Documents.

1.13 REMOVAL AND DISPOSAL OF WASTE MATERIALS

A. Take down and remove existing plumbing equipment and materials to be removed. Turn over all equipment to owner or dispose of by direction of the owner's authorized representative.

B. Remove and dispose of all debris and waste materials from the site in a safe and legal manner.

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of Contract, including General and Supplementary Conditions apply to work of this Section.

1.02 APPLICABILITY

A. This section applies to the contract for Plumbing and supplements the General Conditions. Should any discrepancy exist between this section and the General Conditions, precedence shall be given to this section.

B. Contractor is required to make all submissions indicated herein in the manner indicated.

C. No materials of any kind are to be installed until the Architect has approved submissions in writing.

1.03 PAYMENT WITHHELD

A. Contractor is notified that requisitions for payment for items installed prior to approved submissions may be denied in full until submission is made and approved.

1.04 TYPES OF SUBMITTALS

A. Certification:
   1. Certification shall be a written statement indicating full compliance of the material in questions with the contract documents.
   2. Certification shall include all applicable test reports or calculations indicating compliance.
   3. Certifications shall be furnished on the letterhead of the issuing organization and signed by a responsible officer of that organization.

B. Coordination Data:
   1. Coordination data shall be information required to be furnished to other prime contractors to allow coordination of the work.
   2. Coordination data shall indicate locations, dimensions and roughing requirements of equipment or materials indicated.
   3. Coordination data shall be transmitted directly to Contractors, with a copy to the Architect for his information.

C. Manufacturers Literature:
   1. Manufacturers literature shall be standard catalogs or data sheets furnished by

the manufacturer.

2. Literature must furnish sufficient data to indicate compliance with the contract documents.
3. Specific items to be furnished must be highlighted.

D. Samples:
1. A sample shall be an actual piece of the material in question, fabricated to the exact dimensions and finish specified.
2. Each sample shall be sized as appropriate to demonstrate compliance with the contract documents.

E. Shop Drawings:
1. Shop drawings shall consist of drawings to scale by a competent draftsman.
2. Shop drawings must be prepared specifically for this project.
3. Manufacturers standard drawings will not be accepted as shop drawing unless modified specifically for this project.
4. Shop drawings shall be sufficiently detailed to indicate compliance with the contract documents and shall contain the following:
   a. Plan views, elevations, sectional views, necessary details and methods of installation including details showing connections to other work.
   b. Description of items submitted i.e., materials, gauge, finish, etc.
   c. Locations at which the materials or equipment are to be incorporated into the work.
   d. Schedules as may be necessary or required.

F. Supplies:
1. Supplies shall consist of items required for the maintenance of the building.
2. Supplies shall be turned over directly to the Owner and a signed receipt furnished to the Architect.

G. Installation Instructions:
1. Manufacturers installation instructions shall be standard catalogs or installation sheets furnished by the manufacturer modified as necessary to meet specific job conditions.
2. Instructions shall be of sufficient detail to indicate proper procedures to be used to comply with contract drawings.
3. Installation instructions shall be transmitted to the Architect for his information.

H. Operation and Maintenance Literature
1. Manufacturers O & M literature shall be standard catalogs or O & M sheets furnished by the manufacturer modified as necessary to meet specific job conditions.
2. O & M literature shall be of sufficient detail to indicate proper procedures to be used to comply with contract documents.

3. O & M literature shall be transmitted to the Architect for his information.

1.05 SUBMISSION PROCEDURE

A. Contractor shall submit five (5) copies of each required submission as indicated on the submission schedule to the Architect.

B. Each submission shall be accompanied by a completed copy of the transmittal form included herewith.

C. Architect will return to the contractor three (3) copies of each submission, which has resulted in an "Approved" or "Approved as Noted" determination. The Architect shall maintain one copy at the project site for referral. Two (2) copies shall be for the use of the contractor.

D. Architect will return to the contractor for his use two (2) copies of each submission, which has resulted in a "Disapproved" or "Approved As Noted - Resubmit" determination.

E. If the contractor requires additional copies of the submission, he shall submit a sepia or other reproducible copy for the Architect's review, which shall be returned to the contractor for his own reproduction.

F. If the contractor should alter any information on previous submittals besides the notation called for by the Architect, he must circle this new information to bring it to the Architect's attention and resubmit for approval.

G. Submit all associated items relating to a complete assembly at one and the same time so that each may be checked in relation to the entire proposed assembly.

1.06 ARCHITECT'S REVIEW

A. Architect will review the contractor’s submissions as expeditiously as possible. Contractor should allow sufficient time for each review and schedule his submissions accordingly.

B. Contractor shall notify the Architect of any review he feels has been delayed at least one week prior to the date approved is required to maintain the project schedule.

C. Architect will return the indicated copies of each submission to the contractor with one of the following markings:
   1. Approved - The contractor may proceed with installation of this material since the Architect's review indicates that his submission demonstrates an understanding of the

contract documents and the intention to meet or exceed their requirements. Approval of the submission does not indicate final approval of the actual installation and materials. Approval of submittals does not relieve the contractor of the responsibility for accuracy of such submittals, coordination between subcontractors and with other prime contractors, nor the furnishing of materials or work required by the contract and not shown in the submittals. Approval of submittals shall not be construed as approval of departures from the contract.

2. Approved As Noted - The contractor may proceed with the installation of this material as long as the changes and comments noted by the Architect are complied with. Submissions so marked convey the same intent as those marked "Approved".
3. Approved As Noted, Resubmit - The contractor may, at his own risk, proceed with the installation of this material as long as the changes and comments noted by the Architect are complied with. However, the submission itself must be corrected and resubmitted to indicate that the contractor has fully understood the Architects comments and to complete the project documentation.
4. Disapproved - The contractor may not proceed with the installation of this material since the Architects review indicates non compliance with the contract documents. Contractor shall revise the submission in accordance with the Architects comments and resubmit for another review.

1.07 SUBMISSION SCHEDULE

A. Contractor shall furnish all submissions indicated herein. Detailed requirements for each submission are included in the referenced section.

B. Architect shall maintain a copy of this schedule during the course of the project, indicating the status of each submission. Copies of the updated schedule will be sent to the Contractor as required to notify him of deficiencies in his submissions.

C. Submissions indicated as PRIORITY are important for coordination with other trades and must be expedited.

D. Schedule of Submissions:

Section	Item	Submission	Submitted	Action/Date
15140P		SUPPORTS AND ANCHORS		
	1.	Supports	Shop Drawings	
	2.	Anchors	Shop Drawings	
	3.	Support Framing	Shop Drawings	

	4. Attachment Methods	Shop Drawings
15190P	MECHANICAL IDENTIFICATION	
	1. Nameplates	Product Data
	2. Metal Tags	Product Data
	3. Plastic Pipe Markers	Product Data
	4. Valve Chart	Product Data
15260P	PIPING INSULATION	
	1. Insulation	Product Data
	2. Jackets	Product Data
	3. Insulating Cement	Product Data
	4. Adhesive	Product Data
15410P	PLUMBING PIPING	
	1. Sanitary Piping	Product Data
	2. Water Piping	Product Data
	3. Storm & Roof Drain Piping	Product Data
	4. Natural Gas Piping	Product Data
	5. Compressed Air Piping	Product Data
	6. Gray San. Waste Sys.	Product Data- ADD ALTERNATE
	7. Draw-Off Oil Piping	Product Data
	8. Vent Piping	Product Data
	9. Gas Valves	Product Data
	10. Globe Valves	Product Data
	11. Ball Valves	Product Data
	12. Gas Cocks	Product Data
	13. Butterfly Valves	Product Data
	14. Swing Check Valves	Product Data
	15. Press. Reducing Valve	Product Data
	16. Relief Valves	Product Data
	17. Kitchen/Bar San. Sys.	Product Data
15430P	PLUMBING SPECIALTIES	
	1. System Layout	Shop Drawings
	2. Roof Drains	Product Data
	3. Floor Drains	Product Data
	4. Cleanouts	Product Data
	5. Backflow Preventors	Product Data
	6. Water Hammer Arrestor	Product Data
	7. Hose Bibbs	Product Data
	8. Dom. Hot Wtr. Mixing Va.	Product Data
	9. Wall Hydrants	Product Data
	10. Pressure & Temperature Relief Valves	Product Data

11.	Floor Sinks	Product Data
12.	Funnel Drains	Product Data
13.	Sand & Grit Interceptor	Product Data
15.	Air Hose Reels (Exist)	Product Data
16.	Trench Drains	Product Data
17.	Water Meter & Vault	

15440P PLUMBING FIXTURES

1.	Water Closets	Product Data
2.	Urinals	Product Data
3.	Lavatories	Product Data
4.	Sinks	Product Data
5.	Service Sinks	Product Data
6.	Showers	Product Data
7.	Electric Water Cooler	Product Data
8.	Mop Sinks	Product Data
9.	Prep Sink	Product Data
10.	Bar Sink	Product Data
11.	Ice Machine	Product Data
12.	Refrigerator	Product Data
13.	Freezer	Product Data
14.	Range	Product Data
15.	Dom. Hot Water Heater	Product Data
16.	Expansion Tk.	Product Data

15450P PLUMBING EQUIPMENT

1.	Water Heaters	Product Data
2.	In-Line Circulator Pumps	Product Data
3.	Sewage Ejector Pumps	Product Data
4.	Sewage Ejector Basin	Product Data
4.	Expansion Tanks	Product Data

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of Contract, including General Conditions apply to work of this Section.

B. Pipe, supports, and associated anchors.

C. Equipment bases and supports.

D. Sleeves and seals.

E. Flashing and sealing equipment and pipe stacks.

1.02 WORK FURNISHED BUT INSTALLED UNDER OTHER SECTIONS

A. Furnish hanger and support inserts and sleeves to Section 03300 for placement into formwork.

1.03 RELATED WORK

A. Section 03300 - Concrete equipment bases.

B. Section 15260P - Piping Insulation.

C. Section 15410P - Plumbing System.

1.04 REFERENCES

A. ANSI/ASME B31.1 - Power Piping.

1.05 SUBMITTALS

A. Submit shop drawings in accordance with Section 15011P.

B. Indicate hanger and support framing and attachment methods.

PART 2 PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS

A. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Carbon steel, adjustable swivel, split ring.

B. Hangers for Pipe Sizes 2 to 4 Inches and Cold Pipe Sizes 6 Inches and Over: Carbon steel, adjustable, clevis.

C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

D. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

E. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp; adjustable steel yoke.

F. Vertical Support: Steel riser clamp.

G. Floor Support for Pipe Sizes to 4 Inches and All Cold Pipe Sizes: Cast iron adjustable pipe saddle, locknut nipple, floor flange, and concrete pier or steel support.

H. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

I. Shield for Insulated Piping 2 Inches and Smaller: 18 gage galvanized steel shield over insulation in 180 degree segments, minimum 12 inches long at pipe support.

J. Shield for Insulated Piping 2-1/2 Inches and Larger (Except Cold Water Piping): Pipe covering protective saddles.

K. Shields for Insulated Cold Water Piping 2-1/2 Inches and Larger: Hard block non-conducting saddles in 90 degree segments, 12 inch minimum length, block thickness same as insulation thickness.

L. Shields for Vertical Copper Pipe Risers: Sheet lead.

2.02 HANGER RODS

A. Steel Hanger Rods: Threaded both ends, threaded one end, or continuous threaded.

2.03 INSERTS

A. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.04 FLASHING

A. Metal Flashing: 26 gage galvanized steel.

B. Lead Flashing: 5-lb./sq. ft. sheet lead for waterproofing; one lb./sq. ft. sheet lead for soundproofing.

C. Flexible Flashing: 47 mil. Thick sheet butyl; compatible with roofing.

D. Caps: Steel, 22 gage minimum; 16 gage at fire resistant elements.

2.05 SLEEVES

A. Sleeves for Pipes Through Non-fire Rated Floors: Form with 18 gage galvanized steel.

B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Form with steel pipe or 18-gage steel. All pipe sleeves shall be 2 standard sizes larger than the pipe passing through.

C. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fireproofing: Prefabricated fire rated sleeves including seals, UL listed.

D. Stuffing Insulation: Glass fiber type, non- combustible.

E. Calk: Acrylic sealant.

2.06 FABRICATION

A. Size sleeves large enough to allow for movement due to expansion and contraction, two standard sizes larger than the pipe passing through. Provide for continuous insulation wrapping.

B. Design hangers without disengagement of supported pipe.

C. Provide copper plated hangers and supports for copper piping.

2.07 FINISH

A. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

PART 3 EXECUTIONS

3.01 INSERTS

A. Provide inserts to Section 03300 for placement in concrete formwork.

B. Where inserts are omitted, drill through concrete slab from below and provide thru-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.02 PIPE HANGERS AND SUPPORTS

A. Support horizontal piping as follows:

PIPE SIZE	MAX. HANGER SPACING	HANGER DIAMETER
1/2 to 1-1/4 inch	6'-0"	3/8"
1-1/2 to 2 inch	6'-0"	3/8"
2-1/2 to 3 inch	10'-0"	1/2"
4 to 6 inch	10'-0"	5/8"
8 to 10 inch	19'-0"	7/8"
Copper 2 inch and smaller	6'-0"	3/8"
Copper 2 inch and larger	10'-0"	3/8"

B. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.

C. Place a hanger within 12 inches of each horizontal elbow.

D. Use hangers with 1-1/2 inch minimum vertical adjustment.

E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.

F. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.

G. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

H. Support riser piping independently of connected horizontal piping.

3.03 FLASHING

A. Provide flexible flashing and metal counter flashing where piping penetrates weather or waterproofed walls, floors, and roofs.

B. Flash vent and soil pipes projecting 3 inches minimum above finished roof surface with lead worked one inch minimum into hub, 8 inches minimum clear on sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and calk, metal counter flash and seal.

C. Flash floor drains in floors with topping over finished areas with lead, 10 inches clear on sides with minimum 36 x 36 inch sheet size. Fasten flashing to drain clamp device.

D. Seal floor shower and mop sink drains watertight to adjacent materials.

E. Provide acoustical lead flashing around pipes penetrating equipment rooms, installed in accordance with manufacturer's instructions for sound control.

3.04 SLEEVES

A. Set sleeves in position in formwork. Provide reinforcing around sleeves.

B. Extend sleeves through floors one inch above finished floor level. Calk sleeves full depth and provide floor plate.

C. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent
work with fire stopping insulation and calk seal. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

D. Install chrome plated steel escutcheons at finished surfaces.

3.05 EQUIPMENT BASES AND SUPPORTS

A. Provide equipment bases concrete type specified in Section 3A.

B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.

C. Construct support of steel members. Brace and fasten with flanges bolted to structure.

D. Provide rigid anchors for pipes after vibration isolation components are installed.

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of Contract, including General Conditions apply to work of this Section.

B. Identification of mechanical products installed under Division 15.

1.02 RELATED WORK

A. Section 09900 - Painting: Identification painting.

1.03 REFERENCES

A. ANSI/ASME A13.1 - Scheme for the Identification of Piping Systems.

1.04 SUBMITTALS

A. Submit product data in accordance with Section 15011P.

B. Submit list of wording, symbols, letter size, and color-coding for mechanical identification.

C. Submit typed valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

D. Submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Seton.

B. Emed.

2.02 MATERIALS

A. Color: Unless specified otherwise, conform with ANSI/ASME A13.1.

B. Plastic Nameplates: Laminated three-layer plastic with engraved black letters on light contrasting background color. Seton Setonply Style 2060.

C. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges. Seton Style 250.

D. Stencils: With clean-cut symbols and letters of following size:

OUTSIDE DIAMETER OF INSULATION OR PIPE	LENGTH OF COLOR FIELD	SIZE OF LETTERS
3/4" - 1-1/4"	8"	1/2"
1-1/2" - 2"	8"	3/4"
2-1/2" - 6"	12"	1-1/4"
8" - 10"	24"	2-1/2"
Over 10"	32"	3-1/2"
Equipment	---	2-1/2"

E. Stencil Paint: In accordance with Section 09900, semi-gloss enamel. Seton Coverall Paint Style CPP.

F. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and fluid being conveyed. Seton Set Mark.

G. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape of not less than 6 inch wide by 4 mil. Thick, manufactured for direct burial service. Seton Weather Code.

PART 3 EXECUTIONS

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with Section 09900 for stencil painting.

3.02 INSTALLATION

A. Plastic Nameplates: Install with corrosive-resistant mechanical fasteners, or adhesive.

B. Metal Tags: Install with corrosive-resistant chain.

C. Stencil Painting: Apply in accordance with Section 09900.

D. Plastic Pipe Markers: Install in accordance with manufacturer's instructions.

E. Plastic Tape Pipe Markers: Install complete around pipe in accordance with manufacturer's instructions.

F. Underground Plastic Pipe Markers: Install 6 to 8 inches below finished grade, directly

above buried pipe.

G. Equipment: Identify air handling units, pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates. Small devices, such as in-line pumps, may be identified with metal tags.

H. Controls: Identify control panels and major control components outside panels with plastic nameplates.

I. Valves: Identify valves in main and branch piping with tags.

J. Piping: Identify piping, concealed or exposed, with plastic pipe markers. Tags may be used on small diameter piping (under 1 1/2 inches). Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and "T", at each side of penetration of structure or enclosure, and at each obstruction.

3.03 VALVE CHART AND SCHEDULE

A. Provide typed valve chart and schedule in aluminum frame with clear plastic shield. Install at location as directed. Seton Valve Chart Frame #A11P.

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of Contract, including General Conditions apply to work of this Section.

B. Identification of mechanical products installed under Division 15.

1.02 RELATED WORK

A. Section 09900 - Painting: Identification painting.

1.03 REFERENCES

A. ANSI/ASME A13.1 - Scheme for the Identification of Piping Systems.

1.04 SUBMITTALS

A. Submit product data in accordance with Section 15011P.

B. Submit list of wording, symbols, letter size, and color-coding for mechanical identification.

C. Submit typed valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

D. Submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Seton.

B. Emed.

2.02 MATERIALS

A. Color: Unless specified otherwise, conform with ANSI/ASME A13.1.

B. Plastic Nameplates: Laminated three-layer plastic with engraved black letters on light contrasting background color. Seton Setonply Style 2060.

C. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with

smooth edges. Seton Style 250.

D. Stencils: With clean-cut symbols and letters of following size:

OUTSIDE DIAMETER OF INSULATION OR PIPE	LENGTH OF COLOR FIELD	SIZE OF LETTERS
3/4" - 1-1/4"	8"	1/2"
1-1/2" - 2"	8"	3/4"
2-1/2" - 6"	12"	1-1/4"
8" - 10"	24"	2-1/2"
Over 10"	32"	3-1/2"
Equipment	---	2-1/2"

E. Stencil Paint: In accordance with Section 09900, semi-gloss enamel. Seton Coverall Paint Style CPP.

F. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and fluid being conveyed. Seton Set Mark.

G. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape of not less than 6 inch wide by 4 mil. Thick, manufactured for direct burial service. Seton Weather Code.

PART 3 EXECUTIONS

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with Section 09900 for stencil painting.

3.02 INSTALLATION

A. Plastic Nameplates: Install with corrosive-resistant mechanical fasteners, or adhesive.

B. Metal Tags: Install with corrosive-resistant chain.

C. Stencil Painting: Apply in accordance with Section 09900.

D. Plastic Pipe Markers: Install in accordance with manufacturer's instructions.

E. Plastic Tape Pipe Markers: Install complete around pipe in accordance with manufacturer's instructions.

F. Underground Plastic Pipe Markers: Install 6 to 8 inches below finished grade, directly above buried pipe.

G. Equipment: Identify air handling units, pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates. Small devices, such as in-line pumps, may be identified with metal tags.

H. Controls: Identify control panels and major control components outside panels with plastic nameplates.

I. Valves: Identify valves in main and branch piping with tags.

J. Piping: Identify piping, concealed or exposed, with plastic pipe markers. Tags may be used on small diameter piping (under 1 1/2 inches). Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and "T", at each side of penetration of structure or enclosure, and at each obstruction.

3.03 VALVE CHART AND SCHEDULE

A. Provide typed valve chart and schedule in aluminum frame with clear plastic shield. Install at location as directed. Seton Valve Chart Frame #A11P.

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of Contract, including General Conditions apply to work of this Section.

B. Piping insulation.

C. Jackets and accessories.

1.02 RELATED WORK

A. Section 09900 - Painting: Painting insulation jacket.

B. Section 15190P - Mechanical Identification.

1.03 REFERENCES

A. ANSI/ASTM C195 - Mineral Fiber Thermal Insulation Cement.

C. ANSI/ASTM C547 - Mineral Fiber Preformed Pipe Insulation.

D. ANSI/ASTM C578 - Preformed, Block Type Cellular Polystyrene Thermal Insulation.

E. ASTM B209 - Aluminum and Aluminum-alloy Sheet and Plate.

F. ASTM C449 - Mineral Fiber Hydraulic-setting Thermal Insulating and Finishing Cement.

G. ASTM E84 - Surface Burning Characteristics of Building Materials.

H. NFPA 255 - Surface Burning Characteristics of Building Materials.

I. UL 723 - Surface Burning Characteristics of Building Materials.

1.04 QUALITY ASSURANCE

A. Applicator: Company specializing in piping insulation application with three years minimum experience.

B. Materials: Flame spread/fuel contributed/smoke developed rating of 25/-/50 in accordance with NFPA 255, UL 723.

1.05 SUBMITTALS

A. Submit product data in accordance with Section 15011P.

B. Include product description, list of materials and thickness for each service, and locations.

C. Submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manville.

B. Dow Corning.

C. Certainteed.

2.02 INSULATION

A. Type A: Glass fiber insulation; ANSI/ASTM C547; 'k' value of 0.24 at 75 degrees F; noncombustible. Manville Micro-Loc.

2.03 JACKETS

A. Interior Applications:
   1. Vapor Barrier Jackets: Kraft reinforced foil vapor barrier with self-sealing adhesive joints.
   2. Canvas Jackets: UL listed treated cotton fabric, 6-oz./sq. yd.

2.04 ACCESSORIES

A. Insulation Bands: 3/4 inches wide; 0.015-inch thick galvanized steel.

B. Metal Jacket Bands: 3/8 inch wide; 0.015-inch thick aluminum. 0.010 inch thick stainless steel.

C. Insulating Cement: ANSI/ASTM C195; hydraulic setting mineral wool.

D. Finishing Cement: ASTM C449.

E. Fibrous Glass Cloth: Untreated; 9 oz./sq. yd. weight.

F. Adhesives: Compatible with insulation.

PART 3 EXECUTIONS

3.01 PREPARATION

A. Install materials after piping has been tested and approved.

3.02 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Continue insulation with vapor barrier through penetrations.

C. In exposed piping, locate insulation and cover seams in least visible locations.

D. On insulated piping with vapor barrier, insulate fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

E. On insulated piping without vapor barrier and piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation at such locations.

F. Provide an insert, not less than 6 inches long, of same thickness and contour as adjoining insulation, between support shield and piping, but under the finish jacket, on piping 2 inches diameter or larger, to prevent insulation from sagging at support points. Inserts shall be cork or other heavy density insulating material suitable for the planned temperature range. Factory fabricated inserts may be used.

G. Neatly finish insulation at supports, protrusions, and interruptions.

H. Jackets:

1. Indoor, Concealed Applications: Insulated pipes conveying fluids above ambient temperature shall have standard jackets, with vapor barrier, factory-applied. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass cloth and adhesive.

2. Indoor, Concealed Applications: Insulated dual-temperature pipes or pipes conveying fluids below ambient temperature shall have vapor barrier jackets, factory-applied. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe, and finish with glass cloth and vapor barrier adhesive.

3. Indoor, Exposed Applications: For pipe exposed in mechanical equipment rooms or in finished spaces, insulate as for concealed applications. Finish with PVC jacket; size for finish painting.

3.03 SCHEDULE

PIPING	TYPE	INSULATION PIPE SIZE Inch	THICKNESS Inch
Domestic Hot Water Supply & Recirculation	A	1”	1.5"
Domestic Cold-Water	A	1”	1.5"
Roof Drains	A	4”	1.5"

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of Contract, including General and Supplementary Conditions apply to work of this Section.

B. Pipe and pipefittings.

C. Valves.

D. Sanitary sewer piping system.

E. Domestic water piping system.

F. Vent piping system.

G. Natural gas piping system.

H. Sprinkler Service Piping System

I. Roof Drainage Piping System

J. Compressed Air System

K. Grease Sanitary Piping System

L. Sanitary System

1.02 RELATED WORK

A. Section 02222 - Excavation.

B. Section 02223 - Backfilling.

C. Section 02225 - Trenching.

D. Section 09900 - Painting.

E. Section 15140P - Supports and Anchors.

F. Section 15190P - Mechanical Identification.

G. Section 15260P - Piping Insulation.

H. Section 15430P - Plumbing Specialties.

I. Section 15440P - Plumbing Fixtures.

J. Section 15450P – Plumbing Equipment

1.03 REFERENCES

A. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings Class 150 NS 300.

B. ANSI/ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV.

C. ANSI/ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.

D. ANSI/ASME Sec. 9 - Welding and Brazing Qualifications.

E. ANSI/ASTM B32 - Solder Metal.

F. ASME - Boiler and Pressure Vessel Code.

G. ASTM A74 - Cast Iron Soil Pipe and Fittings.

H. ASTM B88 - Seamless Copper Water Tube.

I. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

J. AWS A5.8 - Brazing Filler Metal.

K. AWWA C601 - Standard Methods for the Examination of Water and Waste Water.

L. CISPI 301 - Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary Systems.

1.04 QUALITY ASSURANCE

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.

C. Welders Certification: In accordance with ANSI/ASME Sec 9.

1.05 SUBMITTALS

A. Submit product data in accordance with Section 15011P.

B. Include data on pipe materials, pipefittings, valves, and accessories.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site.

B. Store and protect products.

C. Deliver and store valves in shipping containers with labeling in place.

PART 2 PRODUCTS

2.01 SANITARY WATER SEWER PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74, extra heavy weight Fittings: Cast iron. Joints: ASTM C564, neoprene gasketing system or lead and oakum, or PVC DWV ASTM D2665 or ASTM D3311 solvent cement joints or mechanical joints.

2.02 SANITARY WATER SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74 extra heavy weight. Fittings: Cast iron. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum or PVC DWV ASTM D2665 or ASTM D3311 solvent cement joints or mechanical joints.

2.03 SANITARY WATER SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: ASTM A74, service weight. Fittings: Cast iron. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum for pumped discharged lines.

B. Cast Iron Pipe: CISPI 301, hubless, service weight. Fittings: Cast iron. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies for gravity drained lines.

2.04 WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. Copper tubing: ASTM B88, Type K, annealed. Fittings: ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B52, solder, Grade 95TA, flared, mechanical joint, compression, ductile iron pipe cement lined AWWA C151or AWWA C115 with malleable iron or ductile iron fittings with mechanical joint ends, mechanical joints terminate 5'-0" inside the point of entry and change to ductile iron pipe, or as approved by local water authority.

2.05 WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Copper Tubing: ASTM B88, Type K, annealed. Fittings; ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA, flared, mechanical joint, compression, ductile iron pipe cement lined AWWA C151or AWWA C115 with malleable iron or ductile iron fittings with mechanical joint ends, mechanical joints terminate 5'-0" inside the point of entry and change to ductile iron pipe, or as approved

by local water authority.
or as approved by local water authority.

2.06 WATER PIPING, ABOVE GRADE

A. Copper Tubing: ASTM B88, Type L, hard drawn. Fittings: ANSI/ASME B16.23, cast brass, or ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.

2.07 VENT PIPING

A. Cast Iron Pipe: ASTM A74, service weight. Fittings: Cast iron. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene Gaskets

B. Cast Iron Pipe: CISPI 301, hubless, service weight. Fittings: Cast iron. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.10 NATURAL GAS PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. Steel Pipe: ASTM A53 or A120, Schedule 40 black. Fittings: ASTM A234, forged steel welding type, with ANSI/AWWA C105 polyethylene jacket or double layer, half-lapped 10 mil. Polyethylene tape. Joints: ANSI/AWS D1.1, welded or PVC ASTM P2513

2.11 NATURAL GAS PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Shall be as approved by local utility. Where local utility does not have standard piping shall be as follows: Steel Pipe: ASTM A53 or A120, Schedule 40 black. Fittings: ASTM A234, forged steel welding type, with ANSI/AWWA C105 polyethylene jacket or double layer, half-lapped 10 mil. Polyethylene tape. Joints: ANSI/AWS D1.1, welded, or PVC ASTM P2513

2.12 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53 or A120, Schedule 40 black. Fittings: ANSI/ASME B16.3, malleable iron, or ASTM A234, forged steel welding type. Joints: Screwed for pipe four inches and under; ANSI/AWS D1.1, welded, for pipe over four inches.

2.13 SPRINKLER SERVICE PIPING BURIED

A. N/A

2.15 ROOF DRAINAGE PIPING BURIED BEYOND 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74 extra heavy weight. Fittings: Cast iron. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum, , or PVC DWV ASTM D2665 or ASTM D3311 solvent cement joints.

2.16 STORM WATER PIPING, BURIED WITH 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74 extra heavy weight. Fittings: Cast iron. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum, , or PVC DWV ASTM D2665 or ASTM D3311 solvent cement joints.

2.17 STORM WATER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight. Fittings: Cast iron. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.18 COMPRESSED AIR PIPING, ABOVE GRADE

A. Copper Tubing: ASTM B88, Type L, hard drawn. Fittings: ANSI/ASME B16.23, cast brass, or ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.

2.19 N/A

2.20 N/A

2.21 FLANGES, UNIONS, AND COUPLINGS

A. Pipe Size 4 Inches and under: 150 psig malleable iron unions for threaded ferrous piping; bronze.

B. Pipe Size Over 4 Inches: 150 psig forged steel slip-on flanges for ferrous piping; bronze flanges for copper piping; neoprene gaskets for gas service; 1/16 inch thick preformed neoprene.

C. Grooved and Shouldered Pipe End Couplings: Malleable iron housing clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion; "C" shape composition sealing gasket; steel bolts, nuts, and washers; galvanized couplings for galvanized pipe.

D. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, and water impervious isolation barrier.

2.22 ACCEPTABLE MANUFACTURERS - GATE VALVES

A. Nibco Model T-113.

B. American Fig. 16F.

C. Watts Model GV, GVS.

2.23 GATE VALVES

A. Up to 2 Inches: Bronze body, rising stem and handwheel, inside screw, single or double wedge or disc, solder or threaded ends.

B. Over 2 Inches: Iron body, bronze trim, rising stem and handwheel, OS&Y, single or double wedge, flanged ends.

2.24 ACCEPTABLE MANUFACTURERS - GLOBE VALVES

A. Watts Model GLV.

B. American Fig. 13.

C. Nibco Model T-211.

2.25 GLOBE VALVES

A. Up to 2 Inches: Bronze body, rising stem and handwheel, inside screw, renewable composition disc, solder or screwed ends, with backseating capacity.

B. Over 2 Inches: Iron body, bronze trim, rising stem and handwheel, OS&Y, plug-type disc, flanged ends.

2.26 ACCEPTABLE MANUFACTURERS - BALL VALVES

A. Appolo-Conbraco Model 70-100.

B. Nibco Model 585.

C. Watts Model G-6400.

2.27 BALL VALVES

A. Up to 2 Inches: Bronze body, chromium plated ball, Teflon seats and stuffing box ring, lever handle, solder or threaded.

B. Over 2 Inches: Cast steel body, chrome plated steel ball, Teflon seat and stuffing box seals, lever handle flanged.

2.28 ACCEPTABLE MANUFACTURERS - GAS COCKS

A. Watts.

B. American Fig. 85C-BK.

C. Jenkins.

2.29 GAS COCKS

A. Up to 2 Inches: Bronze body, bronze tapered plug. non-lubricated, teflon packing, threaded ends.

B. Over 2 Inches: Cast iron body and plug, non- lubricated, teflon packing, flanged ends.

2.30 ACCEPTABLE MANUFACTURERS - BUTTERFLY VALVES

A. Jenkins.

B. Grinnell.

C. Pratt.

2.31 BUTTERFLY VALVES

A. Iron body, bronze disc, resilient replaceable seat for service to 180 degrees F, water or lug ends, handle infinite position lever handle with memory stop.

2.32 ACCEPTABLE MANUFACTURERS - SWING CHECK VALVES

A. Jenkins.

B. Watts Model CVY.

C. Nibco Model T-413.

2.33 SWING CHECK VALVES

A. Up to 2 Inches: Bronze 22 degree swing disc, solder or screwed ends.

B. Over 2 Inches: Iron body, bronze trim, 22 degree swing disc, renewable disc and seat, flanged ends.

2.34 ACCEPTABLE MANUFACTURERS - SPRING LOADED CHECK VALVES

A. Jenkins.

B. Watts Model CV.

C. Nibco Model T-480.

2.35 SPRING LOADED CHECK VALVES

A. Iron body, bronze trim, spring loaded, renewable composition disc, screwed, wafer, or flanged ends.

2.36 ACCEPTABLE MANUFACTURERS - WATER PRESSURE REDUCING VALVES

A. Watts.

B. Taco.

C. B&G Model B7 or 7.

2.37 WATER PRESSURE REDUCING VALVES

A. Up to 2 Inches: Bronze body, stainless steel and thermoplastic internal parts, fabric-reinforced diaphragm, and strainer, threaded double union ends.

B. Over 2 Inches: Cast iron body, bronze fitted, elastomer diaphragm and seat disc, flanged.

2.38 ACCEPTABLE MANUFACTURERS - RELIEF VALVES

A. Watts Model No. 174A.

B. B&G 790 or 1170.

C. Taco.

2.39 RELIEF VALVES

A. Bronze body, Teflon seat, steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labeled.

PART 3 EXECUTIONS

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION

A. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

B. Route piping in orderly manner and maintain gradient.

C. Install piping to conserve building space. All piping to be concealed and not interfere with use of space concealed behind walls and ceilings.

D. Group piping whenever practical at common elevations.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Provide clearance for installation of insulation and access to valves and fittings.

G. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors and provide access door to General Contractor.

H. Slope water piping and arrange to drain at low points.

I. Establish elevations of buried piping outside the building to ensure not less than 3 ft of cover.

J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

K. Prepare pipe, fittings, supports, and accessories not prefinished, ready for finish painting.

L. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum. Maintain gradients.

M. Excavate in accordance with Sections 02222.

N. Backfill in accordance with Sections 02223.

O. Install bell and spigot pipe with bell end upstream.

P. Install valves with stems upright or horizontal, not inverted.

Q. Provide one plug cock wrench for every ten plug cocks sized 2 inches and smaller, minimum of one. Provide each plug cock sized 2-1/2 inches and larger with a wrench with setscrew.

3.03 APPLICATION

A. Use grooved mechanical couplings and fasteners only in accessible locations.

B. Install unions downstream of valves and at equipment or apparatus connections.

C. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.

D. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

E. Install globe valves for throttling, bypass, or manual flow control services.

F. Provide spring loaded check valves on discharge of water pumps. Pipe all relief valves to nearest drain.

3.04 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.

B. Ensure PH of water to be treated is between 7.4 and 7.6 by adding chlorine.

C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 parts per million available chlorine.

D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

E. Maintain disinfectant in system for 24 hours.

F. If final disinfectant residual tests less than 25 mg./L, repeat treatment.

G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg./L.

H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C601.

3.05 SERVICE CONNECTIONS

A. Provide new sanitary sewer services, for the new building with connection to the existing sewer system. Before commencing work verify and finalize all invert elevations required for site sewer connections. Plumbing contractor shall confirm all inverts and be responsible that these can be properly connected with slope for drainage, and cover to avoid freezing.

B. Provide new domestic water services for new buildings from street complete with RPZ and water meter vault with bypass valves, and sand strainer in accordance with Water Authority requirements. Provide sleeve in wall for service main and support at wall. Caulk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall. Water service shall be installed in accordance with local water department and Water Authority specifications.

C. Provide new gas service complete with gas meter and regulators. Gas service distribution piping to have initial minimum pressure of 14 inches w.c. Provide regulators on each line serving gravity type appliances, HVAC equipment, Emergency generator sized in accordance with equipment. Gas service installation shall be in accordance with the gas utility specifications.

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of Contract, including General and Supplementary Conditions apply to work of this Section.

B. Roof and floor drains.

C. Grease Interceptor.

D. Cleanouts.

E. Backflow Preventors.

F. Water hammer arrestors.

G. Hose Bibbs

H. Wall Hydrant

I. Hot Water Mixing Valves

J. Floor Sinks

K. Funnel Drains

L. Pressure & Temperature Relief Valves

M. Ceiling and Wall Mounted Compressed Air Reels (Supplied by Owner)

N. Compressed Air Quick Disconnect Connection (See contract drawings)

1.02 RELATED WORK

A. Section 15140P - Supports and Anchors.

B. Section 15410P - Plumbing Piping.

C. Section 15440P - Plumbing Fixtures.

1.03 REFERENCES

A. ANSI/ASSE 1012 - Backflow Preventors with Immediate Atmospheric Vent.

B. ANSI/ASSE 1011 - Hose Connection Vacuum Breakers.

C. ANSI/ASSE 1013 - Backflow Preventors, Reduced Pressure Principle.

D. ANSI/ASSE 1019 - Wall Hydrants, Frost Proof Automatic Draining Anti-Backflow Types.

E. ANSI A112.21.1 - Floor Drains.

F. ANSI A112.21.2 - Roof Drains.

G. ANSI A112.26.1 - Water Hammer Arresters.

H. ASTM C478 - Precast Reinforced Concrete Manhole Sections.

I. PDI WH-201 Water Hammer Arresters.

1.04 QUALITY ASSURANCE

A. Manufacturer: For each product specified, provide components by same manufacturer throughout.

1.05 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 15011P.

B. Include component sizes, rough-in requirements, service sizes, and finishes.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - ROOF DRAINS

A. J.R. Smith
B. Wade.
C. Zurn.

2.02 N/A

2.03 ACCEPTABLE MANUFACTURERS - FLOOR DRAINS

A. J.R. Smith.

B. Wade.

C. Zurn.

2.04 FLOOR DRAINS

A. FD-1: ANSI A112.21.1; 6”ϕ grate, deep seal trap, lacquered cast iron two piece body with double drainage flange, weep holes, removable perforated sediment bucket, reversible clamping collar, caulked outlet, and round, adjustable nickel-bronze strainer; manufactured by J.R. Smith

B. FD-2: nickel bronze rim and cast iron body, 10-1/2” square vandal secured ribbed grate, with ½” square holes, deep seal trap, no-hub outlet, removable perforated sediment bucket manufactured by J.R. Smith

2.05 ACCEPTABLE MANUFACTURERS - FLOOR SINKS

A. J.R. Smith.

B. Wade.

C. Zurn.

2.06 FLOOR SINKS

A. FS-1: 10” deep cast iron flanged receptor with acid resistant coated interior, nickel bronze rim, and secured one half 12” square grate, and aluminum sediment bucket manufactured by J.R. Smith.

B. .

2.07 ACCEPTABLE MANUFACTURERS – FUNNEL DRAINS

A. J.R. Smith.

B. Wade.

C. Zurn.

2.08 FUNNEL DRAINS

A. FN-1 7”ϕ indirect waste funnel drain, Duco cast iron body with acid resistant coated interior, aluminum dome bottom strainer, caulked outlet manufactured by J.R. Smith

2.09 ACCEPTABLE MANUFACTURERS - CLEANOUTS

A. J.R. Smith.

B. Wade.

C. Zurn.

2.10 CLEANOUTS

A. Interior Finished Floor Areas 4-3/4” diameter round deck plug, nickel-bronze d with polished scoriated cover, water tight and requires a spanner wrench for removal, cover to accept floor finish in finished floor areas; manufactured by J.R.Smith

B. Interior Finished Wall Areas: Line type with Duco ferrule with cast bronze taper threaded plug. Chrome plated bronze round frame and secured cover. manufactured by J.R. Smith

C. Exterior Surfaced Areas: 8-3/4" Duco cast iron, double flanged housing with heavy duty secured scoriated cast iron cover with lifting device. Used in non-surfaced, concrete or asphalt areas. manufactured by J.R. Smith

D. Interior finished floor area: used for terrazzo or similar poured floors recess in cover is filled with the floor material. Duco cast iron 5-3/4 diameter cover. Adjustable secured nickel bronze top with ½" terrazzo recess. manufactured by J.R Smith.

2.11 ACCEPTABLE MANUFACTURERS - BACKFLOW PREVENTORS

A. Watts

B. Febco

C. Wilkins

2.12 BACKFLOW PREVENTORS

A. Reduced Pressure Backflow Preventors: ANSI/ASSE 1013; bronze body with bronze and plastic internal parts and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; non-threaded vent outlet; assembled with two ball valves, and four test cocks;

C. Double Check Valve Assemblies: ANSI/ASSE 1012; Bronze body with corrosion resistant internal parts and stainless steel springs; two independently operating check valves with intermediate atmospheric vent; two quarter turn full port resilient seated bronze ball valves & top mounted test cocks..

2.13 ACCEPTABLE MANUFACTURERS - WATER HAMMER ARRESTORS

A. Watts No. 15 Series.

B. J.R. Smith Hydrotrol Series 5000.

2.14 WATER HAMMER ARRESTORS

A. ANSI A112.26.1; sized in accordance with PDI WH-201, precharged suitable for

operation in temperature range -100 to 300 degrees F and maximum 250 psig working pressure; series No. 5000 manufactured by Jay R Smith

2.15 ACCEPTABLE MANUFACTURERS - HOSE BIBBS (Indoors Only)

A. Watts

B. J.R. Smith

C. Wade.

2.16 HOSE BIBBS

A. Bronze or brass, replaceable hexagonal disc, hose thread spout, chrome plated where exposed to interior and to exterior, with vacuum breaker in conformance with ANSI/ASSE 1011.

2.17 B ANSI/ASSE 1019; non-freeze, self-draining type with chrome plated wall plate lockable recessed box hose thread spout, removable key, and vacuum breaker; Model SC-6 & 8B

2.18 ACCEPTABLE MANUFACTURERS – WALL HYDRANTS (Outdoors Only)

A. J.R. Smith

B. Watts

C. Zurn

A. Key operated frost proof, bronze nickel plated quarter turn non-freeze hydrant with hose Connection, integral vacuum breaker, “T” handle key, and Stainless steel box with full 180° cover opening. 7 inch 16 Ga. Frame and cover enclosure with continuous stainless steel hinge. Manufactured by J.R. Smith model no. 5509 QT

2.19 2.17ACCEPTABLE MANUFACTURERS PRESSURE & TEMPERATURE RELIEF VALVES

A. Watts

B. Bell & Gossett

C. Taco

2.20 PRESSURE & TEMPERATURE RELIEF VALVE

A. The contractor shall furnish a pressure and temperature relief valve as shown on the

Contract drawings. The relief valve shall be of bronze body construction with a seat to disc that will not freeze. The relief valve shall be mounted on the hot water heater to protect the coil and tank from excessive pressure and temperature. The valve shall be certified as meeting the requirement of ASME. Low Pressure Boiler Code and ANSI Z21.22. The BTU discharge capacity shall be greater than the input rating of the hot water heater. Manufactured by Watts Model No Series 10L-2

2.21 ACCEPTABLE MANUFACTURERS DOMESTIC HOT WATER MIXING VALVE

A. Conbraco

B. Holby

C. Bell & Gossett

2.22 DOMESTIC HOT WATER MIXING VALVE

A. TCV-1 The contractor shall furnish and install a domestic water hot water mixing valve as shown on the contract drawings. Corrosion resistant with a replaceable thermostatic shuttle, pre-loaded spring assembly, which acts as an over-travel mechanism. Valve body cast bronze brass retainer and adjusting screw, shuttle shall be Noryl, thermal element shall be bronze/stainless steel, “o” rings BUNA N and stainless steel return and over-travel spring. Max. Working pressure rated @ 150 psi, operating temperature range 33° f. - 180° f. Manufactured by Conbraco model no. 34CLF series

2.23 ACCEPTABLE MANUFACTURERS CEILING MOUNTED COMPRESSED AIR REELS

A. Hannay

B. Reelcraft

2.24 CEILING & WALL MOUNTED COMPRESSED AIR REELS

A. See contract drawings.

PART 3 EXECUTIONS

3.01 PREPARATION

A. Coordinate cutting or forming of roof and floor construction to receive drains to required invert elevations.

3.02 INSTALLATION AND APPLICATION

A. Install specialties in accordance with manufacturer's instructions to permit intended performance.

B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

C. Encase exterior cleanouts in concrete flush with grade.

D. Install water hammer arrestors complete with accessible isolation valve. Contractor shall install water hammer arrestors whether shown on contract drawing or not as needed without additional cost to owner.

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of Contract, including General and Supplementary Conditions apply to work of this Section.

B. Water closets.

C. Urinals.

D. Lavatories.

E. Sinks.

F. Mop sinks.

G. Multiple Wash Sink

H. Emergency Eyewash

I. Drinking Fountain

J. Service Sink

1.02 RELATED WORK

A. Section 06410 - Custom Casework: Preparation of counters for sinks.

B. Section 07900 - Joint Sealers: Seal fixtures to walls and floors.

C. Section 10800 - Toilet and Bath Accessories: Lavatory tops.

D. Section 15140P - Anchors and Supports.

E. Section 15410P - Plumbing Piping.

F. Section 15430P - Plumbing Specialties.

G. Section 15450P - Plumbing Equipment.

1.03 REFERENCES

A. ANSI A112.6.1 - Supports for Off-the-Floor Plumbing Fixtures for Public Use.

B. ANSI A112.18.1 - Finished and Rough Brass Plumbing Fixture Fittings.

C. ANSI A112.19.2 - Vitreous China Plumbing Fixtures.

D. ANSI A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use).

E. ANSI A112.19.4 - Porcelain Enameled Formed Steel Plumbing Fixtures.

F. ANSI A112.19.5 - Trim for Water-Closet Bowls, Tanks, and Urinals.

G. ANSI Z358.1 - Emergency Eye Wash and Shower equipment

1.04 QUALITY ASSURANCE

A. Fixtures: By same manufacturer for each product specified throughout.

B. Trim: By same manufacturer for each product specified throughout.

1.05 SUBMITTALS

A. Submit product data in accordance with Section 15011P.

B. Include fixtures, sizes, rough-in dimensions, utility sizes, trim, and finish.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data.

B. Include fixture trim exploded view and replacement parts lists.

1.07 WARRANTY

A. Provide five-year manufacturer's warranty.

B. Warranty: Include coverage of electric water cooler compressor.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - FIXTURES

A. See schedules on contract drawings.

PART 3 EXECUTIONS

3.01 INSPECTION

A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

B. Verify adjacent construction is ready to receive rough-in work of this Section.

3.02 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide chrome plated rigid or flexible supplies to fixtures with screwdriver stops reducers, and escutcheons.

C. Install components level and plumb.

D. Install and secure fixtures in place with wall carriers and bolts.

E. Seal fixtures to wall and floor surfaces with sealant as specified in Section 07900, color to match fixture.

F. Mount fixtures to the following heights above finished floor:

Water Closet:
- Standard 15 inches to top of bowl rim
- Handicapped 18 inches to top of seat

Urinal:
- Standard 22 inches to top of bowl rim
- Handicapped 19 inches to top of bowl rim

Lavatory:
- Standard 31 inches to top of basin rim
- Handicapped 32 inches to top of basin rim

Emergency Eye Wash
- Standard 38 inches to receptor rim

Drinking Fountain:
- Standard 40 inches to top of basin rim
- Handicapped 36 inches to top of basin rim

Water Closet Flush Valves:
Standard 11 inches min. above bowl rim
Recessed 10 inches min. above bowl rim

Shower Heads:
Adult 69.5 inches to bottom of head

Service Sink	1/2 inch	1/2 inch	2 inch	1-1/2 inch
Sink	1/2 inch	1/2 inch	1-1/2 inch	1-1/4 inch

3.03 ADJUSTING AND CLEANING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

B. At completion clean plumbing fixtures and equipment.

C. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

3.04 FIXTURE ROUGH-IN SCHEDULE

A. Rough-in fixture piping connections in accordance with following table of minimum sizes for particular fixtures.

	Hot Water	Cold Water	Waste	Vent
Lavatory	1/2 inch	1/2 inch	1-1/2 inch	1-1/4 inch
Mop Sink	1/2 inch	1/2 inch	3-inch	1-1/2 inch
Sink	1/2 inch	1/2 inch	1-1/2 inch	1-1/4 inch
Water Closet (Flush Valve)	--	1 inch	4 inch	2 inch
Urinal (Flush Valve)	--	3/4 inch	2 inch	1-1/2 inch
Service Sink	1/2" inch	1/2 inch	3 inch	2 inch

Water Cooler	---	1/2" inch	1-1/2 inch	1-1/2 inch
Shower	1/2"	1/2"	2"	1-1/2"
Eyewash		1/2"	1-1/2"	1-1/2"

All fixtures shall be roughed in as per above unless otherwise indicated on the contract drawings.

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Water heaters.

B. Expansion tanks. (Water Heater)

C. Circulator Pumps

1.02 RELATED WORK

A. Section 15140 - Supports and Anchors.

1.03 REFERENCES

A. ANSI/ASME Section 8D - Pressure Vessels.

B. ANSI/NFPA 30 Flammable and Combustible Liquids Code.

C. ANSI/NFPA 31 - Installation of Oil Burning Equipment.

D. ANSI/NFPA 54 - National Fuel Gas Code.

E. ANSI/NFPA 70 - National Electrical Code.

1.04 QUALITY ASSURANCE

A. Provide pumps with manufacturer's name, model number, and rating/capacity identified.

B. Ensure products and installation of specified products are in conformance with recommendations and requirements of the following organizations:
   1. American Gas Association (AGA).
   2. National Sanitation Foundation (NSF).
   3. American Society of Mechanical Engineers (ASME).
   4. National Board of Boiler and Pressure Vessel Inspectors (NBBPVI).
   5. National Electrical Manufacturers' Association (NEMA).
   6. Underwriters Laboratories (UL).

C. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, operate within 25 percent of midpoint of published maximum efficiency curve.

1.05 REGULATORY REQUIREMENTS

A. Conform to AGA NSF ANSI/NFPA 70, UL 174 requirements for water heaters.

B. Conform to ANSI/ASME Section 8 D for tanks.

1.06 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 15011P

B. Include dimension drawings of water heaters indicating components and connections to other equipment and piping.

C. Include dimensions of expansion tanks, and tappings.

D. Indicate pump type, capacity, power requirements, and affected adjacent construction.

E. Submit certified pump curves showing pump performance characteristics with pump and system-operating point plotted. Include NPSH curve when applicable.

F. Submit manufacturer's installation instructions under provisions of Section 15011P

G. Submit manufacturer's certificate that pressure vessels meet or exceed specified requirements.

H. Submit manufacturer's certificate under provisions of Section that pumps meet or exceed specified requirements.

1.07 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data.
B. Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site.

B. Store and protect products.

C. Provide temporary inlet and outlet caps. Maintain caps in Place until installation.

1.09 WARRANTY

A. Provide five-year manufacturer's warranty.

B. Warranty: Include coverage of domestic water heaters in-line circulator unit.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - WATER HEATERS

A. A.O.Smith.

B. Rheem.

C. Bock

2.02 COMMERCIAL GAS FIRED WATER HEATER

A. see contract drawings

2.03 ACCEPTABLE MANUFACTUFACTURERS- EXPANSION TANKS

A. Amtrol

B. Watts

2.04 EXPANSION TANKS

A. Pre-charged hydro-pneumatic steel expansion tank, internal butyl diaphragm to isolate air charge from water, tank construction in accordance with Section VII of the ASME boiler pressure and vessel code, and all welds conforming to Section IX. Maximum working pressure of 150 psi & a maximum temperature of 200°F. Manufacturer Amtrol “Therm-X-Trol”

2.05 ACCEPTABLE MANUFACTURERS - IN-LINE CIRCULATOR PUMPS

A. Bell & Gossett.

B. Taco.

C. Watts.

2.06 IN-LINE CIRCULATOR PUMPS

A. Casing: Bronze, rated for 125 psig working pressure.

B. Impeller: Bronze.

C. Shaft: Alloy steel with integral thrust collar and two oil lubricated bronze sleeve bearings.

D. Seal: Carbon rotating against a stationary ceramic seat.

E. Drive: Flexible coupling.

PART 3 EXECUTIONS

3.01 WATER HEATER INSTALLATION

A. Install water heaters in accordance with manufacturer's instructions and to NSF, NFPA, And UL requirements.

B. Coordinate with plumbing piping and related fuel piping, gas venting, and electrical work to achieve operating system.

3.02 PUMP INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide air cock and drain connection on horizontal pump casings.

C. Provide line sized gate valve and strainer on suction and line sized soft seated check Valve and globe valve on discharge.

D. Decrease from line size, with long radius reducing elbows or reducers. Support piping Adjacent to pump such that no weight is carried on pump casings.

E. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

F. Align, and verify alignment of base mounted pumps prior to start-up.

END OF SECTION

PART 1 - GENERAL

1.01 IN GENERAL

Drawings and general provisions of the Content, including the Conditions of the Contract and Division 01 Specifications Sections apply to this Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 06 10 00 - Rough Carpentry
B. Section 07 52 00 - Modified Bitumen Roofing
C. Section 07 62 00 - Sheet Metal Flashing

1.03 SUMMARY OF WORK

This Section specifies requirements for the following Scope of Work:

A. Provide new cast iron roof drain assemblies, underdeck clamps, leader extensions, sump pans, insulation and all associated hardware to replace existing roof drains.

B. Replace the first four feet of the existing vertical/horizontal drain leader. Extend new leader(s) to an existing elbow or transition.

C. Provide augmenting drains, leaders, fittings, supports and all required accessories for a complete drainage system at locations indicated on the Roof Area Plan.

D. Provide new augmenting drain leader tie-in to existing leader systems.

E. Confirm location and sizes of existing horizontal leaders and determine approximate location and requirements for new leader tie-ins. Approximate locations are indicated in the Contract Drawings.

F. Clean all low slope roof drain systems from roof level to a distance of thirty (30) feet to achieve a free-flowing system.

G. Replace, patch, seal and repair all existing construction assemblies removed, damaged, or cut to allow for the installation of the new drain bowls, augmenting drain bowls, horizontal and vertical leader assemblies. Repaired areas shall match the surrounding existing construction.

H. Coordinate the repair or replacement of the roof deck.

1.04 JOB CONDITIONS

A. Coordinate the work in this Section with the work by other trades to ensure a watertight condition and the orderly progress of the Work.

B. Notify the Owner at least 72 hours in advance of doing any interior demolition work so that the Owner may provide entry into required areas.

C. The Contractor is required to remove and replace drain bowls, vertical and horizontal leaders to properly install the work. Although not anticipated, if asbestos insulation is encountered, the Contractor shall review the condition with the Owner and the Engineer prior to the removal of the roof drain.

D. Sections of the existing building finishes will require removal in order to properly install the new work. These areas should be reviewed with the Owner and Engineer prior to removal. Work areas shall be clearly defined and closed off from building occupants. Areas of finish removal shall be as small as possible to effectively install the work. Any finishes damaged during drain and leader piping installation shall be repaired or replaced by the Contractor at no cost to the Owner.

E. The Contractor is cautioned to take all necessary precautions and make investigations necessary to install the Work. Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

F. The plumbing work shall be coordinated with the roof work in such a manner that no interior portions of the building are left exposed to the elements at the end of a day's work. All drains should be in working order at the end of each work day.

G. The plumbing shall be performed by licensed tradesmen.

H. All plumbing work shall be inspected by local building inspectors for acceptance.

1.05 REFERENCES

A. ASTM A 74 Cast Iron Soil Pipe and Fittings

B. ASTM C 564 Rubber Gaskets for Cast Iron Soil Pipe and Fittings

C. ASTM A 888

D. ASTM C 1277

E. CISPI Standard 301

F. CISPI Standard 310

1.06 WARRANTY

A. Manufacturer shall provide a limited warranty for the system which shall be warranted to be free from manufacturing defects and to conform to currently applicable ASTM standards for a period of five (5) years from date of delivery.

PART 2 - MATERIALS

2.01 DRAIN ASSEMBLIES

A. Roof drains shall be 12" diameter minimum cast iron with 4" minimum diameter bottom outlet, or sized to match existing leader piping, large sump and wide roof flange, as manufactured by Jay R. Smith MFG. Co., Zurn Industries LLC, Josam Manufacturing Co., or Tyler Pipe/Wade Division. Drain assemblies shall have non-puncturing cast iron clamping ring with integral gravel stop. Drain strainers shall be coated cast iron of suitable size and configuration as provided by the drain manufacturer.

B. Roof drain assemblies shall be installed with no-hub connections. No-hub connections shall be a shielded hub less coupling which consists of a neoprene rubber sleeve and stainless steel shield and band clamps. Joints shall be made with an elastomeric compression gasket meeting the requirements of ASTM C 564.

C. All accessories necessary for the proper installation of the new drain bowl assemblies, including but not limited to under deck clamps, clamping rings with integral gravel stops and strainers, shall be of the same manufacturer as the drain bowls and be completely compatible with the existing piping and surrounding materials. Drain sump caulking shall be as recommended by the supplier and as approved by the roof membrane manufacturer.

D. If needed, drain bowl to leader pipe connections shall be pig lead and oakum.

2.02 INSULATION

Insulation for new drain bowl assemblies and drain leader pipe shall be preformed and skinned fibrous glass, minimum 1" thick, of sufficient size to fit fixtures and piping. Fittings shall be mitered of the same material. Joints shall be taped as recommended and supplied by the manufacturer of the insulation.

2.03 CEILING SYSTEM MATERIALS

Coordinate the removal and re-installation of the existing tiles/finishes to perform the plumbing work. Provide new finishes as required if existing components are damaged during removal.

2.04 SERVICE WEIGHT CAST IRON HUB AND SPIGOT LEADER PIPING

A. Cast Iron Pipe shall conform to the following minimum properties:

1. Tensile Strength 20,000 p.s.i. — 60,000 p.s.i.
2. Elastic Modulus 10 - 23 x 106 p.s.i.
3. Hardness (Brinell) 150 - 250 BHN
4. Thermal Conductivity 0.110 - 0.137 calories/cm2/Sec/cm/ °C
5. Thermal Expansion 10 x 10-6 / °C , 6 x 10-6 / °F
6. Density 0.25 - 0.28 lb./in3 , 6.95 - 7.35 gm/cm3
7. Specific Heat 0.13 BTU / lb / °F, 0.13 cal / gm / °C

B. Cast Iron Fittings shall conform to ASTM A 74 - Cast Iron Soil Pipe and Fittings

C. Compression gaskets shall conform to ASTM C564 and CISPI HSN 85. D.

Hub less couplings shall conform to ASTM C1277 and CISPI Standard 310.

E. All required hangers and fittings for cast iron pipe shall conform to Manufacturer's Standardization Society of Valve and Fittings Industry (MCC) SP-58 and SP-59 guidelines. Hangers and strapping material shall be of approved material that will not promote galvanic reaction.

F. All pipe and fittings shall be made in the United States and marked with the collective trademark of the Cast Iron Soil Pipe Institute and listed by NSF International. All pipe and fittings shall be of the same manufacturer.

PART 3 - EXECUTION

3.01 GENERAL

A. All work in this Section shall be coordinated with roof replacement work. All required work at drain locations on completed or existing membranes shall be properly protected at all times from equipment and traffic.

B. The Owner shall be notified at least two days (48-hours) prior to any under-deck work. All materials, temporary protection, equipment and daily clean-up shall be the responsibility of the Contractor.

C. All flashing-in of the roof drains and membrane repairs as a result of the plumbing work shall be the responsibility of the Roofing Contractor.

D. The Contractor is cautioned to investigate all existing conditions and materials of construction. All replacement items, including but not limited to drain bowls, clamps, hangers, supports, strainers, and caulkings, must be completely compatible with the existing plumbing and new roofing system, while fitting within the existing building structure.

E. Clean all drain assemblies thoroughly of dust, dirt, debris and bituminous materials prior to the installation of the new membrane system.

3.02 REMOVAL OF EXISTING DRAINS

A. Remove the existing drain bowls from the roof deck so as to cause minimum damage to the deck.

B. Remove and replace additional roof deck to allow the new wood blocking that supports the drain bowl flange to bear on the deck surface. The removal of the deck shall be the minimum size possible. Dimensions of deck removal shall be submitted by the Contractor and approved by the Engineer prior to demolition.

C. The Contractor shall provide and maintain all interior and roof deck protection.

3.03 INSTALLATION OF DRAIN ASSEMBLIES

A. Install new drains such that the bowl flanges with clamping ring and integral gravel guard are located two inches above deck level. See Detail Drawings for assembly position.

B. Make all drain to leader connections watertight and of sufficient strength.

1. Lead and oakum joints: Pack joint tightly with oakum of sufficient size to remain firmly in place. Pour hot pig lead into the joint and allow to cool. Tamp tight after cooling.

2. No-hub connections: Install no-hub fittings to drain bowls as required. Clean existing leader pipe as required for a leak free connection. Install no-hub connection and tighten securely.

C. Install new clamping rings using the required hardware. Set strainer on clamping ring and lock in place.

D. Drains installed shall be completed and flashed in the same day's operation.

E. Check all roof drain and leader pipe joints with a water test once roofing and flashing are complete and prior to installing drain system insulation to check for leaks.

3.04 CLEANING OF DRAINAGE SYSTEM

A. Once the new replacement roof system has been installed, clear all roof drain leader piping of debris and clogs such that the system is free-flowing.

B. The Contractor shall clear the existing leader pipe with Roto-rooter type equipment. C.

Provide the Owner 48 hours minimum advance notice of drainage system cleaning. D. D.

Provide water testing for each replacement and augmenting drain to exhibit proper function and water tightness.

3.05 CEILING REMOVAL AND REPLACEMENT

A. It is the intent of this project that interior ceiling tiles and panels will be removed then reinstalled at drain and leader replacement (and augmenting drain and leader) locations during the construction phase; The Contractor is responsible for the removal and replacement of the existing finishes to perform the plumbing work.

B. Temporarily support interior ceiling finishes, plumbing, HVAC and other equipment during roof drain and leader renovations.

3.06 DRAIN LEADER INSTALLATION

A. Installation shall comply with the latest installation instructions published by the pipe manufacturer and shall conform to all applicable plumbing, fire, and building code requirements.

B. Employ *licensed plumbing contractors* for the best possible installations. Follow good plumbing practices and observe all safety precautions.

C. Cast iron pipe installed in the horizontal position shall be supported at every hub (hub and spigot) or every coupling (hub less). The hanger shall be placed within 18" of the hub or coupling. Support horizontal pipe and fittings at sufficiently close intervals to maintain alignment and prevent sagging or grade reversal.

D. Support terminal ends of all horizontal runs or branches and each change of direction or alignment with an approved hanger.

E. Vertical components shall be secured at each stack base and at sufficiently close intervals to keep the system in alignment and to adequately support the pipe and its contents.

F. Completed system shall be inspected by State Plumbing Inspector. Visits should be coordinated and paid for by the Contractor.

END OF SECTION