

SECTION 22 11 20 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes:
 - 1. Vacuum breakers.
 - 2. Backflow preventers.
 - 3. Water meters.
 - 4. Water pressure-reducing valves.
 - 5. Balancing valves.
 - 6. Temperature-actuated, water mixing valves.
 - 7. Strainers for domestic water piping.
 - 8. Outlet boxes.
 - 9. Hose bibbs.
 - 10. Wall hydrants.
 - 11. Roof hydrants.
 - 12. Drain valves.
 - 13. Water-hammer arresters.
 - 14. Trap-seal primer device.
 - 15. Trap-seal primer systems.
 - 16. Flexible connectors.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. The installation and manufacture of all products shall conform to the requirements of the following:
 - 1. International Plumbing Code and any local code amendments. Verify the code requirements with the local code official(s) before beginning the work.
 - 2. Lead Free Law as adapted effective January, 2014.
 - 3. Domestic water piping specialties intended to convey or dispense water for human consumption are to comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or to be certified in compliance with NSF 61 and NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

PART 2 - PRODUCTS

2.1 VACUUM BREAKERS

A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ames Co.
 - b. Cash Acme.
 - c. Conbraco Industries, Inc.
 - d. Watts Industries, Inc.; Water Products Div.
 - e. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1001.
3. Size: NPS 1/4 to NPS 3 (DN 8 to DN 80), as required to match connected piping.
4. Body: Bronze.
5. Inlet and Outlet Connections: Threaded.
6. Finish: Rough bronze where concealed, Chrome plated where exposed.

B. Hose-Connection Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cash Acme.
 - b. Conbraco Industries, Inc.
 - c. Watts Industries, Inc.; Water Products Div.
 - d. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1011.
3. Body: Bronze, nonremovable, with manual drain.
4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
5. Finish: Rough bronze where concealed, Chrome plated where exposed.

2.2 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers: Drawing Tag "RPB"

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ames Co.
 - b. Conbraco Industries, Inc.
 - c. Watts Industries, Inc.; Water Products Div.
 - d. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1013.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: 12 psig (83 kPa) maximum, through middle 1/3 of flow range.
5. Temperature range: 210 degrees F.
6. Size: as indicated on the drawings.
7. Pressure Loss and Design Flow Rate: as indicated on the drawings.
8. Body: Bronze for NPS 2 (DN 50) and smaller; epoxy coated cast iron complying with AWWA C550 and FDA approved for NPS 2-1/2 (DN 65) and larger.

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9. Accessories: Ball type with threaded ends on inlet and outlet of NPS 2 (DN 50) and smaller; outside screw and yoke gate-type with flanged ends on inlet and outlet of NPS 2-1/2 (DN 65) and larger. Provide strainers on the inlet. Provide Air-Gap Fitting, ASME A112.1.2, matching backflow-preventer connection.

B. Backflow Preventers: Drawing Tag "BP"

1. Provide a Series 9D Dual Check Backflow Preventer manufactured by Watts Industries or equal as manufactured by one of the following:
 - a. Ames Co.
 - b. Conbraco Industries, Inc.
 - c. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1012.
3. Temperature range: 330 F to 2500 F.
4. Size: as indicated on the drawings.
5. Working Pressure: 25 to 175 psi.
6. Body: forged brass.

2.3 DOMESTIC SERVICE WATER METERS

A. Water meters will be provided by the Plumbing Contractor.

B. Manufacturers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Master Meter, Inc.

C. Octave Double Beam Ultrasonic:

1. Description: Ultrasonic type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
 - a. Standard: AWWA C7750-03.
 - b. Registration: Flow in gallons.
 - c. Data-Acquisition Units: Comply with utility company requirements for type and quantity.
 - d. Visible Display Units: Comply with utility company requirements for type and quantity.

2.4 WATER PRESSURE-REDUCING VALVES

A. Water Regulators:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ames Co.
 - b. Conbraco Industries, Inc.
 - c. Watts Industries, Inc.; Water Products Div.
 - d. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1003.
3. Pressure Rating: Initial working pressure of 150 psig.

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4. Service Size: various, see kitchen plans
5. Design Flow Rate: 0-5 gpm.
6. Design Inlet Pressure: 80 psig.
7. Design Outlet Pressure Setting: 50 psig.
8. Description: Pilot-operated, diaphragm-type, single-seated, main water-control valve.
9. Pressure Rating: Initial working pressure of 150 psig (1035 kPa) minimum with AWWA C550 or FDA-approved, interior epoxy coating. Include small pilot-control valve, restrictor device, specialty fittings, and sensor piping.
10. Main Valve Body: Cast- or ductile-iron body with AWWA C550 or FDA-approved, interior epoxy coating; or stainless-steel body.

2.5 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bell & Gossett Model CS Plus
 - b. Armstrong Pump Model CVB
 - c. Flow Design Inc. Model UA
 - d. Flo Pac Model MB/MBF/MBG
 - e. Jomar Valve
2. Valves: venturi type bronze body, chrome plated ball, EPDM seals. Provide pressure & temperature test ports across valve measurement area. Ports to be fitted with dual durometer EPDM cores, brass cap & O-ring seal. Valves to have drain/purge port. Provide valve with memory stop, memory lock and calibrated position indicator. Valves to be rated at 200 PSIG at 2500 F and be 100% positive shut-off. Accuracy to be +/- 3%.

2.6 MIXING VALVES

A. DIGITAL WATER MIXING VALVE ASSEMBLIES

1. Manufacturer: Subject to compliance with requirements, provide a water mixing assembly manufactured by Powers/Watts. Products meeting the requirements and manufactured by the following will be considered:
 - a. Leonard Valve Company.
 - b. Armstrong International.
 - c. Lawler Manufacturing Co., Inc.
2. Description: Factory assembled and tested, Lead Free digital water temperature control and monitoring water-mixing-valve assembly with duty as indicated on the drawings. Digital Mixing Valves to comply with ASSE 1017. Include integral check stops on hot- and cold-water inlets.
3. Controller: 3.5" full color touchscreen interface configurable on location to control water temperature to +/- 2 deg F and resist "temperature creep" during no or low demand. Controller shall be password protected and adjustable outlet range of 60-180 deg F with high and low alerts. Controller shall digitally control and monitor mixed outlet temperature and shall integrate with building automation systems through BACnet and Modbus protocols and feature local and remote temperature alarms. System shall feature a user set, high temperature sanitation mode for thermal disinfection and programmable temperature set back feature. System shall fail full cold open and in event loss of cold water, system shall close hot water supply.
4. Power: 120-1-60.

5. Mixing Valve Finish: rough bronze.

B. Individual-Fixture, Water Tempering Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cash Acme.
 - b. Conbraco Industries, Inc.
 - c. Lawler Manufacturing Company, Inc.
 - d. Leonard Valve Company.
 - e. Powers; a Watts Industries Co.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1016, thermostatically controlled water tempering valve.
3. Pressure Rating: 125 psig (860 kPa) minimum, unless otherwise indicated.
4. Body: Bronze body with corrosion-resistant interior components.
5. Temperature Control: Adjustable.

2.7 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers

1. Pressure Rating: 125 psig minimum, unless otherwise indicated.
2. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or FDA-approved, epoxy coating for NPS 2-1/2 and larger.
3. Screen: Stainless steel with round perforations, unless otherwise indicated.
4. Perforation Size:
 - a. Strainers NPS 2 and Smaller: 0.033 inch.
 - b. Strainers NPS 2-1/2 to NPS 4: 0.045 inch.
 - c. Strainers NPS 5 and Larger: 0.125 inch.
5. Drain: Factory-installed, hose-end drain valve.

2.8 OUTLET BOXES

A. Clothes Washer Outlet Boxes WOB-1:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Guy Gray Manufacturing Co., Inc. or equal.
2. Material and Finish: Epoxy-painted-steel or enameled-steel box and faceplate.
3. Mounting: Recessed. Provide fire-rated construction where installed within fire-rated walls.
4. Faucet: Combination valved fitting or separate hot- and cold-water valved fittings complying with ASME A112.18.1. Include garden-hose thread complying with ASME B1.20.7 on outlets.
5. Supply Shutoff Fittings: NPS 1/2 ball valves and NPS 1/2 copper, water tubing.
6. Drain: NPS 2 standpipe and P-trap for direct waste connection to drainage piping.
7. Accessory: Water hammer arresters.

B. Icemaker Outlet Boxes IMB1:

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1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Guy Gray Manufacturing Co., Inc. or equal.
2. Mounting: Recessed.
3. Material and Finish: Enameled-steel or epoxy-painted-steel box and faceplate.
4. Faucet: Valved fitting complying with ASME A112.18.1. Include NPS 1/2 or smaller copper tube outlet.
5. Accessory: Water hammer arrestor.
6. Supply Shutoff Fitting: NPS 1/2 gate, globe, or ball valve and NPS 1/2 copper, water tubing.

2.9 HOSE BIBBS

A. Hose Bibbs HB:

1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Pressure Rating: 125 psig.
5. Vacuum Breaker: Integral.
6. Finish for Equipment Rooms: Rough bronze.
7. Finish for Service Areas: Chrome plated.
8. Finish for Finished Rooms: Chrome plated.
9. Operation: operating key.
10. Include operating key with each operating-key hose bibb.
11. Include integral wall flange with each chrome- or nickel-plated hose bibb.

2.10 WALL HYDRANTS

A. Non-freeze Wall Hydrants WH-1:

1. Manufacturers: Zurn Model Z1320-C or equal.
2. Provide anti-siphon, automatic draining non-freeze wall hydrant with integral backflow preventer.
3. Operation: Loose key.
4. Provide length required to match wall thickness.
5. Nozzle and Wall-Plate Finish: Chrome plated cast bronze.
6. Operating Keys(s): Two with each wall hydrant.

B. Interior Hot & Cold Water Wall Hydrants WH-2:

1. Manufacturers: Acorn model 8156 or equal.
2. Provide Acorn Recessed Hose Box model 8156 with Wall Flange.
3. Box shall be fabricated with 18 gage, type 304 stainless steel, with a satin finished exterior. Flange shall be 16 gage stainless steel and be polished to a satin finish. Door shall be 16 gauge with satin finish and removable hinge and cylinder lock
4. Valve shall be cartridge-operated type with vandal-resistant lock shield, removable loose key wheel handle and screwdriver operated stops.
5. Provide hydrant with vacuum breaker.

2.11 ROOF HYDRANTS

A. Non-freeze, Draining-Type Roof Hydrants RH-1:

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1. Manufacturers: Woodford Manufacturing Company; a division of WCM Industries, Inc Model SRH-MS or equal.
2. Standard: ASSE 1052 and 1057, ASME A112.21.3M.
3. Type: Non-freeze, exposed-outlet roof hydrant.
4. Operation: Lever Lock with plunger.
5. Casing and Operating Rod: cast iron underdeck flange with EDPM boot cover and 35 ½" operating rod.
6. Casing: 1 ¼".
7. Inlet: NPS 3/4 (DN 20).
8. Outlet: Garden-hose thread complying with ASME B1.20.7.
9. Drain: Designed with hole to drain to indirect waste inlet when shut off.
10. Vacuum Breaker:
 - a. Non-removable, drainable, hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052. Garden-hose thread complying with ASME B1.20.7 on outlet.

2.12 WATER HAMMER ARRESTERS

A. Water Hammer Arresters

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AMTROL, Inc.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - e. Tyler Pipe; Wade Div.
 - f. Watts Drainage Products Inc.
 - g. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Metal bellows.
4. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

2.13 TRAP-SEAL PRIMER VALVES

A. Trap-Seal Primer Valves:

1. Manufacturers: Subject to compliance with requirements, provide products conforming to ASSE 1018 manufactured by one of the following:
 - a. MIFAB, Inc.
 - b. Precision Plumbing Products Inc.
 - c. Sioux Chief Manufacturing Company, Inc.
 - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - e. Watts Industries, Inc.; Water Products Div.
2. Body: Bronze.
3. Inlet and Outlet Connections: NPS 1/2 threaded or solder joint.
4. Gravity Drain Outlet Connection: NPS ½ threaded or solder joint.
5. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

2.14 TRAP-SEAL PRIMER SYSTEMS

A. Trap-Seal Primer Systems:

1. Manufacturers: Subject to compliance with requirements, provide products conforming to ASSE 1044 and manufactured by Precision Plumbing Products Inc. or equal.
2. Piping: NPS 3/4, ASTM B 88, Type L copper, water tubing.
3. Cabinet: Surface-mounting steel box with stainless-steel cover.
4. Electric Controls: 24-hour timer, solenoid valve, and manual switch for 120-V ac power.
5. Vacuum Breaker: ASSE 1001.

2.15 FLEXIBLE CONNECTORS

A. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.

1. Working-Pressure Rating: Minimum 200 psig.
2. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
3. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.

B. Stainless Steel-Hose Flexible Connectors: Corrugated-stainless steel tubing with stainless steel wire-braid covering and ends welded to inner tubing.

1. Working-Pressure Rating: Minimum 200 psig.
2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

PART 3 - EXECUTION

3.1 INSTALLATION

A. BACKFLOW PREVENTERS:

1. Install Reduced-Pressure-Principal-Backflow-Preventers (noted as RPB on the drawings) in each water supply to HVAC equipment and systems, at the service entrance for the domestic water main and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
2. In addition to installing an RPB, install Backflow Preventers (noted as BP on the drawings) in each water fill connection to boilers.
3. Install drain for all backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
4. Do not install bypass piping around backflow preventers. Locate backflow preventers in same room as connected equipment or system. Do not install bypass piping around backflow preventers.
5. If a remote meter vault is provided, coordinate with installing contractor and water purveyor for specific requirements for water supply delivery.

B. Water Pressure Reducing/Regulating Control Valves: Install with inlet and outlet shutoff valves. Install pressure gauges on inlet and outlet. Adjust outlet pressure for field required system pressure.

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- C. Install temperature-actuated water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet. Install thermometers and water regulators if specified. Install cabinet-type units recessed in or surface mounted on wall as specified.
- D. Install balancing valves in locations where they can easily be adjusted.
- E. Install Y-pattern strainers for water on supply side of each water pressure-reducing valve, solenoid valve and pump.
- F. Install outlet boxes recessed in wall.
- G. Install non-freeze, nondraining-type post hydrants set in concrete or pavement.
- H. Connect drain piping from roof hydrant and route to nearest indirect waste termination.
- I. Install water hammer arresters in water piping according to PDI-WH 201.
- J. Install air vents at high points of water piping. Install drain piping and discharge onto floor drain.
- K. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- L. Install trap-seal primer systems with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust system for proper flow.

3.2 FIELD QUALITY CONTROL

- A. Perform the following tests and prepare test reports:
 - 1. Test each vacuum breaker, reduced-pressure-principle backflow preventer, double-check backflow-prevention assembly according to authorities having jurisdiction and the device's reference standard.
- B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

3.3 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.
- C. Set field-adjustable temperature set points of temperature-actuated water mixing valves.
- D. Adjust each pressure vacuum breaker, reduced-pressure-principle backflow preventer, double-check, backflow-prevention assembly an double-check, detector-assembly backflow preventer in accordance with manufacturer's written instructions, authorities having jurisdiction and the device's reference standard.

END OF SECTION 22 11 20