SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Definitions, references, and abbreviations.
2. General regulatory requirements.
3. General requirements regarding site/field conditions including existing conditions and field measurements.
4. Sequencing and scheduling including coordination.
5. Definition of design equipment and procedures for consideration of specified equivalents, proposed equivalents, or substitutions.
6. Grout.
7. Plumbing demolition.
8. Painting and finishing.
9. Supports and anchorages.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.4 SYSTEM DESCRIPTION

A. Provide complete systems, properly connected, tested, balanced, adjusted, and ready for operation, including all necessary and required controls, safeties, details and accessories, including (but not limited to):

1. Sanitary drainage and vent systems.
2. Storm drainage and roof drainage systems.
3. Water distribution systems.
4. Plumbing fixtures.
5. Natural gas piping systems.
6. Electrical control wiring to equipment furnished in this Contract.
7. Miscellaneous items.

1.5 COORDINATION PROCEDURES

A. Coordinate construction operations and construction schedule of plumbing work with other contractors in accordance with Section 01 31 00 “Project Management and Coordination” and as modified below.

1. Pre-Installation Conference:

   a. Attend pre-installation conference. Arrange for all subcontractors to be in attendance.

2. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.

3. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Section 08 31 13 "Access Doors and Frames."

4. Coordinate Plumbing Work with HVAC systems, lighting fixtures, ceiling mounted devices, ceiling heights, materials, structural work, maintenance clearances, and electric code clearance and building systems.

5. Notify Owner's Project Representative and Architect in case of unresolved interferences prior to installation of Plumbing Work.

6. Adjust exact size, location and offsets of pipes to achieve reasonable appearance objectives in open areas without ceilings without increase in Contract Sum.

1.6 SUBMITTALS, GENERAL

A. Comply with requirements of SECTION 01 33 00 “Submittal Procedures” for each individual Section and as modified below.

B. Submit all action submittals required by individual Section concurrently.

1. As-Specified Products: If product to be incorporated into Project is as specified by name and product designation in Part 2 of product specification, and will be installed as specified in Part 3, and only where allowed as such in submittal portion of product specification, then submit "**As-Specified Verification Form**" (attached to SECTION 01 33 00 "Submittal Procedures") in lieu of "Product Data" identified in the Action Submittal.

2. Do not use "**As Specified Verification Form**" unless specifically indicated in detailed product specification.

3. Equivalent Products or Substitutions: If product to be incorporated into Project is not specified by name and product designation in Part 2 below, comply with all Product Data requirements specified.

1.7 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sleeves and sleeve seals. Include rated capacities, and furnished specialties and accessories.

1. Penetration firestopping materials.
2. Penetration firestopping assembly drawings.

1.8 INFORMATIONAL SUBMITTALS

A. Contract Closeout Submittals: Comply with requirements of Section 01 77 00 "Closeout Procedures".

1.9 QUALITY ASSURANCE.

A. Provide installation, testing and materials in accordance with Federal, State and Local Building, Health, Plumbing and Electrical Codes, Laws, Ordinances, and Regulations that apply to Plumbing Work.

1. Comply with applicable requirements of following documents:

a. New York State Uniform Fire Prevention and Building Code.
b. 2020 Building Code of New York State.
c. 2020 Fire Code of New York State.
d. 2020 Plumbing Code of New York State.
e. 2020 Mechanical Code of New York State.
f. 2020 Fuel Gas Code of New York State.
g. 2020 Energy Conservation Construction Code of New York State.
h. New York State Education Department Manual of Planning Standards.
i. In event of a conflict between the Codes identified above and Contract Documents, comply with more stringent requirement.

2. Obtain and pay for necessary inspections, certificates, and permits from applicable agencies. Perform required tests in accordance with regulation of agency having jurisdiction. Submit certificates of approval prior to the date of Substantial Completion as defined in Section 01 77 00 “Closeout Procedures”.

B. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is submitted to the Architect and approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Packing and Shipping: Ship materials in manufacturer’s containers, fully identified with manufacture’s name, trade name, type, class, style, model, grade, size and color.

C. Storage and Protection:

1. Store materials, equipment, fixtures, pipe, fittings, and attachments, under cover, off ground in original containers as applicable, and protect from physical and weather damage while in storage and during construction.

2. Furnish extra materials identified in technical sections, in original manufacturers’ containers and packaging, to Owner at location identified during prebid conference. Obtain receipt from Owner upon delivery of extra materials and send copy of receipt to Architect.

3. Replace or repair damaged, rusted, corroded or otherwise unusable materials physically damaged or weather damaged equipment as determined by Architect, at no change in Contract Sum.

1.11 PROJECT/SITE CONDITIONs

A. Existing Conditions:

1. Reuse equipment only as indicated on Drawings.

2. All usable material and equipment not being reused is to be offered to the Owner. If accepted by Owner the Contractor shall deliver to a location on District grounds designated by the Owner.

3. All other material and equipment to be removed, shall be removed from the site and legally disposed of by the Contractor

B. Rodent Proofing:

1. Strainer Plates: All strainer plates on drain inlets shall be designed and installed so that all openings are not greater than a 1/2 inch in least dimension. Refer to Section 22 13 19 “Sanitary Waste Piping Specialties” and 22 14 23 “Storm Drainage Piping Specialties” for additional requirements.

2. Openings for Pipes: In or on structures where openings have been made in walls, floors or ceilings for the passage of pipes, such openings shall be closed and protected by the installation of approved metal collars that are securely fastened to the adjoining structure. Refer to Section 22 05 17 “Sleeves and Sleeve Seals for Plumbing piping” and 22 05 18 “Escutcheons for Plumbing Piping” for additional requirements.

C. Protection of Plumbing Systems:

1. Corrosion: Provide corrosion protection for pipes passing through concrete or cinder walls and floors or buried in corrosive soil conditions.

   a. Provide oversized sleeves or core drilled holes to eliminate rubbing on above grade piping installations. Refer to Section 22 05 17 “Sleeves and Sleeve Seals for Plumbing Piping” for pipe sleeve and core drilling requirements.

   b. Refer to individual Division 22 piping Sections for corrosion protection on buried piping installations in corrosive soil conditions.

2. Stress and Strain: Install plumbing systems in a manner that prevents stresses and strains that exceed the structural strength of the pipe. Install piping systems to accommodate expansion, contraction and structural settlement.

3. Freezing: Do not install water, soil, waste or storm piping outside of a building, in attics or crawlspaces, conceal in outside walls or in any other place subjected to freezing temperatures without providing measures to keep the contents of the piping system from freezing.

D. Field Measurements:

1. Layout of equipment, piping, and similar components in Drawings is diagrammatic. Review Drawings to identify interference with other construction and verify dimensions at Site prior to beginning installation.

   a. Obtain exact location of all items and openings and confirm all existing conditions in field.

   b. Obtain exact location and roughing requirements for all equipment furnished by others, but installed by this Contractor before roughing. Owner reserves right to make reasonable changes prior to "roughing-in" without increase in Contract Sum.

2. Report any conflicts to Architect in writing before beginning installation.

3. Provide fittings, horizontal and vertical offsets, elevation changes, etc. required to install Plumbing Work. Do not infer that Drawings show level of detail indicating every offset, elbow, union, fitting, elevation changes, or other aspect required for complete installation.

4. Install Plumbing Work with proper provisions for removal and/or access to valves, traps, cleanouts, etc.

1.12 SEQUENCING AND SCHEDULING

A. Perform Plumbing Work in cooperation with Owner, Architect, Construction Manager, and all Contractors on this Project, and other separate Contractors at the Site.

1. Coordinate Plumbing Work with construction schedule requirements in Division 01
2. Coordinate all submittals with the construction schedule and with requirements and schedules contained in Section 01 33 00 “Submittals Procedures.”
3. Immediately report any delays in receipt of materials required for Plumbing Work including circumstances causing delays.

B. Refer to Division 01 for cooperation between Contractors. Prior to start of construction:

1. Obtain from Contract Drawings or Architect, exact location of items and openings in construction. Conform to existing conditions in field.

2. Review applicable Shop Drawings of all Contracts.

3. If conflict occurs between Contract Drawings, advise Architect in writing before beginning installation and comply with Architect's directions.

4. Obtain exact location and roughing requirements for equipment furnished by other Contractor or by Owner, but installed by Contractor responsible for Plumbing Work before beginning roughing.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Minimum Material Requirements:

1. Construct potable water systems and equipment according to AWWA standards.

2. Provide electrical equipment and systems meeting UL standards and requirements of NEC.

3. Provide UL label on all equipment and material with listing service.

4. Material Flammability:

a. Flame spread rating of 25 or less.

b. Smoke developed rating of 50 or less.

5. Equipment Verification: Carefully check manufacturer's drawings and specifications as they affect their equipment; follow factory instructions for roughing, installation, connection, filling, lubrication, testing, balancing, adjusting, alignment, wiring, and start-up operation.

2.2 GROUT

A. Description: ASTM C 1107, Grade B, non-shrink, non-metallic, high strength grout, suitable for interior and exterior, above and below grade applications.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 4000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

2.3 SEALANTS

A. Comply with requirements for sealants in non-fire rated penetrations specified in Section 07 92 00 "Joint Sealants."

B. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Building Systems; Omniplus.
b. Dow Corning Corporation; 786 Mildew Resistant.
c. GE Advanced Materials - Silicones; Sanitary SCS1700.

2.4 PENETRATION FIRESTOPPING

A. Comply with requirements for sealants in fire rated penetrations specified in Section 07 84 13 “Penetration Firestopping”.

B. Submit Manufacturers Product Data Sheets for each type of product selected. Certify that Firestop Material is free of asbestos and lead paint, and complies with local regulations.

1. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

C. Submit system design listings, including illustrations from qualified testing and inspection agency that is applicable to each firestop configuration.

D. Submit a project specific Penetration Firestopping Schedule indicating where each firestop configuration will be used.

2.5 ACCESS DOORS

A. Comply with requirements for access doors specified in Section 08 31 13 “Access Doors and Frames” for product requirements.

B. Access Door Sizes for Plumbing Applications:

1. Single Valve:

a. 1 NPS and Smaller Valve Size: 8 inches by 8 inches.
b. 1-1/2 NPS and 2 NPS Valve Size: 12 inches by 12 inches.
c. 3 NPS and 4 NPS Valve Size: 18 inches by 18 inches.

2. Two Valves:

a. 2 NPS and Smaller Valve Size: 12 inches by 12 inches.
b. 3 NPS and 4 NPS Valve Size: 18 inches by 18 inches.

3. Condensate Drain Connection: 18 inches by 18 inches.

4. Other Devices: 12 inches by 12 inches.

2.6 PAINT AND FINISHES

A. Refer to Section 09 91 00 "Painting" for interior and Section 09 96 00 “High-Performance Coatings” for exterior painting and finishing of plumbing piping, equipment and systems.

2.7 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

1. Dielectric Unions:

a. 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:

1) Capitol Manufacturing Company.
2) Central Plastics Company.
3) Hart Industries International, Inc.
4) Jomar International Ltd.
5) Matco-Norca, Inc.
6) McDonald, A. Y. Mfg. Co.
7) Watts Regulator Co.; a division of Watts Water Technologies, Inc.
8) Wilkins; a Zurn company.

b. Description:

1) Standard: ASSE 1079.
2) Pressure Rating: 125 psig minimum at 180 deg F.
3) End Connections: Solder-joint copper alloy and threaded ferrous.

2.8 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

C. Sleeve-Type Transition Coupling: AWWA C219.

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. Cascade Waterworks Manufacturing.
b. Dresser, Inc.; Piping Specialties Products.
c. Ford Meter Box Company, Inc. (The).
d. JCM Industries.
e. Romac Industries, Inc.
f. Smith-Blair, Inc.; a Sensus company.
g. Viking Johnson.

2. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners, and with ends of same sizes as piping to be joined.

3. Standard: AWWA C219.

4. Center-Sleeve Material: Manufacturer's standard.

5. Gasket Material: Natural or synthetic rubber.

6. Pressure Rating: 150 psig minimum.

7. Metal Component Finish: Corrosion-resistant coating or material.

PART 3 - EXECUTION

3.1 PLUMBING DEMOLITION

A. Refer to Section 02 41 19 "Selective Structure Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.

1. Remove Piping: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Abandon Piping in Place: Drain piping and cap or plug piping with same or compatible piping material.
3. Remove Equipment: Disconnect and cap services and remove equipment.
4. Remove and Reinstall Equipment: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
5. Remove and Salvage Equipment: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is rendered unserviceable during the process of demolition, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Unless specific mounting heights are indicated, install equipment to allow maximum possible headroom.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.3 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 05 Sections, Section 22 05 29 “Hangers and Supports for Plumbing Piping and Equipment”, for detailed additional requirements.
B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
C. Field Welding: Comply with AWS D1.1.

3.4 GROUTING

A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
B. Clean surfaces that will come into contact with grout.
C. Provide forms as required for placement of grout.
D. Avoid air entrapment during placement of grout.
E. Place grout, completely filling equipment bases.
F. Place grout on concrete bases and provide smooth bearing surface for equipment.
G. Place grout around anchors.
H. Cure placed grout.

3.5 SEALANTS

A. Install sealants according to the requirements specified in Section 07 92 00 "Joint Sealants."
B. Refer to individual Division 22 plumbing fixture and equipment Sections for specific sealant and caulking requirements.

3.6 FIRESTOPPING

A. Install firestopping according to the requirements specified in Section 07 84 13 "Penetration Firestopping."

B. Applied Fireproofing:

1. Coordinate the installation of hangers, supports and accessories from the structural steel with the fireproofing installation. Install all hangers and supports prior to installation of fireproofing.

2. Repair or replace existing fireproofing removed as a part of Plumbing Work installation.

    a. Employ the services of an approved fireproofing contractor to repair or replace the fireproofing by patching any areas that have been removed or damaged due to the installation of work after the completion of the fireproofing.

    b. Repaired or replacement fireproofing shall match the fireproofing adjacent to the repaired area. All warranties shall be maintained.

3.7 ACCESS DOORS

A. Install access doors according to the requirements specified in Section 08 31 13 "Access Doors and Frames."

B. Install access doors where shown on Drawings or where required for access to plumbing system components requiring service (i.e. valves, equipment, slip joints, unions, gauges, etc.) and are located in concealed installations.

3.8 PAINTING

A. Painting of plumbing systems, equipment, and components is specified in Section 09 91 00 "Painting."
B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.9 DIELECTRIC FITTINGS

A. Install dielectric fittings according to the specific requirements in the Division 22 Sections specifying piping systems.

3.10 TRANSITION FITTINGS

A. Install transition fittings according to the specific requirements in the Division 22 Sections specifying piping systems.

END OF SECTION 22 05 00

SECTION 22 05 17 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeve-seal systems.
2. Grout.
3. Silicone sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sleeves seals.

1. Sleeve-seal systems.
2. Firestopping.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SLEEVES WITHOUT WATERSTOP

A. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends.
B. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, hot-dip galvanized, with plain ends.
C. Steel Sheet Sleeves: ASTM A653/A653M, 0.0239-inch minimum thickness; hot-dip galvanized, round tube closed with welded longitudinal joint.

2.2 SLEEVES WITH WATERSTOP

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, LLC.
2. CALPICO, Inc.
3. GPT; an EnPro Industries company.
4. Metraflex Company (The).

B. Description: Manufactured galvanized steel, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall.

2.3 SLEEVE-SEAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, LLC.
2. CALPICO, Inc.
3. GPT; an EnPro Industries company.
4. Metraflex Company (The).
5. Proco Products, Inc.

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Designed to form a hydrostatic seal of 20 psig minimum.
2. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel, Type 316.
4. Connecting Bolts and Nuts: Stainless steel, Type 316 of length required to secure pressure plates to sealing elements.

2.4 PENETRATION FIRESTOPPING

A. Comply with requirements for sealants in fire rated penetrations specified in Section 07 84 13 “Penetration Firestopping” and Section 22 05 00 “Common Work Results for Plumbing.”

2.5 GROUT

A. Refer to grout product requirements specified in Section 22 05 00 “Common Work Results for Plumbing.”

2.6 SILICONE SEALANTS

A. Comply with requirements for silicone sealants specified in Section 07 92 00 "Joint Sealants" and Section 22 05 00 “Common Work Results for Plumbing.”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.
C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION OF SLEEVES - GENERAL

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.

1. Sleeves are not required for core-drilled holes.

C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.

2. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

D. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.
2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.

E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 078413 "Penetration Firestopping."

3.3 INSTALLATION OF SLEEVES WITH WATERSTOP

A. Install sleeve with waterstop as new walls and slabs are constructed.
B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
C. Secure nailing flanges to concrete forms.
D. Using grout, seal the space around outside of sleeves.

3.4 INSTALLATION OF STACK-SLEEVE FITTINGS

A. Install stack-sleeve fittings in new slabs as slabs are constructed.

1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing.

3. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
5. Using waterproof silicone sealant, seal space between top hub of stack-sleeve fitting and pipe.

B. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.5 INSTALLATION OF SLEEVE-SEAL SYSTEMS

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building, and passing through exterior walls.

B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.6 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
2. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.

B. Prepare test and inspection reports.

3.7 SLEEVE SCHEDULE

A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls above and below Grade:

a. Sleeves with waterstops.

1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

2. Concrete Slabs-on-Grade:

    a. Sleeves with waterstops.

        1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

3. Concrete Slabs above Grade:

    a. Sleeves with waterstops or stack-sleeve fittings.

4. Interior Partitions:

    a. Sleeves without waterstops.

END OF SECTION 22 05 17

SECTION 22 05 18 - ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes escutcheons and floor plates.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.
D. Split-Casting Brass Type: With polished, chrome-plated finish and with concealed hinge and setscrew.
E. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed hinge, and spring-clip fasteners.
F. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed hinge, and spring-clip fasteners.

2.2 FLOOR PLATES

A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
B. Split-Casting Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.
C. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. Install escutcheons for exposed piping penetrations of walls, ceilings, and finished floors.

B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.

1. Escutcheons for New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern type with polished, chrome-plated finish and spring clip fastener.
b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.
c. Insulated Piping: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
d. Bare Piping at Wall, Floor or Ceiling Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
e. Bare or Insulated Piping in Unfinished Service Spaces and Equipment Rooms: No escutcheons required.

C. Install floor plates for piping penetrations of equipment-room floors.

D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. New Piping: One-piece, floor-plate type.
2. Existing Piping: Split-casting, floor-plate type.

3.3 FIELD QUALITY CONTROL

A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 22 05 18

SECTION 22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Ball valves.
2. Check valves.

1.3 DEFINITIONS

A. CWP: Cold working pressure.
B. EPDM: Ethylene propylene copolymer rubber.
C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
D. SWP: Steam working pressure.
E. WOG: Water, oil, gas.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of valve indicated.

1. Ball valves.
2. Check valves.

1.6 QUALITY ASSURANCE

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:

1. ASME B1.20.1 for threads for threaded end valves.
2. ASME B16.1 for flanges on iron valves.
3. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.

4. ASME B16.18 for solder-joint connections.
5. ASME B31.9 for building services piping valves.

C. NSF Compliance:

1. NSF/ANSI-61- Drinking Water System Components - Health Effects.
2. NSF/ANSI-61-8 Commercial Hot 180°F (includes Annex F and G).
3. NSF/ANSI-372 for lead-free valve materials for potable-water service.

D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set ball valves open to minimize exposure of functional surfaces.
4. Block check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of valve from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Standards:

1. Domestic water valves intended to convey or dispense water for human consumption must comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or must be certified to be in compliance with NSF 61 and NSF 372 (by an ANSI-accredited third-party certification body) that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. ASME Compliance:

1. ASME B1.20.1 for threads for threaded end valves.
2. ASME B16.1 for flanges on iron valves.
3. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
4. ASME B16.18 for cast copper solder-joint connections.
5. ASME B16.22 for wrought copper and copper alloy solder-joint connections.
6. ASME B16.34 for flanged and threaded end connections.
7. ASME B16.51 for press joint.
8. ASME B31.9 for building services piping valves.

C. Provide bronze valves made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

D. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

E. Valve Sizes: Same as upstream piping unless otherwise indicated.

F. Valve Actuator Type:

1. Hand Lever: For quarter-turn valves NPS 4 and smaller except plug valves.
2. Handwheel: For valves other than quarter-turn types.

G. Valves in Insulated Piping:

1. Ball Valves: Provide 2-inch extended neck stems.
2. Extended operating handles with nonthermal-conductive covering material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
3. Memory stops that are fully adjustable after insulation is applied.

H. Refer to valve schedule articles for applications of valves.

I. Valve Bypass and Drain Connections: MSS SP-45.

2.3 BRONZE BALL VALVES

A. Bronze Ball Valves, Lead-Free, Two-Piece with Full Port, and Stainless-Steel Trim, Solder or Threaded Ends (NPS 2 and smaller):

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO INC.; Model S/T-585-66-LF-NS or a comparable product by one of the following:

a. Conbraco Industries, Inc.; Apollo Valves; 70LF-140, 70LF-240.
b. Hammond Valve.
c. Milwaukee Valve Company.
d. Watts Regulator Co.; a division of Watts Water Technologies, Inc; LFB6000-SS, LFB6001-SS.

2. Description:

a. Standard: MSS SP-110.
b. SWP Rating: 150 psig.
c. CWP Rating: 600 psig.
d. Body Design: Two piece.
e. Body Material: Bronze.
f. Ends: Soldered or threaded.
g. Seats: PTFE or TFE.
h. Stem: Type 316 stainless steel.
i. Ball: Type 316 stainless steel, vented.
j. Port: Full.
k. Handle: Insulated extension handle.

B. Bronze Ball Valves, Lead-Free, Two-Piece with Full Port, and Stainless-Steel Trim, Press Ends (NPS 2 and smaller):

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO INC.; Model PC-585-80-LF-NS or a comparable product by one of the following:

a. Apollo Flow Controls; Conbraco Industries, Inc.
b. Hammond Valve.
c. Milwaukee Valve Company.
d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

a. Standard: MSS SP-110 or MSS-145.
b. CWP Rating: Minimum 200 psig.
c. Body Design: Two piece.
d. Body Material: Bronze.
e. Ends: Press.
f. Press Ends Connections Rating: Minimum 200 psig.
g. Seats: Reinforced PTFE.
h. Stem: Bronze or brass.
i. Ball: Stainless steel.
j. Port: Full.
k. O-Ring Seal: EPDM.
l. Handle: Insulated extension handle.

2.4 BRONZE SWING CHECK VALVES

A. Bronze, 200 CWP, 125 WSP Swing Check Valves with Metal Seats:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO INC.; Webstone 1054W Series or comparable product by one of the following:

a. Hammond Valve.
b. Milwaukee Valve Company.

2. Description:

a. Sizes: 1/4 to 4 inch.
b. Certification: Certified lead free toin accordance with NSF/ANSI 61, ISO 9001.
c. CWP Rating: 200 psig.
d. Body Design: Horizontal or vertical (flow in upward direction) flow.
e. Body Material: Lead free, corrosion resistant.
f. Ends: Threaded.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves.

F. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION OF VALVES

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

E. Install check valves for proper direction of flow and as follows:

1. Swing Check Valves: In horizontal position with hinge pin level.

F. Valve Tags: Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

3.3 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball valves.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

C. Select valves, except wafer types, with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.

3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze Ball Valves: Two-piece with full port and bronze or brass trim. Provide with threaded, solder or press connection-joint ends.
3. Bronze Swing Check Valves: Class 125, nonmetallic disc.

END OF SECTION 22 05 23

SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Thermal hanger-shield inserts.
5. Fastener systems.
6. Roof mounted pipe stands.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sleeves and sleeve seals. Include rated capacities, and furnished specialties and accessories.

1. Roof mounted pipe stands.
2. Insulation shields.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Section 01 33 00 "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Threaded rod.
2. Adjustable clevis hanger.
3. Adjustable swing-ring band hangers.
4. Adjustable swivel-ring band hangers.
5. Hinged pipe clamps.
6. Pipe stanchion saddles.
7. Adjustable pipe saddle supports.
8. Riser clamps.
9. Beam Clamps.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. 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:

1. Anvil International; a subsidiary of Mueller Water Products Inc.
2. Cooper B-Line, Inc.
3. ERICO International Corporation.
4. PHD Manufacturing, Inc.

2.2 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.
3. Nonmetallic Coatings: Plastic coated or epoxy powder coated.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe and Tube Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel or stainless steel.

2.3 TRAPEZE PIPE HANGERS

A. Description: MSS SP-58, Type 59, shop- or field-fabricated pipe-support assembly, made from structural-carbon-steel shapes, with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.4 METAL FRAMING SYSTEMS

A. MFMA Manufacturer Metal Framing Systems:

1. Description: Shop- or field-fabricated pipe-support assembly, made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
2. Standard: Comply with MFMA-4, factory-fabricated components for field assembly.
3. Channels: Continuous slotted galvanized carbon-steel channel with inturned lips.
4. Channel Width: Selected for applicable load criteria.
5. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of galvanized carbon steel.

7. Metallic Coating: Electroplated zinc.
8. Paint Coating: Green epoxy, acrylic, or urethane.
9. Plastic Coating: PVC.

2.5 THERMAL HANGER-SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Buckaroos, Inc.
2. CADDY; brand of nVent Electrical plc.
3. Carpenter & Paterson, Inc.
4. Pipe Shields Inc.

B. Insulation-Insert Material for Type "B" Insulated Piping Support Assemblies: ASTM C552, Type II cellular glass with 100-psig or ASTM C591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.

C. Insulation-Insert Material for Type "C" Insulated Piping Support Assemblies: Water-repellent-treated, ASTM C533, Type I calcium silicate with 100-psig minimum compressive strength.

D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

F. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.6 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hilti, Inc.
b. ITW Ramset/Red Head; Illinois Tool Works, Inc.
c. MKT Fastening, LLC.
d. Simpson Strong-Tie Co., Inc.

B. Mechanical-Expansion Anchors: Insert-wedge-type anchors, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Cooper B-line; brand of Eaton, Electrical Sector.

b. Empire Tool and Manufacturing Co., Inc.
c. Hilti, Inc.
d. ITW Ramset/Red Head; Illinois Tool Works, Inc.
e. MKT Fastening, LLC.

2. Indoor Applications: Zinc-coated or stainless steel.

3. Outdoor Applications: Stainless steel.

2.7 MATERIALS

A. Carbon Steel: ASTM A1011/A1011M.

B. Structural Steel: ASTM A36/A36M carbon-steel plates, shapes, and bars; black and galvanized.

C. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with requirements in Section 07 84 13 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.

B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size, or install intermediate supports for smaller-diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A36/A36M carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.

D. Thermal Hanger-Shield Installation: Install in pipe hanger or shield for insulated piping.

E. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete, after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.

2. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

H. Install lateral bracing with pipe hangers and supports to prevent swaying.

I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

J. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

L. Insulated Piping:

1. Attach clamps and spacers to piping.

   a. Piping Operating Above Ambient Air Temperature: Clamp may project through insulation.
   b. Piping Operating Below Ambient Air Temperature: Use thermal hanger-shield insert with clamp sized to match OD of insert.
   c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

   a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Shield Dimensions for Pipe: Not less than the following:

   a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.

b. NPS 4: 12 inches long and 0.06 inch thick.
c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.

4. Thermal Hanger Shields: Install with insulation of same thickness as piping insulation.

3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers.
B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

A. Touchup: Clean field welds and abraded, shop-painted areas. Paint exposed areas immediately after erecting hangers and supports. Use same materials as those used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 09 91 00 "Painting" for interior installations and Section 09 96 00 "High-Performance Coatings" for exterior installations.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A780/A780M.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports and attachments for general service applications.

F. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.

G. Use padded hangers for piping that is subject to scratching.

H. Use thermal hanger-shield inserts for insulated piping and tubing.

I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Piping in general service applications:

a. Bare Copper Piping Systems:

1) NPS 1-1/4 and Smaller: Adjustable, plastic coated copper swivel loop hanger for suspension of non-insulated stationary pipes.
2) NPS 1-1/2 and Larger: Copper plated clevis hanger for suspension of non-insulated stationary pipes. Hanger sized on outside pipe diameter.

b. Bare Ferrous Piping Systems:

1) NPS 1-1/4 and Smaller: Heavy duty electro-galvanized steel swivel loop hanger for suspension of non-insulated stationary pipes.
2) NPS 1-1/2 and Larger: Electro-galvanized clevis hanger for suspension of non-insulated stationary pipes. Hanger sized on outside pipe diameter.

c. Insulated Piping Systems:

1) NPS 2 and Smaller: Electro-galvanized clevis hanger with galvanized steel thermal-hanger shield insert for suspension of insulated stationary pipes. Hanger sized on outside insulation diameter.

2) NPS 2-1/2 and Larger: Electro-galvanized clevis hanger with separate or integral galvanized steel thermal-hanger shield insert for suspension of insulated stationary pipes. Hanger sized on outside insulation diameter.

J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.

L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.

2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.

3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.

4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.

5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.

6. C-Clamps (MSS Type 23): For structural shapes.

7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

   a. Light (MSS Type 31): 750 lb.
   b. Medium (MSS Type 32): 1500 lb.
   c. Heavy (MSS Type 33): 3000 lb.

8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.

9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.

2. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.

3. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.

O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

P. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

Q. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 22 05 29

SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Piping labels.
2. Valve tags and signage.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Section 01 33 00 "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Pipe labels.
2. Valve tags.

C. Samples: For color, letter style, and graphic representation required for each identification material and device.

D. Valve-numbering scheme.

E. Valve Schedules: For each piping system. Include in operation and maintenance manuals.

1.5 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
B. Coordinate installation of identifying devices with locations of access panels and doors.
C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 PIPE LABELS

A. 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:

1. Brady, Inc.
2. Craftmark Pipe Markers.
3. Seton, Inc.

B. General Requirements for Manufactured Pipe Labels: Preprinted, color coded, with lettering indicating service and showing flow direction in accordance with ASME A13.1.

C. Letter and Background Color: As indicated for specific application under Part 3.

D. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

E. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing and separate self-adhesive direction arrow tape on each end fully wrapped around pipe.

F. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings. Also include:

1. Pipe size.
2. Flow-Direction Arrows: Include flow-direction arrows on main distribution piping. Arrows may be either integral with label or applied separately.
3. Lettering Size: At least 1/2 inch for viewing distances of up to 72 inches and proportionately larger lettering for greater viewing distances.

2.2 STENCILS

A. 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:

1. Craftmark Pipe Markers.
2. Kolbi Pipe Marker Co.
3. Marking Services Inc.
4. Pipemarker.com; Brimar Industries, Inc.

B. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.

1. Stencil Material: Aluminum, brass, or fiberboard.
2. Stencil Paint: Exterior, gloss, acrylic enamel in colors complying with recommendations in ASME A13.1 unless otherwise indicated. Paint may be in pressurized spray-can form.

3. Identification Paint: Exterior, acrylic enamel in colors in accordance with ASME A13.1 unless otherwise indicated. Paint may be in pressurized spray-can form.
4. Letter and Background Color: As indicated for specific application under Part 3.

2.3 VALVE TAGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Brady Corporation.
2. Craftmark Pipe Markers.
3. Kolbi Pipe Marker Co.
4. Marking Services Inc.
5. Pipemarker.com; Brimar Industries, Inc.
6. Seton Identification Products; a Brady Corporation company.

B. Description: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.04-inch minimum thickness, with predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass link chain or S-hook.

C. Letter and Background Color: As indicated for specific application under Part 3.

D. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Include valve-tag schedule in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surface of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

3.2 INSTALLATION, GENERAL REQUIREMENTS

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
B. Coordinate installation of identifying devices with locations of access panels and doors.
C. Install identifying devices before installing acoustical ceilings and similar concealment.
D. Locate identifying devices so that they are readily visible from the point of normal approach.

3.3 INSTALLATION OF PIPE LABELS

A. Piping Color Coding: Painting of piping is specified in Section 09 91 00 "Painting" and Section 09 96 00 "High-Performance Coatings."

B. Install pipe labels showing service and flow direction with permanent adhesive on pipes.

C. Stenciled Pipe Label Option: Stenciled labels showing service and flow direction may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels, complying with ASME A13.1, on each piping system.

1. Identification Paint: Use for contrasting background.
2. Stencil Paint: Use for pipe marking.

D. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Within 3 ft. of each valve and control device.
2. At access doors, manholes, and similar access points that permit view of concealed piping.
3. Within 3 ft. of equipment items and other points of origination and termination.
4. Spaced at maximum intervals of 25 ft. along each run. Reduce intervals to 10 ft. in areas of congested piping and equipment.

E. Do not apply plastic pipe labels or plastic tapes directly to bare pipes conveying fluids at temperatures of 125 deg F or higher. Where these pipes are to remain uninsulated, use a short section of insulation or use stenciled labels.

F. Flow-Direction Flow Arrows: Use arrows, in compliance with ASME A13.1, to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.

G. Pipe-Label Color Schedule:

1. Domestic Cold-Water Piping: Black letters on an ANSI Z535.1 safety-green background.
2. Domestic Hot-Water Piping: Black letters on an ANSI Z535.1 safety-green background.
3. Domestic Hot-Water Return Piping Black letters on an ANSI Z535.1 safety-green background.
4. Sanitary Waste and Storm Drainage Piping: Black letters on an ANSI Z535.1 safety-green background.

3.4 INSTALLATION OF VALVE TAGS

A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, faucets, convenience and lawn-watering hose connections, and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule in the operating and maintenance manual.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Color: Natural.
2. Letter Color: Black.

C. Provide valve tag for each piping systems valve located above grade.

1. Valve Directory: Provide neat typewritten directory listing valve function, location and identification number.
2. Valve Numbering System: Extension of and compatible with existing valve numbering system, where valves are installed in existing building or in addition to existing building.
3. Verification: Verify existing valve numbers in field and provide valve numbering avoiding duplication of existing numbers.

END OF SECTION 22 05 53

SECTION 22 07 19 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following plumbing piping services:

1. Domestic cold-water piping.
2. Domestic hot-water piping.
3. Domestic recirculating hot-water piping.
4. Roof drains and rainwater leaders.
5. Supplies and drains for handicap-accessible lavatories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).

1. Flexible elastomeric insulation.
2. Mineral-fiber, preformed pipe insulation.
3. Field applied jackets.
4. Protective shielding pipe covers.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Provide insulation system installation by qualified Installers who are trained in installation of each proposed insulation material and product with at least one of the following qualifications:

1. Have successfully completed a Mechanical Insulation Apprenticeship program by the Department of Labor, Bureau of Apprenticeship and Training,
2. Have successfully completed an ASHRAE / NIA 8-hour Mechanical Insulation Training course or equal, or
3. Have five years documented experience as a mechanical insulation specialist with references attesting to successful completion of at least three comparable projects.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

C. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.8 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Aeroflex USA, Inc.; Aerocel.
b. Armacell LLC; AP Armaflex.
c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

G. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Fibrex Insulations Inc.; Coreplus 1200.
b. Johns Manville; Micro-Lok.
c. Knauf Insulation; 1000-Degree Pipe Insulation.
d. Manson Insulation Inc.; Alley-K.
e. Owens Corning; Fiberglas Pipe Insulation.

2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

H. Glass-Fiber Loose-Fill Insulation: Comply with requirements for glass-fiber loose-fill insulation specified in Section 07 21 00 "Thermal Insulation."

I. Spray polyurethane foam: Comply with requirements for spray polyurethane foam specified in Section 07 21 00 "Thermal Insulation."

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Aeroflex USA, Inc.; Aeroseal.

b. Armacell LLC; Armaflex 520 Adhesive.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
d. K-Flex USA; R-373 Contact Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
d. Mon-Eco Industries, Inc.; 22-25.

D. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 739, Dow Silicone.
b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
c. P.I.C. Plastics, Inc.; Welding Adhesive.
d. Speedline Corporation; Polyco VP Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ-SSL: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing, self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.

2.4 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Johns Manville; Zeston.
    b. P.I.C. Plastics, Inc.; FG Series.
    c. Proto Corporation; LoSmoke.
    d. Speedline Corporation; SmokeSafe.

2. Adhesive: As recommended by jacket material manufacturer.

3. Color: White.

4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.

    a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and roof drain bodies.

2.5 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABI, Ideal Tape Division; 428 AWF ASJ.
    b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
    c. Compac Corporation; 104 and 105.
    d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.

3. Thickness: 11.5 mils.

4. Adhesion: 90 ounces force/inch in width.

5. Elongation: 2 percent.

6. Tensile Strength: 40 lbf/inch in width.

7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABI, Ideal Tape Division; 370 White PVC tape.

b. Compac Corporation; 130.
c. Venture Tape; 1506 CW NS.

2. Width: 2 inches.

3. Thickness: 6 mils.

4. Adhesion: 64 ounces force/inch in width.

5. Elongation: 500 percent.

6. Tensile Strength: 18 lbf/inch in width.

2.6 SECUREMENTS

A. Wire: 0.062-inch soft-annealed, stainless steel.

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. C & F Wire.

2.7 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:

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. Engineered Brass Company.
b. Insul-Tect Products Co.; a subsidiary of MVG Molded Products.
c. McGuire Manufacturing.
d. Plumberex.
e. Truebro; a brand of IPS Corporation.
f. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.

2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

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

C. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.

2. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

3. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive along both edges of strip.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap.
4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere and seal patches similar to butt joints.

P. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

Q. Miscellaneous Voids: Install insulation where indicated and in miscellaneous openings and penetrations in the exterior building envelope, including pipe sleeves, exterior wall hydrants, roof drains, downspout nozzles, pipe chases located on exterior walls, voids and cavity spaces created by Plumbing Work where required to provide continuity and integrity to the building exterior envelope insulation system, sealing gaps and preventing air infiltration, using the following materials:

1. Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

2. Spray Polyurethane Foam: Apply according to manufacturer's written instructions.

    a. Trim and dress surface of spray polyurethane foam to provide smooth, flush surface.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.

2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.

3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.

4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.

2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.

3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.

4. Seal jacket to wall flashing with flashing sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Section 07 84 13 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

E. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies.
3. Comply with requirements in Section 07 84 13 "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.

2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.

3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.

4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.

5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.

6. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulation Installation on Roof Drain Bodies:

1. Insulate roof drain bodies using preformed fitting insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement.

2. Adhere fitted PVC cover to insulated Roof Drain Body with PVC Jacket Adhesive. Tape PVC covers to adjoining insulation facing using PVC tape. Seal voids to maintain vapor barrier on drain body assembly.

D. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturers recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. Secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.8 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.9 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water (General Building Areas):

1. Mineral-Fiber, Preformed Pipe Insulation with factory applied jacket, Type I:1-inch thickness.

B. Domestic Cold Water located within Masonry Block Wall cores or buried conduits:

1. Flexible Elastomeric Insulation: 1/2-inch thick.

C. Domestic Hot and Recirculation Water (General Building Areas):

1. Mineral-Fiber, Preformed Pipe Insulation with factory applied jacket, Type I:

a. Pipes size 1 1/4" or smaller: 1-inch thickness.
b. Pipes size 1 1/2" or larger: 1-1/2-inch thickness.

D. Domestic Hot and Recirculation Water located within Masonry Block Wall cores or buried conduits:

1. Flexible Elastomeric Insulation:

a. Pipes size 1 1/4" or smaller: 1/2-inch thickness.

b. Pipes size 1 1/2" or larger: 1-inch thickness.

E. Stormwater and Overflow:

1. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1-inch thick.

F. Roof Drain and Overflow Drain Bodies:

1. Mineral-Fiber, Preformed Pipe Insulation without factory applied jacket, Type I: 2-inch thick.

G. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:

1. Protective Shielding Pipe Covers.

END OF SECTION 22 07 19

SECTION 22 11 16 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Copper tube and fittings.
2. Piping joining materials.
3. Transition fittings.
4. Dielectric fittings.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Copper tube and fittings.
2. Piping joining materials.
3. Transition fittings.
4. Dielectric fittings.

1.4 INFORMATIONAL SUBMITTALS

A. Lab results for lead testing prior to commencing work.
B. System purging and disinfecting activities report.
C. Field quality-control reports.
D. Lab results for biological testing showing samples negative for coliform bacteria.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installers of pressure-sealed joints are to be certified by pressure-seal joint manufacturer as having been trained and qualified to join piping with pressure-seal pipe couplings and fittings.

1.6 FIELD CONDITIONS

A. Interruption of Existing Water Service: Refer to “Existing Utility Interruptions” paragraph of Section 01 12 00 “Multiple Contract Summary-Project Schedule” for requirements associated with interrupting the existing water service to facilities occupied by the Owner.

B. Coordinate potable water lead testing with Owner prior to starting any construction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Domestic water piping, tubing, fittings, joints, and appurtenances intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act, with requirements of authorities having jurisdiction, and with NSF 61 and NSF 372, or be certified in compliance with NSF 61 and NSF 372 by an ANSI-accredited third-party certification body, in that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

2.2 PIPING MATERIALS

A. Potable-water piping and components are to comply with NSF 14, NSF 61, and NSF 372.

2.3 COPPER TUBE AND FITTINGS

A. Drawn-Temper Copper Tube: ASTM B88, Type L.

B. Annealed-Temper Copper Tube: ASTM B88, Type K ASTM B88, Type L.

C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings. Do not use solder joints on pipe sizes greater than NPS 4.

D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, pressure fittings. Do not use solder joints on pipe sizes greater than NPS 4.

E. Cast Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends. Do not use solder joints on pipe sizes greater than NPS 4.

F. Wrought Copper Unions: ASME B16.22. Do not use solder joints on pipe sizes greater than NPS 4.

G. Pressure-Seal-Joint Fittings, Copper or Bronze - Domestic Water:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Viega LLC ; ProPress Copper. or a comparable product by one of the following:

    a. Elkhart Brass Mfg. Co., Inc.
    b. Mueller Streamline Co.; a company of Mueller Industries.
    c. NIBCO INC.

2. Source Limitations: Obtain pressure-seal-joint fittings, copper or bronze, from single manufacturer.

3. Housing: Copper.

4. O-Rings and Pipe Stops: EPDM.

5. Tools: Manufacturer's special tools.

6. Minimum 200 psig working-pressure rating at 250 deg F.

2.4 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials:

1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
2. Full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Solder Filler Metals: ASTM B32, lead-free alloys.

D. Flux: ASTM B813, water flushable.

E. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.5 TRANSITION FITTINGS

A. Install transition couplings at joints of piping with small differences in OD's. Refer to transition fitting products specified in Section 22 05 00 “Common Work Results for Plumbing”.

2.6 DIELECTRIC FITTINGS

A. Dielectric Unions and Flanges: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined. Comply with requirements in Section 22 05 00 "Common Work Results for Plumbing."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before proceeding with water piping installation, examine conditions existing at Site and notify affected Contractors and Architect of any construction or any other conditions prevailing which prevent, inhibit, or otherwise interfere with water piping installation.

B. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PIPING APPLICATIONS

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Aboveground domestic water piping, NPS 2 (DN 50) and smaller is to be the following:

1. Drawn-temper copper tube, ASTM B88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.
2. Drawn-temper copper tube, ASTM B88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.

D. Aboveground domestic water piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100) is to be the following:

1. Drawn-temper copper tube, ASTM B88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.
2. Drawn-temper copper tube, ASTM B88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.

3.3 INSTALLATION OF PIPING

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install domestic water piping level without pitch and plumb.

C. Rough-in domestic water piping for water-meter installation in accordance with utility company's requirements.

D. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

G. Install piping to permit valve servicing.

H. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

I. Install piping free of sags and bends.

J. Install fittings for changes in direction and branch connections.

K. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

L. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

M. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

N. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.4 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads in accordance with ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.

E. Soldered Joints for Copper Tubing: Apply ASTM B813, water-flushable flux to end of tube. Join copper tube and fittings in accordance with ASTM B828 or CDA's "Copper Tube Handbook."

F. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools and procedure recommended by pressure-seal-fitting manufacturer. Leave insertion marks on pipe after assembly.

3.5 INSTALLATION OF DIELECTRIC FITTINGS

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
B. Dielectric Fittings for NPS 2 (DN 50) and Smaller: Use dielectric unions or nipples.

3.6 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for hangers, supports, and anchor devices in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."

B. Install hangers for copper pipe, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

C. Support horizontal piping within 12 inches of each fitting.

D. Support vertical runs of copper pipe to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.7 PIPING CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.

2. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 IDENTIFICATION

A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

3.9 FIELD QUALITY CONTROL

A. Potable water testing for lead:

1. Coordinate with Owner on any potable water system lead testing previously performed in each building where modifications to the potable water systems are to take place.

B. Perform the following tests and inspections:

1. Lead Testing Prior to Commencing Construction:

a. Collect and test water samples in accordance with NYS Law 10 CRR-NY 67-4.

b. Collect a first-draw sample from a cold-water outlet in the vicinity of the building where work is to be performed.

c. Have samples analyzed for lead content by a State Certified testing lab approved to perform such analyses by the Department's Laboratory Approval Program (ELAP). Submit copy of results to Architect/Engineer as a base line of water quality in the building before construction.

2. Lead Testing After Construction is Complete:

   a. Collect and test water samples in accordance with NYS Law 10 CRR-NY 67-4.

   b. Collect a first-draw sample from a cold-water outlet in the vicinity of the building where work was performed.

   c. Have samples analyzed for lead content by a State Certified testing lab approved to perform such analyses by the Department's Laboratory Approval Program (ELAP). Submit copy of results to Architect/Engineer.

3. Piping Inspections:

   a. Do not enclose, cover, or put piping into operation until it has been tested and inspected by the Owner's Representative.

   b. During installation, notify Owner's Representative at least two days before inspection must be made. Perform tests specified below in presence of Owner's Representative:

      1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.

      2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

   c. Reinspection: If Owner's Representative finds that piping will not pass tests or inspections, make required corrections and arrange for reinspection.

   d. Reports: Prepare inspection reports and have them signed by the Owner's Representative.

4. Above Grade Piping Tests:

   a. Initial Test:

      1) Do not connect fixtures, equipment and solenoid valves into system during this test.

      2) Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

3) Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.

4) Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.

5) Cap and subject piping to static water pressure of 150 psig, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

6) Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.

7) Prepare reports for tests and for corrective action required.

b. Test After Fixtures are Connected:

1) Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

2) Test system again for 2 hours at 75 psig or prevailing water pressure, whichever is higher.

3) Repair leaks and defects at fixture and equipment connections or at solenoid valves, and retest piping or portion thereof until satisfactory results are obtained.

4) Prepare reports for tests and for corrective action required.

C. Domestic water piping will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.10 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
6. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.

2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

   a. Flush piping system with clean, potable water until dirty water does not appear at outlets.

   b. Fill and isolate system in accordance with either of the following:

      1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
      2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

   c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.

   d. Repeat procedures if biological examination shows contamination.

   e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
6. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.13 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Piping Inspections:

a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.

b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after installation and before setting fixtures.

2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.

d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.

c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.

d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.

f. Prepare reports for tests and for corrective action required.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 22 11 16

SECTION 22 11 19 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Temperature-actuated, water mixing valves.
2. Strainers for domestic water piping.
3. Hose bibbs.
4. Wall hydrants.
5. Drain valves.
6. Water-hammer arresters.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for domestic water piping specialties. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1. Individual-fixture, water tempering valves.
2. Washing machine valve.
3. Moderate-climate wall hydrants.
4. Stop-and-waste drain valves.
5. Water hammer arresters.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Section 01 33 00 "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Hose bibbs.
2. Hose-end drain valves.

1.4 INFORMATIONAL SUBMITTALS

A. Test and inspection reports.
B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

A. Domestic water piping specialties intended to convey or dispense water for human consumption are to comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or to be certified in compliance with NSF 61 and NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

2.2 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3 TEMPERATURE-ACTUATED, WATER MIXING VALVES

A. Water-Temperature Limiting Devices:

1. Basis-of-Design Product: Subject to compliance with requirements, provide POWERS; A WATTS Brand; Model LFMMV or comparable product by one of the following:

    a. Cash Acme; a division of Reliance Worldwide Corporation; Heatguard 160 LF.
    b. Conbraco Industries, Inc.; MVA (34A) Series.
    c. Honeywell International Inc.; AM-1 1070 series.
    d. Leonard Valve Company; LF-370 series.
    e. Symmons Industries, Inc.; 7 Series Maxline.
    f. Watts; a Watts Water Technologies Company;
    g. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products; ZW 1070 series.

2. Standard: ASSE 1070.

3. Pressure Rating: 125 psig.

4. Minimum pressure required: 30 psig.

5. Hot water inlet to outlet temperature differential: 5 deg F above set point.

6. Minimum flow rate: 0.50 gpm

7. Maximum flow rate: 6.00 gpm

8. Type: Thermostatically controlled, water mixing valve.

9. Material: Lead free bronze body with corrosion-resistant interior components.

10. Accessories: Check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.

11. Valve Finish: Rough bronze.

12. Capacities and Characteristics:

    a. Tempered-Water Setting: 105 deg F.
    b. Inlet Size: 1/2”
    c. Outlet Size: 1/2”

2.4 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Inc; Model T-222-A or F-721-A or comparable product by one of the following:

    a. Conbraco Industries, Inc.
    b. Crane Co.; Crane Valve Group; Crane Valves.
    c. Crane Co.; Crane Valve Group; Jenkins Valves.
    d. Crane Co.; Crane Valve Group; Stockham Div.
    e. Hammond Valve.
    f. Milwaukee Valve Company.
    g. WATTS.
    h. Zurn Industries, LLC.

2. Pressure Rating: 125 psig minimum unless otherwise indicated.

3. Body: Bronze for NPS 2 and smaller; cast iron for NPS 2-1/2 and larger.

4. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.

5. Screen: Stainless steel with round perforations unless otherwise indicated.

6. Perforation Size: Strainers NPS 2 and Smaller: 0.020 inch.

7. Drain: Pipe plug.

2.5 WASHING MACHINE VALVE

A. Washing Machine Shut-off Valve:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Watts; Model 175C or comparable product by one of the following:

a. Acorn Engineering Company; a Division of Morris Group International.
b. Kissler & Co.
c. Oatey.
d. Sioux Chief Manufacturing Company, Inc.
e. Water-Tite, IPS Corporation.

2. Mounting: Surface.

3. Material and Finish: Bronze.

4. Faucet: Combination valved fitting or separate hot- and cold-water valved fittings complying with ASME A112.18.1. Include garden-hose thread complying with ASME B1.20.7 on outlets.

5. Supply Shutoff Fittings: NPS 1/2 ball valves and NPS 1/2 copper, water tubing.

2.6 HOSE BIBBS

A. Hose Bibbs:

1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig.
7. Vacuum Breaker: Integral nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
9. Finish for Service Areas: Rough bronze.
10. Finish for Finished Rooms: Chrome or nickel plated.
11. Operation for Equipment Rooms: Wheel handle or operating key.
12. Operation for Service Areas: Wheel handle.
13. Operation for Finished Rooms: Operating key.
14. Include operating key with each operating-key hose bibb.
15. Include wall flange with each chrome- or nickel-plated hose bibb.

2.7 WALL HYDRANTS

A. Moderate-Climate Wall Hydrants (INT WH):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; Model No. 5509-QT-SAP-CP or comparable product by one of the following:

a. Josam Company.
b. MIFAB, Inc.
c. Prier Products, Inc.
d. WATTS.

e. Woodford Manufacturing Company.
f. Zurn Industries, LLC.

2. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.

3. Pressure Rating: 125 psig.

4. Operation: Loose key.

5. Inlet: NPS 3/4 or NPS 1.

6. Outlet:

a. Concealed, with integral vacuum breaker or nonremovable hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.

b. Garden-hose thread complying with ASME B1.20.7.

7. Box: Deep, flush mounted with cover.

8. Box and Cover Finish: Chrome plated.

9. Operating Keys(s): One with each wall hydrant.

2.8 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Inc; Model T-585-70-HC or comparable product by one of the following:

a. Conbraco Industries, Inc.
b. Crane Co.; Crane Valve Group; Crane Valves.
c. Crane Co.; Crane Valve Group; Jenkins Valves.
d. Crane Co.; Crane Valve Group; Stockham Div.
e. Hammond Valve.
f. Milwaukee Valve Company.
g. Red-White Valve Corp.

2. Standard: MSS SP-110 for standard-port, two-piece ball valves.

3. Pressure Rating: 400-psig minimum CWP.

4. Size: NPS 3/4.

5. Body: Copper alloy.

6. Ball: Chrome-plated brass.

7. Seats and Seals: Replaceable.

8. Handle: Vinyl-covered steel.

9. Inlet: Threaded or solder joint.

10. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

B. Stop-and-Waste Drain Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Inc.; S-FP-600-AD-LF or comparable product by one of the following:

a. Conbraco Industries, Inc.
b. Hammond Valve.
c. Milwaukee Valve Company.
d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Standard: MSS SP-110 for ball valves.

3. Pressure Rating: 200-psig minimum CWP or Class 125.

4. Size: NPS 3/4.

5. Body: Lead-free copper alloy or ASTM B 62 bronze.

6. Drain: NPS 1/8 side outlet with cap.

2.9 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters (WHA "A" through "F"):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; 5200 series "Hydrotrol Junior" or comparable product by one of the following:

a. AMTROL, Inc.
b. Josam Company.
c. MIFAB, Inc.
d. Precision Plumbing Products.
e. Sioux Chief Manufacturing Company, Inc.
f. WATTS.
g. Zurn Industries, LLC.

2. Standard: ASSE 1010 or PDI-WH 201.

3. Type: Copper tube with multiple "O" ring pistons.

4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING SPECIALTIES

A. Balancing Valves: Install in locations where they can easily be adjusted. Set at indicated design flow rates.
B. Temperature-Actuated, Water Mixing Valves: Install with check stops or shutoff valves on inlets and with shutoff valve on outlet.
C. Water-Hammer Arresters: Install in water piping in accordance with PDI-WH 201.

3.2 PIPING CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.
B. When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.

3.3 IDENTIFICATION

A. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 22 05 53 “Identification for Plumbing Piping and Equipment”.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 22 11 19

SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Heavy-duty, high torque hubless-piping couplings.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Section 01 33 00 "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Hub-and-spigot, cast-iron soil pipe and fittings.
2. Hubless, cast-iron soil pipe and fittings.
3. CISPI, low torque hubless-piping couplings.
4. Copper pipe and fittings.
5. Transition couplings.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.5 FIELD CONDITIONS

A. Interruption of Existing Sanitary Waste Service: Refer to "Existing Utility Interruptions" paragraph of Section 01 12 00 "Multiple Contract Summary-Project Schedule" for requirements associated with interrupting the existing sanitary sewer service to facilities occupied by the Owner.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Components and installation are capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10 ft. head of water.

2.2 PIPING MATERIALS

A. Piping materials to bear label, stamp, or other markings of specified testing agency.
B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AB & I Foundry; a part of the McWane family of companies.
2. Charlotte Pipe and Foundry Company.
3. Tyler Pipe; a part of McWane family of companies.

B. Pipe and Fittings: Centrifugally cast gray cast iron pipe and static cast fittings conforming to requirements of ASTM Standard A 74, service weight (SV) type. Pipe and fittings marked with the collective trademark of the Cast Iron Soil Institute and listed by NSF® International.

C. Gaskets: ASTM C564, rubber.

D. Caulking Materials: ASTM B29, pure lead and oakum or hemp fiber.

2.4 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AB & I Foundry; a part of the McWane family of companies.
2. Charlotte Pipe and Foundry Company.
3. Tyler Pipe; a part of McWane family of companies.

B. Pipe and Fittings: Centrifugally cast gray cast iron pipe and static cast fittings conforming to requirements of ASTM A 888 or CISPI 301. Pipe and fittings marked with the collective trademark of the Cast Iron Soil Institute and listed by NSF® International.

C. CISPI, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. ANACO.
   b. Ideal Tridon Group.
   c. Mission Rubber Company, LLC; a division of MCP Industries.
   d. Tyler Pipe; a subsidiary of McWane Inc.

2. Standards: ASTM C1277 or CISPI 310.

3. Description: Standard stainless steel corrugated shield with stainless steel bands and tightening devices; and ASTM C564, neoprene sleeve with integral, center pipe stop.

D. Heavy-Duty, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Husky SD4000.
   b. Clamp All 125.
   c. MG Products.

2. Standards: ASTM C1540.

3. Description: Type 304 stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, neoprene sleeve with integral, center pipe stop.

2.5 COPPER TUBE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Apollo Valves; a part of Aalberts Integrated Piping Systems.
2. Cambridge-Lee Industries, LLC.
3. Cerro Flow Products, LLC.
4. Wieland Copper Products, LLC.

B. Copper Type DWV Tube: ASTM B306, drainage tube, drawn temper.

C. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

D. Hard Copper Tube: ASTM B88, Type L and Type M, water tube, drawn temper.

E. Soft Copper Tube: ASTM B88, Type L, water tube, annealed temper.

F. Solder: ASTM B32, lead free with ASTM B813, water-flushable flux.

2.6 TRANSITION FITTINGS

A. Install transition couplings at joints of piping with small differences in OD's. Refer to transition fitting products specified in Section 22 05 00 “Common Work Results for Plumbing”.

2.7 DIELECTRIC FITTINGS

A. Dielectric Unions and Flanges: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined. Comply with requirements in Section 22 05 00 "Common Work Results for Plumbing."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine conditions under which drainage and vent systems, e.g., storm drainage, sanitary sewer, laboratory waste, etc., are to be installed in coordination with Installer of materials and components specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

1. Verify invert elevation of existing piping when new connections are indicated. Do not install buried sewer work until existing sewer invert elevation has been verified to meet required slope and bury depth requirements of new sewer piping.

2. Determine inverts and routing of piping systems and interferences with other building piping systems, building structure, lights, ductwork, foundations prior to installation.

B. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.

1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
2. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping at indicated slopes.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Install vent piping to allow application of insulation within 10 feet of a roof penetration.

I. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.

1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.

2. Use long-turn, double Y-branch, and 1/8-bend fittings if two fixtures are installed back-to-back or side-by-side with common drainpipe.

a. Straight tees, elbows, and crosses may be used on vent lines.

3. Do not change direction of flow more than 90 degrees.

4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.

a. Reducing size of waste piping in direction of flow is prohibited.

J. Lay buried building waste piping beginning at low point of each system.

1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
3. Maintain swab in piping and pull past each joint as completed.

K. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:

1. Building Sanitary Waste: Two percent downward in direction of flow for piping NPS 2 and smaller; 1 percent downward in direction of flow for piping NPS 3 and larger.
2. Horizontal Sanitary Waste Piping: Two percent downward in direction of flow.
3. Vent Piping: One percent down toward vertical fixture vent or toward vent stack.

L. Install cast-iron soil piping in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

M. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."

N. Install engineered soil and waste drainage and vent piping systems as follows:

1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.

O. Plumbing Specialties:

1. Install backwater valves in sanitary waster gravity-flow piping.

a. Comply with requirements for backwater valves specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

2. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary waste gravity-flow piping.

a. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping.
b. Comply with requirements for cleanouts specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

3. Install drains in sanitary waste gravity-flow piping.

a. Comply with requirements for drains specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

Q. Insulate vent piping within 10 feet of roof penetrations, all directions.

1. Comply with requirements for insulation specified in Section 22 07 19 " Plumbing Piping Insulation."

R. Install sleeves for piping penetrations of walls, ceilings, and floors.

1. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

S. Install sleeve seals for piping penetrations of concrete walls and slabs.

1. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

T. Install escutcheons for piping penetrations of walls, ceilings, and floors.

1. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Hub-and-Spigot, Cast-Iron Soil Piping Caulked Joints: Join in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead-and-oakum caulked joints.

C. Hubless, Cast-Iron Soil Piping Coupled Joints:

1. Join hubless, cast-iron soil piping in accordance with CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

D. Join copper tube and fittings with soldered joints in accordance with ASTM B828. Use ASTM B813, water-flushable, lead-free flux and ASTM B32, lead-free-alloy solder.

3.4 SPECIALTY PIPE FITTING INSTALLATION

A. Comply with requirements for dielectric fittings specified in Section 22 05 00 "Common Work Results for Plumbing."

B. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in ODs.
2. In Waste Drainage Piping: Shielded, nonpressure transition couplings.

C. Dielectric Fittings:

1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges or flange kits.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for pipe hanger and support devices and installation specified in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment".

1. Install galvanized carbon-steel pipe hangers for horizontal piping in noncorrosive environments.

2. Install galvanized carbon-steel pipe support clamps for vertical piping in noncorrosive environments.

3. Vertical Piping: MSS Type 8 or Type 42 clamps.

4. Install individual, straight, horizontal piping runs:

a. 100 Ft. and Less: MSS Type 1, adjustable, steel clevis hangers.
b. Longer Than 100 Ft.: MSS Type 43, adjustable roller hangers.
c. Longer Than 100 Ft. if Indicated: MSS Type 49, spring cushion rolls.

5. Multiple, Straight, Horizontal Piping Runs 100 Ft. or Longer: MSS Type 44 pipe rolls. Support pipe rolls on trapeze.

6. Base of Vertical Piping: MSS Type 52 spring hangers.

B. Install hangers for cast-iron and copper soil piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

C. Support horizontal piping and tubing within 12 inches of each fitting and coupling.

D. Support vertical runs of cast-iron and copper soil piping to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.6 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect waste and vent piping to the following:

1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
5. Comply with requirements for cleanouts and drains specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

E. Make connections in accordance with the following unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.

3.7 IDENTIFICATION

A. Identify exposed sanitary waste and vent piping.
B. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.8 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary waste and vent piping in accordance with procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.

    a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.

    a. Expose work that was covered or concealed before it was tested.

3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.

    a. Close openings in piping system and fill with water to point of overflow, but not less than 10 ft. head of water.
    b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
    c. Inspect joints for leaks.

4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.

    a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1 inch wg.
    b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
    c. Air pressure must remain constant without introducing additional air throughout period of inspection.
    d. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

6. Prepare reports for tests and required corrective action.

3.9 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.
B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
C. Place plugs in ends of uncompleted piping at end of day and when work stops.
D. Repair damage to adjacent materials caused by waste and vent piping installation.

3.10 PIPING SCHEDULE

A. Aboveground, soil, waste and vent piping NPS 3 and smaller are to be any of the following:

1. Service cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; CISPI 310, standard hubless-piping couplings; and coupled joints.
3. Copper Type DWV tube, copper drainage fittings, and soldered joints.
4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

B. Aboveground, soil, waste and vent piping NPS 4 and larger are to be any of the following:

1. Service cast iron, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.
3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

C. Underground, soil, waste, and vent piping NPS 12 and smaller are to be the following:

1. Service cast-iron soil piping; gaskets; and gasketed joints.

END OF SECTION 22 13 16

SECTION 22 13 19 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cleanouts.
2. Floor drains.
3. Miscellaneous sanitary drainage piping specialties.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for the following:

1. Floor cleanouts, general building areas.
2. Wall cleanouts.
3. Floor drain "A".

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Section 01 33 00 "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Deep-seal traps.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTIONS

A. Sanitary waste piping specialties shall bear label, stamp, or other markings of specified testing agency.

2.2 CLEANOUTS

A. Cast-Iron Exposed Cleanouts (CO):

1. Standard: ASME A112.36.2M.
2. Size: Same as connected drainage piping
3. Body Material: Hub-and-spigot, cast-iron soil pipe T-branch or hubless, cast-iron soil pipe test tee as required to match connected piping.
4. Closure: Countersunk or raised-head, brass plug.
5. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

B. Floor Cleanouts, General Building Areas (CODP):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; No. 4021-U Series or a comparable product by one of the following:

    a. Josam Company.
    b. MIFAB, Inc.
    c. WATTS; A Watts Water Technologies Company.
    d. Zurn Industries, LLC.

2. Standard: ASME A112.36.2M for adjustable housing cleanout.

3. Size: Same as connected branch.

4. Type: Adjustable threaded housing.

5. Body or Ferrule: Cast iron.

6. Outlet Connection: Spigot.

7. Closure: Brass plug with tapered threads or plastic plug and gasket.

8. Adjustable Housing Material: Nickel bronze with threads.

9. Frame and Cover Material and Finish: Nickel-bronze, copper alloy with scoriated, vandal resistant top.

10. Frame and Cover Shape: Round.

11. Top-Loading Classification: Medium Duty.

12. Riser: ASTM A74, Service Class, cast-iron drainage pipe fitting and riser to cleanout.

C. Wall Cleanouts (COWP):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; No. 4531-U Series or a comparable product by one of the following:

    a. Josam Company.

b. MIFAB, Inc.
c. WATTS; A Watts Water Technologies Company.
d. Zurn Industries, LLC.

2. Standard: ASME A112.36.2M, for cleanouts. Include wall access.

3. Size: Same as connected drainage piping.

4. Body Material: Hubless, cast-iron soil-pipe test tee as required to match connected piping.

5. Closure: Countersunk, drilled-and-threaded bronze plug and gasket.

6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

7. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with vandal resistant screw.

2.3 FLOOR DRAINS

A. Cast-Iron Floor Drains (FD "A"):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; No. 2005 or a comparable product by one of the following:

a. Josam Company.
b. MIFAB, Inc.
c. WATTS; A Watts Water Technologies Company.
d. Zurn Industries, LLC.

2. Standard: ASME A112.6.3.

3. Pattern: Floor drain.

4. Body Material: Gray iron.

5. Outlet: Bottom.

6. Backwater Valve: Not required.

7. Top of Body and Strainer Finish: Nickel bronze.

8. Top Shape: Round.

9. Dimensions of Top or Strainer: 7-inch diameter.

10. Top Loading Classification: Light Duty.

11. Trap Material: Cast iron.

12. Trap Pattern: Deep-seal P-trap.

13. Trap Features: Trap-seal primer valve drain connection.

2.4 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Deep-Seal Traps:

1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.

2. Size: Same as connected waste piping.

   a. NPS 2: 4-inch-minimum water seal.
   b. NPS 2-1/2 and Larger: 5-inch-minimum water seal.

B. Floor-Drain, Inline Trap Seal:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; Quad Close Trap Seal No. 2962 or a comparable product by one of the following:

   a. Green Drain, Inc.
   b. Josam Company.
   c. MIFAB, Inc.
   d. RectorSeal Plumbing; A CSW Industrials Company.

2. Description: Inline floor drain trap seal, forming a physical barrier to slow trap evaporation while not impeding flow from drain.

3. Material: Polymer.

4. Standard: Tested and certified in accordance with ASSE 1072.

5. Listing: ICC-ES or IAPMO listed.

6. Size: Same as floor drain outlet or strainer throat.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.

3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

D. Install floor and trench drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.

1. Position floor drains for easy access and maintenance.

2. Set floor drains below elevation of surrounding finished floor to allow floor drainage.

3. Set with grates depressed according to the following drainage area radii:

a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.

4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

E. Install deep-seal traps on floor drains and other waste outlets, if indicated.

F. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 PIPING CONNECTIONS

A. Comply with requirements in Section 22 13 16 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment, to allow service and maintenance.

3.3 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 22 13 19

SECTION 22 14 14 - STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Heavy-duty, high torque hubless-piping couplings.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Section 01 33 00 "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Hub-and-spigot, cast-iron soil pipe and fittings.
2. Hubless, cast-iron soil pipe and fittings.
3. Copper pipe and fittings.
4. Transition couplings.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

1.6 FIELD CONDITIONS

A. Interruption of Existing Storm Drainage Sewer: Refer to "Existing Utility Interruptions" paragraph of Section 01 12 00 "Multiple Contract Summary-Project Schedule" for requirements associated with interrupting the existing storm sewer service to facilities occupied by the Owner.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Components and installation are capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Storm Drainage Piping: 10 ft. head of water

2.2 PIPING MATERIALS

A. Piping materials to bear label, stamp, or other markings of specified testing agency.
B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AB & I Foundry; a part of the McWane family of companies.
2. Charlotte Pipe and Foundry Company.
3. Tyler Pipe; a part of McWane family of companies.

B. Pipe and Fittings: Centrifugally cast gray cast iron pipe and static cast fittings conforming to requirements of ASTM Standard A 74, service weight (SV) type. Pipe and fittings marked with the collective trademark of the Cast Iron Soil Institute and listed by NSF® International.

C. Gaskets: ASTM C564, rubber.

D. Caulking Materials: ASTM B29, pure lead and oakum or hemp fiber.

2.4 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AB & I Foundry; a part of the McWane family of companies.
2. Charlotte Pipe and Foundry Company.
3. Tyler Pipe; a part of McWane family of companies.

B. Pipe and Fittings: Centrifugally cast gray cast iron pipe and static cast fittings conforming to requirements of ASTM A 888 or CISPI 301. Pipe and fittings marked with the collective trademark of the Cast Iron Soil Institute and listed by NSF® International.

C. Heavy-Duty, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Huky SD 4000.
   b. Clamp All 125.
   c. MG Products.

2. Standards: ASTM C1540.

3. Description: Type 304 stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.5 COPPER TUBE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Apollo Valves; a part of Aalberts Integrated Piping Systems.
2. Cambridge-Lee Industries, LLC.
3. Cerro Flow Products, LLC.
4. Wieland Copper Products, LLC.

B. Copper Type DWV Tube: ASTM B306, drainage tube, drawn temper.

C. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

D. Hard Copper Tube: ASTM B88, Type Lwater tube, drawn temper.

E. Soft Copper Tube: ASTM B88, Type L, water tube, annealed temper.

F. Solder: ASTM B32, lead free with ASTM B813, water-flushable flux.

2.6 TRANSITION FITTINGS

A. Install transition couplings at joints of piping with small differences in OD's. Refer to transition fitting products specified in Section 22 05 00 “Common Work Results for Plumbing”.

2.7 DIELECTRIC FITTINGS

A. Dielectric Unions and Flanges: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined. Comply with requirements in Section 22 05 00 "Common Work Results for Plumbing."

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.

1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
2. Install piping as indicated unless deviations from layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Make changes in direction for piping using appropriate branches, bends, and long-sweep bends.

1. Do not change direction of flow more than 90 degrees.

2. Use proper size of standard increasers and reducers if pipes of different sizes are connected.

a. Reducing size of drainage piping in direction of flow is prohibited.

K. Lay buried building piping beginning at low point of each system.

1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
3. Maintain swab in piping and pull past each joint as completed.

L. Install piping at the following minimum slopes unless otherwise indicated:

1. Building Storm Drain: 2 percent downward in direction of flow for piping NPS 3and smaller; 1 percent downward in direction of flow for piping NPS 4and larger.
2. Horizontal Storm Drainage Piping: 1 percent downward in direction of flow.

M. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

N. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."

O. Plumbing Specialties:

1. Install cleanouts at grade and extend to where building storm drains connect to building storm sewers in storm drainage gravity-flow piping.

a. Comply with requirements for cleanouts specified in Section 22 14 23 "Storm Drainage Piping Specialties."

2. Install drains in storm drainage gravity-flow piping.

a. Comply with requirements for drains specified in Section 22 14 23 "Storm Drainage Piping Specialties."

P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

Q. Install sleeves for piping penetrations of walls, ceilings, and floors.

1. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

R. Install sleeve seals for piping penetrations of concrete walls and slabs.

1. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

S. Install escutcheons for piping penetrations of walls, ceilings, and floors.

1. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.2 JOINT CONSTRUCTION

A. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Hubless, Cast-Iron Soil Piping Coupled Joints:

1. Join according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

C. Join copper tube and fittings with soldered joints according to ASTM B 828 procedure. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.

3.3 SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in ODs.
2. In Drainage Piping: Shielded, nonpressure transition couplings.

B. Dielectric Fittings:

1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric nipples.
3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flange kits.

3.4 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for hangers, supports, and anchor devices specified in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.

2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.

3. Vertical Piping: MSS Type 8 or Type 42, clamps.

4. Install individual, straight, horizontal piping runs:

   a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
   b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
   c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

5. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

6. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support horizontal piping and tubing within 12 inches of each fitting and coupling.

C. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

D. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
2. NPS 6 and NPS 8: 60 inches with 3/4-inch rod.
3. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

E. Install supports for vertical cast-iron soil piping every 15 feet.

F. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3 and NPS 5: 10 feet with 1/2-inch rod.

G. Install supports for vertical copper tubing every 10 feet.

H. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.

C. Connect storm drainage piping to roof drains and storm drainage specialties.

1. Install test tees (wall cleanouts) in conductors near floor, and floor cleanouts with cover flush with floor.

D. Where installing piping adjacent to equipment, allow space for service and maintenance.

3.6 IDENTIFICATION

A. Identify exposed storm drainage piping.
B. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.

2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Test storm drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.

a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved.

a. Expose work that was covered or concealed before it was tested.

3. Test Procedure:

a. Test storm drainage piping on completion of roughing-in.

b. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts until completion of inspection, water level must not drop. Inspect joints for leaks.

4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

5. Prepare reports for tests and required corrective action.

C. Piping will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.8 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.
B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.9 PIPING SCHEDULE

A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

B. Aboveground, storm drainage piping NPS 4 and larger shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.

2. Hubless, cast-iron soil pipe and fittings; heavy-duty, hubless-piping couplings; and coupled joints.
3. Copper Type DWV tube, copper drainage fittings, and soldered joints.
4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

C. Underground storm drainage piping shall be the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

END OF SECTION 22 14 14

SECTION 22 42 13.13 - COMMERCIAL WATER CLOSETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Water closets.
2. Flushometer valves.
3. Toilet seats.

1.3 DEFINITIONS

A. Effective Flush Volume: Average of two reduced flushes and one full flush per fixture.
B. Standard-Efficiency Flush Volume: 1.6 gal. per flush.
C. High-Efficiency Flush Volume: 1.28 gal. or less per flush.
D. WaterSense Fixture: Water closet and/or flushometer valve/tank certified by the EPA to meet the WaterSense performance criteria.
E. Remote Water Closet: Located more than 30 feet from other drain line connections or fixture and where less than 1.5 drainage fixture units are upstream of the drain line connection.

1.4 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for water closets. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1. Water Closet “A” flushometer valves.
2. Water Closet “B” flushometer valves.
3. Water Closet “C” flushometer valves.
4. Water Closet “D” flushometer valves.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Section 01 33 00 "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Water Closet "A" bowl.
2. Water Closet "B" bowl.
3. Water Closet "C" bowl.
4. Water Closet "D" bowl.
5. Supports.
6. Toilet seats.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flushometer valves to include in operation and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Water Conservation:

1. Provide plumbing fixtures complying with applicable provisions of Section 604.4 of the Plumbing Code of New York State.

B. Regulatory Requirements: Comply with requirements in 36 CFR Part 1191 – "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines"; for plumbing fixtures for people with disabilities.

1.8 EXTRA MATERIALS

A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than six of each type.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Standards:

1. Comply with ASME A112.19.2/CSA B45.1 for water closets.
2. Comply with ASME A112.19.5/CSA B45.15 for flush valves and spuds for water closets and tanks.
3. Comply with ASSE 1037/ASME A112.1037/CSA B125.37 for flush valves.
4. Comply with IAMPO/ANSI Z124.5 for water-closet (toilet) seats.

5. Comply with ASME A112.6.1M for water-closet supports.
6. Comply with ICC A117.1 for ADA-compliant water closets.
7. Comply with ASTM A1045 for flexible PVC gaskets used in connection of vitreous china water closets to sanitary drainage systems.
8. Comply with ASME A112.4.3 for plastic fittings used in connection of vitreous china water closets to sanitary drainage systems.

2.2 GENERAL CHARACTERISTICS

A. Vitreous China: Unmarked, true and level, clear, smooth and bright. Warranted not to craze, color or scale.
B. Trap ways no less than 2-1/8 inches in diameter and fully glazed.
C. Water surface area no less than 10 inches x 12 inches.
D. 100 percent factory tested for hydraulic performance, and trap seal depth, meeting or exceeding ANSI/ASME Standard A112.19.6, CSA B45 and a minimum ball pass diameter of 2 inches.

2.3 FLOOR-MOUNTED WATER CLOSETS

A. Water Closets (WC "A"): Floor mounted, top spud.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard; Madera FloWise 15" Height Elongated No. 3451.001 or comparable product by one of the following:

    a. Kohler Co.
    b. Sloan Valve Company.
    c. Zurn Industries, LLC.

2. Bowl:

    a. Material: Vitreous china.
    b. Type: Siphon jet.
    c. Style: Flushometer valve.
    d. Height: Refer to Schedule on Drawings.
    e. Rim Contour: Elongated.
    f. Water Consumption: 1.1 gal. – 1.6 gal. per flush.
    g. Effective Flush Volume: 1.28 gal. per flush.
    h. Spud Size and Location: NPS 1-1/2; top.
    i. Outlet: Bottom.
    j. Color: White.

3. Flushometer Valve: Comply with requirements in "Flushometer Valve" Article.

4. Toilet Seat: Comply with requirements in "Toilet Seat" Article.

B. Water Closets (WC “B”): Accessible floor mounted, top spud.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard; Madera FloWise 16-1/2” Height Elongated No. 3461.001 or comparable product by one of the following:

   a. Kohler Co.
   b. Sloan Valve Company.
   c. Zurn Industries, LLC.

2. Bowl:

   a. Material: Vitreous china.
   b. Type: Siphon jet.
   c. Style: Flushometer valve.
   d. Height: Refer to Schedule on Drawings.
   e. Rim Contour: Elongated.
   f. Water Consumption: 1.1 gal. – 1.6 gal. per flush.
   g. Effective Flush Volume: 1.28 gal. per flush.
   h. Spud Size and Location: NPS 1-1/2; top.
   i. Outlet: Bottom.
   j. Color: White.

3. Bowl-to-Drain Connecting Fitting: ASME A112.4.3.

4. Flushometer Valve: Comply with requirements in “Flushometer Valve” Article.

5. Toilet Seat: Comply with requirements in "Toilet Seat" Article.

2.4 WALL-MOUNTED WATER CLOSETS

A. Water Closets (WC “C” and “D”): Wall mounted, top spud.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard; Afwall Millennium FloWise Elongated No. 3351.101 or comparable product by one of the following:

   a. Kohler Co.
   b. Sloan Valve Company.
   c. Zurn Industries, LLC.

2. Bowl:

   a. Material: Vitreous china.
   b. Type: Siphon jet.
   c. Style: Flushometer valve.
   d. Height: Refer to Plumbing Fixture Schedule on Drawings.
   e. Rim Contour: Elongated.
   f. Water Consumption: 1.1 gal. – 1.6 gal. per flush.
   g. Effective Flush Volume: 1.28 gal. per flush.

h. Spud Size and Location: NPS 1-1/2; top.
i. Outlet: Back.
j. Color: White.

3. Support: Comply with requirements in “Support” Article.

4. Flushometer Valve: Comply with requirements in “Flushometer Valve” Article.

5. Toilet Seat: Comply with requirements in "Toilet Seat" Article.

2.5 FLUSHOMETER VALVES

A. Battery-Powered, Dual Flush Flushometer Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sloan Valve Company; Sloan ECOS Model No. ECOS 8111-1.6/1.1-YO-YB or comparable product by the following:

a. Zurn Industries, LLC; Commercial Brass and Fixtures.

2. Minimum Pressure Rating: 125 psig.

3. Features: Include angle stop bumper, sweat solder adapter, cast set screw escutcheon, casing tube, integral check stop and backflow-prevention device.

4. Material: Brass body with corrosion and chloramine resistant components.

5. Exposed Flushometer-Valve Finish: Chrome plated.

6. Actuator: Solenoid complying with UL 1951, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

7. Trip Mechanism: Battery-powered electronic sensor complying with UL 1951, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

8. Consumption: 1.6 gal./ 1.1 gal. per flush.

9. Effective Flush Volume: 1.28 gal. per flush.

10. Minimum Inlet: NPS 1.

11. Minimum Outlet: NPS 1-1/4.

2.6 TOILET SEATS

A. Standards Toilet Seats:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Beneke, a division of Sanderson Plumbing Products, Inc.; Model 523-SS or comparable product by the following:

    a. American Standard.
    b. Bemis Manufacturing Company.
    c. Church Seats.
    d. Kohler Co.
    e. Olsonite Seat Co.
    f. Zurn Industries, LLC; Commercial Brass and Fixtures.

2. Material: Anti-microbial treated fire-retardant plastic.

3. Type: Commercial (Heavy duty).

4. Shape: Elongated rim, open front.

5. Hinge: Self-sustaining, check.

6. Hinge Material: Stainless steel.

7. Seat Cover: Not required.

8. Color: White.

2.7 SUPPORTS

A. Water Closet Carrier:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg.; Series 100 and Series 200 M51 or comparable product by one of the following:

    a. Josam Company.
    b. Zurn Industries, LLC.

2. Description: Waste-fitting assembly, as required to match drainage piping material and arrangement with faceplates, couplings gaskets, and feet; bolts and hardware matching fixture.

    a. Provide horizontal carrier fittings with NPS 2 auxiliary no-hub inlet where appropriate for other plumbing fixture vertical pipe connections.

        1) Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg.; Series 209 and Series 219 M51 or comparable product.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before water-closet installation.
B. Examine walls and floors for suitable conditions where water closets will be installed.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 INSTALLATION

A. Water-Closet Installation:

1. Install level and plumb according to roughing-in drawings.
2. Install floor-mounted water closets on bowl-to-drain connecting fitting attachments to piping or building substrate.
3. Install accessible, wall-mounted water closets at mounting height for handicapped/elderly, according to ICC/ANSI A117.1.

B. Support Installation:

1. Install supports, affixed to building substrate, for floor-mounted, back-outlet water closets.
2. Use carrier supports with waste-fitting assembly and seal.
3. Install wall-mounted, back-outlet water-closet supports with waste-fitting assembly and waste-fitting seals; and affix to building substrate.

C. Flushometer-Valve Installation:

1. Install flushometer-valve, water-supply fitting on each supply to each water closet.

2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.

3. Install flushometer valves for accessible water closets such that the operating handle faces the approach or transfer side of the water closet stall. Install sensor operated flushometer valves in the same manner so that, in the event that the sensor operated flushometer valve is replaced by a manually operated valve, the handle will comply with the above requirement.

D. Install toilet seats on water closets.

E. Wall Flange and Escutcheon Installation:

1. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."
2. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations and within cabinets and millwork.
3. Install escutcheon so set screw is facing floor.

F. Joint Sealing:

1. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."
2. Seal joints between water closets and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
3. Match sealant color to water-closet color.

3.3 CONNECTIONS

A. Connect water closets with water supplies and soil, waste, and vent piping. Use size fittings required to match water closets.
B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."
C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."
D. Where installing piping adjacent to water closets, allow space for service and maintenance.

3.4 ADJUSTING

A. Operate and adjust water closets and controls. Replace damaged and malfunctioning water closets, fittings, and controls.
B. Adjust water pressure at flushometer valves to produce proper flow.
C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

A. Clean water closets and fittings with manufacturers' recommended cleaning methods and materials.
B. Install protective covering for installed water closets and fittings.

END OF SECTION 22 42 13.13

SECTION 22 42 13.16 - COMMERCIAL URINALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Urinals.
2. Flushometer valves.
3. Supports.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for urinals. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1. Urinal “A” flushometer valves.
2. Urinal “B” flushometer valves.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the “**As-Specified Verification Form**” (attached to Section 01 33 00 “Submittal Procedures”) for each item listed below; otherwise submit full Product Data for the following:

1. Urinal “A” bowls.
2. Urinal “B” bowls.
3. Support.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flushometer valves to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Water Conservation:

1. Provide plumbing fixtures complying with applicable provisions of Section 604.4 of the Plumbing Code of New York State.

B. Regulatory Requirements: Comply with requirements in 36 CFR Part 1191 – “Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines"; for plumbing fixtures for people with disabilities.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than one of each type.

PART 2 - PRODUCTS

2.1 WALL-HUNG URINALS

A. Urinals (UR “A” and “B”): Top spud.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard America; Washbrook FloWise No. 6590.001 or comparable product by one of the following:

a. Kohler Co.; Dexter Model K-5016-ET.
b. Sloan Valve Company.; Model SU-1009.
c. Zurn Industries, LLC.; OMNI-FLO Model Z5755-U.

2. Fixture:

a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
b. Material: Vitreous china.
c. Type: Washout flush action with extended shields.
d. Strainer or Trapway: Manufacturer's standard strainer with integral trap.
e. Water Consumption: 0.5 gal. per flush.
f. Spud Size and Location: NPS 3/4; top.
g. Outlet Size and Location: NPS 2; back.
h. Color: White.

3. Waste Fitting:

a. Standard: ASME A112.18.2/CSA B125.2 for coupling.
b. Size: NPS 2.

4. Flushometer Valve: Comply with requirements in “Flushometer Valve” Article.

5. Support: Comply with requirements in “Support” Article.

2.2 FLUSHOMETER VALVES

A. Battery-Powered Flushometer Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sloan Valve Company; G2 Optima Plus Model No. 8186-0.5 L/LOGO YBYC or comparable product by the following:

   a. Zurn Industries, LLC.

2. Standard: ASSE 1037.

3. Minimum Pressure Rating: 125 psig.

4. Features: Include sweat solder adapter, cast set screw escutcheon, casing tube, integral check stop and backflow-prevention device.

5. Material: Brass body with corrosion and chloramine resistant components.

6. Exposed Flushometer-Valve Finish: Chrome plated.

7. Style: Exposed.

8. Actuator: Solenoid complying with UL 1951, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

9. Trip Mechanism: Battery-powered electronic sensor complying with UL 1951, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

10. Consumption: 0.5 gal.per flush.

11. Minimum Inlet: NPS 3/4.

12. Minimum Outlet: NPS 3/4.

2.3 SUPPORTS

A. Type I Urinal Carrier:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; Series 637 or a comparable product by one of the following:

   a. Josam Company.
   b. MIFAB, Inc.

c. Wade Drains.
d. WATTS.
e. Zurn Industries, LLC.

2. Standard: ASME A112.6.1M.

3. Description: Type I, urinal carrier with top and bottom fixture support plates, coupling with seal and fixture bolts and hardware matching fixture, 1-1/4 inch diameter steel uprights welded to 4 inch square steel floor anchor plates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before urinal installation.
B. Examine walls and floors for suitable conditions where urinals will be installed.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Urinal Installation:

1. Install urinals level and plumb according to roughing-in drawings.
2. Install wall-hung, back-outlet urinals onto waste fitting seals and attached to supports.
3. Install accessible, wall-mounted urinals at mounting height for the handicapped/elderly, according to ICC/ANSI A117.1.
4. Install trap-seal liquid in waterless urinals.

B. Support Installation:

1. Install supports, affixed to building substrate, for wall-hung urinals.
2. Use off-floor carriers with waste fitting and seal for back-outlet urinals.
3. Use carriers without waste fitting for urinals with tubular waste piping.
4. Use chair-type carrier supports with rectangular steel uprights for accessible urinals.

C. Flushometer-Valve Installation:

1. Install flushometer-valve water-supply fitting on each supply to each urinal.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install lever-handle flushometer valves for accessible urinals with handle mounted on open side of compartment.
4. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

D. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations.

2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

E. Joint Sealing:

1. Seal joints between urinals and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to urinal color.
3. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."

3.3 CONNECTIONS

A. Connect urinals with water supplies and soil, waste, and vent piping. Use size fittings required to match urinals.
B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."
C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."
D. Where installing piping adjacent to urinals, allow space for service and maintenance.

3.4 ADJUSTING

A. Operate and adjust urinals and controls. Replace damaged and malfunctioning urinals, fittings, and controls.
B. Adjust water pressure at flushometer valves to produce proper flow.
C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

A. Clean urinals and fittings with manufacturers' recommended cleaning methods and materials.
B. Install protective covering for installed urinals and fittings.
C. Do not allow use of urinals for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 13.16

SECTION 22 42 16.13 - COMMERCIAL LAVATORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Lavatories.
2. Faucets.
3. Supplies.
4. Drains.
5. Traps.
6. Supports.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for lavatories. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1. Lavatory “A” faucets.
2. Lavatory “B” faucets.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the “**As-Specified Verification Form**” (attached to Section 01 33 00 “Submittal Procedures”) for each item listed below; otherwise submit full Product Data for the following:

1. Lavatory “A” bowls.
2. Lavatory “B” bowls.
3. Supports.
4. Supply fittings.
5. Straight tailpiece drains.
6. Offset tailpiece drains.
7. Standard traps.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For lavatories and faucets to include in operation and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Water Conservation:

1. Provide plumbing fixtures complying with applicable provisions of Section 604.4 of the Plumbing Code of New York State.

B. NSF Compliance:

1. NSF/ANSI-61- Drinking Water System Components - Health Effects.
2. NSF/ANSI-372 for lead-free valve materials for potable-water service.

C. Regulatory Requirements: Comply with requirements in 36 CFR Part 1191 – "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines"; for plumbing fixtures for people with disabilities.

1.5 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. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.

PART 2 - PRODUCTS

2.1 VITREOUS-CHINA, WALL-MOUNTED LAVATORIES

A. Lavatory (LAV "A"): Vitreous china, wall mounted.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard America; Lucerne No. 0355.012 or comparable product by one of the following:

a. Kohler Co.
b. Sloan Valve Company.
c. Zurn Industries, LLC.

2. Fixture:

a. Standard: ASME A112.19.2/CSA B45.1.
b. Type: For wall hanging.
c. Nominal Size: Rectangular, 20 by 18 inches.
d. Faucet-Hole Punching: Three holes, 4-inch centers.
e. Faucet-Hole Location: Top.
f. Color: White.
g. Mounting Material: Chair carrier.

3. Faucet: Manual-type, two-handle metering, centerset commercial, solid-brass valve. Comply with requirements in “Lavatory Faucet” Article.

4. Water-Temperature Limiting Device: Comply with requirements for temperature-actuated, water mixing valves specified in Section 22 11 19 "Domestic Water Piping Specialties" and as scheduled on Drawings.

5. Supplies: Comply with requirements in “Supply Fittings” Article.

6. Drain: Straight Tailpiece.Comply with requirements in “Drain” Article.

7. Trap: Standard Trap. Comply with requirements in “Trap” Article.

8. Support: Comply with requirements in “Support” Article.

B. Lavatory (LAV “B”): Vitreous china, wall mounted, accessible.

1. Basis-of-Design Product: Subject to compliance with requirements, provide American Standard America; Lucerne No. 0355.012 or comparable product by one of the following:

   a. Kohler Co.
   b. Sloan Valve Company.
   c. Zurn Industries, LLC.

2. Fixture:

   a. Standard: ASME A112.19.2/CSA B45.1.
   b. Type: For wall hanging.
   c. Nominal Size: Rectangular, 20 by 18 inches.
   d. Faucet-Hole Punching: Three holes, 4-inch centers.
   e. Faucet-Hole Location: Top.
   f. Color: White.
   g. Mounting Material: Chair carrier.

3. Faucet: Manual-type, two-handle metering, centerset commercial, solid-brass valve. Comply with requirements in “Lavatory Faucet” Article.

4. Water-Temperature Limiting Device: Comply with requirements for temperature-actuated, water mixing valves specified in Section 22 11 19 "Domestic Water Piping Specialties" and as scheduled on Drawings.

5. Supplies: Comply with requirements in “Supply Fittings” Article.

6. Drain: Offset Tailpiece. Comply with requirements in “Drain” Article.

7. Trap: Standard Trap. Comply with requirements in “Trap” Article.

8. Support: Comply with requirements in “Support” Article.

2.2 MANUALLY OPERATED LAVATORY FAUCETS

A. Lavatory faucets intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), with requirements of the Authority Having Jurisdiction (AHJ), and with NSF 61/NSF 372, or be certified in compliance with NSF 61/NSF 372 by an American National Standards Institute (ANSI) accredited third-party certification body, that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

B. Lavatory Faucets: Manual-type, two-handle metering, centerset commercial, solid-brass valve.

1. Basis-of-Design Product: 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. Chicago Faucets; MVP Commercial Faucet No. 802-V665CP.
   b. Delta Faucet Company; Commercial Faucet No. 86T1153.
      MOEN M-PRESS COMMERCIAL FAUCET NO. 8886.
   c. Zurn Industries, LLC; Commercial Brass and Fixtures; AquaSpec Faucet No. Z86500.

2. Standard: ASME A112.18.1/CSA B125.1.

3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and fixture receptor.

4. Body Type: Centerset, with 4” centers.

5. Body Material: Commercial, solid brass.

6. Finish: Polished chrome plate.

7. Maximum Flow: 0.25 gal. per metering cycle.

8. Mounting Type: Deck, exposed.

9. Valve Handle(s): Push button.

10. Spout: Rigid type.

11. Spout Outlet: Aerator.

12. Operation: Compression, manual.

2.3 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF 61 and NSF 372 for supply-fitting materials that will be in contact with potable water.

B. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc., or comparable product by one of the following:

1. American Standard America.
2. Zurn Industries, LLC; Commercial Brass and Fixtures.

C. Standard: ASME A112.18.1/CSA B125.1.

D. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass escutcheon with set screw.

E. Supply Stops: Basis-of-Design: No. LFHST02LKSB chrome-plated-brass, compression valve with inlet connection matching supply piping.

1. Operation: Loose key.

F. Risers: ASME A112.18.6/CSA B125.6, braided-stainless steel, flexible hose riser.

1. NPS 3/8.

2.4 DRAINS

A. Straight Tailpiece:

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc.; No. 155-A or comparable product by one of the following:

a. American Standard America.
b. Zurn Industries, LLC; Commercial Brass and Fixtures.

B. Offset Tailpiece:

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc.; No. 155-WC or comparable product by one of the following:

a. American Standard America
b. Zurn Industries, LLC; Commercial Brass and Fixtures.

C. Standard: ASME A112.18.2/CSA B125.2.

D. Drain: Grid type with NPS 1-1/4 tailpiece.

E. Material: Seamless, chrome plated cast brass, brass locknut, heavy rubber basin washer and fiber friction washer.

2.5 TRAPS

A. Standard Trap:

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc.; No. 8902-F or comparable product by one of the following:

a. American Standard America.
b. Zurn Industries, LLC; Commercial Brass and Fixtures.

2. Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow, 17 gauge brass tube to wall with cleanout plug. Include chrome-plated brass escutcheon with set screw.

B. Standard: ASME A112.18.2/CSA B125.2.

C. Size: NPS 1-1/2 by NPS 1-1/4.

2.6 LAVATORY SUPPORTS

A. Lavatory Carrier:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jay R. Smith Mfg Co; a division of Morris Group International; Series No. 700-M31 or a comparable product by one of the following:

a. MIFAB, Inc.
b. WATTS; A Watts Water Technologies Company.
c. Zurn Industries, LLC.

2. Standard: ASME A112.6.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before lavatory installation.
B. Examine counters and walls for suitable conditions where lavatories will be installed.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. Install lavatories level and plumb in accordance with roughing-in drawings.

B. Install supports, affixed to building substrate, for wall-mounted lavatories.

C. Install accessible wall-mounted lavatories at handicapped/elderly mounting height for people with disabilities or the elderly, in accordance with ICC A117.1.

D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

E. Seal joints between lavatories, counters, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."

F. Install protective shielding pipe covers on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Section 22 07 19 "Plumbing Piping Insulation."

3.3 PIPING CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."
C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.4 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner will engage a qualified laboratory to perform lead testing on all potable water faucets installed under this contract and used or potentially used for drinking or cooking purposes according to NYS Law 10 CRR-NY 67-4.1. Test results will be submitted to the Owner, Contractor and the Architect.

B. Replace any faucet that exceeds the lead action level (15 micrograms per liter) and coordinate with the Owner for retesting until satisfactory results are obtained.

3.5 ADJUSTING

A. Operate and adjust lavatories and controls. Replace damaged and malfunctioning lavatories, fittings, and controls.

3.6 CLEANING AND PROTECTION

A. After completing installation of lavatories, inspect and repair damaged finishes.
B. Clean lavatories, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
C. Provide protective covering for installed lavatories and fittings.

END OF SECTION 22 42 16.13

SECTION 22 42 16.16 - COMMERCIAL SINKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Service basins.
2. Sinks.
3. Sink faucets.
4. Supply fittings.
5. Waste fittings.
6. Service basins.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sinks.

2. Include rated capacities, operating characteristics and furnished specialties and accessories.

   a. Sink "A" faucet.
   b. Mop receptor faucet.

B. As-Specified Data: If the product to be incorporated in the Work is as specified by manufacturer name and product designation in this Specification Section, submit the "**As-Specified Verification Form**" (attached to Section 01 33 00 "Submittal Procedures") for each item listed below; otherwise submit full Product Data for the following:

1. Mop receptor "A".
2. Mop receptor accessories.
3. Sink "A" bowl.
4. Supply Fittings.
5. Drain Fitting.
6. Sink Traps.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sinks and accessories to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Water Conservation:

1. Provide plumbing fixtures complying with applicable provisions of Section 604.4 of the Plumbing Code of New York State, including the 2017 Uniform Code Supplement.

PART 2 - PRODUCTS

2.1 SERVICE BASINS

A. Mop Receptor (MR "A"): Plastic, floor mounted.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Crane Plumbing, L.L.C.; Fiat Model No. MSB2424 or comparable product by one of the following:

a. Ferguson Enterprises, Inc.; ProFlo Brand.
b. Florestone Products Co., Inc.
c. Mustee, E. L., & Sons, Inc.
d. Swan Corporation (The).
e. Zurn Industries, LLC; Light Commercial Specialty Plumbing Products.

2. Fixture:

a. Standard: IAPMO/ANSI Z124.6.
b. Material: CAST POLYMER.
c. Nominal Size: 24 by 24 by 10 inches.
d. Rim Guard: On front top surfaces.
e. Drain: Stainless steel, flat grid drain body with NPS 3 outlet.

3. Mounting: On floor and flush to wall.

B. Accessories:

1. Faucet: Comply with requirements in "Sink Faucet" Article.

2. Hose and hose bracket; 5 by 3 inches stainless steel bracket with rubber grips. 30 inch long flexible heavy duty 5/8 inch rubber hose, cloth reinforced with 3/4 inch chrome coupling at one end. Similar to "No. 832-AA" by Fiat.

3. Mop hanger bracket; 24 by 3 inches, stainless steel with three (3) rubber grips. Similar to "No. 889-CC."

2.2 SINKS

A. Sink “A”: Plastic laundry tub, freestanding.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Crane Plumbing, L.L.C.; Fiat Model No. FL-1 Floor Mounted Serv-A-Sink or comparable product by one of the following:

a. Ferguson Enterprises, Inc.; ProFlo Brand.
b. Florestone Products Co., Inc.
c. Mustee, E. L., & Sons, Inc.
d. Swan Corporation (The).
e. Zurn Industries, LLC; Light Commercial Specialty Plumbing Products.

2. Fixture:

a. Standard: CSA B45.5/IAPMO Z124.
b. Material: Molded polymer.
c. Nominal Size: 23 by 21-1/2 by 13-7/16 inches.
d. Color: White.

3. Supports: Adjustable-length steel legs.

4. Faucet(s): Manual type, center set deck faucet with arc tube spout. Comply with requirements in “Sink Faucet” Article.

a. Number Required: One.
b. Mounting: On backsplash.

5. Supply Fittings: Comply with requirements in "Supply Fittings" Article.

6. Waste Fittings: 1-1/2 inchdrain assembly provided with sink by the manufacturer.

7. Traps: Sink Trap. Comply with requirements in "Traps" Article.

2.3 SINK FAUCETS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for faucet-spout materials that will be in contact with potable water.

B. Mop Receptor Faucets: Manual type, two-lever-handle mixing valve.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Speakman Company: Model No. SC-5811 or comparable product by one of the following:

a. Chicago Faucets.
b. Delta Faucet Company.
c. GROHE America, Inc.
d. Just Manufacturing.
e. Moen Incorporated.

f. T & S Brass and Bronze Works, Inc.
g. Zurn Plumbing Products Group.

2. Standard: CSA/ASSE-1001.

3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.

4. Body Type: Widespread.

5. Body Material: Commercial, solid brass.

6. Finish: Polished chrome plate.

7. Maximum Flow Rate: 10 gpm hot- and cold-water full open at 40 psig

8. Handle(s): Cross, four arm.

9. Mounting Type: Back/wall, exposed.

10. Spout Type: Rigid, solid brass with wall brace.

11. Vacuum Breaker: Required for hose outlet.

12. Spout Outlet: Hose thread according to ASME B1.20.7.

13. Integral Stops: Required.

C. Sink Faucets: Accessible manual type, single control mixing valve with swing spout.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Elkay Manufacturing Co; Model LK1000CR or comparable product by one of the following:

a. American Standard America.
b. Bradley Corporation.
c. Chicago Faucets.
d. Delta Faucet Company.
e. Elkay Manufacturing Co.
f. GROHE America, Inc.
g. Just Manufacturing.
h. Kohler Co.
i. Moen Incorporated.
j. Speakman Company.
k. T & S Brass and Bronze Works, Inc.
l. Zurn Industries, LLC; Commercial Brass and Fixtures.

2. Standard: ASME A112.18.1/CSA B125.1.

3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.

4. Body Type: Widespread.

5. Body Material: General-duty, solid brass.

6. Finish: Chrome plated.

7. Maximum Flow Rate: 1.5 gpm.

8. Handle(s): Lever.

9. Mounting Type: Deck, exposed.

10. Spout Type: Swing, shaped tube.

11. Spout Outlet: Aerator.

D. Sink Faucets: Manual type, center set deck faucet with arc tube spout.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Elkay Manufacturing Co; Model LK406AT10L2 or comparable product by one of the following:

   a. American Standard America.
   b. Bradley Corporation.
   c. Chicago Faucets.
   d. Delta Faucet Company.
   e. GROHE America, Inc.
   f. Just Manufacturing.
   g. Kohler Co.
   h. Moen Incorporated.
   i. Speakman Company.
   j. T & S Brass and Bronze Works, Inc.
   k. Zurn Industries, LLC; Commercial Brass and Fixtures.

2. Standard: ASME A112.18.1/CSA B125.1.

3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.

4. Body Type: Center set on 4- inch centers.

5. Body Material: General-duty, solid brass.

6. Finish: Chrome plated.

7. Maximum Flow Rate: 1.5 gpm.

8. Handle(s): Lever blade, 2 inches.

9. Mounting Type: Deck, exposed.

10. Spout Type: 10-inch arc tube spout with integral restriction pin.

2.4 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.

B. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc. No. LF2167-F or comparable product by one of the following:

1. American Standard America
2. Zurn Industries, LLC; Commercial Brass and Fixtures.

C. Standard: ASME A112.18.1/CSA B125.1.

D. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass escutcheon with set screw.

E. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.

F. Operation: Wheel handle.

G. Risers:

1. NPS 1/2.
2. ASME A112.18.6, braided or corrugated stainless-steel flexible hose.

2.5 DRAINS

A. Drain Fitting:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Elkay Manufacturing Co No. LK35 or comparable product by one of the following:

a. Just Manufacturing.
b. Zurn Industries, LLC; Commercial Brass and Fixtures.

2. Standard: ASME A112.18.2/CSA B125.2.

3. Drain: Conical basket strainer with removable stopper and chrome plated brass NPS 1-1/2 by 4-inch tailpiece.

4. Material: Stainless steel body with polished finish.

2.6 TRAPS

A. Sink Traps:

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc. No. 8912-F or comparable product by one of the following:

a. American Standard America.
b. Zurn Industries, LLC; Commercial Brass and Fixtures.

2. Material: Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow, 17-gauge brass tube to wall with cleanout plug. Include chrome-plated brass escutcheon with set screw.

3. Standard: ASME A112.18.2/CSA B125.2.

4. Size: NPS 1-1/2 by 1-1/2.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before sink installation.
B. Examine walls, floors, and counters for suitable conditions where sinks will be installed.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. Install sinks level and plumb according to roughing-in drawings.

B. Set floor-mounted sinks in leveling bed of cement grout.

C. Install water-supply piping with stop on each supply to each sink faucet.

1. Exception: Use ball valves if supply stops are not specified with sink. Comply with valve requirements specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping."
2. Install stops in locations where they can be easily reached for operation.

D. Install wall flanges or escutcheons at piping wall penetrations and casework penetrations. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

E. Seal joints between sinks and counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants” and sink manufacturer’s recommendations.

3.3 CONNECTIONS

A. Connect sinks with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."
C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Operate and adjust sinks and controls. Replace damaged and malfunctioning sinks, fittings, and controls.
B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

A. After completing installation of sinks, inspect and repair damaged finishes.
B. Clean sinks, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
C. Provide protective covering for installed sinks and fittings.
D. Do not allow use of sinks for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 16.16

SECTION 22 42 23 - COMMERCIAL SHOWERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Individual showers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for showers. Include rated capacities, operating characteristics, and furnished specialties and accessories.

1. Shower “A” cabinet, valve and head.
2. Shower “B” cabinet, valve and head.
3. Shower “C” cabinet, valve and head.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For shower faucets to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Water Conservation:

1. Provide plumbing fixtures complying with applicable provisions of Section 604.4 of the Plumbing Code of New York State.

B. NSF Compliance:

1. NSF/ANSI-61- Drinking Water System Components - Health Effects.
2. NSF/ANSI-372 for lead-free valve materials for potable-water service.

C. Regulatory Requirements: Comply with requirements in 36 CFR Part 1191 – “Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines"; for plumbing fixtures for people with disabilities.

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. Shower Valve Stem Assemblies: Equal to 5 percent (but at least one) of amount of each type and size installed.

PART 2 - PRODUCTS

2.1 INDIVIDUAL SHOWERS

A. Accessible, Recessed Mounted Shower with Valve on Left/Seat on Right (SHR "A"):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bradley Corporation; Model HN200-HD-SX20-HS-VL-AKV-ST-NS-VS or comparable product by one of the following:

a. Acorn Engineering Company.
b. Willoughby Industries, Inc.

2. Description: Factory-fabricated, recess-mounted accessible cabinet shower, with shower valve, severe service head, diverter valve, hand-held shower spray, recessed soap dish and vandal resistant screws. Less barrier-free seat, grab bar, curtain, rod and hooks.

3. Standards: ASME A112.18.1/CSA B125.1 and ASSE 1016.

4. Material: Type 304 stainless steel, front access.

5. Metal Nominal Thickness: 0.060-inch minimum.

6. Height to Shower Heads: 72 inches.

7. Flow Control: 2.0 gpm.

8. Shower Valve: ASSE 1016 certified, heavy duty pressure balanced mixing valve with hot- and cold-water operation 1/2-inch chrome plated brass stem, tamper resistant brass limit stop, stainless steel piston, and check stops on inlets.

9. Shower Head: Chrome plated brass arm severe service head with stainless steel wall flange, fixed direction spray pattern adjustable only through orifice with an Allen key.

10. Hand-Held Shower Spray: Consisting of hand shower with on-off control, a 60" stainless steel flexible hose and post style mounting bracket to hold to shower panel, elevated in-line backflow preventer with quick-disconnect and lever handle diverter valve.

11. Supplies: NPT 1/2 flexible stainless-steel hoses.

B. Accessible, Recessed Mounted Shower with Valve on Right/Seat on Left (SHR "B"):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bradley Corporation; Model Model HN200-HD-SX20-HS-VR-AKV-ST-NS-VS or comparable product by one of the following:

   a. Acorn Engineering Company.
   b. Willoughby Industries, Inc.

2. Description: Factory-fabricated, recess-mounted accessible cabinet shower, with shower valve, severe service head, diverter valve, hand-held shower spray, recessed soap dish and vandal resistant screws. Less barrier-free seat, grab bar, curtain, rod and hooks.

3. Standards: ASME A112.18.1/CSA B125.1 and ASSE 1016.

4. Material: Type 304 stainless steel, front access.

5. Metal Nominal Thickness: 0.060-inch minimum.

6. Height to Shower Heads: 72 inches.

7. Flow Control: 2.0 gpm.

8. Shower Valve: ASSE 1016 certified, heavy duty pressure balanced mixing valve with hot- and cold-water operation 1/2-inch chrome plated brass stem, tamper resistant brass limit stop, stainless steel piston, and checkstops on inlets.

9. Shower Head: Chrome plated brass arm severe service head with stainless steel wall flange, fixed direction spray pattern adjustable only through orifice with an Allen key.

10. Hand-Held Shower Spray: Consisting of hand shower with on-off control, a 60-inch stainless steel flexible hose and post style mounting bracket to hold to shower panel, elevated in-line backflow preventer with quick-disconnect and lever handle diverter valve.

11. Supplies: NPT 1/2 flexible stainless-steel hoses.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before shower installation.
B. Examine walls and floors for suitable conditions where showers will be installed.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 INSTALLATION

A. Assemble shower components according to manufacturers' written instructions.

B. Install showers level and plumb according to roughing-in drawings.

C. Install water-supply piping with stop on each supply to each shower faucet.

1. Install stops in locations where they can be easily reached for operation.

D. Install shower flow-control fittings with specified maximum flow rates in shower arms.

E. Seal joints between showers and floors and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

3.4 ADJUSTING

A. Operate and adjust showers and controls. Replace damaged and malfunctioning showers, fittings, and controls.
B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

A. After completing installation of showers, inspect and repair damaged finishes.
B. Clean showers, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
C. Provide protective covering for installed fixtures and fittings.
D. Do not allow use of showers for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 23

SECTION 22 47 16 - PRESSURE WATER COOLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes pressure water coolers and related components.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of pressure water cooler. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1. Wall mounted, bi-level, wheelchair accessible.
2. Supply fittings.
3. Traps.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For pressure water coolers to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Water Conservation:

1. Provide plumbing fixtures complying with applicable provisions of Section 604.4 of the Plumbing Code of New York State, including the 2017 Uniform Code Supplement.

B. NSF Compliance:

1. NSF/ANSI-61- Drinking Water System Components - Health Effects.
2. NSF/ANSI-372 for lead-free valve materials for potable-water service.

C. Regulatory Requirements: Comply with requirements in 36 CFR Part 1191 – “Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines"; for plumbing fixtures for people with disabilities.

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. Filter Cartridges: Equal to 10 percent of quantity installed for each type and size indicated, but no fewer than 5 of each.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PRESSURE WATER COOLERS

A. Pressure water coolers and components shall be of a lead-free design, tested and certified by NSF International for compliance with NSF 61 and 372.
B. Comply with ASHRAE 34, "Designation and Safety Classification of Refrigerants," for water coolers. Provide HFC 134a (tetrafluoroethane) refrigerant unless otherwise indicated.

2.2 PRESSURE WATER COOLERS

A. Pressure Water Coolers (EWC “A”): Wall mounted, bi-level with filtered bottle filling station, wheelchair accessible.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Elkay; Model No. LZSTL8WSSK or comparable product by one of the following:

a. Halsey Taylor.
b. Haws Corporation.
c. Oasis International.

2. Cabinets: Bi-level with two attached cabinets and one bottle filling station, all stainless steel.

3. Bubblers: Abrasion-resistant, anti-sweat, pliable polyester elastomer with infused anti-microbial, keyed in location to prevent rotation, with adjustable stream regulator, located on each cabinet deck.

4. Controls: Push bar on front and sides of each cabinet.

5. Drains: Grid with NPS 1-1/4 tailpiece.

6. Filter: One or more water filters complying with NSF 42 and NSF 53 for cyst and lead reduction to below EPA standards; with capacity sized for unit peak flow rate.

7. Bottle Filling Station: Stainless steel construction with ABS plastic alcove and the following features;

a. Electronic sensor for touchless activation with auto 20-second shut off.
b. Filling Rate: 1.1 gpm.
c. Laminar flow to minimize splashing.

d. Integral drain to eliminate standing water.
e. LED visual filter monitor to indicate when filter requires replacement.

8. Cooling System: Electric, with hermetically sealed compressor, cooling coil, air-cooled condensing unit, corrosion-resistant tubing, refrigerant, corrosion-resistant-metal storage tank, and adjustable thermostat.

   a. 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.

9. Capacities and Characteristics:

   a. Cooled Water: 8 gph.

   b. Ambient-Air Temperature: 90 deg F.

   c. Inlet-Water Temperature: 80 deg F.

   d. Cooled-Water Temperature: 50 deg F.

   e. Electrical Characteristics:

      1) Motor Horsepower: 1/5.
      2) Volts: 120-V ac.
      3) Phase: Single.
      4) Hertz: 60.
      5) Full-Load Amperes: 4.

10. Support: Hangar bracket supplied with fixture from manufacturer.

2.3 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.

B. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc. No. LF2167-F or comparable product by one of the following:

   1. American Standard America
   2. Zurn Industries, LLC; Commercial Brass and Fixtures.

C. Standard: ASME A112.18.1/CSA B125.1.

D. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass escutcheon with set screw.

E. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.

F. Operation: Wheel handle.

G. Risers:

1. NPS 1/2.
2. ASME A112.18.6, braided or corrugated stainless-steel flexible hose.

2.4 TRAPS

A. Basis-of-Design Product: Subject to compliance with requirements, provide McGuire Manufacturing, Inc. No. 8872C-F or comparable product by one of the following:

1. American Standard America.
2. Zurn Industries, LLC; Commercial Brass and Fixtures.

B. Material: Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow, 17- gauge brass tube to wall with cleanout plug. Include chrome-plated brass escutcheon with set screw.

C. Standard: ASME A112.18.2/CSA B125.2.

D. Size: NPS 1-1/4 by 1-1/4.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before fixture installation.
B. Examine walls and floors for suitable conditions where fixtures will be installed.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION

A. Install fixtures level and plumb according to roughing-in drawings. For fixtures indicated for children, install at height required by authorities having jurisdiction.

B. Install manufacturer supplied hangar bracket, affixed to building substrate, for wall-mounted fixtures.

C. Install mounting frames, affixed to building construction, and attach recessed, pressure water coolers to mounting frames.

D. Install water-supply piping with ball valve shutoff on supply to each fixture to be connected to domestic-water distribution piping. Install valves in locations where they can be easily reached for operation. Valves are specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping."

E. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.

F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

G. Seal joints between fixtures and walls using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

C. Install supply stop on water supply to each fixture. Install valve upstream from filter for water cooler. Comply with valve requirements specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping."

D. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.4 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner will engage a qualified laboratory to perform lead testing on all potable water fixtures installed under this contract and used or potentially used for drinking or cooking purposes according to NYS Law 10 CRR-NY 67-4.1.

B. Replace any water cooler that exceeds the lead action level (15 micrograms per liter) and coordinate with the Owner for retesting until satisfactory results are obtained.

3.5 ADJUSTING

A. Adjust fixture flow regulators for proper flow and stream height.
B. Adjust pressure water-cooler temperature settings.

3.6 CLEANING

A. After installing fixture, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.
B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.
C. Provide protective covering for installed fixtures.
D. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 47 16