

## **SECTION 22 10 10**

### **PLUMBING PIPING VALVES AND ACCESSORIES**

#### **PART 1 - GENERAL**

##### 1.1 RELATED DOCUMENTS:

- A. The Conditions of the Contract and applicable requirements of Division 1, "General Requirements", and Section 23 01 00, "Mechanical General Provisions", govern this Section.

##### 1.2 APPLICABLE PUBLICATIONS

NSF/ANSI 61 --Drinking Water System Components – Health Effects  
NSF/ANSI 372 -- Drinking Water System Components – Lead Content

##### 1.3 DESCRIPTION OF WORK:

- A. Work Included: Provide plumbing piping valves and accessories as specified, and indicated.
- B. Types: The types of plumbing piping valves and accessories required for the project include, but are not limited to:
  - 1. Valves.
  - 2. Strainers.
  - 3. Unions.
  - 4. Flanges.
  - 5. Gaskets.
  - 6. Flexible connections.
  - 7. Gauges.

##### 1.4 QUALITY ASSURANCE:

- A. Acceptable Manufacturers: The model numbers listed in the Specifications establish a level of quality and material. The following manufacturers are acceptable, subject to compliance with the requirements of these Specifications.
  - 1. General Valves:
    - a. Crane Company.
    - b. Jenkins Bros. Valves.
    - c. Lunkenheimer.
    - d. Nibco.
    - e. Red and White.
    - f. Stockham Valves and Fittings.
    - g. Walworth Company.
    - h. Flomatic valves.
    - i. KITZ.
  - 2. Ball Valves:
    - a. Apollo.
    - b. Crane Company.
    - c. Jenkins Bros. Valves.
    - d. Nibco.
    - e. Red and White.
    - f. Stockham Valves and Fittings.
    - g. Victaulic.

- h. KITZ.
- 3. Backflow Preventers/Pressure Reducing Valves:
  - a. Febco.
  - b. Hersey Products, Inc.
  - c. Watts Regulator Company.
  - d. Flomatic valves.
- 4. Check Valves:
  - a. Crane Company.
  - b. Jenkins Bros. Valves.
  - c. Mission.
  - d. Muesco, Inc.
  - e. Williams-Hager, Clow Pipeline Products, Valve Division.
  - f. Victaulic.
  - g. Flomatic valves.
  - h. KITZ.
- 5. Strainers:
  - a. Crane.
  - b. Keckley.
  - c. Muessco.
  - d. Victaulic.
  - e. Zurn.
  - f. KITZ.
- 6. Thermostatic Mixing Valves:
  - a. Leonard.
  - b. Rada.
  - c. Lawler.

1.5 SUBMITTALS:

- A. Shop Drawing submittals shall include, but not be limited to, the following:
  - 1. Cut sheets on all valves, strainers, unions, flanges, gaskets, water meters, and gauges and thermometers, clearly showing all rating, capacities, and features.
  - 2. Valve samples, when requested.
  - 3. Additional information as required in Section 23 01 00.

1.6 DELIVERY, STORAGE AND HANDLING:

- A. Store plumbing piping valves and accessories in their factory-furnished coverings, and in a clean, dry indoor space which provided protection against the weather.

**PART 2 - PRODUCTS**

2.1 MATERIALS:

Material or equipment containing a weighted average of greater than 0.25 percent lead shall not be used in any potable water system intended for Human consumption, and shall be certified in accordance with NSF/ANSI 61 or NSF 372. Endpoint devices used to dispense water for drinking must meet the requirements of NSF/ANSI 61, Section 9.

2.2 VALVES

A. General: All valves shall be similar to numbers listed. All similar type and size valves shall be products of one manufacturer.

B. Applications: Valve application shall be as follows:

<u>Service</u>	<u>Application</u>	<u>Type</u>
Domestic Water	Shutoff	Ball
	Shutoff	Gate
	Balancing	Globe
	Check	Silent Check

C. Pressure Ratings:

<u>Service</u>	<u>Location</u>	<u>Rating</u>
Domestic Water	All	Refer to Section 22 00 00

D. Insulated Piping: Stems on all valves installed in insulated piping shall be extended to allow adequate clearance between the operator and the insulation specified for the piping system when the valve is installed.

E. Flanges: Valve flanges and companion flanges for all valve applications shall be compatible with the valve rating and the system pressure at the point of application. Flanges shall conform to ANSI B16.1 and ANSI B16.10.

F. General Requirements:

1. All valves shall be of threaded or flanged type. No solder connected valves on water lines shall be used on this project. All bronze and iron body gate and globe valves shall be of one manufacture for each project. Manufacturers of other types may not be mixed on the same project; i.e., all butterfly valves shall be of the same manufacture, all ball valves shall be of the same manufacture, etc.
2. All valves at system points where the System Working Pressure (SWP) at the point of application, including appropriate pump shutoff head, does not exceed 150 psi, may use Class 150 valves.
3. All bronze gate valves for pressures up to 150 psi shall be ASTM B62 composition bronze. Bronze valves for pressures above 150 psi shall be ASTM B61 steam bronze. All bronze valves shall be union or screw over bonnet, rising stem type with ASTM B99 alloy 651 or ASTM B371 alloy 694 or equal stem material.
4. All bronze ball valves for pressures up to 300 psi shall be ASTM B62 composition bronze or ASTM B584 alloy 844.
5. All iron body valves shall have the pressure containing parts constructed of ASTM A126 Class B cast iron. Stem material shall meet ASTM alloy 876 or ASTM 371 Alloy 876 silicon bronze or its equivalent. Gates and globes shall be bolted bonnet with OS&Y (outside screw and yoke) and rising stem design. A lubrication fitting shall be provided on yoke cap for maintenance lubrication of the yoke bushing.
6. All valves shall be repackable, under pressure, with the valve in the full open position.
7. All gate valves, globe valves, angle valves and shutoff valves of every character shall have malleable iron handwheels, except iron body valves 2-1/2" and larger which may have either malleable iron or ASTM A126 Class B, gray iron handwheels.
8. Packing for all valves shall be selected for the pressure-temperature service of the valve. It is incumbent upon the manufacturer to select the best quality, standard packing for the intended valve service. At the end of one year period spot checks will be made, and should the packing show signs of hardening or causing stem corrosion then all valves supplied by the manufacturer shall be repacked at no expense to the Owner with a packing material selected by the Owner.

9. Valves located with stem in horizontal position shall be drilled and tapped in accordance with MSS-SP-45 at Boss G to accommodate a drain valve.
- G. Plumbing Valves For Domestic Water Service at or Less Than 150 PSIG:
1. Ball Valves:
- a. Ball valves shall be two piece with a standard or full line size port chromium plated brass balls for domestic water, 316L stainless steel and stems and reinforced seats and stuffing box rings. All ball valves shall be designed to permit repacking while valve is in line. Valves shall be furnished with blowoutproof stems.
- b. Ball valves 2" and smaller shall be threaded body bronze or brass valves of a **full or standard** port design. Valves shall be rated for 300 psi WOG and shall conform to Federal Specification WW-V-35B. Valves shall be:
- 1) Apollo No. 77-100 Series.
  - 2) Crane No. 9032 Series .
  - 3) Nibco No. T-585 Series.
  - 4) Red and White No. 5044F Series.
  - 5) Stockham No. S-216-BR-R-T.
  - 6) Victaulic Style 722
  - 7) Milwaukee UBPA-475 Lead-free
2. Gate Valves:
- a. Valves 2-1/2" and larger shall be flanged bronze mounted Class 125 iron body, outside screw and yoke gate valves with bolted bonnets and solid wedges. Valves shall be rated for 200 psi WOG and shall conform to MSS SP-70 and shall be:
- 1) Crane No. 465-1/2.
  - 2) Jenkins No. 651-C.
  - 3) Lunkenheimer No. 1430.
  - 4) Nibco No. F-617-0.
  - 5) Red and White No. 421.
  - 6) Stockham No. G-623.
  - 7) Walworth No. 8726-F..
  - 8) **Milwaukee 2885A**
3. Globe Valves:
- a. Globe valves 2" and smaller shall be 300 psi WOG rated, all bronze globe valves with renewable-regrindable stainless steel plug disk and seat ring, union bonnet, and threaded connections. Valves shall conform to MSS SP-70 and shall be:
- 1) Crane No. 14-1/2-P.
  - 2) Jenkins No. 546-P.
  - 3) Lunkenheimer No. LQ-600-150.
  - 4) Nibco No. T-276-AP.
  - 5) Stockham No. B 29.
  - 6) Walworth No. 3237-P.
  - 7) **Milwaukee UP502 Lead Free**
- b. Angle and Y-pattern globe valves corresponding to the standard globe valve models specified above may be used where more-suited to the installation location.
- c. Valves 2-1/2" and larger shall be flanged bronze mounted Class 125 iron body, outside screw and yoke globe valves with bolted bonnets and renewable seat and disc. Valves shall be rated for 200 psi WOG and shall conform to MSS SP-85 and shall be:

- 1) Crane No. 351.
- 2) Jenkins No. 613-B.
- 3) Lunkenheimer No. 1123.
- 4) Nibco No. F-718-B.
- 5) Red and White No. 400.
- 6) Stockham No. G-512.
- 7) Walworth No. 8906-F.

4. Check Valves:

- a. Check valves 2" and smaller shall be Class 150 threaded bronze swing check valves with horizontal swing and replaceable discs. Valves shall be rated for 300 psi WOG and shall conform to MSS SP-80 and shall be:
  - 1) Crane No. 141.
  - 2) Jenkins No. 352-C.
  - 3) Lunkenheimer No. 230.
  - 4) Nibco No. T-433.
  - 5) Red and White No. 238.
  - 6) Stockham No. B-321..
  - 7) **Milwaukee UP509 Lead Free**
- b. Check valves 2-1/2" and larger shall be flanged bronze mounted Class 150 iron body swing check valves with bolted bonnets and renewable seat and disc. Valves shall be rated for 200 psi WOG and shall conform to MSS SP-71, Type 1 and shall be:
  - 1) Crane No. 373.
  - 2) Jenkins No. 624-C.
  - 3) Lunkenheimer No. 1790.
  - 4) Nibco No. F-918-B.
  - 5) Red and White No. 435.
  - 6) Stockham No. G-931.
  - 7) Walworth No. 8928-F.
  - 8) **Milwaukee 2974A**
- c. All swing check valves shall be installed in vertical piping only. Allow adequate pipe clearance to allow for proper valve operation.

H. Reduced Pressure Backflow Preventer: Backflow preventers up to 2" shall be bronze body reduced pressure principal type with strainer and inlet and outlet gate valves, Clayton Model RP-2 or an approved equal. Backflow preventers 2-1/2" and larger shall be all bronze or epoxy coated cast iron with strainer and inlet and outlet OS&Y gate valves, Clayton Model RP-1 or an approved equal.

I. Flanges: Valve flanges and companion flanges for all valve applications shall be compatible with the valve rating and the system pressure at the point of application.

J. Valves for Gas Service:

1. Valves 2-1/2" and smaller Ball Valves, UL-AGA approved refer to Paragraph 2.1/G.1.

2.3 STRAINERS:

A. General: Water strainers shall be as follows:

1. 150 psig Working Pressure: 150 psig working pressure, 2" and smaller, shall be Muessco No. 351 or equal, 200 pounds WOG, bronze body with perforated 20 mesh stainless steel screen with cleanout and screwed ends. 150 psig working pressure, 2-1/2 through 24", shall be Muessco No. 751 or equal, 150 pounds WOG, perforated stainless steel screen with 1/16"

perforations for sizes through 4", and 5/32" perforations for 5" and above, with blowdown connection, and Class 125 ANSI B16.1 flanged ends.

2. 300 psig Working Pressure: 300 psig working pressure, 2" and smaller, shall be Muesco No. 352 or equal, 400 pounds WOG, bronze body with perforated 20 mesh monel screen with cleanout and screwed ends. 300 psig working pressure, 2-1/2 to 24", shall be Muesco No. 752 or equal, 300 pounds WOG, perforated stainless steel screen with 1/16" perforations in sizes through 4", and 5/32" perforations for 5" and above, with blowdown connection, and Class 250 ANSI B16.5 flanges.

#### 2.4 UNIONS:

- A. General: Provide in lines assembled with screwed and soldered fittings at points of connection to items of equipment and elsewhere as indicated or required to permit proper connections to be made or so that equipment may be removed. Unions shall also be provided in welded lines at the connections to items of equipment, where flanges are not provided.
  1. Unions in steel lines assembled with screwed fittings shall be malleable iron screwed pattern unions with bronze seats. Unions in copper or brass lines shall be all brass, threaded pattern unions. Where unions are required by the above in steel lines assembled by welding, they shall consist of two mating welding flanges.
  2. Dielectric unions shall be used at all junctures of dissimilar metals.
  3. Unions in 2" and smaller in ferrous lines shall be Class 300 AAR malleable iron unions with iron to brass seats, and 2-1/2" and larger shall be ground flange unions. Unions in copper lines shall be 125 pounds ground joint brass unions or 150 pounds brass flanges if required by the mating item of equipment. Companion flanges on lines at various items of equipment, machines and pieces of apparatus shall serve as unions to permit removal of the particular items. See particular Specifications for special fittings and pressure.

#### 2.5 FLANGES:

- A. General: All 125/150 pound and 250/300 pound ANSI flanges shall be weld neck and shall be domestically manufactured, forged carbon steel, conforming to ANSI B16.5 and ASTM A-181 Grade I or II or ASTM A-105-71 as made by Tube Turn, Hackney or Ladish Company. Slip on flanges will not be acceptable. Each fitting shall be stamped as specified by ANSI B16.9 and, in addition, shall have the laboratory control number stenciled on each fitting for ready reference as to physical properties and chemical composition of the material. Complete test reports may be required for any fitting selected at random. Flanges which have been machined, remarked, painted or otherwise produced domestically from imported forgings or materials will not be acceptable. The flanges shall have the manufacturer's trademark permanently identified in accordance with MSS SP-25. Submit data for firm certifying compliance with these Specifications. Gaskets used shall be ring form, dimensioned to fit accurately within the bolt circle, shall be 1/16" thick, Manville service sheet packing Style 60. Inside diameter shall conform to the nominal pipe size. Bolts used shall be carbon steel bolts with semifinished hexagon nuts of American Standard Heavy dimensions. All-thread rods will not be an acceptable for flange bolts. Bolts shall have a tensile strength of 60,000 psi and an elastic limit of 30,000 psi. Flat faced flanges shall be furnished where required to match flanges on pumps, check valves, strainers, and similar items. Only one manufacturer of weld flanges will be approved for each project.

#### 2.6 GASKETS:

- A. General: Gaskets shall be placed between the flanges of all flange joints. Such gaskets shall be ring form gaskets fitting within the bolt circle of their respective flanges. Gaskets shall be 1/16" thick Manville Service Sheet Packing Style 60. The inside diameter of such gaskets shall conform to the nominal pipe size and the outside diameter shall be such that the gasket extends outward to the studs or bolts employed in the flanged joint.

#### 2.7 FLEXIBLE CONNECTIONS:

- A. General: Refer to Section 15250, "Vibration Isolation", for flexible connections.

2.8 GAUGES:

- A. General: Provide gauges and thermometers for monitoring plumbing systems as shown on the Drawings and specified herein.
- B. Gauges: Gauges shall be Ashcroft, Terice, Weksler, Moeller, or U.S. with 4-1/2" dial face, phenol case, stainless steel movement with Grade A phosphor bronze bourdon tube and micrometer-type calibration adjustment screw. Accuracy shall be 1/2 of 1% of full scale. Provide a Crane No. 88 or equal needle valve gauge cock in pressure tube to gauge. Gradation shall be one pound or less.
- C. Range and Gradations: Gauges and thermometers shall be selected to give range and graduations best suited for quantities to be measured. Generally, gauges and thermometers shall be selected so that normal operating pressures and temperatures are not more than 2/3 nor less than 1/2 of the range; scale division shall be 2°F or less. Typical ranges for domestic cold water shall be 0°F to 100°F and for domestic hot water shall be 30°F to 240°F.
- D. Gauge Locations: Provide pressure gauges at the following locations:
  - 1. Suction side of each pump.
  - 2. Discharge side of each pump.
  - 3. **At the inlet and outlet of each water softener.**
  - 4. As shown on the Drawings.

**PART 3 - EXECUTION**

3.1 INSTALLATION:

- A. General: Except as otherwise indicated, comply with the following requirements.
- B. Isolation Valves: Provide isolation valves in domestic water systems at each runout to a piece of equipment, each fixture, and elsewhere as shown on the Drawings.
- C. Valve Stems: Install valves with stems pointed up, in the vertical position where possible, but in no case with stems pointed downward from a horizontal plane. All valves shall be located so as to make the removal of their bonnets possible. All flanged valves shown in the horizontal lines with the valve stem in a horizontal position shall be positioned so that the valve stem is inclined one bolt hole above the horizontal position. Screw pattern valves placed in horizontal lines shall be made up with their valve stems inclined at an angle of 30 degrees above the horizontal position. All valves must be true and straight at the time the system is tested for final acceptance. Valves shall be installed as nearly as possible in the locations as shown on and Drawings. Any change in valve location must be so indicated on the As-built Drawings.
- D. Swing Check Valves: Swing check valves shall be installed in horizontal piping only.
- E. Unions and Companion Flanges: Provide unions or companion flanges where required to facilitate dismantling of valves and equipment.
- F. Strainer Blowdown: Provide a blowdown valve with hose connection and cap at each strainer for blowdown.

3.2 IDENTIFICATION:

- A. Refer to Section 23 03 00 for applicable painting, nameplates, and labeling requirements.

**END OF SECTION 22 10 10**