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SECTION 21 13 00

FIRE PROTECTION

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 WORK INCLUDED

A. Furnish all labor, materials, equipment and related items required to complete the work indicated on drawings and/or specified. The work under this Section includes, but is not limited to the following:

1. Valve manhole. (See Section 33 05 13)
2. Fire hydrants. (See Section 33 11 16)
3. Underground fire service mains. (See Section 33 11 16)
4. Wet automatic fire sprinkler system(s).
5. Pre-action automatic fire sprinkler system with single double interlock.
6. Dry automatic fire sprinkler system(s).
7. Automatic - Wet Fire Department standpipe system.
8. Manual - Wet F.D. standpipe system.
9. Manual - Dry F.D. standpipe system.
10. Firecycle system.
11. Sleeves.
12. Inserts.
13. U.L. labelled waterflow switch.
14. U.L. labelled pressure switch.
15. Fire and jockey pumps with controllers and accessories.
16. Electric alarm bell.
17. Stobe/horn annunciator. (See Division 16, Electrical)
18. Exposed fire department inlet connection.
19. OS and Y gate valves.
20. Listed indicating type control valves.
21. Double Check Valve Assembly.
22. Approved valve locking device.
23. Valve supervisory switches.
24. System main drain.
25. “TESTanDRAIN” valve. (Victaulic Company TestMaster II Style 720)
26. Dry pipe valve assembly.
27. Pre-action valve assembly.
28. 1 1/2" deluge/pre-action riser assembly.
29. First aid hose racks.
30. Spare sprinkler cabinet.
31. Standard response sprinkler - upright, pendent, sidewall, recessed pendent, concealed.
32. Quick response sprinkler - upright, pendent, sidewall, recessed pendent, concealed.
33. Extended coverage sprinkler - upright, pendent, sidewall, recessed pendent, flush.
    a. Pendent/upright (limited to max. 400 s.f., 20' x 20' square coverage pattern or as per manufacturer's listing).
    b. Sidewall (limited to max. 384 s.f., 16' x 24' area).

34. Quick response concealed extended coverage sprinkler - pendent.
    a. Pendent coverage heads (limited to max. 324 s.f., 18' x 18' square coverage pattern or as per manufacturer's listing).
35. Quick response extended coverage (QREC) sprinkler - upright, pendent, sidewall, recessed pendent, flush.
36. Dry sprinkler - pendent and sidewall.
37. Dry sprinkler - listed concealed.
38. Braided flexible hose assemblies including stainless steel hose and steel ceiling mounting bracket assembly.
39. Fine water spray.
40. Site observations as required.
41. Special sprinklers.
42. Air maintenance device and related components for use with plant pressurized air system.
43. Air compressor, air maintenance device and related components.
44. Coordination of work with all other trades.
45. Shop drawings.
46. Operating instructions and valve diagrams.

B. Per NFPA 13, 8.15.5.1, On fully sprinklered buildings, install sidewall automatic sprinkler at the bottom of the elevator hoistway/shaft not more than two feet above the pit floor.
1. Not required for enclosed, noncombustible hoist-way/shaft that does not contain combustible hydraulic fluids.
2. Sprinkler branch line may be installed in hoist-way/shaft.
3. Smoke and heat detection is not required in the elevator pit for those sprinklers installed within two feet of the pit floor.

C. Per NFPA 13, 8.15.5.4, On fully sprinklered buildings, install upright or pendent automatic sprinkler at the top of the elevator hoist-way/shaft.
1. Sprinkler shall have a temperature rating of 212°F.
2. Not required for noncombustible hoist-way/shaft of passenger elevators whose car enclosure materials meet the requirements of ASME A17.1.
3. Sprinkler branch line may be installed in hoist-way/shaft.
4. See Division 26, Electrical, for elevator shunt trip circuit breaker and 190°F fixed temperature heat detector. Detector shall be located within two feet of each sprinkler head. Circuit breaker, activated by the heat detector, disconnects main power to the elevator prior to the application of water.

D. On fully sprinklered buildings or buildings with only a basement sprinkler system, install an automatic sprinkler in the elevator machine room.
1. Sprinkler shall have a temperature rating of 165°F.
2. Sprinkler branch line may be installed in room.
3. See Division 16, Electrical, for elevator shunt trip circuit breaker and 135°F fixed temperature heat detector. Detector shall be located within two feet of each sprinkler head. Circuit breaker, activated by the heat detector, disconnects main power to the elevator prior to the application of water.

E. Per NFPA 13, 8.15.6, install sprinklers in spaces under all combustible ground floors, exterior docks, and platforms, except where the following conditions exist:
1. Space is not accessible for storage purposes and is protected against accumulation of wind-borne debris;
2. Space contains no equipment such as conveyors or fuel-fired heating units;
3. Floor over the space is of tight construction;
4. No combustible or flammable liquids or materials that under fire conditions would convert into combustible or flammable liquids are processed, handled, or stored on the floor above the space.

F. Per NFPA 13, 8.15.7, install sprinklers under exterior combustible roofs or canopies exceeding 4 ft in width, unless:
1. canopy or roof is of noncombustible or limited combustible construction.
2. exterior exit corridors that have exterior walls at least 50 percent open and is entirely of noncombustible construction.

G. Per NFPA 13, 8.15.7.5, install sprinklers under exterior combustible roofs or canopies over areas where combustibles are stored and handled.

H. NFPA 13, 8.15.8, install sprinklers in bathrooms unless within dwelling units of hotels and motels and does not exceed 55 square feet (5.11 square meters) and that have walls and ceilings, including behind fixtures, are of non-combustible or limited combustible materials providing a fifteen minute thermal barrier. Verify with Architectural.

I. Per NFPA 13, 8.15.9, in library stack rooms, install sprinklers without regard to aisles where there is 18" or more clearance between sprinkler deflectors and tops of racks.

J. NFPA 13, 8.15.10.1, install sprinklers in electrical equipment rooms, unless all of following conditions are met:
1. The room is dedicated to electrical equipment;
2. Only dry-type electrical equipment is used;
3. The electrical equipment room is separated from all other parts of the building by construction that has a 2-hour fire-resistance rating; and
4. There is no combustible storage in the room.

K. Per NFPA 13, 8.16.3, all sprinkler systems shall be arranged for flushing. Provide readily removable fittings at the end of all cross mains. Terminate all cross mains in 1 ¼" or larger pipe. Arrange all branch lines on gridded systems to facilitate flushing.

L. Provide protection before combustible contents are moved into building. Install paired flanges and numbered test blanks to provide partial protection during construction to assure removal of all blanks at completion of job.

M. All sprinkler piping in finished spaces shall be concealed in chases, pipe shafts, soffits, furred spaces, manufactured pipe concealment systems, or walls except may be exposed in maintenance, janitor rooms, closets, receiving, mechanical, or boiler rooms. All costs associated with providing additional soffits, chases, etc. not shown on Architectural Drawings shall be included in this Section of work. Additional soffits, chases, etc. must meet A/E approval.

1.03 RELATED WORK

A. Fire Stopping: Section 07 84 00.

B. General Provisions: Section 22 05 00

C. Pipe Identification: Section 22 05 53.

D. Pipe and Pipe Fittings: Section 22 10 01.

E. Domestic Water System and Equipment: Section 22 10 11.

F. Electrical: Division 26.
1. Heat and smoke detectors above ceilings and within raised floor systems.
2. Fire protection control panel.

3. Heat Sensor for Elevator Shaft/Machine Room.
4. Flow Switch wiring.
5. Supervisory switch wiring.
6. Pressure switch wiring.
7. Pre-action Detector wiring.
8. Pre-action Sprinkler Valve Assembly wiring.
9. Air compressor, air maintenance device and related component wiring.
10. Fire pump and controller wiring.
11. Jockey pump and controller wiring.
12. Strobe/horn annunciator wiring.

G. Water Distribution: Section 33 11 16.

1.04 QUALITY ASSURANCE

A. All installation work under this Section by a qualified Fire Protection Subcontractor.
1. Provide A/E with the name of the company individual designated as "Qualifier" for State of Wisconsin, who has successfully completed the "fire sprinkler contractor's exam".
2. Other sprinkler fitters, doing work in Wisconsin shall be licensed journeyman fitters or indentured apprentices.

B. Design shall be completed and certified by a licensed professional engineer or designer or NICET (NATIONAL INSTITUTE OF CERTIFIED ENGINEERING TECHNICIANS) certified.

C. Perform flow test as required for system sizing.

D. All grooved joint couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
1. All castings used for coupling housings, fittings, valve bodies, etc., shall be date stamped for quality assurance and traceability.

E. Size sprinkler system(s) by hydraulic calculations. Refer to drawings for size and location of water service. Determine flow capabilities of exterior water mains, as required.

F. Provide an automatic fire sprinkler system(s) complying with NFPA 13.

G. Comply with applicable standards.

H. Wet sprinkler system(s) shall not be installed in areas subjected to freezing temperatures.

I. An approved alternative system design may be acceptable. Any additional work necessary shall be coordinated and approved by the A/E with all costs included in this Section.

J. Location of sprinklers and / or piping soffits / concealment systems/etc. will be subject to the A/E and / or Owner approval.

K. Make no changes in installation from layout as shown on approved drawings, unless specifically approved by the Architect.

1.05 REGULATORY REQUIREMENTS

A. Local and State Codes.

B. Wisconsin Administrative Code.

C. International Building Code

D. International Fire Code

E. American Society of Mechanical Engineers
1. ASME A17.1-1990, Safety Code For Elevators and Escalators.

F. National Fire Protection Association Standards (Latest Edition).
1. No. 13 - Sprinkler Systems.

HAZARD CLASSIFICATION DEFINITIONS: (NFPA 13, chapter 1)

	Combustibility of Contents	Quantity of Contents	Heat Release Rate	Storage Height
Light	Low	Low	Low	
Ordinary Group 1	Low	Moderate	Moderate	8' max.
Ordinary Group 2	Moderate-high	Moderate-high	Moderate-high	12'max.
Extra Group 1	Very high	Very high	High	
Extra Group 2	Very high	Very high	High	

2. No. 14 - Standpipe and Hose System.
3. No. 17/17A - Dry/Wet Chemical Extinguishing Systems.
4. No. 20 - Centrifugal Fire Pumps.
5. No. 24 - Outside Protection.
6. No. 25 - Inspection, Testing, and Maintenance of Water-Base Fire Protection Systems.
7. No. 30 - Flammable and Combustible Liquids Code.
8. No. 75 - Electronic Computer/Data Processing Equipment
9. No. 96 - Ventilation Control and Fire Protection of Commercial Cooking Operations.
10. No. 101 – Life Safety Code
11. No. 231 - General Indoor Storage.
12. No. 231C - Rack Storage of Materials.
13. No. 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations
14. No. 291 - Fire Flow Testing and Marking of Hydrants.
15. No. 325M - Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids - 1991.
16. No. 430, Liquid and Solid Oxidizers.(swimming pool chemical storage)
17. No. 750 - Water Mist Fire Protection Systems.

G. 1991 Uniform Building Code (UBC)
1. Chapter 38, Fire-Extinguishing Systems.
2. U.B.C. Standard No. 38-1, Installation of Sprinkler Systems.
3. U.B.C. Standard No. 38-2, Standpipe Systems.
4. U.B.C. Standard No. 38-3, Installation of Sprinkler Systems in Group R Occupancies Four Stories or Less.

H. Insurance Services Office of Wisconsin - Commercial Risk.

I. Factory Mutual Data Sheets: (if applicable - consult Owner).
1. 2-8N Installation of sprinkler systems.
2. 3-10 Installation of private fire service mains.
3. 5-32 - Electronic computer systems.
4. 8-OS - Commodity classification.
5. 8-9 - Storage of plastics and elastomers.
6. 8-25 - Indoor general storage.
7. Other applicable data sheets.

J. Department of the Army Technical Manual TM 5-812-1 (April 1977).

K. Department of Defense Construction Criteria Manual DoD 4270.1-M (December 1983).

L. DARCOMR 385-100.

M. Comply with the most stringent requirements of applicable standards.

N. Where automatic fire sprinkler systems are to be installed or altered, sprinkler plans and specifications shall be present at the job site and made available, upon request, to the department, its agent or local governmental agencies exercising jurisdiction.
1. Verify if local ordinance requires plans when less than 20 heads are involved.
2. On systems involving less than 20 heads and plans and specs are not provided, the sprinkler contractor shall provide a written description of the type and scope of the work included with the material and test certificate, if required. The description shall be made available, upon request, to the department, its agent or local governmental agencies exercising jurisdiction.

1.06 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

B. Submit seven (7) blue line prints per NFPA 13 of complete working plans, shop drawings, hydraulic calculations and manufacturer's data on devices and etc., indicating by model and number to be used, to the Architect for review and approval.
1. Submittals may be in PDF format.

C. Contractor shall obtain Wisconsin approval and submit copy to A/E (projects involving the alteration or addition of more than 20 sprinklers). Submit to one of the following:

Greenbay S&B
2331 San Luis Place
Green Bay, WI 54304-5211
Phone: 920-492-5601

Madison S&B
201 W Washington Avenue
Madison, WI 53703-2760
Phone: 608-266-3151

Waukesha S&B
141 NW Barstow Street
Waukesha, WI 53188-3789
Phone: 262-548-8600

D. Contractor shall obtain Wisconsin Department of Health Services approval and submit copy to A/E (Hospitals and nursing homes). Submit to the following:
Department of Health Services
1 West Wilson Street
Madison, WI 53703
General Phone Number: 608-266-1865
DHSwebmaster@wisconsin.gov
You can find staff phone numbers and e-mail addresses for DHS programs using the
Directory of Department Services.

E. Contractor shall obtain Fire Department approval and submit copy to A/E.

F. Contractor shall obtain “Fire Protection System Grading Analysis” from Insurance Services Office and submit copy to A/E.

Insurance Services Office, Inc.
Plan Review Department
3000 S. IH 35, Suite 225
Austin, TX 78704
800-277-8392, option 1 then 2
512-440-9900

1. No work shall commence until all approvals have been obtained. Contractor to allow sufficient time for the approvals.
2. Prepare shop drawings at minimum scale of 1/8" = 1'-0" (1:100) for plans and 1/4" = 1'-0" (1:50) for details. Show all piping, sprinklers, hangers, roof construction, occupancy of each area, assumed area of operation, ceiling and roof heights.
3. Installation shall be based on all of the latest architectural, structural, heating and ventilating, plumbing and electrical drawings. Any field modifications required due to insufficient coordination shall be the responsibility of the Fire Protection Contractor.

G. Maintain at the site an up-to-date marked set of as-built drawings which shall be corrected and delivered to the Architect upon completion of the work.

H. Sprinklers shall be referred to on drawings, submittals, and other documentation, by the sprinkler identification or model number as specifically published in the appropriate agency listing or approval. Trade names or other abbreviated designations shall not be allowed.

I. At the completion of the work provide a small plan of building indicating the locations of all control valves, low point drains and Inspector's test. The plans shall be neatly drawn, framed under glass and permanently mounted on the wall adjacent to sprinkler riser.

J. Furnish two (2) bound sets of printed operating and maintenance instructions to the Owner and adequately instruct the Owner's maintenance personnel in proper operation of all sprinkler devices installed.

K. Certificate of Compliance: Contractors material and test certificate.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to job site, unload and stack in location determined by General Contractor.

1.08 WARRANTY

A. Furnish to the Architect at the completion of this work, a written guarantee (in triplicate) stating that all equipment, materials and work performed are in full accordance with the drawings and specifications. The guarantee shall also state that this work and all subsequent Change Orders, are fully guaranteed for one (1) year from the date of final acceptance and any equipment, materials, or workmanship which may prove defective within that time will be replaced at no cost to the Owner.

1.09 PERMITS AND FEES

A. Pay for all permits, fees and charges relative to this work.

1.10 COMMISSIONING

A. Witness all tests and compile all documentation including verification of the following:
1. Start-up and testing of the entire system.
2. Providing As-Built Drawings.
3. Written guarantee.
4. Pressure/leak testing of piping.

1.11 SYSTEM DEMONSTRATIONS

A. Provide personal instructions and training in operation of the system to the building operator(s) during the commissioning phase.

PART 2: PRODUCTS

2.01 MATERIALS

A. The naming of manufacturers in the specifications shall not be construed as eliminating the materials, products or services of other manufacturers and suppliers having approved equivalent items.

B. All materials and equipment shall be new, manufactured in the United States, and approved/listed by Underwriters' Laboratories, Inc. (UL), Factory Mutual (FM) and American Water Works Association (AWWA) where applicable.
1. All castings used for coupling housings, fittings, valve bodies, etc., shall be date stamped for quality assurance and traceability.

2.02 UNDERGROUND PIPING (FIRE SERVICE MAINS)

A. Polyvinyl chloride (PVC) pressure pipe with push-on joints conforming to AWWA C900, Class 150, DR 18.

B. Ductile iron mechanical joint fittings with cement lining conforming to USAS A21.11, AWWA C-111.

C. Ductile iron pipe and fittings with push-on or mechanical joints with cement lining conforming to AWWA C-151, Class 2, USAS A21.51, USAS A21.10, USAS A21.11, 250 psi pressure rating.

2.03 UNDERFLOOR PIPING

A. As specified for underground piping but having mechanical joints incorporating gaskets, glands, and bolts. PVC piping not permitted.

2.04 ABOVE FLOOR PIPING (PRE-ACTION OR DRY-PIPE SPRINKLER SYSTEM) (Including bulk mains, cross mains and branch lines)

A. Sprinkler pipe shall meet ASTM A795 and/or A135, and shall be UL listed and FM approved. All pipe shall have a minimum Corrosion Resistance Ratio; CRR = 1.00 or greater, as per UL listings. All piping shall be "hot dip" galvanized in accordance with ASTM A795 zinc coating specifications. Sprinkler contractor shall supply mill certificates verifying that the products submitted from the manufacturer meet the above criteria.

B. Schedule 40 galvanized steel pipe and fittings, ASTM A795.

C. Gaskets for flanged fittings shall be full face of 1/8" (3.175 mm) minimum thickness red sheet rubber. Flange bolts shall be hexagon head machine bolts with heavy semi-finished hexagon head nuts, cadmium plated, having dimensions in accordance with ANSI B18.2.

D. All piping and fittings on "Pre-Action" or "Dry Pipe" sprinkler system shall be galvanized.

2.05 ABOVE FLOOR PIPING (WET PIPE SPRINKLER SYSTEM) (Including bulk mains, cross mains, branch lines, riser nipples and sprigs.)

A. Schedule 40 black steel pipe, ASTM A795, with 150 psi steel weld fittings, 125/250 psi cast iron screw fittings, 150/300 psi malleable iron screwed fittings, or grooved pipe mechanical couplings/fittings. (ID=1"-1.049", 1 ¼"-1.380", 1 ½"-1.610", 2"-2.067", 2 ½"-2.469")

1. Grooved mechanical couplings and fittings shall be based on product by Victaulic.
    a. Fittings shall be full flow, short radius, ductile iron FireLock® fittings conforming to ASTM A536; or standard radius ASTM A536 ductile iron or carbon steel conforming to ASTM A53, with grooved ends designed to accept Victaulic couplings.
    b. Couplings shall consist of two ASTM A536 ductile iron housings, pressure-responsive, synthetic rubber gasket and plated steel bolts and nuts.
        1) Rigid Type: Housings shall be cast with offsetting, angle-pattern bolt pads to provide system rigidity and support and hanging in accordance with NFPA 13.
            a. 1-1/4" through 8": "Installation Ready" stab-on design, for direct 'stab' installation onto grooved end pipe without prior field disassembly and no loose parts. Victaulic FireLock EZ Style 009H (1-1/4" – 8") and QuickVic™ Style 107H (2" – 8").
            b. 10" and Larger: Standard rigid coupling. Victaulic Style 07 Zero-Flex®
        2) Flexible Type: Use in seismic areas where required by NFPA 13.
            a. 2" through 8": "Installation Ready" stab-on design, for direct 'stab' installation onto grooved end pipe without prior field disassembly and no loose parts. Victaulic QuickVic™ Style 177.
            b. 10" and Larger: Standard flexible couplings. Victaulic Style 75 or 77.

B. Sprinkler pipe complying with ASTM A795 and/or A135, and is UL listed and FM approved. All pipe shall have a minimum Corrosion Resistance Ratio; CRR = 1.00 or greater, as per UL listings. All piping shall be black carbon steel. Sprinkler contractor shall supply mill certificates verifying that the products submitted from the manufacturer meet the above criteria.

1. Allied Tube & Conduit specification:
    a. Allied Dyna-Flow, ASTM A795 Type E, Grade A, 300 psi w.p., UL listed, FM approved, ULC listed. (ID 11% > than Sch-40 & 7% > than Sch-10). (ID=1"-1.191", 1 ¼"-1.536", 1 ½"-1.728", 2"-2.203", 2 ½"-2.703", 3"-3.314", 4"-4.31")
    b. Allied Dyna-Thread, ASTM A135, Grade A, 300 psi w.p., UL & ULC & FM approved for fire sprinkler systems, Diamond Coat exterior acrylic finish, no thread gauge warnings, std. hanger spacing. (ID is up to 3.6% > than Sch-40). (ID=1"-1.08", 1 ¼"-1.408", 1 ½"-1.639", 2"-2.104")
2. Allied Tube & Conduit specification recommendation:
    a. Dyna-Light, Sch-5, ASTM A135/A795 Grade A, zinc coating interior and exterior, pre-galvanized steel, Diamond Coat exterior acrylic finish, UL & FM & ULC approved for use w/Victaulic's Press-Fit system (FM to 175 psi), UL & ULC listed for use w/rolled groove couplings up to 300 psi, UL & ULC & FM approved for welded joints and outlets, 12' max. hanger spacing. (> ID than Sch-10).
3. XL pipe: Underwriters' Laboratories, Inc. listed, exterior galvanized, ASTM A-135 or A795 steel pipe joined by screwed joints in accordance with specification ANSI B2.1 (ANSI B1.20 - 1983) per NFPA-13, or by welded joints in accordance with specification ANSI 31.1 as amended or by NFPA-13 approved mechanical fittings. Couplings may be of the rolled groove type or the mechanical locking type (push-on), and they shall be dimensionally

compatible with the coupling. Pipe end preparation for the mechanical locking type couplings will be in accordance with the manufacturer's recommendations. If the above is to be installed, the Contractor shall use thread gauges, check for water corrosion potential on piping, and maintain quality control on the threading operations. All ASTM A135 sprinkler pipe must be tested with a non-destructive electric test for continuous and uninterrupted inspection of the welded seam. All ASTM A135 sprinkler pipe must be tested to a critical weld, both cone and flatten test. (ID=1"-1.104", 1 ¼"-1.452", 1 ½"-1.687", 2"-2.154", 2 ½"-2.581", 3"-3.200")

C. All black steel pipe must be pre-oxidized with a suitable protective coating. Sprinkler piping and fittings that are exposed to the weather, or used in a corrosive atmosphere shall be galvanized.

D. Gaskets for flanged fittings shall be full face of 1/8" (3.175 mm) minimum thickness red sheet rubber. Flange bolts shall be hexagon head machine bolts with heavy semi-finished hexagon head nuts, cadmium plated, having dimensions in accordance with ANSI B18.2.

E. Horizontal piping in standpipe systems shall be enclosed in fire resistive construction, except in buildings which are protected throughout by sprinklers.

F. BlazeMaster CPVC fire sprinkler system. Can only be used in accordance with their listing – light hazard only. May be painted, but only with acrylic latex, not oil based paints. Cannot be installed in exposed structure (bar joist) such as a gymnasium. Must have smooth ceiling. Can be used in light hazard occupancy areas and some ordinary hazard occupancy areas of schools. Must be installed in accordance with manufacturer recommendations by a trained and certified installer.

G. FlexHead Industries flexible fire sprinkler connectors. 304 stainless steel braided, 1" tru-bore ID, 300 psig maximum w.p., welded connections, threaded outlet fittings, ceiling bracket, FM approved, UL listed.

H. VicFlex series AH2 braided flexible hose fire sprinkler connector. Type 304L stainless steel braided hose, Victaulic grade EHP EPDM gasket seal, 1" ID, 200 psig maximum w.p. (FM approved), 175 psig maximum w.p. (UL listed), NPT male thread inlet connection to branch line, female thread outlet connection to sprinkler, ½" or ¾" zinc-plated grade 1020 steel straight or 90° elbow reducers, 7" minimum bend radius (FM), 2" minimum bend radius (UL), available lengths of 31" (1-FM, 4-UL bends max.), 36" (2-FM, 5-UL bends max.), 48" (3-FM, 6-UL bends max.), 60" (4-FM, 6-UL bends max.), 72" (4-FM, 7-UL bends max.), FM approved, UL listed.

I. VicFlex series AH4 braided flexible hose fire sprinkler connector. Type 304L stainless steel braided hose, EPDM gasket seal per ASTM D2000, 1" ID, 200 psig maximum w.p. (FM approved), NPT male thread inlet connection to branch line, female thread outlet connection to sprinkler, ½" or ¾" zinc-plated grade 1020 steel straight or 90° elbow reducers, 7" minimum bend radius with maximum of three 90° bends, available lengths of 31" (1-bend max.), 36" (2-bends max.), 48" (3-bends max.), 60" (4-bends max.), 72" (4-bends max.), FM approved.

J. VicFlex style AB1 ceiling mounting bracket assembly. Zinc-plated steel assembly. FM approved with AH2 or AH4 braided flexible hose fire sprinkler connectors. UL listed with AH2 braided flexible hose fire sprinkler connector. Available in 24" & 48" widths. Open gate center bracket. Allows for standard ceiling tile installation after the VicFlex bracket assembly is installed in the ceiling grid.

K. Victaulic VicFlex stainless steel sprinkler fitting system may be used to locate sprinklers as required by final finished ceiling tiles and walls. The drop system shall consist of a braided or unbraided (corrugated) type 304 stainless steel flexible tube, a zinc plated steel 1" NPT male threaded nipple for connection to branch-line piping, and a zinc plated steel reducer with a 1/2"

or 3/4" NPT female thread for connection to the sprinkler head. The flexible drop must be listed for a minimum of three 90 degree bends to assure proper installation. Union joints shall be provided for ease of installation. The flexible drop shall attach to the ceiling grid using a one-piece open gate bracket (the bracket shall allow for sprinkler installation before or after the bracket is secured to the sprinkler grid). The braided drop system is FM Approved for sprinkler services to 200 psi and can be installed without the use of tools, and the corrugated system is UL Listed for sprinkler services to 175 psi. All hoses shall be factory-pressure tested to 400 psi.

L. Other pipe or tube material may be acceptable if listed for the service and approved by the applicable regulatory agencies and by A/E and/or Owner.

2.06 HANGERS

A. Section 22 10 04 need not apply to this Section.

B. All hanger components shall be of the Listed and Approved type.
1. Spacing of hangers to be as follows, unless otherwise stated: 12' (3.6576 m) apart for 1" (DN25) and 1 1/4" (DN32) pipe size and 15' (4.572 m) apart for 1 1/2" (DN40) pipe and larger.

C. Below concrete construction: Inserts may be used.
1. Expansion shields in vertical position may support pipes 4" (DN100) or less in diameter.
2. Expansion shields in vertical position used to support pipes 5" (DN125) or larger shall alternate with hangers connected directly to structural members. (In absence of convenient structural members, expansion shields may be used but spaced not more than 10' (3.048 m) apart.)

D. Continuous threaded rods shall be used wherever possible and shall be cadmium plated except above suspended ceilings. Size shall conform to NFPA No. 13.

E. ITW Buildex “Sammy” X-Press Swivel Pipe Hanger. Flexible head designed to hang plumb in extreme roof pitches – 12/12, 0° - 89° off vertical, no pre-drilling required. No retaining nut required, access to the back of the fastener is not required.

F. Adjustable swivel ring hanger, electro-galvanized (plated) low carbon steel with steel knurled insert, UL listed, FM approved, Fed. Spec. WW-H-171E (type 10), MSS SP-69 (type 10), 1/2" - 8" (DN15-DN200) pipe sizes.

G. Beam clamp, malleable iron with hardened steel cup point set screw and locknut, standard or wide throat, UL listed, FM approved, Fed. Spec. WW-H-171E and MSS SP-69 (Type 19 and 23) top or bottom beam use, 3/8" (9.5 mm) and 1/2" (12.7 mm) rod sizes.

H. Others as manufactured by Creative Systems Engineering, Inc.

I. Others per NFPA.

2.07 VALVES AND DEVICES

A. All sprinkler control valves, devices, check valves, etc. shall be of the type approved and listed. Check valve connected to the domestic water supply shall be U.L. Listed.

2.08 CROSS CONNECTION CONTROL DEVICES

A. Double Check Valve Assembly: (Automatic fire sprinkler systems and standpipe systems which are defined as nontoxic). Conforming to ASSE Std. 1015 and approved by the Department, designed for low hazard use and continuous or non-continuous pressure.

B. Double Check Detector Assembly: (Automatic fire sprinkler systems and standpipe systems which are defined as nontoxic). Conforming to ASSE Std. 1048 and approved by the Department, designed for low hazard use and continuous or non-continuous pressure.

C. Reduced Pressure Detector Assembly: (Automatic fire sprinkler systems which are defined as toxic). Conforming to ASSE Std. 1047 and approved by the Department, designed for low/high hazard use and continuous or non-continuous pressure.

2.09 SPRINKLERS

A. Standard response type fire sprinklers:

1. Upright/Pendent: Victaulic Model V27 or TYCO Central Series TY-B, standard response - standard coverage, 2.8, 5.6, 8.0 K-factor, decorative 5 mm glass bulb, 175 psi max. w.p., temperature ratings of 135°, 155°, 175°, 200°, 286°, 360°F, natural brass or chrome plated or white polyester coated, listed by U.L. for light, ordinary, or extra hazard occupancies.
2. Horizontal/Vertical Sidewall: Victaulic Model V27 or TYCO Central Series TY-B, standard response – standard coverage, 5.6 K-factor, decorative 5 mm glass bulb, 175 psi max. w.p., temperature ratings of 135°, 155°, 175°, 200°, 286°, 360°F, natural brass or chrome plated or white polyester coated, listed by U.L. for light or ordinary hazard occupancies.
3. Recessed Pendent: Victaulic Model V27 or TYCO Central Series TY-B, standard response - standard coverage, 2.8, 5.6, 8.0 K-factor, decorative 5 mm glass bulb, 175 psi max. w.p., temperature ratings of 135°, 155°, 175°, 200°, 286°, 360°F, sprinkler finish to be natural brass or chrome plated or white polyester coated; two-piece Style 10 (1/2" NPT) or Style 40 (3/4" NPT) escutcheon, escutcheon finish to be brass plated or chrome plated or white color, listed by U.L. for light, ordinary, or extra hazard occupancies.

4. Pendent Concealed: Victaulic Model V38 or TYCO Central Series RFII, standard response - standard coverage, 5.6 K-factor, decorative 5 mm glass bulb, 175 psi max. w.p., temperature ratings of 155°, 200°F, two-piece flat cover plate/support cup assembly, finish to be brass plated or chrome plated or white color, listed by U.L.

B. Standard response extended coverage type fire sprinklers:

1. Upright/Pendent/Recessed Pendent: Victaulic Model V34 or TYCO Central Series EC-5, EC-8, EC-11, EC-14, standard response - extended coverage, decorative glass bulb, 175 psi max. w.p., temperature ratings as required, sprinkler finish to be natural brass or chrome plated or white polyester coated; two-piece escutcheon, escutcheon finish to be brass plated or chrome plated or white color, listed by U.L.
2. Horizontal Sidewall/Recessed Horizontal Sidewall: Victaulic Model V34 or TYCO Central Series SW-20, SW-24, standard response – extended coverage, decorative glass bulb, 175 psi max. w.p., temperature ratings as required, natural brass or chrome plated or white polyester coated; two-piece escutcheon, escutcheon finish to be brass plated or chrome plated or white color, listed by U.L.
3. Pendent Concealed: TYCO Central Series ELOC, standard response - extended coverage, extra large orifice concealed, 11.2 K-factor, solder link element, 175 psi max. w.p., temperature ratings of 160°, 212°F, two-piece flat cover plate/support cup assembly, finish to be brass plated or chrome plated or white color, listed by U.L. for light hazard occupancies.

4. Horizontal Sidewall: Victaulic Model V3415 or Reliable Model MBEC-14, extended coverage, large orifice (0.70") (K=14), levered fusible alloy solder link, 175 psi max. w.p., temperature ratings of 165°F & 212°F, 175 sq, ft. per sprinkler, natural brass or chrome plated, listed by U.L. for use in ordinary & extra hazard occupancies per NFPA 13 and manufacture's design criteria.

C. Standard response dry type fire sprinklers:
1. Horizontal Sidewall: Victaulic Model V36 or TYCO Central Series DS-1, standard response - standard coverage, 5.6 K-factor, decorative 5 mm glass bulb, 175 psi max. w.p., temperature ratings of 135°, 155°, 175°, 200°, 286°, 360°F, natural brass or chrome plated or white polyester coated, listed by U.L., available in lengths from 3-1/2" to 48" in 1/4" increments, standard escutcheon plate with chrome plated or white painted finish.
2. Recessed Pendent: Victaulic Model V36 or TYCO Central Series DS-1, standard response - standard coverage, 5.6 K-factor, decorative 5 mm glass bulb, 175 psi max. w.p., temperature ratings of 135°, 155°, 175°, 200°, 286°, 360°F, natural brass or chrome plated or white polyester coated, listed by U.L., available in lengths from 3-1/2" to 48" in 1/4" increments, standard recessed escutcheon plate with chrome plated or white painted finish.

D. Quick response standard coverage type fire sprinklers:
1. Upright/Pendent: Victaulic Model V27 or TYCO Central Series TY-FRB, quick response - standard coverage, 2.8, 4.2, 5.6, 8.0 K-factor, decorative 3 mm glass bulb, 175 psi max. w.p., temperature ratings of 135°, 155°, 175°, 200°, 286°F, natural brass or chrome plated or white polyester coated, 1/2" NPT, listed by U.L. for light or ordinary hazard occupancies.
2. Horizontal/Vertical Sidewall: Victaulic Model V27 (horizontal) or TYCO Central Series TY-FRB, quick response – standard coverage, 5.6 K-factor, decorative 3 mm glass bulb, 175 psi max. w.p., temperature ratings of 135°, 155°, 175°, 200°F, natural brass or chrome plated or white polyester coated, 1/2" NPT, two-piece Style 10 or Style 20 escutcheon, escutcheon finish to be brass plated or chrome plated or white color, listed by U.L. for light or ordinary hazard occupancies.

3. Recessed Pendent: Victaulic Model V27 or TYCO Central Series TY-FRB, quick response - standard coverage, 2.8, 4.2, 5.6, 8.0 K-factor, decorative 3 mm glass bulb, 175 psi max. w.p., temperature ratings of 135°, 155°, 175°, 200°F, sprinkler finish to be natural brass or chrome plated or white polyester coated; 1/2" NPT, two-piece Style 10 or Style 40 escutcheon, escutcheon finish to be brass plated or chrome plated or white color, listed by U.L. for light or ordinary hazard occupancies.
4. Pendent Concealed: Victaulic Model V38 or TYCO Central Series RFII, quick response - standard coverage, 5.6 K-factor, decorative 3 mm glass bulb, 175 psi max. w.p., temperature ratings of 155°, 200°F, two-piece flat cover plate/support cup assembly, finish to be brass plated or chrome plated or white color, 1/2" NPT, listed by U.L.

E. Early suppression, fast response type fire sprinklers:
1. Tested by FM 2008 approval standard and installed per NFPA 13 (not acceptable in NFPA 13D or 13R systems).

F. Quick response extended coverage type fire sprinklers:
1. Upright/Pendent/Recessed Pendent: Victaulic Model V34 or TYCO Central Series EC-5, EC-8, EC-11, EC-14, quick response - extended coverage, decorative glass bulb, 175 psi max. w.p., temperature ratings as required, sprinkler finish to be natural brass or chrome plated or white polyester coated; two-piece escutcheon, escutcheon finish to be brass plated or chrome plated or white color, listed by U.L.

2. Horizontal Sidewall/Recessed Horizontal Sidewall: Victaulic Model V34 or TYCO Central Series SW-20, SW-24, quick response – extended coverage, decorative glass bulb, 175 psi max. w.p., temperature ratings as required, natural brass or chrome plated or white polyester coated; two-piece escutcheon, escutcheon finish to be brass plated or chrome plated or white color, listed by U.L.
3. Pendent Concealed: TYCO Central Series RFII, quick response - extended coverage, 5.6 K-factor, decorative 3 mm glass bulb, 175 psi max. w.p., temperature ratings of 155°, 200°F, two-piece flat cover plate/support cup assembly, finish to be brass plated or chrome plated or white color, listed by U.L. for light hazard occupancies.

G. Quick response standard coverage dry type fire sprinklers:
1. Horizontal Sidewall: Victaulic Model V36 or TYCO Central Series DS-1, quick response - standard coverage, 5.6 K-factor, decorative 3 mm glass bulb, 175 psi max. w.p., temperature ratings of 135°, 155°, 175°, 200°, 286°F, natural brass or chrome plated or white polyester coated, listed by U.L., available in lengths from 2-1/2" to 48" in 1/4" increments, standard escutcheon plate with chrome plated or white painted finish.
2. Recessed Pendent: Victaulic Model V36 or TYCO Central Series DS-1, quick response - standard coverage, 5.6 K-factor, decorative 3 mm glass bulb, 175 psi max. w.p., temperature ratings of 135°, 155°, 175°, 200°, 286°F, natural brass or chrome plated or white polyester coated, listed by U.L., available in lengths from 3-1/2" to 48" in 1/4" increments, standard recessed escutcheon plate with chrome plated or white painted finish.

H. Quick response institutional type fire sprinklers:
1. Pendent and horizontal sidewall: Reliable Model XL INST, quick response, standard and extended coverage, fusible solder link, 175 psi max. w.p., 165°F temperature rating, 5.6 K factor, ½" NPT thread, retaining flange, sprinkler finish to be chrome plated; escutcheon finish to be white color, listed by U.L. for light and ordinary hazard occupancies. Fusible link shall be designed to release a suspended load that exceeds 50 lbs when dropped from a 1-inch height.

2. Pendent and horizontal sidewall: Tyco Raven series, quick response, standard and extended coverage, fusible solder link assembly, 175 psi max. w.p., 165°F temperature rating, 5.6 K factor, ½" NPT thread, tamper-resistant design, escutcheon plate, sprinkler & escutcheon plate finish to be (chrome, white), brass body, bronze deflector, sealing assembly, two adjustment spacer rings if required, installation wrench, listed by U.L. for light hazard occupancies.

I. 165°F sprinkler temperature rating or as otherwise required.

J. Install high temperature head of proper degree rating wherever necessary to meet requirements of NFPA No. 13.

K. Install listed lead coated or corro-proof sprinklers in all areas exposed to atmosphere or to corrosive conditions.

L. Quick response sprinklers and standard response sprinklers shall not be intermixed.

M. The sprinkler bulb protector must remain in place until the sprinkler is completely installed and before the system is placed in service. Remove bulb protectors carefully by hand after installation. Do not use any tools to remove bulb protectors.

2.10 SIGNS

A. Provide standard metal signs in accordance with NFPA No. 13.

2.11 HOSE THREADS

A. Hose threads for fire department siamese / stortz connections shall match those of the local Fire Department.

2.12 "RISER MANIFOLD" TEST/DRAIN ASSEMBLY

A. Central/Tyco Model No. 513 riser manifold/floor control assembly, including pressure gauge/valve, flow switch, drain valve, inspector's test & drain valve, site glass, etc.

B. Victaulic Series 720 TestMaster II, globe style test and drain valve with bronze body and bonnet, bronze and copper alloy internals with stainless steel spring, dual polycarbonate sight glasses, ½" orifice for test purpose, and malleable iron hand wheel. UL listed and FM approved for services up to 300 psi.

C. Zone control Riser Module: Install in zoned wet sprinkler systems, compact design zone control riser module consisting of a ductile iron module body with grooved ends, shutoff valve, test and drain valve combination with different orifice sizes, and vane type waterflow detector with sealed retard, visual switch activation, and mechanical delay adjustment. Victaulic Series 747M.

2.13 WATERFLOW SWITCH

A. System Sensor WFD or Potter VSR-F vane type waterflow switch with retard, red housing, adjustable retard setting and tamper proof, 120V AC, available in 2" - 8" sizes, (2 inch (DN50) size, with 2 x 6 inch (DN50 x DN150) adapter nipple for connecting to 1-1/4 inch (DN32) piping), UL & FM approved for use on steel pipe.

2.14 SUPERVISORY SWITCH

A. Potter-Roemer Fig. No. 6220, red baked enamel cover with J-bolt mounting.

2.15 STROBE/HORN ANNUNCIATOR (See Division 16, Electrical)

2.16 ACCESSORIES

A. Drip pan valve, air maintenance devices and related accessories as required in compliance with NFPA standards.

2.17 BALL DRIP VALVE

A. Cast brass, straight design, 1/2" (DN15) size.

2.18 PRESSURE GAUGE

A. Potter-Roemer Fig. No. 6240, polished brass 3 1/2" (88.9 mm) case with 1/4" (DN8) male N.P.T. connection. Glass enclosed dial with pressure range of 0-300 PSI.

2.19 SITE FLOW CONNECTION

A. Central/Tyco Model No. F1321 site flow connection, 1 & 2" size.

2.20 DELUGE VALVE/TRIM

A. Valve internal components shall be replaceable without removing the valve from the installed position and shall be externally resettable.

B. Victaulic FireLock® NXT Series 769 deluge valve, sizes 1-1/2” through 8”, low differential, latched clapper design, ductile iron body with grooved ends, aluminum bronze clapper, brass seat with Nitrile seat o-rings, EPDM seals. Provide Series 753-E solenoid valve for electrical activation and shutoff valve, pressure switches and drain kit. 300 psi maximum working pressure in all sizes.

C. Central Sprinkler Corporation Model "DL" deluge valve, 2" (DN50) size, quick opening, hydraulically operated, "DL-A" manual emergency station, electrically actuated, and related trim. 120 V.A.C.

D. Central Sprinkler Corporation Model "A" deluge valve, 4" size or as required, quick opening, hydraulically operated, manual emergency station, electrically actuated, and related trim. 120 V.A.C.

2.21 PRE-ACTION VALVE/TRIM

A. Valve internal components shall be replaceable without removing the valve from the installed position and shall be externally resettable.

B. Deluge valve of size as required, specifically listed for pre-action system, complete with required trim, quick opening, hydraulically operated, manual emergency station, electrically actuated, 120 V.A.C.

C. Valve to open only when both air pressure is reduced in the sprinkler piping and the detection system operates. This is a double interlocked pre-action system. See electrical for wiring.

D. Victaulic FireLock® NXT Series 769 pre-action valve, sizes 1-1/2” through 8”, low differential, latched clapper design, ductile iron body with grooved ends, aluminum bronze clapper, brass seat with Nitrile seat o-rings, EPDM seals. Provide Series 753-E solenoid valve for electrical activation and shutoff valve, pressure switches and drain kit. 300 psi maximum working pressure in all sizes. This is a double interlocked pre-actions system with electric release trim.

2.22 DRY PIPE VALVE/TRIM

A. As required.

B. Valve internal components shall be replaceable without removing the valve from the installed position and shall be externally resettable.

C. Victaulic FireLock® NXT Series 768 grooved end valve complete with Series 776 low pressure actuator requiring 13 psi (90-kPa) minimum air pressure. Valve shall be ductile iron, latched clapper design, aluminum bronze clapper, EPDM diaphragm and seal with brass seat and Nitrile seat o-rings. Water working pressure is 300 psi in all sizes, vertical installation only. Valve shall be provided pre-trimmed as a Vic®-Quick Riser with all necessary piping, shutoff valve, pressure switches, and gages. Available in sizes through 8”.

2.23 AIR MAINTENANCE DEVICE/ALARM SWITCHES

A. As required.

B. Victaulic Series 757P air maintenance device for use with Series 768 and 769 NXT valves shall be preset at 13-18 psi operating range.

2.24 FIRST AID HOSE VALVE AND CABINETS

A. Provide U.L. listed surface mounted hose cabinets complete with hose valves, hose and nozzle where indicated.

B. Cabinet shall have 16 gage steel body, 20 gage duo-panel plate glass door with identifying decal. Cabinets shall have white enamel finish. Units shall be equal to Allenco No. 464W with Hose Rack.

C. Provide 1 1/2" (DN40) U.L. listed combination pressure restricting angle valve equal to Allenco No. 177U – 1 1/2" (DN40).

D. Hose shall be 100 feet (30.48 m) U.L. listed, lined linen 1 1/2" (DN40) in diameter.

E. Nozzle shall be Allenco No. 7171 fog nozzle with U.L. approval.

2.25 PIPE CONCEALMENT SYSTEM

A. Creative Systems Engineering, Inc. or

B. "Soffi-Steel Systems" by Grice Engineering, Inc.

PART 3: EXECUTION

3.01 UNDERGROUND PIPING (FIRE SERVICE MAINS)

A. Installation shall conform to applicable NFPA and FM Standards. Coordinate with installer. See Section (33 11 16, 22 10 11).

B. Sprinkler contractor shall be responsible for installation of complete private fire service.

3.02 ABOVE FLOOR PIPING

A. All sprinkler, standpipe, drain and test piping, Fire Department connection piping, etc. installed through exterior walls shall be galvanized. All piping must be substantially supported from building structure and only approved type hangers shall be used. Piping under ducts shall not be supported from ductwork but shall be supported from building structure with trapeze hangers where necessary or from steel angles supporting ductwork in accordance with NFPA No. 13. The interior surfaces of all piping and equipment shall be clean and free of all dirt, loose scale, rust, and other foreign material before installation.

B. Install sprinkler piping as high as possible using necessary fittings and auxiliary drains to maintain maximum clear head room, 7'-0" (2.13 m) minimum.

C. System shall be designed to completely drain, except in trapped piping that can be drained by removing a single pendent sprinkler. When over five gallons is trapped in piping, provide a drain valve.

D. Arm-overs in steel piping systems more than 24 inches in length from the branch shall be supported by a pipe hanger.

E. One-piece reducing fittings shall be used wherever a change is made in pipe size. Bushings shall not be permitted unless fitting is not available or where temporary sprinklers are used.

F. Extend sprinkler piping to exhaust hood fire protection system panels furnished by FEC. Extend 2" piping from same panel to each respective separate exhaust hood as required. Exhaust hood and related hood suppression system by FEC.

G. See Section 07 84 00 for requirements when penetrating into or through required fire-resistive assemblies, fire protective membranes, thermal barriers, or construction providing a finish rating as an alternative to a fire resistive assembly.

H. Grooved joint piping systems shall be installed in accordance with the manufacturer's (Victaulic) guidelines and recommendations. All grooved couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. Gaskets shall be molded and produced by Victaulic. Grooved end shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove for proper gasket sealing. A Victaulic factory-trained field representative shall provide on-site training for contractor's field personnel in the proper use of grooving tools and installation of grooved piping products. Factory-trained representative shall periodically review the product installation. Contractor shall remove and replace any improperly installed products.

3.03 SPRINKLERS

A. Sprinklers on exposed piping shall be bronze upright type, in upright position except bronze pendent type in pendent position may be used on wet pipe systems where necessary due to duct interferences, etc.

B. Do not install sprinklers that have been dropped, damaged, or show a visible loss of fluid. Never install sprinklers with cracked bulbs.

C. Sprinkler bulb protector must remain in place until the sprinkler is completely installed and before the system is placed in service. Remove bulb protectors carefully by hand after installation. Do no use any tools to remove bulb protectors.

D. Sprinklers in rooms with plastered, gypsum board, or acoustical suspended ceilings shall be (pendant, concealed/flush mounted, recessed/semi-recessed, recessed pendent) type, with supply piping concealed above ceiling. Ceiling plate/escutcheon thickness shall not exceed 1/2" (12.7 mm) maximum depth.

E. Side wall sprinklers shall be used with supply piping concealed in walls and only installed where other sprinklers cannot be used to protect certain areas. Escutcheon plate thickness shall not exceed 1/2" (12.7 mm) maximum depth.

F. Install sprinklers in all work rooms, trash rooms, storage rooms, as shown on drawings.

G. Maintain 18" clearance between sprinkler and top of shelving. Coordinate height of ceilings and shelving units.

H. Install sprinklers in trash chute per NFPA 13.

I. Install sprinklers under overhead garage doors.

J. When the light fixtures extend below the ceiling, the pendent sprinklers shall be spaced so that the sprinkler spray pattern is not obstructed in accordance with NFPA No. 13.

K. During installation of sprinklers, verify that the model number, style, orifice size and temperature ratings are correct.

L. Install sprinklers centered in the portion of the acoustical ceiling tile (ACT) bordered by scored lines ("SECOND LOOK"), tegular edges and/or ceiling grid, as applicable. Contractor's option to use VicFlex ceiling mounting bracket assembly.

M. Confirm ceiling types with General Contractor prior to sprinkler selection.

N. Confirm building type/fire proofing and provide sprinklers in concealed spaces as required.

3.04 DRAINS

A. Provide drain valves and extend to floor drains or grade.

B. Provide all auxiliary drains where necessary.
1. Plugs used for auxiliary drains shall be brass.

C. Pipe all drains and auxiliary drains discharging to outside atmosphere to location where water drained will not damage equipment, vehicles, planted areas, etc. or injure personnel.
1. All drain piping downstream of drain valve shall be galvanized.

D. Provide main drain test connection at location that will permit flow test of water supply. Record static and residual pressures. Pipe discharge to location that will allow valve to be fully opened without causing water damage.

3.05 CEILING AND WALL PLATES

A. Install ceiling and wall plates wherever exposed piping passes through ceilings and walls. (Note that plastic escutcheons or plates are not acceptable.)

3.06 SLEEVES

A. Set sleeves in place for all pipes passing through floors and walls.

B. Sleeves through floors shall be watertight.

C. Seal all openings, created by piping passing through walls, floors and sleeves with rock wool insulation.

3.07 WELDING

A. Galvanized steel piping shall not be welded.

B. No field welding of piping shall be permitted.

C. Join all inside piping by means of screwed, flanged or flexible gasketed joints or other acceptable fittings. Headers, risers, feed and cross mains and branch lines may be shop welded using acceptable welding fittings with screwed branch outlets. Welding and brazing shall conform to American National Standard Institute for Power Piping, ANSI B31.10 - 1967, with Addenda ANSI B.31.1 Oa - 1971 and ANSI B31.1-Ob - 1971. Welding and torch cutting shall not be permitted as a means of installing or repairing systems.

1. Provide a blind flange at each end of welded header.

D. Certify welders or brazers as being qualified for welding and/or brazing in accordance with the requirements of ASME Boiler and Pressure Vessel Code, Section IX, Qualification Standard for Welding and Brazing Procedures, Welders, Brazers and Welding and Brazing Operators 1968 Edition.

E. Certify that welding procedures comply with the requirements of at least AWS D10.9, level AR-3.

F. Certify that welding will be performed by welders qualified in compliance with the requirements of at least AWS D10.9, level AR-3.

G. Certify that welding will be carried out in compliance with a documented quality control procedure to insure that all discs are retrieved, that openings in piping are smooth, that slag and other welding residue are removed and that the internal diameters of piping are not penetrated.

3.08 INSPECTOR'S TEST CONNECTIONS

A. Provide inspector's test connections, as specified in NFPA No. 13, at required points for testing each waterflow alarm device. Special discharge nozzle shall have same size orifice as majority of sprinkler heads installed.

B. Provide 1" (DN25) sight glass where inspector's test discharge cannot be readily observed while operating valve.

3.09 EXTRA SPRINKLERS

A. Furnish one cabinet constructed of size required to store one of every type, length and temperature rating of sprinkler necessary and in use throughout the installation, including also any required sprinkler wrench needed for any sprinkler type. Verify size required.

B. Furnish one cabinet and with a supply of twelve (12) sprinklers of assorted temperature ratings of the type necessary and in use throughout the installation, including also one (1) special sprinkler wrench.

C. Install on wall adjacent to sprinkler riser.

3.10 SPRINKLER GUARDS AND SHIELDS

A. Provide guards on sprinklers which are within 7'-0" (2.13 m) of finished floor or where sprinklers may be subject to damage (gyms, etc.).

B. Sprinkler guards shall be listed, supplied, and approved for use with the sprinkler, by the sprinkler manufacturer.

3.11 "RISER MANIFOLD" TEST/DRAIN ASSEMBLY (INSPECTOR'S TEST)

A. Provide test/drain connections, as specified in NFPA No. 13, at required points for testing each waterflow alarm device. Include sight glass where test discharge cannot be readily observed while operating valve.

3.12 PRESSURE GAUGE

A. Install pressure gauge with valve at top of each standpipe.

B. Install pressure gauge with valve where required.

3.13 ELECTRICAL WORK

A. Provide any additional wiring, not specifically included in Division 26, as part of this Section of Work.

3.14 ELECTRIC ALARM BELL (STROBE/HORN ANNUNCIATOR)

A. Furnished, installed, and wired in Division 26, Electrical.

3.15 AIR MAINTENANCE DEVICE, AIR COMPRESSOR, ALARM SWITCH

A. Extend compressed air piping from the existing plant pressurized air system.

B. Extend compressed air piping from the air compressor.

C. Wiring to alarm under Division 26, Electrical.

D. Wiring of compressor, pressure switch, alarm under Division 26, Electrical.

E. Install in Room No. 110 to monitor the air pressure in the pre-action sprinkler system.

F. Wiring to alarm under Division 26, Electrical. (Upon low air pressure, the alarm will be activated and pre-action valve will open only if a smoke or heat detector has also activated.)

G. Wiring to alarm under Division 26, Electrical. (Upon low air pressure, the alarm will be activated and the valve will open.)

H. Install where shown on drawings.

3.16 FLOW SWITCH, PRESSURE SWITCH, SUPERVISORY SWITCH

A. Install where shown on drawings.

B. Wiring under Division 26, Electrical.

3.17 PREACTION SYSTEM

A. Furnished, installed and wired under Division 26, Electrical. (Upon activation of one smoke or heat detector, the alarm will be activated and pre-action valve will open only if air pressure in the piping system is low enough to activate the respective pressure/alarm switch.)

3.18 PREACTION SMOKE AND/OR HEAT DETECTOR

A. Furnished, installed and wired under Division 26, Electrical. (Upon activation of one smoke or heat detector, the alarm will be activated and pre-action valve will open only if air pressure in the piping system is low enough to activate the respective pressure/alarm switch.)

B. Fire alarm panel furnished, installed and wired under Division 26, Electrical. (The panel will monitor the spaces in zones so that the operator can identify the specific are sending the alarm.)

3.19 PREACTION SPRINKLER VALVE ASSEMBLY

A. Wiring of valve solenoid under Division 26, Electrical.

B. Extend drain from drip cup to floor drain.

C. Valve to open only when both air pressure is reduced in the sprinkler piping and the detection system operates. This is a double interlocked pre-action system. See electrical for wiring.

3.20 DRY PIPE VALVE ASSEMBLY

A. Install in Room C118 next to pre-action valve assemblies.

B. Furnish and mount air maintenance device (air compressor) and respective pressure switch in Room C118. 3/4 horsepower, 480 V.A.C., 3 phase.

C. Wiring of pressure switch to alarm system under Division 26, Electrical.

D. Wiring of pressure switch and air compressor under Division 26, Electrical.

3.21 CROSS CONNECTION CONTROL DEVICES

A. Install as recommended by manufacturer, where indicated on drawings.

B. Double Check Valve Assembly:
1. The Fire Protection Contractor shall arrange for a performance test to be conducted at the time the device is put into service by a department-listed Backflow Prevention Device Tester. Complete the "Double Check PerformanceTest" form (SBD-10754) upon completion of the test and send copy to Owner and A/E. Reports to be maintained on site.
2. Record of test results to be maintained at the site of the device.
3. The assembly shall be installed by a Department licensed automatic fire sprinkler contractor, journeyman automatic fire sprinkler fitter or indentured registered automatic fire sprinkler system apprentice.
4. Performance test shall comply with ASSE 5010-1015-1, 5010-1015-2, 5010-1015-3, 5010-1015-4.
5. Install four feet above floor along wall and maintain minimum required clearances to ensure accessibility / serviceability. Any part of the assembly shall be at least 12" above the floor (max. of 84") with clearances of 18" above, 4" from the back wall and 24" in front for servicing.
6. Owner shall arrange for annual performance tests thereafter.

C. Cross connection control device requires State (Wisconsin) approval and shall be approved prior to purchasing, installing or connecting. If the specified item is not approved, an equal product from another listed acceptable manufacturer that is approved must be used.

3.22 EXISTING SPRINKLER SYSTEMS

A. The existing fire protection system shall remain intact throughout the construction period to protect those spaces. If piping must be removed for installation of new systems the piping shall be rerouted as required.

3.23 TESTING PIPE

A. Perform all required acceptance tests per NFPA. (13-24.2.)
1. Unless permitted, all piping and attached appurtenances subjected to system working pressure shall be hydrostatically tested at 200 psi (13.8 bar) and shall maintain that pressure without loss for 2 hours.
2. Portions of systems normally subjected to system working pressures in excess of 150 psi (10.4 bar) shall be tested at a pressure of 50 psi (3.5 bar) in excess of system working pressure.
3. Modifications affecting 20 or fewer sprinklers shall not require testing in excess of system working pressure.
4. Where addition or modification is made to an existing system affecting more than 20 sprinklers, the new portion shall be isolated and tested at not less than 200 psi (13.8 bar) for 2 hours.
5. Modifications that cannot be isolated, such as relocated drops, shall not require testing in excess of system working pressure.
6. Loss shall be determined by a drop in gauge pressure or visual leakage.
7. The test pressure shall be read from a gauge located at the low elevation point of the system or portion being tested. The pressures in piping at higher elevations shall be permitted to be less than 200 psi (13.8 bar) when accounting for elevation losses. Systems or portions of systems that can be isolated shall be permitted to be tested separately.

B. Notify the AHJ & Architect's Representative in advance regarding time and date of all tests.

C. Overhead piping should be tested before being concealed by drop ceilings, etc.

D. Hydrostatic pump is commonly used to develop and maintain the 200 psi test pressure. The A/E should be consulted prior to the test if another method is planned to be used to maintain test pressure.

E. Complete and sign the appropriate contractor’s material and test certificates per NFPA.

3.24 ADJUSTING AND CLEANING

A. The Contractor shall be responsible during the installation and testing periods of the sprinkler system for any damage to the work of others, to the building, its contents, etc. caused by leaks in any equipment, by unplugged or disconnected pipes, fittings, etc. or by overflow and shall pay for the necessary replacements for repairs to work of others, building contents, equipment, or landscape damaged by such leakage.

B. Maintain the premises free from accumulation of waste materials or rubbish caused by this work.

END OF SECTION 21 13 00

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SECTION 22 05 53

IDENTIFICATION: PIPING/VALVES

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 WORK INCLUDED

A. Tag new valves with reference to listing.

B. Identify all new mechanical piping as hereinafter specified under "EXECUTION".

1.03 RELATED WORK

A. Piping: Section 22 10 01.

B. Valves: Section 22 10 02.

C. Painting of Piping: Division 9.

1.04 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.
1. Submit valve chart, on form provided at end of this Section.

PART 2: PRODUCTS

2.01 VALVES

A. Provide round sheet aluminum, brass or plastic tags with brass or galvanized steel split ring or S rings. Tags shall have identification number stamped on and prefixed "P" for plumbing and "F" for fire protection.

2.02 PRINTED CHARTS

A. Glazed (black) wood or metal frame, with typed chart indicating valve number, manufacturer, model number, location, system used, function, etc. See attached form.

2.03 IDENTIFICATION-PIPE MARKERS (OPTIONAL)

A. Based on product by Seton Nameplate Corporation.
1. Brady, Brimar Industries, Emed Co., Ready Made or MIFAB equals are acceptable.

B. Seton "Set Mark" type SNA markers shall be used on piping/insulation with overall outside diameters 3/4 inch through 5 inch; Type STR markers shall be used on piping 6 inch diameter and larger. Include flow direction arrows, as scheduled.
1. Markers to be semi-rigid plastic designed to fit over piping and Snap-on tight. Furnish as per manufacturers recommendations, color coded as per ANSI Specifications.

PART 3: EXECUTION

3.01 VALVES

A. Attach tags for valve identification, with split ring around valve stem. Attach chart to wall with screws or bolts.

B. Place color-coded ¼" round self-adhesive dot/sticker on ceiling tile grid at each valve location. Dot/sticker shall be placed on the edge of the grid closest to the tile to be removed for valve access.

3.02 IDENTIFICATION: PIPING

A. Finish painting for all piping, covering, hangers and equipment furnished under the Fire Protection & Plumbing Work, is included under Division 9, Painting, unless otherwise stated herein.

B. After painting is completed, stamp or stencil all exposed piping in equipment rooms, boiler and furnace rooms, accessible pipe spaces, unfinished storerooms, pipe tunnels and concealed piping above suspended ceilings, as follows:

1. Stenciling shall be black and done on side or bottom of pipe covering, uncovered pipe, as required to be easily seen and read.
2. Stenciling shall be black for all <u>except</u> "DOMESTIC COLD WATER – (FROM WATER ONLY METER)" which shall be light blue, and done on side or bottom of pipe as required to be easily seen and read.
3. 4. Stencil at intervals of 15 feet, but at least once in every room, including alongside each valve.
4. Conform to the following schedule:
   a. <u>O.D. of PIPE or COVERING</u> <u>HEIGHT of LETTERS</u>
      1) Thru 1-1/4 inch 1/2 inch
      2) 1-1/2 inch to 3 inch 1 inch
      3) 4 inch and over 1-1/2 inch
5. Stencil wording shall be as follows:
   a. WELL WATER (*)
   b. DOMESTIC COLD WATER (*)
   c. DOMESTIC COLD WATER – FROM WATER ONLY METER (*)
   d. DOMESTIC COLD WATER – NON-POT. – EQUIP. USE ONLY (*)
   e. DOMESTIC COLD WATER – NON-POT. – DISCHARGE TO STORM (*)
   f. NON-POT. WTR. – FROM WATER ONLY METER (*)
   g. NON-POT. WTR. – EQUIP. USE ONLY (*)
   h. NON-POT. WTR. – DISCHARGE TO STORM (*)
   i. DOMESTIC SOFT COLD WATER (*)
   j. FIRE SPRINKLER (*)
   k. DOMESTIC HOT WATER (*)
   l. DOMESTIC HOT WATER RETURN (*)
   m. WASTE (*)
   n. VENT (*)
   o. RAINWATER (*)
   p. NATURAL GAS (*)
6. (*) Add flow direction arrow to these designations.

C. Unpainted covered piping shall be given a coat of clear seal under area of stencil, before application.

D. (Optional) Install Seton identification pipe markers as recommended by manufacturer.

END OF SECTION 22 05 53

VALVE CHART

PROJECT : X

02-Feb-21 HSR NUMBER : X

VALVE TAG NO.	SYSTEM	PIPE SIZE (IN.)	VALVE LOCATION (ROOM NO.)	VALVE MANUFACTURER	VALVE TYPE	VALVE MODEL NO.	AREA ISOLATED BY VALVE	CEILING DOT COLOR
E X A M P L E								
P1	DOMESTIC HW	2	A101	NIBCO	BALL	S502	ROOMS 101-151	ORANGE
P2	DOMESTIC HWR							ORANGE
P3	DOMESTIC CW							GREEN
P4	NATURAL GAS							YELLOW
P5	COMPRESSED AIR							BLUE
P6	MEDICAL GAS							BLUE

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SECTION 22 05 93

TESTING

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 WORK INCLUDED

A. Piping will have openings capped and shall be tested before any painting, covering or backfilling is done.

1. Testing shall be conducted in the presence of the Owner's representative, the Architect, the Engineer, inspector or their representatives. Contractor shall notify AE of proposed tests at least two days prior to testing.
2. When plumbing systems are installed in a municipality having a local inspector, the inspector shall:
   a. Inspect system testing.
   b. Inspect rough-in work before being closed in, concealed, covered and fixtures set.
   c. Inspect final installation.
   d. Notify the inspector when work is ready for inspection.
   e. Provide apparatus and appliances required for making the tests.
   f. If inspector fails to inspect by the end of the following business day, contractor may proceed with work.
3. Respective piping Trade shall provide all equipment required to conduct tests.
4. Submit report on test results, on form provided at end of this Section.

PART 2: PRODUCTS - NOT USED

PART 3: EXECUTION

3.01 TESTING

A. Piping systems shall be tested as hereafter specified; but not less than 50% above the operating pressure of the system.

B. Piping systems test requirements:

SYSTEM	TEST	TEST PRESSURE	HOLD PERIOD	PERMISSIBLE PRESSURE DROP
1. Domestic Water	Hydrostatic	City Press.	15 Min.	None
2. Domestic Water	Hydrostatic	150 PSIG	4 Hrs.	None
3. Bldg.San.Sewer	Hydrostatic	5 PSIG	15 Min.	None
4. Bldg.San.Sewer	Pneumatic	5 PSIG	15 Min.	None
5. Bldg.St. Sewer	Hydrostatic	5 PSIG	15 Min.	None
6. Bldg.St. Sewer	Pneumatic	5 PSIG	15 Min.	None
7. Natural Gas	(see below)			
8. DWV	Hydrostatic	5 PSIG	15 Min.	None
9. DWV	Pneumatic	5 PSIG	15 Min.	None
10. DWV	Hydrostatic	5 PSIG	2 Hrs.	None
11. RWC & Clearwater	Hydrostatic	(See below)	2 Hrs.	None

C. Defects discovered during the tests shall be immediately corrected and piping system shall be retested until it qualifies. Defective joints found in welded piping shall be ground off and rewelded; screwed joints shall be disassembled, cleaned and rejoined as a new joint.

3.02 RAINWATER

A. Storm drains and rainwater piping systems having vertical rainwater conductors higher than 12 feet above low-point of horizontal storm sewer, shall be tested for static pressure of water in riser. (Height ft. divided by 2.3 = PSI).

3.03 GAS SYSTEMS

A. Air, CO2, or nitrogen shall be used to conduct pressure test.

B. Gas piping shall stand a pressure of not less than 10 psi gauge pressure. Test pressures shall be held for a length of time satisfactory to the Authority Having Jurisdiction but in no case less than 15 minutes with no perceptible drop in pressure.

C. For welded piping, and for piping carrying gas at pressures in excess of 14" of w.c., the test pressure shall be not less than 60 psi and shall be continued for a length of time satisfactory to the Authority Having Jurisdiction, but in no case less than 30 minutes.

D. For CSST carrying gas at pressures in excess of 14" of w.c., the test pressure shall not be less than 30 psi for 30 minutes.

E. Pressure tests shall be made in the presence of the Authority Having Jurisdiction.

F. Necessary apparatus for conducting tests shall be furnished by the permit holder.

G. After testing is completed, fill system with gas and soap test all joints for leaks; or test with gas detection meter.

3.04 FIRE PROTECTION

A. Test in accordance with NFPA No. 13, Chapter 1, Sections 1-11, and requirements of Insurance Services Offices of Wisconsin.

END OF SECTION 22 05 93

M E C H A N I C A L   T E S T I N G   R E P O R T

02-Feb-21

PROJECT: X
HSR NUMBER: X

PORTION OF SYSTEM TESTED	MATERIAL	DATE	TYPE OF TEST	TEST PRESSURE (P.S.I.)	DURATION (HRS.)	PRESSURE DROP (P.S.I.)	CONTRACTOR'S SIGNATURE	WITNESS SIGNATURE

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SECTION 22 07 19

PIPE INSULATION

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 WORK INCLUDED

A. Pipe insulation herein specified, applies to all mechanical systems piping, as indicated under EXECUTION.

1.03 RELATED WORK

A. Piping: Section 22 10 01.

B. Piping Supports: Section 22 10 04.

1.04 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

1.05 QUALITY ASSURANCE

A. Refer to Article 5, paragraph 5.2 of the General Conditions of the Contract for Construction (AIA Document A201).

PART 2: PRODUCTS

2.01 PIPE INSULATION COVERING

A. Based on product by Manville.
1. Knauf, Manson and Owens-Corning equals are acceptable.
2. Pipe insulation and components shall meet ASTM E-84, NFPA 255 or U.L. 723 tests, Flame Spread 25 and Smoke Dev. 50.

The following may be substituted for fiberglass base specification providing the system temperature is within the manufacturer's respective operating range, the Flame Spread and Smoke Dev. ratings are not exceeded, the thickness is adjusted according to the respective "R" values per following tables and installed as follows:

a. Armacell AP Armaflex black flexible elastomeric thermal insulation, expanded closed-cell structure, unslit, 3/8", ½", ¾", 1", and 1 ½" thick, 25/50 flame and smoke rating for use in air plenums, manufactured without the use of CFC's, HFC's or HCFC's, formaldehyde free, low VOCs, fiber free, dust free, resists mold and mildew, made with Microban antimicrobial product, water vapor transmission of 0.05 perm-inch, up to 6" IPS, meets the energy code requirements of ASHRAE 90.1, ASHRAE 90.2, International Energy Conservation Code (IECC) and other building codes, conforms to NFPA 90A and 90B requirements, K=0.25 per inch and R=4.0 per inch based on flat surface rather than radial surface, recommended temperature usage range of -297°F to 220°F.

b. Armacell AP Armaflex SS self-seal black flexible elastomeric thermal insulation, expanded closed-cell structure, ½", ¾", and 1" thick, 25/50 flame and smoke rating for use in air plenums, manufactured without the use of CFC's, HFC's or HCFC's, formaldehyde free, low VOCs, fiber free, dust free, resists mold and mildew, made with Microban antimicrobial product, water vapor transmission of 0.05, up to 4" IPS, meets the energy code requirements of ASHRAE 90.1, ASHRAE 90.2, International Energy Conservation Code (IECC) and other building codes, conforms to NFPA 90A and 90B requirements, K=0.24 per inch and R=4.2 per inch based on flat surface rather than radial surface, recommended temperature usage range of -297°F to 180°F.
c. Armacell AP Armaflex W self-seal white flexible elastomeric thermal insulation, expanded closed-cell structure, unslit, ½", ¾", and 1" thick, 25/50 flame and smoke rating for use in air plenums, manufactured without the use of CFC's, HFC's or HCFC's, formaldehyde free, low VOCs, fiber free, dust free, resists mold and mildew, made with Microban antimicrobial product, water vapor transmission of 0.05, up to 4" IPS, conforms to NFPA 90A and 90B requirements, K=0.25 per inch and R=4.0 per inch based on flat surface rather than radial surface, recommended temperature usage range of -297°F to 220°F.
d. Apply Armaflex 520 adhesive to all joints and seams to seal water tight as recommended by manufacturer.
e. Rubatex "Insul-Tube" flexible elastomeric thermal insulation, expanded closed-cell structure, unslit or factory slit, black, 3/8", ½", 3/4" and 1" thick, 25/50 flame and smoke rating, water vapor transmission of 0.10, up to 5" IPS, K=0.277 per inch, R=3.61 per inch, -40°F to 220°F.
f. Rubatex "Insul-Lock" flexible elastomeric thermal insulation, expanded closed-cell structure, self-seal, pre-slit, black, 3/8" and ½" thick, 25/50 flame and smoke rating, water vapor transmission of 0.10, up to 2-1/8" insulation I.D., K=0.277 per inch, R=3.61 per inch, -40°F to 220°F.
g. Fittings: Fabricate fitting covers from properly miter-cut pieces as recommended by manufacturer.
h. Flanges, valves, water meters, reduced pressure principle backflow preventers, check valves, pressure reducing valves, strainers, etc: Fabricate covers from properly cut pieces of sheet material as recommended by manufacturer.
i. Apply Armaflex 520 adhesive to all joints and seams to seal water tight as recommended by manufacturer.
j. All flexible elastomeric/foam plastic/rubber pipe insulation installed on the Project shall be of the same manufacturer.
k. Foam plastic insulations shall not be installed exposed in areas of human occupancy or egress, but may be installed in equipment rooms, storage rooms, non-ventilated ceilings, etc.
    1) AP Armaflex and Self Seal Armaflex may be used provided its horizontal or vertical projected area is less than 10% of the projected building interior adjacent to the piping.
l. Installation shall conform to manufacturer's published installation instructions.

3. Insulations exceeding Smoke Dev. 50 shall not be installed in ceiling air plenums.

B. Cold Piping, Concealed or Exposed Indoors:

1. Maximum temperature +850°F.
2. Manville Micro-Lok fiberglass insulation with factory applied "AP-T Plus" vapor barrier jacket with pressure sensitive tape lap sealing system with matching butt strips. (To be installed only when air temperatures are between 15°F and 130°F.) or
3. Manville Micro-Lok fiberglass insulation with factory applied "AP" vapor barrier jacket secured with CMC 17-465 adhesive and stapled. Coat staples with vapor barrier mastic. (May be installed when air temperatures are lower than 15°F or more than 130°F.)

4. Fittings under 3 inch, insulate with insulating cement to thickness of adjoining pipe. Fittings 3" and larger shall be insulated with segmented or molded insulation of same material and thickness as adjoining pipe, secured with galvanized steel wire and finished with a smoothing coat of insulation cement. Vapor seal with a layer of glass cloth embedded between 2 coats of Foster 30-35 mastic, each 1/16" thick.
    a. At Contractor's Option: Manville "Zeston", Knauf "Proto Fitting Covers", Foster "Speedline 25/50 Smoke-Safe" or Universal premolded one piece PVC insulated fitting covers may be used provided: installation conforms to manufacturer's recommendations; fiberglass insulation insert thickness is the same or greater than specified for adjacent piping; tack fasteners are used prior to using PVC Z-Tape on all joints; and State flame spread and smoke developed ratings are complied with.
    b. At Contractor's option: may use pipe insulation of same material and thickness, size as required to overlap onto adjoining pipe insulation, with exposed joints and ends sealed.
5. Thermal conductivity: R = 4.3 / K = 0.23 at +75°F. mean temperature, 1 inch thick.

C. Hot Piping, Concealed or Exposed Indoors:
1. Maximum temperature +500°F.
2. Manville Micro-Lok fiberglass insulation with factory applied "AP-T Plus" vapor barrier jacket with pressure sensitive tape lap sealing system with matching butt strips. (To be installed only when air temperatures are between 15°F and 130°F.) or
3. Manville Micro-Lok fiberglass insulation with factory applied "AP" vapor barrier jacket secured with CMC 17-465 adhesive and stapled. Coat staples with vapor barrier mastic. (May be installed when air temperatures are lower than 15°F or more than 130°F.)
4. Fittings under 3 inch, insulate with insulation cement to thickness of adjoining pipe. Fittings 3" and larger shall be insulated with segmented or moulded insulation of same material and thickness as adjoining pipe, secured with galvanized steel wire and finished with a smoothing coat of insulation cement. Apply mastic and reinforced fiberglass mesh or at Contractor's option, canvas covering with fire-safe adhesive; Foster 30-36 (two coats).
    a. At Contractor's option, Manville "Zeston", Foster "Speedline 25/50 Smoke-Safe" or Universal insulated fitting covers may be used provided: installation conforms to manufacturer's recommendations; fiberglass insulation insert thickness is the same or greater than specified for adjacent piping; tack fasteners are used on all joints; and State flame spread and smoke developed ratings are complied with.
    b. At Contractor's option: may use pipe insulation of same material and thickness, size as required to overlap onto adjoining pipe insulation, with exposed joints and ends sealed.
5. Thermal conductivity: R = 4.3 / K = .23 at +75°F. mean temperature, 1 inch thick.

D. Cold and Hot Piping, Insulation Thickness: Provide as scheduled below:

Plumbing Piping Minimum Insulation (inches)

Fluid	Nominal Pipe Diameter (inches)					Insulation Conductivity	
Operating Temperature Range, °F	1" and Less	1-1/4" to 2"	2 ½" to 4"	5" and 6"	8" and up	Conductivity Range BTU-in/(h*ft^3*°F)	Mean Rating Temperature °F
Domestic Hot Water systems							
105 and greater	1.0	1.0	1.5	1.5	1.5	0.24 - 0.28	100
Domestic Cold Water; Condensate Drains							
40 - 75	0.5	0.5	0.5	0.5	0.5	0.23 - 0.27	75
Rainwater Conductors							
40 - 70	1.0	1.0	1.0	1.0	1.0	0.23 - 0.27	75

Recirculating Plumbing system piping, Plumbing piping in the first 8 feet from storage tanks for non-circulating systems, any piping served by a self-regulating electric heating cable, shall be thermally insulated in accordance with the Table above.
Plumbing piping systems without a heat trap to prevent circulation due to natural convection shall be considered circulating systems.
The required minimum thicknesses do not consider water vapor transmission and condensation. Additional insulation, vapor retarders, or both, may be required to limit water vapor transmission and condensation.

2.02 METAL INSULATION PROTECTION SHIELDS

A. Based on B-Line Systems Inc.
1. Buckaroo equals are acceptable.

B. B-Line Systems Inc. Figure B3151, 18 to 12 gauge galvanized steel and 12 to 24 inch long respectively or

C. B-Line Systems Inc. Figure B3154 short insulation protection shield, 18 gauge galvanized steel and 8 to 12 inch long.

2.03 STRUT PIPE SUPPORT CLAMP INSERTS (See Section 22 10 04)

2.04 PIPE INSULATION FITTING COVERS AND JACKETING

A. Based on Manville.
1. Proto PVC equals are acceptable.
2. Manville “Zeston® 2000 PVC” Insulated Fitting Covers and Jacketing.
   a. High impact, gloss white, UV resistant, polyvinyl chloride.
   b. Fitting covers for 45° and 90° short and long radius elbows, tees and valves, flanges, reducers, end caps, soil pipe hubs, traps and mechanical groove-type fittings
   c. Jacketing available in rolls in thicknesses of 10, 15, 20, and 30 mil. The 20 or 30 mil thicknesses are recommended for outdoor applications and is factory-cut to fit up to 30” O.D. piping.
   d. Sections of System 2000 PVC Cut & Curled Jacketing are 48” in length and are factory curled to fit snugly.
   e. PVC covers must be kept below 150°F, kept away from contact with, or exposure to, sources of direct or radiated heat.
   f. An approved vapor retarder mastic compatible with PVC must be applied between pipe insulation and fitting cover, and on fitting cover throat overlap seam.

g. For totally sealed systems (USDA Approval), use 20 or 30 mil Zeston PVC jacketing applied to pipe insulation in conjunction with Zeston PVC fitting covers.
   1) All circumferential and longitudinal seams of jackets and fitting covers should be sealed with Zeston Perma-Weld adhesive. Circumferential seams should be a minimum 1" overlap, and longitudinal seams should be 1 ½" to 2" overlap.
   2) Slip joints are required periodically between fixed supports and on continuous long runs of straight piping. Slip joints are achieved by increasing circumferential overlap to 8 to 10 inches and applying a flexible white caulking in the overlap area to maintain a sealed system.

h. Installation shall conform to manufacturer's published installation instructions.

PART 3: EXECUTION

3.01 PIPE INSULATION COVERING

A. Covering shall be installed as per the manufacturer's recommendations, by a qualified insulation subcontractor, after piping has been tested, as specified.

B. The inside diameter of insulation shall match outside diameter of the tubing or piping being insulated. Improper insulation size or thickness will not be acceptable.

C. All covering shall be continuous through walls, floors, ceilings, sleeves, and other openings. Insulation on cold surfaces shall have a continuous, unbroken vapor seal; vapor barrier joints shall be sealed and lapped. Self-sealing lap joints shall be stapled.

D. Insulation shall be equal to or better in thermal efficiency than the base specification, or additional thickness shall be provided.

E. Provide for operation and viewing of name plates, controls, instruments, valve bonnets and stems. Insulate flanges, valve bodies, strainers, etc. as hereafter specified:
1. Balancing stations shall be insulated with a removable type enclosure. Removable straps shall be required for reinstallation.
2. Ball Valves (Domestic hot water system): Insulate body, taper insulation and provide clearance at valve stem/handle so operation of valve handle does not rub or otherwise damage the insulation.
3. Ball Valves (Domestic cold water system): Insulate body up to non-rotating stem extension sleeve and provide a tight vapor seal.
4. Butterfly valves (Domestic hot and cold water system): insulate as specified for fittings.
5. Check Valves (Domestic hot water system): Insulate body, taper insulation and provide clearance for servicing.
6. Flanges (Domestic hot and cold water system): insulate as specified for fittings.
7. Flanges (Domestic cold water system): insulation shall stop at flanges and sealed, then cover flanges with ½" flexible foamplastic "slip cover", to fit snugly against piping insulation forming a tight vapor seal - "slip cover" shall be removable.
   a. At Contractor's option: may use pipe insulation of same material and thickness, size as required to overlap onto adjoining pipe insulation, with exposed joints and ends sealed.
8. Strainers: Insulate body and/or flanges as specified for valves and flanges; do not insulate removable portion.
9. Unions (Domestic hot and cold water system): insulate with flexible elastomeric insulation or as specified for fittings.
10. Accessories and Specialties in hot piping, insulation is not required for such items as thermometer wells, gauge tappings, etc.; in cold piping where condensation will occur, these items will be insulated as specified for fittings.

F. Pipes shall be clean and dry before insulation is applied.

G. Maximum lengths of pipe insulation shall be used in rooms with exposed ceilings, mechanical equipment rooms, etc. where highly visible. Short lengths may be used above ceilings. (Vapor barrier seal shall be maintained on all cold water piping).

3.02 METAL INSULATION PROTECTION SHIELDS

A. Provide shields as follows:
1. Install in conformance with manufacturer's recommendations.
2. Install a treated hardwood block insert in insulation between pipe and support as required.
3. Domestic cold water piping.
   a. All insulated cold water piping shall be provided with oversized hangers.
   b. Provide shields on all insulated piping 1 inch and larger.
   c. Provide shields on all insulated piping on trapeze or rack supports. (Vapor barrier seal shall be maintained).
4. Domestic hot water piping.
   a. All insulated hot water piping may be provided with oversized hangers.
   b. Provide shields on all insulated piping 1 inch and larger when oversized hangers are used.
5. Rainwater piping.
   a. All insulated piping shall be provided with oversized hangers.
   b. Provide shields on all insulated piping.

3.03 STRUT PIPE SUPPORT CLAMP INSERTS (See Section 22 10 04)

3.04 PIPE INSULATION FITTING COVERS AND JACKETING

A. To be used on all new and existing exposed water piping.

B. Maximum lengths of jacketing shall be used where highly visible.

C. Position joints in jacketing towards wall or ceiling as applicable in order to conceal the joint.

3.05 PLUMBING PIPING INSULATION

A. All domestic hot, cold and hot water return piping in building will be insulated, including piping in tunnels, suspended ceilings, soffits, chases, shafts, walls, behind cabinets, etc., modified as follows:
1. Underground domestic cold water piping will not be insulated.
2. Domestic water piping rough-in at fixtures will not be insulated. (Except where handicapped hot water fixtures such as sink supplies/drains require.)
3. Hangers on all cold water piping shall be oversized for pipe insulation and shall not be insulated.
4. Hangers for hot water piping may be insulated with piping.
5. All above floor cold water piping to hosebibbs, wall hydrants, clothes washers, non-refrigerated drinking fountains or other continuous flow devices, will be insulated.
6. Underground (underfloor) domestic hot water and hot water circulating piping, will be insulated.

B. Insulate all above ground, exposed waste traps from drinking fountains and electric water coolers, as specified for cold piping, including piping/traps in cabinets.

C. All rainwater piping, including roof drain bowls/pans, above ground inside building shall be insulated as specified for cold piping.
1. Hangers on piping shall be oversized for pipe insulation and shall not be insulated.

D. Insulate building water service meter with flexible elastomeric insulation, provide visibility to readout registers.

3.06 FIRE PROTECTION PIPING

A. Fire protection piping will not be insulated, unless installed in areas subject to below freezing temperatures and indicated on Drawings for insulation and electric heat tape protection.

3.07 EXISTING PIPING

A. Existing piping insulation damaged during construction shall be repaired to match original condition.

B. Insulate existing exposed PVC piping located adjacent to the water reuse system in Fire Bay Rm 122. See Detail 4P000.

3.08 PAINTING

A. Coordinate with the General Contractor when piping is to be painted. Oil based paints are not acceptable, as the solvents cause the self-sealing joint on the pipe insulation to fail. Masking the joint is not acceptable. If the insulation taping is rippled due to the oil based application, the Painter shall be responsible for replacement of the insulation. (Certain Class A, non-combustible paints may maintain a 25/50 rating for the painted pipe insulation, PVC jacketing and fittings. Check with the state and local building codes and fire marshal for approved practice before painting.)

END OF SECTION 22 07 19

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SECTION 22 10 01

PIPE AND PIPE FITTINGS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 WORK INCLUDED

A. Make pipe joints watertight, gastight, under pressures required for various services.

B. Under Materials, the ASTM or Federal Spec. numbers shall be the current ones in use, for pipe specified.

1.03 RELATED WORK

A. Refer to applicable Sections for type piping materials to be used with various systems.

1.04 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

PART 2: PRODUCTS

2.01 PIPING

A. Hubless cast iron soil pipe and fittings for sanitary and storm drain, waste and vent piping applications: CISPI 301 (current standard); ASTM A-888 (current standard).
1. Shall not be used where soil conditions will corrode pipe, fittings and couplings unless installed per manufacturer's recommendations when dealing with corrosive soils/conditions. Contractor to determine soil compatibility.
2. Couplings/neoprene sleeves and/or gaskets used in cast iron building drains serving boiler rooms and kitchens shall be rated for the respective discharge temperatures. Neoprene, ASTM C-564, ASTM C-1563, CISPI 310-11, and NSF Certified.

B. Steel pipe: Schedule 10 black, ASTM A-135 and A-568, NFPA 13; plain end or roll grooved. (Fire Protection - only.)

C. Steel pipe: Schedule 40 galvanized, seamless, ASTM A-53.

D. Copper tubing: Type L, hard, ASTM B-88.

E. Pex tubing: Crosslinked Polyethylene (PEX) tubing systems for pressure applications, ASTM F876, ASTM F877, CSA B137.5

F. Polyvinyl chloride (PVC): Schedule 40 solid wall pipe and PVC DWV solvent cement fittings, iron pipe size (IPS), ASTM D-1785, ASTM D-2665, non-pressure applications with less than 140°F operating temperature, (1 ½"- 12").

2.02 FITTINGS

A. Cast iron drainage fittings: Galvanized or asphaltum coated, ANSI-B16.12.

B. Cast iron screw fittings: 125 psi black or galvanized, ANSI-B16.4.

C. Flex-seal couplings for similar and dissimilar pipe materials and sizes: sizes 1 1/4"-72", molded natural and synthetic rubber seal (ASTM C425 and ASTM C1173), 300 series stainless steel worm drive clamping bands (ASTM A240), as manufactured by Mission Rubber Company or Husky.

D. Band-seal sewer couplings: sizes 1 ½'-8", extra thick molded natural and synthetic rubber seal (ASTM C425 and ASTM C1173), 316 series stainless steel clamps with nut and bolt or worm drive take-up, as manufactured by Mission Rubber Company or Husky.

E. No-hub cast iron pipe coupling:
1. Knurled stainless steel shield, clamp assembly and molded one-piece **Neoprene** sealing sleeve, ASTM C564, ASTM C1277, CISPI 310-11, and NSF Certified, as manufactured by Tyler Pipe Company, Anaco, Ideal, Mission, or Husky.
2. Heavy duty corrugated 304 series stainless steel shield conforming to ASTM C 1540 with a molded one-piece **Neoprene** sealing sleeve, ASTM C564, CISPI 310-11, and NSF Certified. Couplings can withstand head pressures of 50' (1 ½"-4"), 40' (5"-6"), when properly restrained and anchored, as manufactured by Husky SD 4000, Mission HW, or Ideal MD.
3. Mid-range corrugated 304 stainless steel shield conforming to ASTM C1540 with a neoprene sleeve, ASTM C 564, CISPI 310-11, and NSF Certified, as manufactured by Husky HD 2000, Mission HW, or Ideal MD.
4. Shielded transition couplings for use with dissimilar DWV pipe & fittings above ground, ASTM C1460.

F. Grooved fittings: Full flow with grooves or shoulders designed to accept Victaulic mechanical couplings. Standard fittings shall be cast of ductile iron conforming to ASTM A536 malleable iron conforming to ASTM A47, max temp. +230°F (110°C), fabricated carbon steel, ASTM A53, Type E, F, or S, Grade B, galvanized when required.
1. Anvil Gruvlok, Shurjoint, Star equals are acceptable.

G. Grooved fittings for copper systems: Full flow copper fittings with grooves designed to accept Victaulic grooved end couplings. Standard fittings shall be 2 ½" - 4" (DN65 mm - DN100 mm) copper per ASTM B-75 alloy C12200 and 5" - 8" (DN125 mm - DN200 mm) bronze sand castings per ASTM B-584-87 copper alloy CDA 844 (81-3-7-9).
1. Anvil Gruvlok, Shurjoint, Star equals are acceptable.

H. Grooved couplings for copper systems: Victaulic Style 606, consisting of cast ductile iron housing conforming to ASTM A-536 (Grade 65-45-12) with copper alkyd enamel paint coating, synthetic rubber gasket of a central cavity pressure-responsive design (conforming to copper tube size (CTS) O.D. and coupling housing and properties of ASTM D-2000. Gaskets for water service shall be EPDM, Grade "E" with green color code). Nuts and bolts to secure unit together.
1. Anvil Gruvlok, Shurjoint, Star equals are acceptable.

I. Copper tube press water fittings: Viega ProPress copper or bronze fittings with “Smart Connect Feature”, for use on copper type K or L or M ½”-4” hard tubing or ½”-1 ¼” soft tubing, above ground installations, green dots, and EPDM rubber (black) 0-ring seal in the fitting socket, IAPMO IGC 137-99/PS 117-2000 and ANSI/NSF 61 approved, 0°F to 250°F operating temperature range, 200 psi maximum w.p., material complying with ANSI-ASME B16.18, B16.22, and ASTM B 88, seal complies with ASTM D 2000, 50-year warranty.

J. Copper tube press water fittings: Nibco Pressystem with wrought copper (ASTM B 75 Alloy C12200) & cast copper fittings (BS EN 1982:1999 modified Alloy CC491K), cast copper alloy press fittings shall be made from materials with a minimum of 78% copper and a maximum of 15% zinc, for use on copper type K or L or M, ½"-4" hard tubing or ½"-1 ¼" soft tubing, above ground installations, EPDM (BS EN 681-1) rubber (black) 0-ring seal in the fitting socket, ANSI/NSF 61 approved, -20°F to 250°F operating temperature range, 200 psi maximum w.p., flow area complying with ASME B16.22, fittings complying with ASME B16.22 and B16.18, 50-year warranty.

K. PEX fittings: EP, lead free brass, stainless steel, NSF 61 certified.

L. Wrought copper fittings: Solder-joint, ANSI-B16.22.

M. PVC threaded fittings: Schedule 80, ASTM D-2464.

N. PVC socket-type pressure fittings: Schedule 40, ASTM D-2466.

O. PVC socket-type fittings: Schedule 80, ASTM D-2467.

P. PVC solvent weld type: ASTM D-2665 and D-3311 (for Cellular Core pipe).

2.03 NIPPLES

A. Same material, composition and weight class as related pipe or tubing, except close nipples to be extra strong.

B. Threaded nipples, FS WW-N-351.

PART 3: EXECUTION

3.01 CAST IRON PIPING

A. Hubless Cast Iron Pipe Coupling - stainless steel shield & clamp assembly (Above Floor and Underfloor):
1. Position neoprene gasket on spigot; push spigots together inside sleeve firmly seated against separator ring; slide stainless steel shield into position over sleeve and tighten screws. Tighten stainless steel bands alternately and firmly to manufacturer's torque recommendation.
2. Coupling joint, ANSI A40.5, ANSI A40.1, CISPI 310, ASTM C564, ASTM C1277.

B. Hubless Cast Iron Pipe Coupling - cast iron clamp assembly (Above Floor and Underfloor):
1. Place neoprene gasket on the end of one pipe and the clamp assembly on the end of the other pipe.
2. Fit both hubless pipe ends into neoprene gasket, firmly butting them against the internal center rib or shoulder between them. Make certain that the pipe and/or fittings to be joined are in proper alignment and that necessary support is available to maintain that alignment during installation.
3. Pull the loose clamp assembly over the gasket so that the gasket is completely covered, keeping the bolting flanges evenly separated.
4. To provide a sound joint with field cut lengths of pipe, the ends should be cut square. To minimize friction during fastening and thereby obtain maximum clamping force or holding power: pipe and surfaces that receive the gasket should be clean, clamp assembly alignment maintained and fastener threads kept clean of dirt.

3.02 PLASTIC PIPING

A. PVC Solvent cement joints, ASTM D-2855.

B. PVC primer: ASTM F-656.

C. PVC Solvent cement shall be made in a two step process with primer manufactured for thermoplastic piping systems and solvent cemented conforming to ASTM D-2564.

D. Remove excess solvent cement from the exterior of the joint.

E. Primers and cements used in PVC solvent cement joints shall have contrasting colors.

F. PVC screwed piping: As per recommendation of manufacturer.
1. All pipe threads to be per ASME B1.20.1.

3.03 STEEL PIPING

A. Screw pipe: Cut square and ream, with thread end extending to shoulder of fitting, USAS-B2.1.
1. Apply approved pipe joint compound to male threads, pipe cement and oil or graphite and oil.
2. All pipe threads to be per ASME B1.20.1.

3.04 COPPER TUBING

A. Cut square, ream and apply flux to outside of tube and inside of fittings; heat joint until flux boils and apply solder to edge of fitting until entire joint is filled, wiping off excess solder, USAS-B.91.

B. Solder, ASTM B-32.
1. Use 95-5 lead free solder and lead free flux all domestic water piping.

3.05 GROOVED FITTINGS AND COUPLINGS

A. Before assembly, properly apply a uniform thin coat of lubricant on gasket exterior including inside lip, pipe ends, and housing interiors, to prevent pinching the gasket. Use "Victaulic Lubricant" or other compatible materials such as silicone. Do not use petroleum based lubricants.

B. Pipe grooving shall be as recommended by manufacturer.

C. Do not use in conjunction with expansion joints.

D. Maximum temperature +230 degrees F.

E. Include field inspection by manufacturer during assembly.

END OF SECTION 22 10 01

SECTION 22 10 02

VALVES AND COCKS: MANUAL

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

PART 2: PRODUCTS

2.01 SILENT CHECK VALVES (WATER)

A. Based on product by Apollo.

B. Apollo series 62, ¼" - 2", lead free, stainless steel body, performs function of swing checks or vertical lift checks, prevents water hammer, conical lead free disc, RPTFE seat, install in horizontal or vertical position, pressure drop equivalent to swing check, stainless steel guide rod and spring, threaded ends, silent operation, 400 psi WOG.

2.02 BALL VALVES (WATER)

A. Based on product by Apollo, Jomar.

1. Plumbing water valves serving two or more plumbing fixtures shall have, with the valve in a fully open position, a flow through passageway of not less than one nominal pipe size smaller than the nominal size of the piping connecting to the valve. (SPS384.30(5)(b)3.)

B. Standard port two-piece (1/2" - 3" sizes) Apollo 76-100 series stainless steel ball valve, A351-CF8M stainless steel body, threaded ends, MPTFE stem packing, stainless steel and nut, PTFE body seal, 2000 psig CWP. All materials in contact with potable water shall not contain more than 0.25% lead content per SDWA 1417(a)(1)(A) – 2011. NSF/ANSI Standard 372 "lead free" ANSI 3rd party certified.

C. Provide 1-1/4" stem extensions on all hot water piping insulated with more than 1/2" thick insulation.

D. Provide 1-1/4" stem extensions on all insulated cold water piping.
1. Include a non-rotating sleeve with cap around the stem extensions on all insulated cold water piping to facilitate vapor barrier seal.

E. Contractor shall install stainless steel ball valves as specified and where shown on drawings. If brass, bronze, CPVC, or other non-specified ball valve material are substituted and installed, the contractor will be required to replace each with as specified.

F. Contractor shall install ball valve stem extensions as specified. If not, the contractor will be required to install as specified or to provide a credit of $50 for the deletion of each valve stem extension. A/E will discuss with the Owner and if acceptable will process a change order.

2.03 BALL VALVES (NATURAL GAS)

A. Based on product by Apollo.
1. Brasscraft, Hammond, Jomar, Milwaukee, Nibco, Watts equals are acceptable.

B. Apollo No. 80-100 Series, screwed connections, adjustable gland packing, bronze with chrome plated ball and RTFE stem packing and seats, blow-out-proof stem, 600 psi WOG, 250 psi LP gas, rated for vacuum service, UL Listed, sizes 1/4" through 3".

PART 3: EXECUTION

3.01 VALVES (GENERAL USE)

A. Use ball valves for isolating equipment or main/branch piping. Install valves as indicated, full size of piping.

B. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward from horizontal plane unless unavoidable. Ball valves to be installed with stems in the horizontal position.

C. Install swing check valves in the horizontal position, unless otherwise shown on drawings, with hinge pin horizontally perpendicular to centerline of pipe. Install for proper direction of flow.

D. Install valves in water piping where indicated on Drawings.

3.02 BALL VALVES

A. Piping and valve on cold water piping up to and including the non-rotating sleeve shall be insulated and sealed with vapor barrier mastic.

END OF SECTION 22 10 02

SECTION 22 10 04

PIPING SUPPORT DEVICES

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 RELATED WORK

A. Piping: Section 22 10 01.

B. Metal Insulation Protection Shields: Section 22 07 19.

1.03 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

1.04 REFERENCES

A. ASTM B633 - specification for Electrodeposited Coatings of Zinc on Iron and Steel.

B. ASTM A123 - Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strip.

C. ASTM A653 G90 - Specification for Steel Sheet, Zinc-Coated by the Hot-Dip Process.

D. MSS SP58 and MSS SP69 - Manufacturers Standardization Society: Pipe Hangers and Supports - Materials, Design and Manufacture.

E. NFPA 13 - Standard for the Installation of Sprinkler Systems.

PART 2: PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS

A. Based on products by B-Line Systems.
1. Anvil International, Anvil Strut, FNW, Hilti, Michigan, Power-Strut, Unistrut, Hubbard Enterprises/Holdrite equals are acceptable.

B. Individual pipe attachments shall conform to the following:
1. Steel/Plastic Pipe:
   a. B-Line B3100 standard steel clevis hanger (½" - 30").
   b. B-Line B3104 carbon steel light-duty clevis hanger (3/8" - 4").
   c. B-Line B3170 pre-galvanized carbon steel adjustable swivel ring band hanger (2 ½" - 8").
   d. B-Line B3170NF pre-galvanized steel adjustable swivel ring band hanger (½"-8").
   e. B-Line B3171 malleable iron adjustable swivel ring hanger (½" - 8").
   f. B-Line B3198H malleable iron hinged extension split pipe clamp hanger (3/8 - 3").
   g. B-Line B3198R malleable iron extension split pipe clamp hanger (3/8 - 4").
   h. B-Line B3690 carbon steel adjustable "J" hanger (½" - 8").

C. B-Line bolted metal framing support system consisting of channel, fittings, hardware and/or threaded hanger rods (with inserts, beam clamps, pipe clamps and pipe rollers similar to items specified above), modified as follows:
1. For supporting insulated piping to strut, use B-Line Armafix IPH Series insert and clamp assembly unless the specified insulation can be undisturbed and insulation protection shields used. Pipe clamps/straps to be used as needed for alignment of piping on trapeze supports and to secure piping installed along walls. Insulation shall not be cut, notched, or otherwise damaged at support locations and shall maintain vapor barrier jacketing.
2. Armafix IPH Series insert and clamp assembly shall be installed prior to pipe insulation.

D. B-Line Armafix IPH Series insert and clamp assembly (Buckaroo equals are acceptable). ½", ¾", & 1" Armaflex insulation thickness, ½" - 8" pipe sizes, painted aluminum jacket, CFC-free PUR/PIP supports, self-adhesive closure. Materials shall have a flame-spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E84, latest revision. In addition, the product, when tested, shall not melt or drip flaming particles, the flame shall not be progressive and all materials shall pass simulated end-use fire tests.

E. Wall supports:
1. B-Line B3064 carbon steel adjustable strut bracket with B-Line B2000 two-piece rigid pipe clamp.
2. B-Line B3066 welded carbon steel medium duty angle bracket with B3110 or B3120 roller supports.
3. B-Line B3067 welded carbon steel heavy-duty angle bracket with B3110 or B3120 roller supports.
4. B-Line B3190 carbon steel offset J-Hook (½" - 4").
5. B-Line B3191 carbon steel straight J-Hook (½" - 4").
6. B-Line B3690 carbon steel adjustable "J" hanger (½" - 8").

F. Floor supports:
1. B-Line B3090 carbon steel pipe support with U-Bolt and B3088 carbon steel base stand (2 ½" - 36").
2. B-Line B3093 carbon steel adjustable pipe saddle support with B3088T carbon steel threaded base stand (2 ½" - 36").
3. B-Line B3117SL carbon steel roller stand with cast iron roller (2" - 30").
4. B-Line B3118SL carbon steel adjustable roller stand with cast iron roller and base plate (2" - 30").

G. Vertical supports:
1. B-Line B3373 standard carbon steel riser clamp (½" - 30").
2. B-Line B3373CT dura copper coated carbon steel riser clamp (½" - 4").
3. Clamp shall be sized to fit outside diameter of pipe.

H. Pipe covering protection saddles, B-Line B3160-3/4" through B3165-36 (¾" - 36"), carbon steel with plain finish.
1. Use saddles with all roller type supports or hangers.
2. Refer to Section 22 07 19 for pipe covering protection shields.

2.02 PLASTIC PIPING HANGERS AND SUPPORTS

A. Based on products by Specialty Products Company. Plastic swivel lock pipe hangers, hanger rods, strap hangers, couplings, pipe clamps, pipe insulators and brackets.

B. Based on products by "Clic". Automatic locking and corrosion resistant pipe/tube support and hanger constructed of Nylon 12 Grilamid (polyamid) and rated for continuous temperatures of minus 40°F to 180°F. Can be installed in temperatures down to minus 5°F. and either indoor or outdoor use. May include reusable polypropylene split routing rings, stainless steel flanges, adapters or studs as required.

PART 3: EXECUTION

3.01 PIPE HANGERS AND SUPPORTS

A. Individual pipe hangers shall be furnished for each respective piping system, however, trapeze type supports for grouped piping runs may be used.

B. Pipe hangers shall be rated for the load to be carried. Where loads are excessive, furnish heavier duty equipment or reduce spacing. Include all supplemental angles, channels, plates, etc. of adequate sizes and design, where supports shall be required between building structural members.

C. Hangers shall be arranged as not to cause undue strain, located near or at change in direction and at concentrated loads. They shall provide vertical adjustment to maintain proper pitch and shall allow for expansion and contraction in the piping. Hangers shall be fastened to building steel members wherever practical.

D. No dissimilar support shall come in contact with copper tubing; use epoxy painted finish on all hangers and clamps (B-Line “Dura-Copper” or FNW epoxy plated finish). The epoxy painted finish provides corrosion protection and protects from dissimilar metal contact. With the epoxy painted finish, it is not necessary to isolate the clamp, hanger, or trapeze from the tubing.

E. Horizontal steel pipe shall be supported as below:

PIPE SIZE	ROD DIAMETER	MAXIMUM SPACING
1. Up thru 1 1/4 inch	3/8 inch	7 feet
2. 1 1/2 inch	3/8 inch	9 feet
3. 2 inch	3/8 inch	10 feet
4. 2-1/2 inch	1/2 inch	11 feet
5. 3 inch	1/2 inch	12 feet
6. 4 and 5 inch	5/8 inch	12 feet
7. 6 inch and 8 inch	3/4 inch	12 feet

F. Horizontal lines of copper tubing shall be supported as below:

NOM. TUBING SIZE	ROD DIAMETER	MAXIMUM SPACING
1. Up thru 3/4 inch	3/8 inch	5 feet
2. 1 and 1-1/4 inch	3/8 inch	6 feet
3. 1-1/2 and 2 inch	3/8 inch	10 feet
4. 3 inch	1/2 inch	10 feet

G. Support vertical cast iron and copper risers at base and secured at every floor; support vertical steel risers at every other floor.

H. Structural attachments shall be as hereafter specified.
1. Attach to concrete using B-Line B2500 light weight concrete insert for loads up to 400 pounds and B-Line B3014 universal insert for loads up to 1,140 pounds.
2. Attach to steel beams using B-Line B3050 malleable iron I-beam clamp for piping 6 inch diameter or less.

I. Where inserts are omitted, use two (2) Phillips expansion shields with B-Line channel, for each hanger.

J. Continuous threaded rods shall be used wherever possible and shall be zinc plated, except above suspended ceilings.

K. No wood supports will be allowed. Do not pierce ducts with hanger rods.

L. Ductwork shall not be used to support piping.

M. Hangers and strut located outdoors shall be hot dip galvanized after fabrication in accordance with ASTM A123. All hanger hardware shall be hot dip galvanized or stainless steel. Zinc plated hardware is not acceptable for outdoor or corrosive use.

N. Hangers and strut located in corrosive areas shall be type 304 stainless steel with stainless steel hardware.

3.02 STRUT PIPE SUPPORT CLAMP INSERTS

A. Provide Armafix® inserts with clamps on all insulated hot and cold water piping clamped to strut systems or other pipe support systems to prevent compression of insulation, to maintain insulation thermal properties, to maintain vapor barrier, and prevent condensation on piping and supports. All joints shall be sealed with Armaflex 520 adhesive. Friction insulation tape shall be used to position Armafix® inserts to help prevent insert from slipping out of the support due to thermal expansion and contraction.

3.03 PLASTIC PIPE SUPPORTS

A. Horizontal PVC piping (polyvinyl chloride) shall be supported on plastic supports and hangers or on steel padded split ring or clevis hangers.

B. Support vertical plastic risers at each floor.

C. Plastic DWV piping shall be supported at intervals of not more than 4 feet, at the end of branches, change of direction or elevation and at all closet bends.

D. Do not clamp plastic piping too tightly.

E. Plastic piping shall be free to move sideways; installation should not be rigid.

F. Conform to manufacturer's latest support recommendations. However, the above support spacing shall not be exceeded.

3.04 NO-HUB CAST IRON PIPING SUPPORTS

A. Vertical piping shall be secured at each stack base, at each floor and supported at sufficiently close intervals to keep the system in alignment and to adequately support the weight of the pipe and its contents.

B. Support vertical cast iron risers at base and secured at every floor.

C. Horizontal hubless cast iron piping 10" I.D. and smaller shall be supported at every coupling. Hanger shall be within 18" of the coupling. If 10-foot pipe lengths are used, the supports may be 10 feet apart. Horizontal hubless cast iron piping 12" & 15" I.D. shall be supported within 18" on both sides of the coupling.

D. Horizontal hubless cast iron piping 5" I.D. and larger shall be suitably braced to prevent horizontal movement (end thrust). This shall be done at every branch opening or change of direction by the use of braces, blocks, rodding or other suitable method.

E. Conform to CISPI installation guidelines in the Cast Iron Soil Pipe and Fitting Handbook.

F. Hangers, supports, or blocks, shall be adequate to maintain alignment and prevent sagging or joint separation and shall be placed on, or immediately adjacent to, the couplings. Where hubless components are suspended by means of non-rigid hangers, longer than eighteen inches, they shall be suitably braced to prevent horizontal movement.

G. Closet bends, trap arms and similar branches shall be secured against movement in any direction.

H. Piping laid on grade or in trenches, shall be continuously supported on undisturbed earth, or compacted fill or masonry blocks on solid ground under each coupling. Vertical sections and their connecting branches shall be adequately staked and fastened to driven steel pipe or reinforcing bars so as to remain stable while backfill is placed or concrete is poured.

END OF SECTION 22 10 04

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SECTION 22 10 06

PLUMBING SPECIALTIES

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

PART 2: PRODUCTS

2.01 HWR BALANCING VALVE

A. Based on products by Nibco.
1. Victaulic equals are acceptable.

B. Nibco S-1810-LF or T-1810-LF, balancing valve with provisions for connecting a portable differential pressure meter, solder or threaded connections, pressure/temperature probes, fixed orifice, globe style, Y-pattern style, lead free, dezincification resistant, hidden locking memory stop, 1440° of throttling adjustment, 1/2" - 2" size, 300 psi. Capable of being installed in any direction or position.

2.02 LAUNDRY UNIT OUTLET BOX (OB-1)

A. Based on products by Oatey.
1. Guy Gray, Mifab, Canplas, IPS Corp equals are acceptable.

B. Oatey Model No. 38547 or 38548 recessed washing machine outlet box with 2" left or right drain, high impact polystyrene construction, four support brackets, easy knockout drain, top and bottom knockouts for water supply, with 90° single lever hammer ball valve (integral water hammer arrestors), ASTM F1807 or 1960 PEX connections, box dimensions of 8 ¾" W x 7 ½" H x 3 5/8" D, faceplate dimensions of 11 ¾" W x 10 1/8" H. (Note: This unit does not include electric receptacles.)

2.03 WALL HYDRANT (HYD-1)

A. Based on product by Woodford.
1. Josam, J. R. Smith, Mifab, Prier, Wade, Watts, Zurn equals are acceptable.

B. Woodford Model 65 series, anti-siphon automatic draining freezeless type with ASSE 1011 vacuum breaker-backflow preventer, 3/4 inch inlet, loose key handle, wall clamp, chrome finish on brass casting.
1. Provide hydrants of length required to seat valve inside building wall. Excessive lengths will not be acceptable.

2.04 JAIL CELL WATER CLOSET/LAVATORY COMBINATION (WC-3)

A. Based on products by Acorn.

B. Acorn Penal-Ware Model No. 1418FA-2-BP-04, 18” lav-toilet combination with lavatory oval bowl.

PART 3: EXECUTION

3.01 HWR BALANCING VALVE

A. Install per manufacturer's recommendations and located per drawings.

B. Balance domestic hot water return system. Record final handle setting on tag and attach to valve.

C. Install valves in the piping to facilitate use and service with the handle/knob in the down position so calibrations can be easily read. Note that manufacturer allows valve to be installed in this position.

3.02 LAUNDRY UNIT

A. Install recessed in wall.

B. Electrical connection - see Division 26, Electrical.

C. Install top of standpipe drain on L.U. 26-48 inches above floor.

D. Install 2" standpipe 18-36" high/above trap weir.

3.03 WALL HYDRANTS

A. Mount 18 inches above grade.

B. Pack fiberglass insulation around piping penetrating exterior wall and caulk watertight (color to match exterior of building).

3.04 JAIL CELL WATER CLOSET/LAVATORY COMBINATION

A. Fixture for training purposes only. No waste or water supply connections required. Securely mount unit to wall/floor, coordinate with owner.

END OF SECTION 22 10 06

SECTION 22 10 11

DOMESTIC WATER SYSTEM AND EQUIPMENT

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 RELATED WORK

A. Fire Stopping: Section 07 84 00.

B. Fire Protection: Section 21 13 00.

C. General Provisions: Section 22 05 00.

D. Pipe/Valve Identification: Section 22 05 53.

E. Testing: Section 22 05 93.

F. Pipe Insulation: Section 22 07 19.

G. Pipe and Pipe Fittings: Section 22 10 01.

H. Valves and Cocks (Manual): Section 22 10 02.

I. Piping Support Devices: Section 22 10 04.

1.03 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

PART 2: PRODUCTS

2.01 PIPING ABOVE FLOOR (DOMESTIC AND NON-POTABLE)

A. Chlorinated polyvinyl chloride (CPVC) pressure pipe and fittings.

2.02 WATER METER

A. Based on product by Sensus.

B. Sensus OMNI C^2 water meter, 1 1/2" size, magnetic drive, ductile iron with NSF approved epoxy coating maincase construction, large LCD readout with 10 year battery life guarantee, operating range: 0.5-200 gpm. Conforms to AWWA performance and material standards.

PART 3: EXECUTION

3.01 BUILDING WATER PIPING SYSTEM

A. Piping shall be pitched to drain entire system; install drain valves at low points. Provide unions, at piping connections to all equipment, control valves, etc.

B. No water piping shall be installed in exterior walls above grade.

C. At each high point where air may be trapped in water distribution mains 3/4" and larger, install 1/2" air vent line with valve or a fixture branch off top of main.

D. Extend hot and cold water piping from water heater/water meter and connect to all fixtures and equipment as required.

E. Seal openings around piping and pipe sleeves penetrating walls, floors and ceilings, including areas above suspended ceilings. Refer to Section 22 05 00.

F. See Section 07 84 00 for requirements when penetrating into or through required fire-resistive assemblies, fire protective membranes, thermal barriers, or construction providing a finish rating as an alternative to a fire resistive assembly.

G. See notes on drawing for information pertaining to the cutting, notching and boring of framing/structural members.

H. No piping shall be permitted to be installed in, enter or pass through spaces dedicated for electrical switchboards, panelboards, distribution boards, etc. Dedicated spaces extend from floor to structural ceiling with a width and depth that of the electrical equipment plus the working space in front of same with a width matching the equipment but not less than 30 inches, a depth of 36 inches and a height to at least 78 inches above floor. (Sections 110-16 and 384-4 of NFPA 70.)

I. Provide manufactured steel nailing plates (tube guards/safety plates) that are specifically designed to protect copper/PEX tubing from being damaged by nails or screws driven into framing members. Install at locations where this potential exists.

J. Where piping penetrates concrete/masonry walls and/or floors, protect piping from physical damage and corrosion by using protective tape material or pipe insulation to prevent physical contact with concrete/masonry, mortar, etc.

3.02 WATER METERS

A. Install where indicated.

B. Conform with local utility regulations.

C. Insulate with 3/4" Armaflex II sheet insulation following manufacturers recommendations, except do not insulate readout register/tranmitter.

3.03 TESTS

A. Before joints are covered. (Refer to Section 22 05 93).

B. All new combined water service piping must be hydrostatically tested at not less than 200 psi pressure for two hours in the presence of the local authority having jurisdiction.

3.04 FLUSHING

A. Remove faucet outlets during the flushing process to prevent debris accumulation or clogging. Make sure each faucet outlet is unobstructed prior to A/E final inspection.

3.05 STERILIZATION

A. As soon as the water distribution system has been flushed out as above specified, it shall be sterilized in accordance with the requirements of the Wisconsin Plumbing Code or, in the absence of such, by the following method:

1. Introduce chlorine or a solution of calcium or sodium hypochlorite, filling the lines slowly and applying the sterilizing agent at a rate of 50 parts per million (ppm) of chlorine, as determined by residual chlorine tests at the ends of the lines. Open and close all valves and hydrants while the system is being chlorinated.
2. After the sterilizing agent has been applied for 24 hours, test for residual chlorine at the ends of the lines. If less than 5 ppm is indicated, repeat the sterilization process.
3. When tests show at least 5 ppm. of residual chlorine, flush out the system until all traces of the chemical used are removed.
4. 24 hours after the above flushing (3), arrange for a certified testing agency to collect a water sample, taken at the most remote location, and perform a potable water test. Submit copy of test report to HSR Construction Administrator. If sample fails to meet the potable water requirements, repeat the above procedure(s) as required.

END OF SECTION 22 10 11

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SECTION 22 10 12

DRAIN, WASTE AND VENT SYSTEMS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 RELATED WORK

A. Flashing and Sheet Metal: Section 07 60 00.

B. Fire Stopping: Section 07 84 00.

C. General Provisions: Section 22 05 00

D. Pipe Identification: Section 22 05 53.

E. Testing: Section 22 05 93.

F. Pipe and Pipe Fittings: Section 22 10 01.

G. Piping Support Devices: Section 22 10 04.

H. Drains and Cleanouts: Section 22 40 42.

1.03 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

B. Record installed building drain elevations on "As-Built Drawings".

1.04 COMMISSIONING

A. Witness all tests and compile all documentation including verification of the following:
1. Verifying and recording building drain elevations on As-Built Drawings.
2. Pressure/leak testing before joints are covered per Section 22 05 93.

PART 2: PRODUCTS

2.01 PIPING BELOW FLOOR (BUILDING DRAINS & VENT PIPING)

A. "Service weight" cast iron bell and spigot pipe, with fittings of corresponding weight and quality.
1. Shall not be used where soil conditions will corrode pipe, fittings and couplings unless installed per manufacturer's recommendations when dealing with corrosive soils/conditions. Contractor to determine soil compatibility.
2. Neoprene gaskets used in cast iron building drains serving boiler rooms and kitchens shall be rated for the respective discharge temperatures.
3. At commercial dishwashers, provide 4" hub drain with 24" of vertical drain piping above the trap.

B. No-Hub cast iron pipe and fitting.
1. Stainless steel shield and clamp assembly.
2. Cast iron clamp assembly.
3. Couplings/neoprene sleeves and/or gaskets used in cast iron building drains serving boiler rooms and kitchens shall be rated for the respective discharge temperatures.
4. Shall not be used where soil conditions will corrode pipe, fittings and couplings unless installed per manufacturer's recommendations when dealing with corrosive soils/conditions. Contractor to determine soil compatibility.

C. Schedule 40 PVC DWV pipe and fittings.
1. Not to be used where drain water temperatures exceed 140°F (ie. dishwashers, boilers, steamers, etc.).

2.02 PIPING ABOVE FLOOR (DRAIN, WASTE AND VENT)

A. "Service weight" cast iron bell and spigot pipe with drainage fittings of corresponding weight and quality.

B. No-Hub cast iron pipe and fittings.

C. Schedule 40 galvanized steel pipe with cast iron long sweep drainage fittings, may be used with piping 2 ½" and under. Long sweep drainage fittings are not required with vent piping.

D. Schedule 40 PVC DWV pipe and fittings.
1. Not to be used where temperatures exceed 140°F (ie. dishwashers, boilers, steamers, etc.).
2. Not to be installed in air plenums unless material has a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E84.
3. Note requirements when penetrating into or through required fire-resistive assemblies, fire protective membranes, thermal barriers, or construction providing a finish rating as an alternative to a fire resistive assembly.
4. Note installation requirements for plastic pipe and fittings.

2.03 FLEXIBLE COUPLING (1-1/2” THRU 15" O.D.)

A. Fernco, Mission or equal.

B. Fernco adapters/couplings constructed of elastomeric PVC with stainless steel clamp bands.

C. *NOTE:* Flexible couplings are not to be used as no-hub couplings for hubless cast iron pipe. No-hub couplings require a neoprene sleeve/gasket conforming to CISPI 310 and ASTM C564 and a stainless steel shield conforming to CISPI 310. Plasticized rubber and elastomeric PVC are not equals to neoprene. Install flexible couplings per manufacturer’s recommendations and do not exceed temperature limits of couplings when kitchen waste, boiler water discharge, water heater discharge, or other similar high temperature discharges are present in the drainage system.

2.04 VENT TERMINAL

A. F. J. Moore frostproof vent terminal Model No. 1-S with Olson vent top or equal.

PART 3: EXECUTION

3.01 DRAIN, WASTE AND VENT

A. Changes in direction of drainage piping shall be made with 45 degree wyes, long or short sweep quarter bends, sixth, eighth, or sixteenth bends, or combination of these or other equivalent fittings. Fittings shall be installed as to make for least possibility of stoppage.

B. The minimum pitch of horizontal branch drains: 2” or less in diameter shall be ¼” per foot, and larger than 2” in diameter shall be 1/8” per foot.

C. Connect to all fixtures and equipment, as required.

D. Sleeve piping as noted on drawings.

E. Sleeve all exposed piping penetrating floors where water may enter penetration and seal. Extend sleeves 1” above finished floor.

F. Extend piping cleanouts through floor above when located above inaccessible ceilings, or provide required access panel.

G. Each plumbing fixture shall be separately trapped and such trap shall be effectively protected against siphonage or back pressure.

H. Pitch vent piping to drain back to a drain pipe.

I. Connect vent piping to horizontal drain piping at point above the horizontal centerline of the drain piping.

J. Vent pipes passing through roof shall be provided with F.J. Moore frost proof vent terminal. Color of vent pipe and terminal shall match roof.

K. Vent pipes passing through roof shall be provided with sheet lead weighing not less than 3# per square foot. Lead shall run up along the stack and bend over the top 1-1/2" into pipe. Same to be well flashed onto the roof, 12" all around pipe. Lead flashing shall be beaded over top of vent termination, in workmanlike manner. Color of vent terminal shall match roof.

L. Vent pipes passing through roof shall be well flashed onto the roof. Flashing provided by Roofing Contractor on all single membrane roofing systems. Color of vent piping terminal and flashing shall match roof.

M. Vent pipes passing through roof shall extend 8" above roof and be located at least: 10' from windows, doors, air intakes or scuttles; 5' from exhaust vents or parapet walls.

N. Install indirect waste piping and local waste piping draining fixtures, appliances, and devices having public health concerns, as follows:
1. Piping shall be accessible for flushing and cleaning.
2. Indirect waste piping and sanitary local waste piping greater than 30" long shall be trapped.
3. Indirect waste piping draining refrigerated compartments shall be trapped.
4. Piping shall discharge into a receptor excluding plumbing fixtures used for domestic or culinary purposes.
5. Food Prep sinks to have air gap at hub drain, not at sink tailpiece.

O. Where walls are not sufficient in width to install bell and spigot cast iron pipe, No-Hub cast iron pipe shall be used. The bell of the pipe shall not extend above the finished floor.

P. No piping shall be permitted to be installed in, enter or pass through spaces dedicated for electrical switchboards, panelboards, distribution boards, etc. Dedicated spaces extend from floor to structural ceiling with a width and depth that of the electrical equipment plus the working space in front of same with a width matching the equipment but not less than 30", a depth of 36" and a height to at least 78" above floor. (Sections 110-16 and 384-4 of NFPA 70).

Q. Provide manufactured steel nailing plates (tube guards/safety plates) that are specifically designed to protect plastic piping from being damaged by nails or screws driven into framing members. Install at locations where this potential exists.

R. Seal openings around piping and pipe sleeves penetrating walls, floors and ceilings, including areas above suspended ceilings. Refer to Section 22 05 00.

S. Plastic pipe and fittings shall not be installed in plenums used for the supply, return and transfer of air **UNLESS**:
1. It complies with International Mechanical Code 602.2.1. Material must be non-combustible or shall have a flame spread index of not more than 25 and a smoke developed index of not more than 50 when tested in accordance with ASTM E 84.

2. Contractor shall be responsible for reviewing HVAC drawings to determine exact locations of areas used as plenums and to coordinate his work with the Heating Contractor.

T. See Section 07 84 00 for requirements when penetrating into or through required fire-resistive assemblies, fire protective membranes, thermal barriers, or construction providing a finish rating as an alternative to a fire resistive assembly.

U. Where piping penetrates concrete/masonry walls and/or floors, protect piping from physical damage and corrosion by using protective tape material or pipe insulation to prevent physical contact with concrete/masonry, mortar, etc.

3.02 CLEANOUTS

A. Provide cleanouts in drainage lines where stoppages may occur and at each change in pipe size.

B. Cleanouts shall be readily accessible, with adequate clearance to properly clean pipe.

C. Cleanouts shall open in the direction of flow or perpendicular to the flow.

D. Cleanout plugs may be either brass or plastic. Brass plugs shall only be used with metal piping.

E. Cleanouts shall not exceed 75 feet apart for horizontal drains.

END OF SECTION 22 10 12

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SECTION 22 10 13

RAINWATER AND CLEAR WATER WASTE SYSTEMS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 RELATED WORK

A. Flashing and Sheet Metal: Section 07 60 00.

B. Fire Stopping: Section 07 84 00.

C. General Provisions: Section 22 05 00

D. Pipe Identification: Section 22 05 53.

E. Tests: Section 22 05 93.

F. Pipe Insulation: Section 22 07 19.

G. Pipe and Pipe Fittings: Section 22 10 01.

H. Piping Support Devices: Section 22 10 04.

I. Electrical Heat Tracing For Pipelines: Section 22 30 59.

J. Drains and Cleanouts: Section 22 40 42.

1.03 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

1.04 COMMISSIONING

A. Witness all tests and compile all documentation including verification of the following:
1. Verifying and recording building sewer & drain elevations on As-Built Drawings.
2. Pressure/leak testing before joints are covered per Section 22 05 93.

PART 2: PRODUCTS

2.01 PIPING ABOVE FLOOR (RAINWATER CONDUCTORS)

A. "Service weight" cast iron bell and spigot pipe.

B. No-Hub cast iron pipe and fittings.

C. Schedule 40 galvanized steel pipe with cast iron long sweep drainage fittings, may be used with piping 2 ½" and under. Long sweep drainage fittings are not required with vent piping.

D. Schedule 40 PVC DWV pipe and fittings.
1. Not to be installed in air plenums.
2. Note requirements when penetrating into or through required fire-resistive assemblies, fire protective membranes, thermal barriers, or construction providing a finish rating as an alternative to a fire resistive assembly.
3. Note installation requirements for plastic pipe and fittings.

2.02 ROOF DRAINS (RD-1, ORD-1), DOWNSPOUT NOZZLES (DSN-1)

A. Based on products by J.R. Smith.
1. Froet Industries, Josam, Mifab, Portals Plus, Wade, Watts, Zurn equals are acceptable.

B. Roof drain and overflow drain:
1. J.R. Smith #1010-C-CID or #1020-C-CID (side outlet) cast iron drains with under deck clamp, extension, sump receiver, cast iron flashing ring/gravel stop and removable cast iron dome strainer. Include extension (E) and sump receiver (R) when required. Plastic domes are not acceptable.
2. Furnish drains of type for roof deck specified with deck clamps as required. Provide a 36 inch square, 4# lead flashing, at each drain. (Flashing provided by Roofing Trade on all single membrane roofing systems.)
3. Shall conform to ANSI A112.21.2.

C. Downspout Nozzle: J.R. Smith #1770 with threaded outlet and wall flange, cast bronze body and flange, rough bronze finish. Finish to be nickel brass.

2.03 FLEXIBLE SEWER COUPLING (1-1/2” THRU 15” O.D.)

A. Fernco, Mission or equal.

B. Fernco adapters/couplings constructed of elastomeric plastic with stainless steel clamp bands.

PART 3: EXECUTION

3.01 RAINWATER CONDUCTORS

A. Changes in direction of drainage piping shall be made with 45°wyes, long or short sweep quarter bends, sixth, eighth, or sixteenth bends, or combination of these or other equivalent fittings. Fittings shall be installed as to make for least possibility of stoppage.

B. The minimum pitch of horizontal rainwater conductors shall be 1/16" per foot. Install horizontal rainwater conductors at slope specified on drawings.

C. Piping and joints shall be capable of withstanding pressure of water in riser, for static height of building.

D. Sleeve exposed piping penetrating floors when water may enter penetration and seal. Extend sleeves 1" above finished floor.

E. No piping shall be permitted to be installed in, enter or pass through spaces dedicated for electrical switchboards, panelboards, distribution boards, etc. Dedicated spaces extend from floor to structural ceiling with a width and depth that of the electrical equipment plus the working space in front of same with a width matching the equipment but not less than 30", a depth of 36" and a height to at least 78" above floor. (Sections 110-16 and 384-4 of NFPA 70.)

F. Plastic pipe and fittings shall not be installed in plenums used for the supply, return and transfer of air **UNLESS:**

1. It complies with International Mechanical Code 602.2.1. Material must be non-combustible or shall have a flame spread index of not more than 25 and a smoke developed index of not more than 50 when tested in accordance with ASTM E 84.
2. Contractor shall be responsible for reviewing HVAC drawings to determine exact locations of areas used as plenums and to coordinate his work with the Heating Contractor.

G. See Section 07 84 00 for requirements when penetrating into or through required fire-resistive assemblies, fire protective membranes, thermal barriers, or construction providing a finish rating as an alternative to a fire resistive assembly.

H. Where walls are not sufficient in width to install bell and spigot cast iron pipe, No-Hub cast iron pipe shall be used. The bell of the pipe shall not extend above the finished floor.

I. Seal openings around piping and pipe sleeves penetrating walls, floors and ceilings, including areas above suspended ceilings. Refer to Section 22 05 00.

3.02 ROOF DRAINS

A. General Contractor to provide required openings, coordinate proper size.

B. Drains shall be located at least: 10' from windows, doors, air intakes or scuttles unless otherwise indicated.

C. Install drains, level and adjust to proper elevation. Flashing clamp to be below level of single membrane roofing. Coordinate with General Contractor.

D. Install blocking required to level and set drain at proper elevation. Flashing clamp to be below level of single membrane roofing. Coordinate with General Contractor.

E. Install lead and flash into drain in cooperation with General Contractor. Secure flashing collar as required.

F. All drains shall be well flashed onto the roof. Flashing provided by Roofing Contractor on all single membrane roofing systems.

G. If PVC piping system is installed, the drain outlet shall be No-Hub type.

H. Drains shall have temporary plugs during construction to protect rainwater conductors from freezing when only temporary or no heat is available in building.

END OF SECTION 22 10 13

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SECTION 22 10 92

NATURAL GAS SYSTEMS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 WORK INCLUDED

A. Work under this section shall include furnishing, installing and testing the complete piping system including pipe, fittings, valves, together with all permanent components attached.

1.03 RELATED WORK

A. Fire Stopping: Section 07 84 00.

B. General Provisions: Section 22 05 00.

C. Pipe/Valve Identification: Section 22 05 53.

D. Tests: Section 22 05 93.

E. Pipe and Pipe Fittings: Section 22 10 01.

F. Valves and Cocks (Manual): Section 22 10 02

G. Piping Support Devices: Section 22 10 04.

H. Water Heaters and Equipment: Section 22 30 57.

I. Painting of Piping: Division 9

1.04 QUALITY ASSURANCE

A. Conform to state and local codes.

B. Conform to NFPA #37, Stationary Combustion Engines and Gas Turbines.

C. Conform to NFPA #54, National Fuel Gas Code.

D. Conform to NFPA #101, Life Safety Code.

E. Conform to NFPA #110, Emergency and Standby Power.

F. Conform to local gas utility regulations.

G. Conform to manufacturer's instructions.

H. Conform to International Mechanical Code (2015).

I. Notify the local gas utility before excavating in area of existing gas mains or service lines.

1.05 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

1.06 PERMITS AND FEES

A. The Contractor shall obtain all required permits and approvals from the state and local fire department.

1.07 COMMISSIONING

A. Witness all tests and compile all documentation including verification of the following:
1. Pressure/leak testing prior to acceptance and operation per Section 22 05 93.
2. Purging.
3. Local gas utility or inspection department inspection report.

PART 2: PRODUCTS

2.01 PIPING ABOVE GRADE (Under 5 PSI)

A. Schedule 40 black steel pipe with 150 psi steel weld fittings or 150 psi malleable iron screw fittings.

2.02 PIPING BELOW GRADE

A. Schedule 80 black steel pipe extra strong steel weld fittings. (Wrapping or coating and cathodic protection to be used).

B. Polyethylene (PE) gas pipe and tubing specified for gas main and service construction, suitable for use with natural gas installed by qualified/certified installer. Material and marking meeting ASTM D2513 (Specification for Thermoplastic Gas Pressure Pipe, tubing and fittings). Resin to be PE 2406 compounds, Type II, Grade P24, Class B, with antioxidants of ASTM D1248. Measurements per ASTM D1238. Burst pressure testing per ASTM D1599. Apparent tensile strength testing per ASTM D2290. Sustained pressure testing per ASTM D1598. Yellow color. (To be protected from shearing action caused by backfill settlement). (Sizes ½" - 1 ¼" and 2")

2.03 PIPE SLEEVE BELOW FLOOR/GRADE

A. Schedule 40 PVC DWV pipe and fittings.

2.04 PIPING ABOVE FLOOR (Under 5 PSI)

A. Schedule 40 black steel pipe with 150 psi malleable iron screw fittings.

2.05 GAS REGULATOR

A. Based on product by Maxitrol.

1. Pietro Fiorentini, equals are acceptable.
2. (2 psig to 7" w.c.): Maxitrol model no. 325-3L regulator, lever acting design, 3/8" or ½" size, (4 - 12", 10 - 22", 15 - 30", 1 – 2 psi) w.c. spring range. Includes the 12A09 automatic vent limiting device and positive shut-off type lockup characteristics. Largest single appliance served by the regulator – 140,000 Btu/hr. Total load of all appliances combined - 250,000 Btu/hr. Ambient temperature limits -40° to 205°F (-40° to 96°C). Vent pipe connection size - 1/8" NPT. Tested for inlet pressures up to 10 psi. CSA 6.22 and ANSI Z21.80 certified for 2-psi inlet pressure, with the 7 to 11 inches w.c. outlet spring. With the 12A09, maximum inlet pressure is 5 psi. Inlet pressures exceeding 5 psi require a vent line. Designed for multi-position mounting, but when using the vent limiting device, the regulator must be mounted in a horizontal upright position. Over-pressure protection is not required for supply pressures up to 2-psi. These regulators provide no downstream over-pressure protection in the event of failure. At supply pressures in excess of 2 psi, the new ANSI Z21.80 line regulator standard requires means approved and tested with the regulator to limit the downstream pressure to 2-psi maximum, in the event of regulator failure.
3. (2 psig to 7" w.c.): Maxitrol model no. 325-5L regulator, lever acting design, ½", ¾", or 1:, (4 - 12", 10 - 22", 15 - 30", 1 – 2 psi) w.c. spring range. Includes the 12A39 automatic vent limiting device and positive shut-off type lockup characteristics. Largest single appliance served by the regulator – 425,000 Btu/hr. Total load of all appliances combined - 500,000 Btu/hr (½"), 600,000 Btu/hr (¾",1"). Ambient temperature limits -40° to 205°F (-40° to 96°C). Vent pipe connection size - 3/8" NPT. Tested for inlet pressures up to 10 psi. CSA and ANSI Z21.80 certified for 2-psi inlet pressure, with the 7 to 11 inches w.c. outlet spring. With the 12A39 installed, maximum inlet pressure is 5 psi. Inlet pressures exceeding 5 psi require a vent line. Designed for multi-position mounting, but when using the vent limiting device, the regulator must be mounted in a horizontal upright position. Over-pressure protection is not required for supply pressures up to 2-psi. These regulators provide no downstream over-pressure protection in the event of failure. At supply pressures in excess of 2 psi, the new ANSI Z21.80 line regulator standard requires means approved and tested with the regulator to limit the downstream pressure to 2-psi maximum, in the event of regulator failure.
4. (2 psig to 7" w.c.): Maxitrol model no. 325-7AL regulator, lever acting design, 1 ¼" or 1 ½" size, (4 - 12", 10 - 22", 15 - 30", 1 – 2 psi) w.c. spring range. Includes the 12A49 automatic vent limiting device and positive shut-off type lockup characteristics. Largest single appliance served by the regulator – 1,250,000 Btu/hr. Total load of all appliances combined – 1,250,000 Btu/hr. Ambient temperature limits -40° to 205°F (-40° to 96°C). Vent pipe connection size - 1/2" NPT. Designed for multi-position mounting, but when using the vent limiting device, the regulator must be mounted in a horizontal upright position. Tested for inlet pressures up to 10 psi. CSA and ANSI Z21.80 certified for 2-psi inlet pressure, with the 7 to 11 inches w.c. outlet spring. Over-pressure protection is not required for supply pressures up to 2-psi. These regulators provide no downstream over-pressure protection in the event of failure. At supply pressures in excess of 2 psi, the new ANSI Z21.80 line regulator standard requires means approved and tested with the regulator to limit the downstream pressure to 2-psi maximum, in the event of regulator failure.

2.06 GAS APPLIANCE CONNECTORS

A. Based on product by T&S.

B. T&S Safe-T-Link gas appliance connector. Welded fittings, extruded coating, stainless steel braid, free-spin fittings, swivelink fittings, one quick-disconnect fitting, quick-disconnect and swivelink fittings, reversed quick-disconnect fittings, stationary appliance gas connectors, one adjustable surelink restraining cable (3'-5'), ½" – 1 ¼" sizes.

2.07 STRAINER

A. Based on product by Watts.
1. Conbraco, Crane, Mueller Steam Specialty (Muessco), Zurn/Wilkins equals are acceptable.

B. Watts No. 777SI bronze "Y" type strainer, threaded connections, bronze body, 60 mesh stainless steel screen, tapped brass retainer cap and closure plug, 300 p.s.i. W.P. at 210°F, 3/8" - 3" sizes.

PART 3: EXECUTION

3.01 GAS SERVICE

A. Gas service to building, including meter, regulator and gas cock will be furnished and installed by local gas utility. Contractor shall verify what their responsibility entails. All costs not accepted by the utility will be assumed by the Plumbing Contractor. (Including, but not limited to permit fees, connection charges, etc.)

B. Gas meters shall be located in ventilated spaces, readily accessible, not be subject to damage or excessive corrosion, at least three feet (radially) from sources of ignition, such as electric switches and air-conditioning units, and securely supported. The three foot distance must also be maintained from windows, vents and air intakes and outside water faucets. The natural gas service line must be a minimum of 15 feet from a water well.

3.02 PIPING ABOVE FLOOR, ABOVE GRADE, ABOVE ROOF

A. Where the first floor of a building is slab-on-grade, all gas piping shall rise above the ground outside the building and shall enter the building above the first floor slab.

B. Gas piping shall be installed with swing joints or other positive means of expansion to relieve the thrust on the pipe at the point where it pierces the building wall. The annular space between the pipe and sleeve, where the pipe pierces building walls, shall be grouted watertight and filled with fiberglass insulation.

C. Grounding of each gas piping entrance to building furnished and installed under DIVISION 26, Electrical. No other grounding in building is required even if switching to "Gastite" or other flexible tubing material.

D. All gas piping with gas pressures over 2 psi (or 2 ½" and larger) shall be welded. Seamless welding fittings shall be used, except that welding nipples (Weldolets, Threadolets or Pipe-o-Lets, 250# minimum w.p.) may be used for branch take-offs up to one-half (1/2) the diameter of the main.

E. Piping 2" and smaller with gas pressures 2 psi or less may be screwed using taper pipe threads per ANSI/ASME B1.20.1. Thread compounds shall be resistant to the action of gas being used and applied to the male threads only.

F. No pipe bends will be allowed. Only where gas contains moisture shall gas piping grade 1/4 inch in 15 feet to drip pots at all low points. All changes in pipe sizes shall take place at branches. Take-offs to be at top or side of main.

G. No interior gas piping shall be concealed in solid partitions.

H. Gas piping may be installed in concealed locations such as hollow partitions, walls and floors as long as unions, tubing fittings, running threads, right and left couplings, bushings, swing joints, and compression couplings are not made by a combination of fittings. Normal fittings using tapered pipe thread may be used. Tubing joints shall be brazed.

1. When tubing is used, provide steel striker barriers not less than 0.0508 inch thick, or equivalent, between the tubing and the finished wall and extend at least 4" beyond concealed penetrations of plates, fire stops, wall studs, etc.
2. Install tubing in single runs and do not secure rigidly.

I. Gas piping may be installed above non-accessible and non-ventilated ceilings without sleeving as long as no valves or regulators are located in same space.

J. Gas piping may be installed in plenum areas without sleeving per NFPA 54.

K. Open ends of gas piping shall be capped until extension or connection to equipment can be completed.

L. Extend from gas meter and connect to all equipment as required.

M. Insulating (dielectric) union shall be provided in the above ground gas piping at each gas service entrance, on the service-side of the gas meter. Coordinate with local utility.

N. Spacing of pipe supports for ½", ¾" and 1", and 1 ¼" piping and larger shall be 6, 8 and 10 feet, respectively.

O. No piping will be permitted to enter or pass through spaces dedicated for electrical switchboards, panelboards, distribution boards, etc. Dedicated spaces extend from floor to structural ceiling, width and depth of electrical equipment plus three feet in front and minimum width of 30 inches. (NFPA 70)

P. Before any cutting or welding is done for pipe removal, disconnect gas piping system from source and thoroughly purge with air or inert gas venting to the outdoors.

Q. All gas piping passing through walls, floors and ceilings shall be sleeved with annular space packed with fiberglass insulation except through fire rated assemblies.

R. Seal openings around piping and pipe sleeves penetrating walls, floors and ceilings, including areas above suspended ceilings. Refer to Section 22 05 00.

S. See Section 07 84 00 for requirements when penetrating into or through required fire-resistive assemblies, fire protective membranes, thermal barriers, or construction providing a finish rating as an alternative to a fire resistive assembly.

3.03 SETTING VALVES AND STOPS

A. Before setting, clean the interior of valves and stops; check plug valves for lubrication. Set at the exact locations shown and with stems plumb. Refer to Section 22 10 02 of this Division.

3.04 GAS REGULATOR

A. Install where noted on drawing.

B. Install vent limiting devices on gas regulators as noted on drawings. Ensure vent limiting device is properly sized for each regulator.

C. Where vent limiting devices are not used, vent discharge shall be provided with cap designed to exclude water and insects.

D. Install regulator for equipment downstream of shut-off valve, dirtleg and union, as required.

E. Install strainer upstream of regulator.

3.05 EQUIPMENT CONNECTIONS

A. Provide shut-off valve, dirt leg and union at each equipment connection including food service equipment; install regulator furnished for equipment downstream of shut-off valve, dirtleg and union, as required. Unions are not required where flexible gas hoses and / or quick connects are used.

B. Verify inlet pressures to equipment and regulators to be connected / installed. Replace equipment regulator or install additional regulator as required.

C. If vent limiting device is utilized, the regulator must be installed in the upright position.

D. Install mechanical gas shut-off safety valve furnished by food service equipment contractor. Control cabling/wiring to valve is completed by the food service equipment contractor. Coordinate. Provide gas valve and union ahead of valve.

E. Use natural gas detector at final connections to equipment.

3.06 TESTING (REFER TO SECTION 22 05 93)

END OF SECTION 22 10 92

SECTION 22 40 41

CHINA AND ENAMELED FIXTURES AND TRIM

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

B. Installation Instructions: Include manufacturer's rough-in dimensions, utility sizes, methods of assembly of components, anchorages, and finishes. Furnish templates for coordination of fixtures installed in countertops and cabinets which are fabricated off-site.

C. Wiring Diagrams: Submit manufacturer's electrical requirements and wiring diagrams for power supply to units. Clearly differentiate between portions of wiring that are factory installed and portions that are field installed.

D. Color Charts: Submit manufacturer's standard color charts for fixture and accessory colors.

E. Quality Control Submittals: Submit certification of compliance with specified standards and performance verification requirements. Submit for products not fully documented in manufacturer's product data.

1.03 RELATED WORK

A. Joint Sealers: Section 07 90 00.

B. Toilet and Bath Accessories: Section 10 80 00.

C. Domestic Water Systems and Equipment: Section 22 10 11.

D. Drain Waste and Vent Systems: Section 22 10 12.

E. Electrical: Division 26.

1.04 REFERENCES

A. ADA (Americans With Disabilities Act) – Standards for Accessible Design; 2010

B. UFAS (Uniform Federal Accessibility Standards) - Standards for Handicapped and adaptable/accessible locations.

C. FHAG (Fair Housing Accessibility Guidelines) - Standards for accessible / adaptable dwellings.

D. ANSI A112.6.1M - Plumbing fixture carrier supports.

E. ANSI A112.18.1M - Lavatory, bathtub & sink fittings; supplies, stops & traps.

F. ANSI/ASME A112.19.1M - Enameled plumbing fixtures.

G. ANSI/ASME A112.19.2M - Vitreous china plumbing fixtures.

H. ANSI/ASME A112.19.6 - Hydraulic Requirements for Water Closets and Urinals.

I. ICC ANSI A117.1 – Accessible and Usable Building and Facilities; 2009

J. ANSI/NSF Standard 61, Section nine - Drinking Water Systems Components.

K. ASSE 1037 - Performance Requirements for Pressurized Flushing Devices for Plumbing Fixtures.

PART 2: PRODUCTS

2.01 CHINA AND ENAMELED FIXTURES

A. Based on product by Sloan, Kohler.

2.02 WATER CLOSET SEATS

A. Based on product by Bemis.

2.03 CARRIER SUPPORTS

A. Based on product by J. R. Smith.
1. Josam, Mifab, Wade, Watts, Zurn equals are acceptable.

2.04 FLUSHOMETER VALVES

A. Based on product by Sloan.

B. Exposed flushometer valves shall be provided with matching wall and spud flanges.

C. Flushometer valve body and other metal parts in water stream (bronze, red brass) shall contain less than 15% zinc. Furnish factory documentation.

D. The diaphragm, vacuum breaker, stop seat and handle seal material shall be made of chloramine resistant material.

2.05 LAVATORY FITTINGS

A. Based on product by Sloan.

B. Comply with ANSI/NSF Standard 61 section as follows:
1. Provide written documentation (listing) from NSF International or Underwriters Laboratory showing product compliance.
2. Drinking water faucets/fittings shall not contribute more than 11 micrograms (11 parts per billion) of lead to the water after the water has been standing in the fitting for 16 hours. Brass components which contact water within the faucet shall be from brass which contains no more than 3% lead by dry weight.

a. Includes: residential kitchen faucets, lavatory faucets (including hospital patient rooms & school), commercial kitchen & bar faucets, drinking fountains and bubblers, glass fillers, supply stops, basin cocks, hot and cold water dispensers and ice makers.
b. Excludes: metering and electronic lavatory faucets, faucets w/hose end connections, bath shower fittings, ball cocks, all drains, residential laundry fittings, shampoo fittings, laboratory fittings, backflow prevention devices and bed pan flushers.

2.06 SUPPLIES, STOPS, TRAPS

A. American Standard, Brass Craft, Brass Products Company, Dearborn Brass, Duracraft Plastics Inc, Engineered Brass, Keeney Manufacturing Co, Kohler, McGuire, ProFlo, Tubular Brass, Wolverine Brass are acceptable.

B. Water and waste piping, valves, traps and escutcheons exposed below fixture shall have polished chrome finish.

C. Water and waste piping, valves, traps and escutcheons concealed within cabinet space may have rough unplated finish.

D. Piping at walls shall have escutcheons (wall plates).

E. Water Closets:
1. BrassCraft fixture stop model OCR19Z valve with metal stem and metal handle, 1/2" nominal inlet and 3/8" O.D. riser. (Brass-Craft washerless quarter-turn fixture stops are **NOT** acceptable.)

F. Urinals:
1. Rigid supply to flushometer valve with screwdriver angle stop and escutcheon.

G. Lavatories:
1. BrassCraft fixture stop model OCR19Z valve with metal stem and metal handle, 1/2" nominal inlet and 3/8" O.D. riser. (Brass-Craft washerless quarter-turn fixture stops are **NOT** acceptable.)

2.07 LAVATORY SUPPLY/WASTE COVERS

A. Based on product by Truebro.
1. McGuire, ProFlo equals are acceptable.

B. Lav-Guard:
1. Truebro Lav-Guard Model #100. One P-trap cover only and fasteners.
2. Truebro Lav-Guard Model #101. P-trap cover, hot water angle valve cover and fasteners.
3. Truebro Lav-Guard Model #102. P-trap cover, hot and cold water angle valve cover and fasteners.
4. Truebro Lav-Guard Model #103. P-trap cover, hot and cold water angle valve cover, 5" offset wheelchair strainer cover and fasteners.
5. Truebro Lav-Guard Model #103K. P-trap cover, hot and cold water angle valve cover, Kohler 6" offset wheelchair strainer cover and fasteners.
6. Truebro Lav-Guard Accessory #105. 5" offset wheelchair strainer cover and fasteners.
7. Truebro Lav-Guard Accessory #105K. Kohler 6" offset wheelchair strainer cover and fasteners.
8. Truebro Lav-Guard Extension 100. 16" extension for waste arm or tailpiece.

9. Color to be white or gray.
10. Constructed of molded closed cell vinyl, 1/8" thickness, "Snap-Clip" flush reusable fasteners, paintable with acrylic enamel, burning characteristics in compliance with ASTM D 635, thermal conductivity K value of 1.17, anti-microbial vinyl formula.
11. Lav-Guard kits will not fit schedule 40 plastic P-traps.

2.08 FIXTURE DESCRIPTION

A. WC-1: Water closet, floor mounted, tank type, 1.6 gpf, vitreous china, elongated bowl, 2 1/8" fully glazed passageway, 11 3/8" x 8" water surface, ADA compliant.
1. China: Kohler "Highline" Comfort Height K-3979-RA
2. Seat: Bemis No. 1655SSCT white, open front, extra heavy weight, injection molded solid plastic seat less cover, factory installed stainless steel self-sustaining and external check hinge with double sided gasket/tape and "StaTite" fastening system.

B. WC-2: Fixture provided by owner, for training purposes only. No waste or water supply connections required. Securely fasten WC to floor, coordinate with owner.

C. UR-1:
1. Urinal: Sloan SU-7009, wall hung. white Vitreous china, washdown flushing action, integral flushing rim, ¾" top spud inlet, 2" NPT outlet flange, vandal resistant strainer, 100% Factory flush tested
2. Exposed flushometer valve: Sloan Solis 8180-1.0; solar powered with 4 size-AA backup batteries, 1 gpf, polished chrome, stop seat and vacuum breaker of molded PERMEX rubber compound for chloramine resistance; vandal resistant stop cap; cast set screw wall flange, 1" screwdriver back check angle stop, ADA compliant infrared sensor, three second flush delay with courtesy flush override

D. L-1:
1. Lavatory: Sloan No. SS-3003 vitreous china, wall hung, 18 ¼" x 20 ¾", 4" centers, front overflow, concealed arm supports.
2. Faucet: (2-hole) Sloan ETF-600 infrared sensor faucet, 0.5 gpm, multi-laminar spray type, box transformer, chrome finish.
3. Mixing Valve: Symmons Model 4-10B mechanical mixing valve- to supply tempered water to hot inlet of two-supply faucet.
4. Drain: Kohler No. K-7129-A.
5. Support: Floor mounted, concealed arm. J. R. Smith Fig. 0700. Include "M24" extension adaptor(s) as required.

E. L-3: (EMS Training RM 107):
1. China: Provided by owner.
2. Faucet: Provided by owner.
3. Drain: Provided by owner.
4. Stops: No stops required.
5. No waste or water connections required, lavatory is for training purposes only. Securely mount lavatory to wall.

F. BT-1:
1. Bathtub/shower surround, shower controls, and showerhead provided by owner, for training purposes only. No waste or water connections required. Securely mount bathtub/shower surround, shower controls, and shower head. Coordinate with owner.

2.09 FIXTURE CAULKING

A. GE Silicone Sanitary 1700, Dow Corning 786, or equivalent, clear silicone rubber sealant, mildew resistant, 25% movement.

PART 3: EXECUTION

3.01 FIXTURE INSTALLATION

A. Fixtures shall be installed tight to wall. Space between wall and fixture exceeding 1/16" will not be accepted. Coordinate with the general contractor prior to his beginning wall installation.

B. Fixtures and accessory trim shall be installed as recommended by manufacturer.

C. All fixtures shall be securely fastened and supported. All floor bolts in shoe of floor mounted supports shall be securely anchored including rear support lug and anchor foot of water closet supports. Any additional wall framing or blocking required for secure installation shall be included as part of this Section.

D. Wall hangers, when used to support wall hung lavatories, shall have at least two bolts or lag screws of sufficient strength at each end of hanger, under or immediately adjacent to each support tab and lower holes on china fixture shall be secured to wall.

E. Fittings shall be securely fastened with joints watertight.

F. Water and waste rough-ins in wall shall be secure and perpendicular to wall/fixture.

G. After installation but before acceptance by Owner, all fixtures shall be protected to prevent scratching or other construction damage and shall be cleaned only with compounds recommended by the respective manufacturer.

H. Verify specific fixture locations with Architectural drawings.

3.02 FIXTURE CAULKING

A. Space between fixture and wall or floor shall be **neatly** caulked with a narrow bead of clear silicone rubber sealant.

1. PREPARATION
   a. Clean joint surfaces immediately before installation of sealant. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond of sealant.
   b. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer.
   c. Roughen vitreous or glazed joint surfaces as recommended by sealant manufacturer.
   d. Prime or seal the joint surfaces as recommended by the sealant manufacturer.
   e. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.
2. APPLICATION, GENERAL
   a. Apply sealant with a gun having proper size nozzle or with a knife, as required. Use sufficient pressure to fill all voids and joints solid. **Remove excess sealant and leave surfaces smooth, neat and clean.** Upon completion sealant shall have a smooth, even finish and all joints shall be weather tight. All work shall be in accordance with manufacturer's printed instructions.

b. **Do not allow sealants to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces. Clean the adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage. Sealant shall be confined to the space only between the fixture and wall or floor and not beyond. Temporarily tape off adjacent surfaces as required to ensure compliance. Installation not conforming to the above will not be accepted.**

3.03 LAVATORY FAUCETS

A. Water supply and waste rough-ins shall be as high as possible below lavatories accessible for handicap use (not the standard heights).

B. Do not use cleaning chemicals that will be detrimental to the finish of the faucets.

C. Adjust the thermostatic mixing valve to discharge water at a maximum temperature of 105°F.

3.04 FLUSHOMETER VALVES

A. Before water in supply pipes is turned on, close stop valve to flushometer valves. Remove working parts from flush valve. Open control stop and flush out dirt, chips, and other foreign material. Replace working parts and turn on water.

B. Adjust to achieve optimum quietness and efficiency of operation. Adjust control stop so that rate of flow into fixture is not excessive, yet sufficient to adequately carry out waste.

C. Adjust flushometer valve to be plumb with fixture and wall. Mis-alignments will not be acceptable.

D. Secure wall water supply escutcheon to piping/tubing using set screw. (Do not secure escutcheon to chrome plated supply cover tubing.)

3.05 WATER CLOSETS

A. Install per manufacturer's recommendations.

B. Tanks shall be level, plumb, parallel to wall, & snugged down evenly against bowl surface (china to china).

C. Shorten length of closet bolts as required so bolt caps fit properly.

D. Position water closet squarely to wall and firmly seated on floor.

3.06 URINALS

A. Inspect each urinal spreader for debris and remove prior to installation.

B. Verify that urinals are set level for proper spreader discharge.

C. Wall openings behind rear spud urinals shall be a minimum of six inches square and centered on rear spud for ease of future service work.

D. Flushometer valves shall deliver the proper quantity of water for complete cleansing of the back wall and drain area without creating spillage problems.

E. Adjust each flushometer valve for proper flush (1 gpf maximum, water shall not overshoot the side of urinal or flood the drain, flushometer valve shall open and close properly, and provide complete washdown).

3.07 LAVATORY SUPPLY/WASTE COVERS/LAV-SHIELDS

A. Cover the tailpiece, trap, waste arm and water piping below lavatories in handicap accessible locations. Water piping need not be covered if configured in such a way to protect against contact, i.e. keeping rough-ins as high as possible.

B. Install according to manufacturer's recommendations.

END OF SECTION 22 40 41

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SECTION 22 40 42

DRAINS AND CLEANOUTS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 RELATED WORK

A. Trench Drains: Section 02 70 00.

B. Drain, Waste and Vent Systems: Section 22 10 12.

C. Rainwater and Clearwater Waste Systems: Section 22 10 13.

1.03 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

PART 2: PRODUCTS

2.01 FLOOR DRAINS AND CLEANOUTS

A. Based on products by Blucher-Josam, Duriron, Sioux Chief, J.R. Smith, Zurn.
1. Blucher-Josam, Canplas, Cretex, Duriron, Josam, Mifab, Orion, Prier, R & G Sloane, Sioux Chief, Wade, Watts, Zurn equals are acceptable.

B. Shall conform to ANSI A112.21.1M.

2.02 FLOOR DRAINS

A. FD-1: Sioux Chief No. 842-2PSQ, adjustable floor drain, square stainless steel strainer, heel-proof, 2” schedule 40 PVC hub connection.

B. FD-2: Sioux Chief No. 842-3PSR, adjustable floor drain, round stainless steel strainer, heel-proof, 3” schedule 40 PVC hub connection.

2.03 CLEANOUTS

A. In Concrete Floors:
1. J.R. Smith Fig. 4023, 4033, or 4028 with spigot, speedi-set, or caulk outlet, cast iron adjustable cleanout with round scoriated N.B. cover and bronze plug, (2”, 3", 4", 6" sizes).

B. In Resilient or Ceramic Tile Floor:
1. J.R. Smith Fig. 4043, 4053, or 4048 with spigot, speedi-set or caulk outlet, cast iron adjustable cleanout with square scoriated N.B. cover and bronze plug.

C. In carpet floor: as specified for concrete floors, but to include carpet marker, and optional polished bronze or PVC cover.

D. In walls: install a threaded bronze raised head plug.
1. In finished rooms with painted walls install a J.R. Smith Fig. 4710-PC or Zurn model Z-1469-77 (properly prepared and prime coated stainless steel) round cleanout access cover with securing screw, for painting out with wall.
2. In finished rooms with ceramic tile walls install a J.R. Smith Fig. 4710 or Zurn model Z-1469 round stainless steel cleanout access cover with securing screw.

E. Contractor shall install all cleanouts required and shown on drawings. If any cleanout is not installed, the contractor will be required to install as shown on drawings or to provide written documentation from the local authority permitting deletion of each cleanout not installed and to provide the following credits: Floor cleanouts - $275 each, wall cleanouts - $175 each. Contractor to furnish copy of documentation to A/E. A/E will discuss with Owner and if acceptable will process a change order.

PART 3: EXECUTION

3.01 FLOOR DRAINS

A. Adjust flush with top of existing finished floor.

B. Floor drains installed in floors that are not membrane waterproofed and are not laid on ground, shall be provided with plastic safing membrane extending 12" from the edge of the fixture and must be properly drained. Floor drain to have clamping collar.

C. Flash and clamp waterproof membrane into collar.

D. Floor drains that are located in certain areas or serving specific equipment that cannot maintain the trap seal shall be provided with a sufficient quantity of vegetable oil or other acceptable product.

E. Floor drains installed on existing concrete floors shall be core drilled larger than diameter of floor drain. Place floor drain in center of core and fill rest of core with “Rocktite” to prevent movement of the floor drain and leaks to floor below.

3.02 CLEANOUTS

A. Provide cleanouts in drainage lines where stoppages may occur and at each change in pipe size.

B. Cleanouts under floor are to be brought up flush with floor level.

C. Cleanouts shall be readily accessible, with adequate clearance to properly clean pipe.

D. Cleanouts shall open in the direction of flow or perpendicular to the flow.

E. Provide cleanout within 5 feet of where the building drain and the building sewer connect.

F. Cleanout plugs may be either brass or plastic. Brass plugs shall only be used with metal piping.

G. Cleanouts shall not exceed: 75 feet apart for horizontal drains.

END OF SECTION 22 40 42

SECTION 22 40 43

ELECTRIC WATER COOLERS/DRINKING FOUNTAINS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

1.03 REFERENCES

A. ANSI/NSF Standard 61, Section nine - Drinking Water Systems Components.

PART 2: PRODUCTS

2.01 ELECTRIC WATER COOLER/BOTTLE FILLER

A. Based on product by Elkay.

B. Shall conform to ARI-1010.

C. Conform to "ADA" (Americans With Disabilities Act) Standards for Handicapped and adaptable/accessible locations.

D. Conform to "ADA" (Americans With Disabilities Act) Standards for protruding objects on accessible routes.

E. Conform to "UFAS" (Uniform Federal Accessibility Standards) for Handicapped and adaptable/accessible locations.

F. Conform to the Lead Contamination Control Act of 1988.

G. Refrigerants used in the products contained in this section shall be either HFC-134A or other environmentally friendly type.

2.02 SUPPLIES, STOPS AND TRAPS

A. American-Standard, Brass-Craft "Speedway", Briggs, Dearborn, Duracraft Plastics Inc, Crane, Eljer, Engineered Brass, Gerber, Keeney Manufacturing Co, Kohler, McGuire, ProFlo, Tubular Brass, Wolverine Brass are acceptable.

B. Water and waste piping, valves, traps and escutcheons shall be concealed within cabinet space.

C. Fixture stop valves: BrassCraft fixture stop model OCR19Z valve with metal stem and metal handle, 1/2" nominal inlet and 3/8" O.D. riser. (Brass-Craft washerless quarter-turn fixture stops are **NOT** acceptable.)

D. Adjustable 1 ½" brass tubing or PVC plastic tubing P-trap, less cleanout, and 17 gauge tubing to wall.

E. Shall conform to ANSI A112.18.1M.

2.03 FIXTURE DESCRIPTION

A. EWC-1 (higher unit, located on left side) Elkay Model EZS8 barrier-free wall mounted water cooler having a capacity of 8.0 GPH of 50°F drinking water at 80°F. inlet water temperature and 90°F. room temperature, self-closing Easy-Touch control located on front and both sides of unit, refrigeration unit to have air-cooled compressor, 4.0 full load amps (120/1), 3-wire grounding type service cord with plug, refrigerant HFC-134a, automatic stream height regulator providing a constant stream height under line pressures between 20 and 105 psi, flexi-guard stream saver bubbler, stainless steel antisplash top with integral drain grid, lead free, fine mesh "Y" strainer on water inlet line, gray laminated vinyl or stainless steel cabinet with removable panels.

B. EWC-2 (lower unit, located on right side) Elkay Model LZS8WSSP

1. Barrier-free ADA compliant design, wall mounted water cooler having a capacity of 8.0 GPH of 50°F drinking water at 80°F inlet water temperature and 90°F room temperature, self-closing Easy-Touch control located on front and both right and left sides of unit, refrigeration unit to have air-cooled compressor, 5.0 full load amps (120/1), 3-wire grounding type service cord with plug, refrigerant HFC-134a, automatic stream height regulator providing a constant stream height under line pressures between 20 and 105 psi, flexi-guard stream saver bubbler, stainless steel antisplash top with integral drain grid, gray laminated vinyl steel cabinet with removable panels, lead free, fine mesh "Y" strainer on water inlet line. Bottle filling station, 1.1-1.5 gpm fill rate, one-handed operation, visual filter monitor, laminar flow dispenser, sensor activated with 20-second shut-off timer, silver ion anti-microbial protection, flexible fill mat, installed/attached to electric water cooler cabinet, ADA compliant.

2. EWCs to be installed with 6" separation between the units.

3. Include Water Sentry Plus 3000 gallon capacity filter.

C. No product in which the drinking water contacts any lead, will be acceptable. Manufacturer certification is required.

PART 3: EXECUTION

3.01 ELECTRIC WATER COOLERS/DRINKING FOUNTAINS

A. All fixtures shall be securely fastened to wall construction. Use hanger plates furnished.

B. Install as recommended by manufacturer.

C. Each EWC to have a dedicated electrical outlet.

D. 120 volt duplex electrical wall outlet connected to GFI circuit breaker under Division 26, Electrical. Coordinate installation height of receptacle so that it is within the EWC cabinet space and not below the bottom of cabinet.

E. A protruding object, such as a water cooler, shall be installed not less than 36" from any corridor wall corners.

F. Do not use cleaning chemicals that will be detrimental to the finish of the product.

3.02 FIXTURE MOUNTING HEIGHT

A. EWC-1 (higher unit, located on left side)
1. Install at 39 1/2 to 42 inches above floor to spout outlet (Std. and those having difficulty bending - ADA).

B. EWC-2 (lower unit, located on right side)
1. Install at 34 1/8 to 36 inches above floor to spout outlet (Wheelchair accessible - ADA).

END OF SECTION 22 40 43

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SECTION 22 40 45

LAUNDRY TUBS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

PART 2: PRODUCTS

2.01 TUB

A. Based on product by E.L. Mustee and Sons, Inc.

2.02 FITTINGS

A. Fittings to be relocated from removed sink.

B. Laundry fittings are exempt from compliance with ANSI/NSF Standard 61, section nine.

2.03 SUPPLIES, STOPS AND TRAPS

A. American-Standard, Brass-Craft "Speedway", Briggs, Crane, Dearborn, Duracraft Plastics Inc, Eljer, Engineered Brass, Keeney Manufacturing Co, Kohler, McGuire, ProFlo, Tubular Brass, Wolverine Brass equals are acceptable.

B. Water and waste piping, valves, traps and escutcheons shall be polished chrome plated brass, brass tubing or copper tubing.

C. Fixture stop valves: see below.

D. Adjustable 1 ½” brass tubing P-trap, less cleanout, and 17 gauge tubing to wall.

2.04 FIXTURE DESCRIPTION

A. LT-1: Mustee Model 18W, wall hung, one piece, single compartment (thermoplastic, dura-stone tub) with wall bracket and two side filler panels, 20 gallon capacity, 20" x 24" size, drain assembly, wall mounting hardware, 8" faucet centers.

B. Faucet: Salvage and reinstall T&S Brass faucet from removed sink.

C. Fixture stop valves: Salvage and reinstall stainless steel stops from removed sink.

2.05 FIXTURE CAULKING

A. GE Silicone Sanitary 1700, Dow Corning 786, or equivalent, clear silicone rubber sealant, mildew resistant, 25% movement.

PART 3: EXECUTION

3.01 LAUNDRY TUBS

A. Reinforce wall as required to properly support tub to wall.

B. Mount tub at 33-1/2" floor to rim.

C. Do not use cleaning chemicals that will be detrimental to the finish of the product.

D. Fixtures shall be installed tight to wall. Space between wall and fixture exceeding 1/16" will not be accepted. Coordinate with the general contractor prior to beginning wall installation.

E. Water and waste rough-ins in wall shall be secure and perpendicular to wall/fixture.

3.02 FIXTURE CAULKING

A. Space between fixture and wall or floor shall be neatly caulked with a narrow bead of clear silicone rubber sealant.

1. PREPARATION
   a. Clean joint surfaces immediately before installation of sealant. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond of sealant.
   b. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer.
   c. Prime or seal the joint surfaces as recommended by the sealant manufacturer.
   d. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.
2. APPLICATION, GENERAL
   a. Apply sealant with a gun having proper size nozzle or with a knife, as required. Use sufficient pressure to fill all voids and joints solid. Remove excess sealant and leave surfaces smooth, neat and clean. Upon completion sealant shall have a smooth, even finish and all joints shall be weather tight. All work shall be in accordance with manufacturer's printed instructions.
   b. Do not allow sealants to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces. Clean the adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage. Sealant shall be confined to the space only between the fixture and wall or floor and not beyond. Temporarily tape off adjacent surfaces as required to ensure compliance. Installation not conforming to the above will not be accepted.

END OF SECTION 22 40 45

SECTION 22 40 46

MOP BASINS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

PART 2: PRODUCTS

2.01 MOP BASIN

A. Based on product by Powers-Fiat.
1. Acorn, AquaGlass, Eljer, E.L. Mustee, Florestone, Hal-Stone Products, ProFlo, Stern-Williams, Zurn, equals are acceptable.

B. MB-1: Powers Fiat Model (MSB-2424) molded stone "Mop Service Basin", one-piece, homogeneous product, 10" high sides. Color to be 219 "White" with Black accents. Drain body, stainless steel flat strainer, optional Quick Drain Connector “QDC-3" gasket for 3" pipe, #E-77-AA vinyl bumperguards on exposed sides. On floor installation.

2.02 FITTINGS

A. Based on product by Chicago, T & S Brass, Watts.
1. American Standard, Central Brass, Crane, Grohe, Kohler, Royal Brass, Sloan, Speakman, Union Brass, Wolverine Brass equals are acceptable.

B. Fittings: Chicago No. 305-R-XK-CP, exposed faucet, rigid spout with hose end, pail hook, integral stops, ceramic disc cartridges, all metal moving parts in water stream shall be monel, polished chrome finish. Provide Watts LF-600 silent checks on Hot and Cold piping.

C. Include Woodford model 34 hose connection vacuum breaker, polished chrome finish.

D. Mop basin fitting is exempt from compliance with ANSI/NSF Standard 61, section nine.

PART 3: EXECUTION

3.01 MOP BASINS

A. Seal joints at wall and floor using clear G.E. Silicone rubber.

B. Do not use cleaning chemicals that will be detrimental to the finish of the product.

C. Install faucet outlet 28" above floor.

D. Install hose bracket 18" above floor.

E. Install mop hanger 56" above floor above side of mop basin.

F. Attach hose connection vacuum breaker to faucet spout outlet.

G. Install stainless steel wall guards as recommended by the manufacturer.

H. Install water supply piping on exterior of existing block wall, anchor water supply piping as required.

END OF SECTION 22 40 46

SECTION 22 40 48

STAINLESS STEEL FIXTURES AND TRIM

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division 00 and 01 of this Project Manual apply to this Section as though repeated herein.

B. The requirements of Section 22 05 00 apply to this Section.

1.02 RELATED WORK

A. Food Waste Disposers: Section 22 30 52.

B. Solids interceptor: Section 22 30 53.

1.03 REFERENCES

A. ANSI/NSF Standard 61, Section nine - Drinking Water Systems Components.

1.04 SUBMITTALS

A. Submit descriptive product data describing all material furnished under Part 2 of this Section.

PART 2: PRODUCTS

2.01 LAVATORY

A. Based on product by Just.
1. Acorn, Aero, Advance Elkay, Tabco, Intersan, Willoughby equals are acceptable.

2.02 SINKS

A. Based on product by Elkay.

B. Shall conform to ANSI A112.19.3 (Residential).

2.03 FITTINGS

A. Based on product by T & S Brass, Sloan.

B. Shall conform to ANSI A112.18.1M.

C. Comply with ANSI/NSF Standard 61 section 9 as follows:
1. Provide written documentation (listing) from NSF International or Underwriters Laboratory showing product compliance.
2. Drinking water faucets/fittings shall not contribute more than 11 micrograms (11 parts per billion) of lead to the water after the water has been standing in the fitting for 16 hours. Brass components which contact water within the faucet shall be from brass which contains no more than 3% lead by dry weight.

a. Includes: residential kitchen faucets, lavatory faucets (including hospital patient rooms & school), commercial kitchen & bar faucets, drinking fountains and bubblers, glass fillers, supply stops, basin cocks, hot and cold water dispensers and ice makers.
b. Excludes: metering and electronic lavatory faucets, faucets w/hose end connections, bath shower fittings, ball cocks, all drains, residential laundry fittings, shampoo fittings, laboratory fittings, backflow prevention devices and bed pan flushers.

2.04 SUPPLIES, STOPS AND TRAPS

A. American-Standard, Brass-Craft "Speedway", Briggs, Crane, Dearborn, Duracraft Plastics Inc, Eljer, Engineered Brass, Keeney Manufacturing Co, Kohler, McGuire, ProFlo, Tubular Brass, Wolverine Brass are acceptable.

B. Water and waste piping, valves, traps and escutcheons exposed below fixture shall have polished chrome finish.

C. Water and waste piping, valves, traps and escutcheons concealed within cabinet space may have rough unplated finish.

D. Lavatory fixture stops: See below.

E. Sink fixture stops: See below.

F. Piping at walls shall have escutcheons (wall plates).

G. Shall conform to ANSI A112.18.1M.

2.05 SINK SUPPLY/WASTE COVERS

A. Based on product by Truebro "Handi Lav-Guard".
1. McGuire, ProFlo equals are acceptable.
2. Truebro Handi Lav-Guard Model #100. One P-trap cover only and fasteners.
3. Truebro Handi Lav-Guard Model #101. P-trap cover, hot water angle valve cover and fasteners.
4. Truebro Handi Lav-Guard Model #102. P-trap cover, hot and cold water angle valve cover and fasteners.
5. Truebro Handi Lav-Guard Model #103. P-trap cover, hot and cold water angle valve cover, 5" offset wheelchair strainer cover and fasteners.
6. Truebro Handi Lav-Guard Model #103K. P-trap cover, hot and cold water angle valve cover, Kohler 6" offset wheelchair strainer cover and fasteners.
7. Truebro Handi Lav-Guard Accessory #105. 5" offset wheelchair strainer cover and fasteners.
8. Truebro Handi Lav-Guard Accessory #105K. Kohler 6" offset wheelchair strainer cover and fasteners.
9. Truebro Handi Lav-Guard Extension 100. 16" extension for waste arm or tailpiece.
10. Color to be white or gray.
11. Constructed of molded closed cell vinyl, 1/8" thickness, "Snap-Clip" flush reusable fasteners, paintable with acrylic enamel, burning characteristics in compliance with ASTM D 635, thermal conductivity K value of 1.17, antimicrobial vinyl formula.
12. Handi Lav-Guard kits will not fit schedule 40 plastic P-traps.

2.06 FIXTURE DESCRIPTION

A. S-1 (EMS Training, Classroom 112 and 114, Student Lounge): ADA compliant, drop-In, single compartment, 18 gauge 304 stainless steel, bottom sound dampening pads, lustrous satin finish, center drain:
1. Sink: Elkay Model LRAD221906 with overall dimensions of 22 x 19-1/2" x 6" inches. 3 hole drill configuration.
2. Faucet: T&S Brass faucet to be salvaged from removed sink and reinstalled.
3. Drain: Elkay LK99 3-1/2" drain, type 304 stainless steel body, strainer with rubber seal, 1-1/2" O.D. stainless steel tailpiece.
4. Stops: Stainless steel stops to be salvaged from removed sink and reinstalled.
5. For S-1 located in the EMS Training room, remove and reinstall/plumb the sampling tap.

B. S-2 (EMS Workroom, Office): Drop-In, single compartment, 18 gauge 304 stainless steel, bottom sound dampening pads, lustrous satin finish, center drain:
1. Sink: Elkay Model LR2219 with overall dimensions of 22 x 19-1/2" x 7-5/8" inches. 3 hole drill configuration.
2. Faucet: T&S Brass faucet to be salvaged from removed sink and reinstalled.
3. Drain: Elkay LK99 3-1/2" drain, type 304 stainless steel body, strainer with rubber seal, 1-1/2" O.D. stainless steel tailpiece.
4. Stops: Stainless steel stops to be salvaged from removed sink and reinstalled.

C. S-3 (EMS Training): Drop-In, single compartment, 18 gauge 304 stainless steel sink:
1. Sink: To be salvaged from removed sink and reinstalled.
2. Faucet: To be salvaged from removed sink and reinstalled.
3. Drain: To be salvage from removed sink and reinstalled.
4. Stops: No stops required.
5. No waste or water connections required, sink is for training purposes only.

D. L-2: ADA compliant, undermount, single compartment, type 304 18 gauge stainless steel, fully coated underside, 3 ½"
1. Sink: Just UOR-ADA-1619-A oval lavatory sink, overall bowl dimensions 15-1/2" x 11-3/8"
2. Faucet: Faucet: (2-hole) Sloan ETF-600 infrared sensor faucet, 0.5 gpm, multi-laminar spray type, box transformer, chrome finish.
3. Mixing Valve: Symmons Model 4-10B mechanical mixing valve- to supply tempered water to hot inlet of two-supply faucet.
4. Stops: To be salvage from removed lavatories and reinstalled.
5. Drain: Just J-15-CC drain, stainless steel drain and strainer, chrome plated tailpiece

PART 3: EXECUTION

3.01 COUNTERTOP SINKS

A. Fittings shall be securely fastened to sink and sink to countertop.

B. Wood cabinet and opening in top is furnished by Others. Verify that sink will fit in cabinet before ordering sink.

C. Do not use cleaning chemicals that will be detrimental to the finish of the product.

D. Apply sealing caulk for undermount sinks.

E. Apply sealing caulk to underside of sink rim.

F. Install sink in countertop and remove excess caulk with a damp cloth and a small amount of powdered cleanser.

G. Water supply and waste rough-ins shall be as high as possible below sinks accessible for handicap use. Waste tailpiece shall be kept to a minimum length.

3.02 SINK SUPPLY/WASTE COVERS

A. Cover the tailpiece, trap, waste arm and water piping below sinks in handicap accessible locations. Water piping need not be covered if configured in such a way to protect against contact, i.e. keeping rough-ins as high as possible.

B. Install according to manufacturer's recommendations.

END OF SECTION 22 40 48