

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and Divisions 00 and 01, apply to this Section.
- B. Related Sections include the following:
 - 1. Division 23
 - 2. Division 26

1.2 SUMMARY

- A. This Section includes water distribution piping specialties for the following:
- B. Water distribution systems.

1.3 DEFINITIONS

- A. Domestic Water Piping: Piping inside building that conveys potable cold and hot water to fixtures and equipment throughout the building.
- B. Non-Potable Water Piping: Piping inside building that conveys non-potable water to fixtures and equipment throughout the building.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing piping systems with following minimum working-pressure ratings, unless otherwise indicated:
 - 1. Water Distribution Piping: 125 psig.

1.5 SUBMITTALS

- A. Product Data: For each plumbing specialty indicated. Include rated capacities of selected equipment and shipping, installed, and operating weights. Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections for the following plumbing specialty products:
 - 1. Backflow preventers
 - 2. Water pressure regulators
 - 3. Balancing valves
 - 4. Water filters
 - 5. Thermostatic water mixing valves
 - 6. Water tempering valves
 - 7. Strainers
 - 8. Trap seal primers
 - 9. Hydrants
 - 10. Outlet boxes
 - 11. Washer supply outlets
 - 12. Water hammer arresters
 - 13. Hose bibbs
 - 14. Water meters

- B. Reports: None required.
- C. Maintenance Data: For specialties to include in the maintenance manuals specified in Division 01. Include the following:
 - 1. Backflow preventers
 - 2. Water pressure regulators
 - 3. Balancing valves
 - 4. Water filters
 - 5. Thermostatic water mixing valves
 - 6. Water tempering valves
 - 7. Strainers
 - 8. Trap seal primers
 - 9. Water meters

1.6 CODES AND STANDARDS

- A. Codes and Standards shall be the current version adopted by the Authority Having Jurisdiction.

1.7 QUALITY ASSURANCE

- A. Provide listing/approval stamp, label, or other marking on water distribution piping specialties made to specified standards.
- B. Listing and Labeling: Provide electrically operated water distribution piping specialties specified in this Section that are listed and labeled.
 - 1. Terms "Listed" and "Labeled": As defined in National Electrical Code, Article 100.
 - 2. Listing and Labeling Agency Qualifications: "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- C. Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.
- D. Comply with NFPA 70, "National Electrical Code," for electrical components.
- E. Comply with Washington State Department of Health Publication 331-137 "Backflow Prevention Assemblies Approved for Installation in Washington State."
- F. Comply with AWWA C 700 for Cold-Water Meters – Displacement type.
- G. Comply with AWWA C 701 for Cold-Water Meters – Turbine type.
- H. Comply with the Reduction of Lead in Drinking Water Act of 2011. This act redefines "lead free" as "not containing more than 0.2 percent lead when used with respect to solder and flux and not more than a weighted average of 0.25 percent lead when used with respect to wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures". Products required to be "lead free" shall have NSF 61-G or NSF 372 certification.

1.8 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Water Filter Cartridges: Furnish quantity not less than 200 percent of amount of each type and size installed.
2. Operating Key Handles: Furnish one extra key for each key-operated hose bibb and hydrant installed.

PART 2 – PRODUCTS

2.1 BASIC, COMMON FEATURES

- A. Water distribution piping specialties that are used for domestic water piping systems shall be “lead free”.
- B. Soldered Lead Free End Connections: Copper alloys with silicone content greater than 0.005% are not allowed.

2.2 BACKFLOW PREVENTERS

- A. Manufacturers: Subject to compliance with requirements and approval by the Authority Having Jurisdiction, provide products by one of the following:
 1. CMB Industries; Febco Div.
 2. Conbraco Industries, Inc.
 3. Watts Industries, Inc.; Water Products Div.
 4. Zurn Industries, Inc.; Wilkins Div.
 5. Or Approved Equal
- B. General: ASSE standard, backflow preventers, of size indicated for maximum flow rate and maximum pressure loss indicated.
 1. Interior Components: Corrosion-resistant materials.
 2. Exterior Finish: Polished chrome-plate if used in chrome-plated piping system.
- C. Reduced Pressure Backflow Assemblies (RPBA): ASSE 1013, suitable for continuous pressure application.
 1. 2-Inch NPS and Smaller:
 - a. Bronze body with threaded ends.
 - b. Full port ball valves on inlet and outlet, strainer on inlet, test cocks, and pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between two positive-seating check valves.
 - c. Pressure Loss: 15 psig maximum, through middle one-third of flow range.
 2. 2-1/2-Inch NPS and Larger:
 - a. Bronze, cast-iron, steel, or stainless steel body with flanged ends.
 - b. Interior Lining: AWWA C550 or FDA-approved, epoxy coating for backflow preventers having cast-iron or steel body.
 - c. Full port gate valves on inlet and outlet, strainer on inlet, test cocks, and pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between two positive-seating check valves.
 - d. Pressure Loss: 15 psig maximum, through middle one-third of flow range.

- D. Double Check Backflow Assemblies (DCBA): ASSE 1015, suitable for continuous pressure application
1. 2-Inch NPS and Smaller:
 - a. Bronze body with threaded ends.
 - b. Full port ball valves on inlet and outlet, strainer on inlet, and test cocks with two positive-seating check valves.
 - c. Pressure Loss: 7 psig maximum, through middle one-third of flow range.
 2. 2-1/2-Inch NPS and Larger:
 - a. Bronze, cast-iron, steel, or stainless steel body with flanged ends.
 - b. Interior Lining: AWWA C550 or FDA-approved, epoxy coating for backflow preventers having cast-iron or steel body.
 - c. Full port gate valves on inlet and outlet, strainer on inlet, and test cocks with two positive-seating check valves.
 - d. Pressure Loss: 7 psig maximum, through middle one-third of flow range.
- E. Anti-siphon Pressure Type Vacuum Breakers: ASSE 1020, suitable for continuous pressure application. Include shutoff valves, spring-loaded check valve, spring-loaded floating disc, test cocks, and atmospheric vent.
1. Bronze body with threaded ends.
 2. Full port ball valves on inlet and outlet, spring-loaded check valve, spring-loaded floating disc, test cocks, and atmospheric vent.
 3. Pressure Loss: 5 psig maximum, through middle one-third of flow range.
- F. Pipe Applied, Atmospheric-Type Vacuum Breakers: ASSE 1001, bronze body with floating disc and atmospheric vent.
- G. Hose Connection Vacuum Breakers: ASSE 1011, brass body with non-removable and manual drain features, and ASME B1.20.7 garden-hose threads on outlet.

2.3 WATER PRESSURE REGULATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cashco, Inc.
 2. Cla-Val Co.
 3. Conbraco Industries, Inc.
 4. FLOMATIC Corp.
 5. Honeywell Braukmann.
 6. IMI Cash Valve.
 7. Spence Engineering Co., Inc.
 8. Watts Industries, Inc.; Water Products Div.
 9. Zurn Industries, Inc.; Wilkins Div.
 10. Or Approved Equal
- B. General: ASSE 1003, water regulators, rated for initial working pressure of 150 psig minimum, of size, flow rate, and inlet and outlet pressures indicated. Include integral factory-installed or separate field-installed Y-pattern strainer.

1. 2-Inch NPS and Smaller: Bronze body with threaded ends.
 2. 2-1/2-Inch NPS and Larger: Bronze or cast-iron body with flanged ends. Include AWWA C550 or FDA-approved interior epoxy coating for regulators with cast-iron body.
 3. Interior Components: Corrosion-resistant materials.
 4. Exterior Finish: Polished chrome-plate if used in chrome-plated piping system.
- C. Single-seated, direct-operated type.
- D. Single-seated, direct-operated, integral-bypass type.
- E. Pilot-operated type, single- or double-seated, cast-iron-body main valve, with bronze-body pilot valve.

2.4 BALANCING VALVES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Amtrol, Inc.
 2. Armstrong Pumps, Inc.
 3. Flow Design, Inc.
 4. ITT Fluid Technology Corp.; ITT Bell & Gossett Div.
 5. Taco, Inc.
 6. Tour & Anderson, Inc.; Valve Div.
 7. Watts Industries; Water Products Div.
 8. Or Approved Equal
- B. Circuit Balancing Valves: Adjustable, with 2 readout ports and memory setting indicator. Include manufacturer's standard hoses, fittings, valves, differential pressure meter, and carrying case.
1. 2-Inch NPS and Smaller: Bronze body with brass ball, adjustment knob, calibrated nameplate, and threaded or solder-joint ends.
 2. 2-Inch NPS and Smaller: Bronze, Y-pattern body with adjustment knob and threaded ends.
 3. 2-1/2-Inch NPS and Larger: Cast-iron, Y-pattern body with bronze disc and flanged or grooved ends.
- C. Memory-Stop Balancing Valves, 2-Inch NPS and Smaller: MSS SP-110, ball valve, rated for 400-psig minimum CWP. Include 2-piece, ASTM B 62 bronze body with standard port, chrome-plated brass ball, replaceable seats and seals, blowout-proof stem, solder-joint ends, and vinyl-covered steel handle with memory-stop device.

2.5 WATER FILTERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AMETEK, Inc.; Plymouth Products Div.
 2. CUNO, Inc.
 3. Eagle Spring Filtration, Inc.
 4. Manitowoc Co., Inc.
 5. Met-Pro Corp.; Keystone Filter Div.

6. Pura, Inc.
 7. Service Filtration Corp.; Filterspun Div.
 8. Follett.
 9. Or Approved Equal
- B. General: Cartridge-type assemblies suitable for potable water of size and at flow rate and pressure loss indicated. Include housing, fittings, filter cartridges, and cartridge end caps.
- C. Wall-Mounting Type: Housing head section with threaded inlet and outlet, mounting bracket, and removable lower section for 10-inch- long filter cartridge.
1. Housing Material: [Stainless steel, 150-psig minimum operating pressure][Plastic, 125-psig minimum operating pressure].
 2. Cartridge: [Activated-charcoal filter media, 10 inches, 10-micron-particulate removable rating][Wound- or molded-fiber filter media, 10 inches, 10-micron-particulate removable rating][Pleated-polypropylene filter media, 10 inches, 10-micron-particulate removable rating].
- D. Floor-Mounting Type: Stainless-steel housing rated at 150-psig minimum operating pressure.
1. Base Section: Floor-mounting section with inlet and outlet connections and removable top section for one or more 10-micron-particulate removable-rating cartridges.
 2. Connections, 2-Inch NPS and Smaller: Threaded.
 3. Connections, 2-1/2-Inch NPS and Larger: Flanged.
 4. Cartridge: [Activated-charcoal filter media][Wound- or molded-fiber media][Pleated-polypropylene filter media].

2.6 THERMOSTATIC WATER MIXING VALVES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Lawler Manufacturing Co., Inc.
 2. Leonard Valve Co.
 3. Mark Controls Corp.; Powers Process Controls.
 4. Symmons Industries, Inc.
 5. T & S Brass and Bronze Works, Inc.
 6. Or Approved Equal
- B. General: ASSE 1017, manually adjustable, thermostatic water mixing valve with bronze body. Include check stop and union on hot- and cold-water-supply inlets, adjustable temperature setting.
1. Bimetal Thermostat, Operation and Pressure Rating: 125 psig minimum.
 2. Liquid-Filled Motor, Operation and Pressure Rating: 100 psig minimum.
- C. Thermostatic Water Mixing Valves: Unit, with the following:
1. Piping, of sizes and in arrangement indicated. Include valves and unions.
 2. Piping Component Finish: [Polished chrome-plate][Satin spray][Rough brass].
 3. Cabinet: [Steel box with steel hinged door and white enameled finish][Stainless-steel box with stainless steel hinged door].
 4. Cabinet Mounting: [Recessed][Surface].
 5. Thermometer: Manufacturer's standard.

- D. **Manifolded, Thermostatic Water Mixing Valve Assemblies:** Factory-fabricated unit consisting of parallel arrangement of thermostatic water mixing valves.
1. Arrangement: One large-flow, thermostatic water mixing valve with flow-control valve, pressure regulator, inlet and outlet pressure gages, and one small-flow, thermostatic water mixing valve with flow-control valve. Include outlet thermometer, factory- or field-installed inlet and outlet valves, and other indicated options.
 2. Piping, of sizes and in arrangement indicated. Include valves and unions.
 3. Piping Component Finish: [Polished chrome-plate][Satin spray][Rough brass].
 4. Cabinet: [Steel box with steel hinged door and white enameled finish][Stainless-steel box with stainless steel hinged door].
 5. Cabinet Mounting: [Recessed][Surface].
- E. **Hydrotherapy, Thermostatic Water Mixing Valve Assemblies:** Factory-fabricated, thermostatic water mixing valve; 2 shutoff valves and 1 volume-control valve; unions; check stops; thermometer; atmospheric vacuum breaker; piping; escutcheons; and cabinet.
1. Sizes and Arrangement: As indicated.
 2. Piping Component Finish: [Polished chrome-plate][Satin spray][Rough brass].
 3. Cabinet: Steel box with steel hinged door and white enameled finish.
 4. Cabinet: Stainless-steel box with stainless-steel hinged door.
 5. Cabinet Mounting: [Recessed][Surface].
- F. **Photographic-Process, Thermostatic Water Mixing Valve Assemblies:** Factory-fabricated, thermostatic water mixing valve; volume-control valve; unions; check stops; thermometer; atmospheric vacuum breaker; piping; escutcheons; and panel enclosure.
1. Sizes and Arrangement: As indicated, with controls mounted in front of panel cover and factory- or field-installed inlet valves. Assembly can control outlet-water temperature within 0.5 deg F throughout temperature and flow operating ranges.
 2. Panel: [Steel box with white enameled finish][Stainless-steel box].
 3. Panel Mounting: [Recessed][Surface]Recessed.

2.7 WATER TEMPERING VALVES

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. Conbraco Industries, Inc.
 2. Honeywell Braukmann.
 3. IMI Cash Valve.
 4. Leonard Valve Co.
 5. Watts Industries, Inc.; Water Products Div.
 6. Or Approved Equal
- B. **General:** Manually adjustable, thermostatically controlled water tempering valve; bronze body; and adjustable temperature setting.
- C. **System Water Tempering Valves:** Piston or discs controlling both hot- and cold-water flow, capable of limited antiscald protection. Include threaded inlets and outlet, capacity at pressure loss, and temperature range or setting as indicated.
1. Finish: Rough bronze unless chrome-plated finish is indicated.

- D. Limited-Volume, Water Tempering Valves: Solder-joint inlets and 3/4-inch NPS maximum outlet, with minimum capacity and maximum pressure loss as indicated.

2.8 STRAINERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ames Co., Inc.
 2. Cla-Val Co.
 3. CMB Industries; Febco Div.
 4. Conbraco Industries, Inc.
 5. FLOMATIC Corp.
 6. Grinnell Corp.; Mueller Co. Marketing Group for Hersey Products Div.
 7. IMI Cash Valve.
 8. Titan Flow Control, Inc.
 9. Watts Industries, Inc.; Water Products Div.
 10. Zurn Industries, Inc.; Wilkins Div.
 11. Nibco.
 12. Or Approved Equal
- B. Strainers: Y-pattern, unless otherwise indicated, and full size of connecting piping. Include ASTM A 666, Type 304, stainless-steel screens with 0.033-inch round perforations, unless otherwise indicated.
1. Pressure Rating: 125-psig minimum steam working pressure, unless otherwise indicated.
 2. 2-Inch NPS and Smaller: Bronze body, with female threaded ends.
 3. 2-1/2-Inch NPS and Larger: Cast-iron body, with interior AWWA C550 or FDA-approved epoxy coating and flanged ends.
 4. Y-Pattern Strainers: Screwed screen retainer with centered blowdown. Pipe plug in drain connection.
 5. T-Pattern Strainers: Malleable-iron or ductile-iron body with grooved ends; access end cap with drain plug and access coupling with rubber gasket.
 6. Basket Strainers: Bolted flange or clamp cover, and basket with lift-out handle.
 - a. Simplex Type: Single unit, with one basket.
 - b. Duplex Type: Double unit, with bronze or stainless-steel diverter valve and 2 baskets.
 - c. Drain: Pipe plug.
 - d. Drain: Factory- or field-installed, hose-end drain valve.
- C. Drainage Basket Strainers: Non-pressure-rated, cast-iron or coated-steel body; with bolted flange or clamp cover and drain with plug.
1. Basket: Bronze or stainless steel with 1/8- or 3/16-inch- diameter holes and lift-out handle.
 2. Female threaded ends for 2-inch NPS and smaller, and flanged ends for 2-1/2-inch NPS and larger.

2.9 TRAP SEAL PRIMERS

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

1. Trap Seal Primer Valves:
 - a. Josam Co.
 - b. Jay R. Smith Mfg. Co.
 - c. Precision Plumbing Products, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Zurn Industries, Inc.; Hydromechanics Div.
 - f. Or Approved Equal
 2. Trap Seal Primer Systems:
 - a. Precision Plumbing Products, Inc.
 - b. Or Approved Equal
 3. Trap Seal Primer - Water Closet Fitting:
 - a. Precision Plumbing Products, Inc.
 - b. Or Approved Equal
- B. Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics:
1. 125-psig minimum working pressure.
 2. Bronze body with atmospheric-vented drain chamber.
 3. Inlet and Outlet Connections: 1/2-inch NPS threaded, union, or solder joint.
 4. Gravity Drain Outlet Connection: 1/2-inch NPS threaded or solder joint.
 5. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.
- C. Trap Seal Primer System: Factory-fabricated, automatic-operation assembly for wall mounting with the following:
1. Piping: 3/4-inch NPS, ASTM B 88, Type L; copper, water tubing inlet and manifold with number of 1/2-inch NPS outlets as indicated.
 2. Cabinet: Steel box with stainless-steel cover.
 3. Electric Controls: 24-hour timer, solenoid valve, and manual switch for 120-V, ac power.
 4. Water Hammer Arrester: ASSE 1010.
 5. Vacuum Breaker: ASSE 1001.
- D. Trap Seal Primer – Water Closet Fitting: Factory-fabricated flush valve primer tube and fitting with the following:
1. Flush Valve Primer Tube: 1.5-inch x 12-inch, 17-gauge chrome plated tube with 1/2-inch compression fitting.
 2. Chrome Plated Trap Primer Line: 1/2-inch x 12-inch.
 3. Piping: 1/2-inch NPS, ASTM B 88, Type L copper.
 4. Vacuum Breaker: ASSE 1001.

2.10 HYDRANTS

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

1. Josam Co.
 2. Jay R. Smith Mfg. Co.
 3. Tyler Pipe; Wade Div.
 4. Zurn Industries, Inc.; Hydromechanics Div.
 5. Or Approved Equal
- B. Wall Hydrants: ASME A112.21.3M or ASSE 1019, nonfreeze, automatic draining, antbackflow type, key operation, with 3/4- or 1-inch NPS threaded or solder-joint inlet, and ASME B1.20.7 garden-hose threads on outlet. Include operating key for each hydrant.
1. Type: Recessed.
 2. Finish: [Nickel bronze][Polished brass].
- C. Ground Hydrants: Flush with grade, non-freeze ground hydrant, cast iron box, bronze interior parts, bronze seat and replaceable seat washer, 1-1/4-inch inlet connection. Include operating key for each hydrant. Minimum 4'-0" depth of bury.

2.11 OUTLET BOXES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Acorn Engineering Co.
 2. Guy Gray Manufacturing Co., Inc.
 3. Symmons Industries, Inc.
 4. Or Approved Equal
- B. General: Recessed-mounting outlet boxes with fittings complying with ASME A112.18.1M. Include box with faceplate, services indicated for equipment connections, and wood-blocking reinforcement.
- C. Clothes Washer Outlet Boxes: With hose connections, drain, and the following:
1. Shutoff Fittings: 2 hose bibbs.
 2. Shutoff Fittings: Combination, single lever.
 3. Drain Fitting: 2-inch NPS drainage piping P-trap with 2-inch NPS standpipe extending from floor to outlet box and 2-inch NPS waste.

2.12 WASHER-SUPPLY OUTLETS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. IMI Cash Valve.
 2. Symmons Industries, Inc.
 3. Watts Industries, Inc.; Water Products Div.
 4. Or Approved Equal
- B. Description: Surface-mounting, washer-supply outlet fittings complying with ASME A112.18.1M and reinforcement. Include the following:
1. Shutoff Fitting: Combination, single lever.
 2. Supply Fittings: Two 1/2-inch NPS gate, globe, or ball valves and 1/2-inch NPS copper, water tubing.

2.13 WATER HAMMER ARRESTERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Precision Plumbing Products, Inc.
 2. Sioux Chief.
 3. Watts Industries; Water Products Div.
 4. Jay R. Smith Mfg. Co.
 5. Josam Co.
 6. Tyler Pipe, Wade Div.
 7. Zurn Industries, Inc.
 8. Or Approved Equal
- B. ASME A112.26.1M, ASSE 1010, or PDI-WH 201, bellows or piston type with pressurized cushioning chamber. Sizes are based on water-supply fixture units, ASME A112.26.1M sizes A through F and PDI-WH 201 sizes A through F.

2.14 HOSE BIBBS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Jay R. Smith Mfg. Co.
 2. Josam Co.
 3. Tyler Pipe, Wade Div.
 4. Zurn Industries, Inc.
 5. Or Approved Equal
- B. Bronze body, with renewable composition disc, 1/2- or 3/4-inch NPS threaded or solder-joint inlet. Provide ASME B1.20.7 garden-hose threads on outlet and integral or field-installed, nonremovable, drainable, hose-connection vacuum breaker.
1. Finish: [Rough brass][Chrome or nickel plated].
 2. Operation: [Wheel handle][Operating-key (handle) type]. Include operation key].

2.15 WATER METERS (FOR SUB METERING INSIDE THE BUILDING)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Displacement Meters:
 - a. Badger Meter
 - b. Neptune Technology Group
 - c. Hershey Products
 - d. Elster Metering Limited – Kent Meters
 - e. Daniel Jerman Co.
 - f. Assured Automation
 - g. Or Approved Equal
 2. Turbine Meters:
 - a. Badger Meter

- b. Hershey Products.
 - c. Neptune Technology Group.
 - d. Sensus.
 - e. Or Approved Equal
- B. Connections: 5/8 inch to 2 inch: threads at each end; 3 inches and larger: flange at each end.
- C. Meter Applications:
- 1. Meters 5/8-inch to 2-inch: Displacement type (except for constant flow where 2-inch turbine may apply).
 - 2. Meters 3" and above: Turbine type.
- D. Cold-Water Meters:
- 1. Displacement Type: AWWA C 700; sizes 5/8-inch up to and including 2-inches; impeller, disc or piston of magnetic drive type; bolted split-case design, with either being removable. Hermetically sealed register, hinged lens cover. Rated to a maximum pressure of 150 psi, and a maximum temperature of 80 deg F. Lead free, NSF/ANSI Standard 61, Annex G Certified.
 - 2. Turbine Type: AWWA C 701; Class I; sizes 3-inches through 10-inches; flanged; straight-through measuring chamber; rotor construction: polypropylene or similar non-rubber material with specific gravity of approximately of approximately 1.0, equipped with near frictionless replaceable bearings in turbine working against rotor shaft positioned thrust bearing. Transient/Fire/Hydrant Meter Inlet: Female fitting for attachment to hose nozzle with National Standard Fire hose thread. Outlet: 2-inch nipple with National Pipe Thread. Include restriction plate to limit flow through meter to 400 gpm at 65 psi. Hermetically sealed register, hinged lens cover. Rated to a maximum pressure of 150 psi, and a maximum temperature of 80 deg F. Lead free, NSF/ANSI Standard 61, Annex G Certified.
- E. Strainers:
- 1. Provide self-straining by means of annular space between measuring chamber and external case or with strainer screens installed in meter for displacement type meters. Provide rigid screens which fit snugly, are easy to remove, with effective straining are at least double that of main case inlet.
 - 2. Provide separate external strainers (when required by meter manufacturer) approved for use in fire service metered connections by Underwriters Laboratories. Bodies: Cast iron or copper alloy. Ends: Flanged in accordance with ASME B 16.1, Class 125. Provide stainless steel basket. Strainers shall be detachable from meter.
- F. Pulse Output: Provide dry contact pulse output for monitoring by DDC systems; DDC shall convert pulses to gallons.

PART 3 – EXECUTION

3.1 WATER DISTRIBUTION PIPING SPECIALTY INSTALLATION

- A. General: Install water distribution piping specialty components, connections, and devices according to manufacturer's written instructions.
- B. Install backflow preventers of type, size, and capacity indicated, at each water-supply connection to mechanical equipment and systems, and to other equipment and water systems as

- indicated. Comply with authorities having jurisdiction. Locate backflow preventers in same room as connected equipment. Install air-gap fitting on units with atmospheric-vent connection and pipe relief outlet drain to nearest floor drain. Do not install bypass around backflow preventer.
- C. Install pressure regulators with inlet and outlet shutoff valves and balance valve bypass. Install pressure gages on inlet and outlet.
 - D. Install strainers on supply side of each control valve, pressure regulator, water meters 3-inch and larger, and solenoid valve, and where indicated.
 - E. Install trap seal primers with valve outlet piping pitched down toward drain trap a minimum of one percent and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
 - F. Fasten wall-hanging water distribution piping specialties securely to supports attached to building substrate if supports are specified and to building wall construction if no support is indicated.
 - G. Fasten recessed, wall-mounting water distribution piping specialties to reinforcement built into walls.
 - H. Secure supplies to supports or substrate.
 - I. Install individual stop valve in each water supply to water distribution piping specialties. Use ball, gate, or globe valve if specific valve is not indicated.
 - J. Install water-supply stop valves in accessible locations.
 - K. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.
 - L. Include wood-blocking reinforcement for recessed and wall-mounting water distribution piping specialties.
 - M. Include access for trap primers.
 - N. Install hose bibbs with integral or field installed vacuum breaker.
 - O. Install wall hydrants with integral or field installed vacuum breaker.
 - P. Install water hammer arrestors near quick acting valves at the end of pipe runs and batteries of fixtures, including flush valves, washing machines, dishwashers, and as indicated. Provide access.
 - Q. Pipes, pipe fittings, plumbing fittings, or fixtures, including backflow preventers, that are used exclusively for nonpotable services such as manufacturing, industrial processing, irrigation, outdoor watering, or any other uses where the water is not anticipated to be used for human consumption; or "(B) toilets, bidets, urinals, fill valves, flushometer valves, tub fillers, shower valves, service saddles, or water distribution main gate valves that are 2 inches in diameter or larger."; and

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties. The following are specific connection requirements:
 - 1. Install piping connections between water distribution piping specialties and piping specified in other Division 22 Sections.
 - 2. Install piping connections indicated between appliances and equipment specified in other Sections; connect directly to plumbing piping systems.
 - 3. Install piping connections indicated as indirect wastes from appliances and equipment specified in other Sections, to spill over receptors connected to plumbing piping systems.
- B. Install hoses between water distribution piping specialties and appliances as required for connections.
- C. Arrange for electric-power connections to water distribution piping specialties and devices that require power. Electric power is specified in Division 26 Sections.
- D. Supply Runouts to water distribution piping specialties: Install hot- and cold-water-supply piping of sizes indicated, but not smaller than required by authorities having jurisdiction.
- E. Ground electric-powered water distribution piping specialties.
 - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- F. Arrange for electric-power connections to water distribution piping specialties and devices that require power. Electric power, wiring, and disconnect switches are specified in Division 26 Sections.

3.3 START-UP PROCEDURES

- A. Before startup, perform the following checks:
 - 1. System tests are complete.
 - 2. Damaged and defective specialties and accessories have been replaced or repaired.
 - 3. Clear space is provided for servicing specialties.
- B. Before operating systems, perform the following steps:
 - 1. Close drain valves, hydrants, and hose bibbs.
 - 2. Open general-duty valves to fully open position.
 - 3. Remove and clean strainers.
 - 4. Verify that drainage and vent piping are clear of obstructions. Flush with water until clear.
- C. Startup Procedures: Follow manufacturer's written instructions. If no procedures are prescribed by manufacturer, proceed as follows:
 - 1. Energize circuits for electrically operated units. Start and run units through complete sequence of operations.

3.4 DEMONSTRATION

- A. Startup Services: Engage a factory-authorized service representative to perform startup services and train Owner's maintenance personnel as specified below:
 - 1. Train Owner's maintenance personnel on procedures and schedules related to startup of and servicing trap seal primers.
 - 2. Review data in the maintenance manuals. Refer to Division 01.
 - 3. Schedule training with Owner with at least 7 days' advance notice.

3.5 PROTECTION

- A. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION