

**PART 1 - GENERAL REQUIREMENTS**

**1.01 SUMMARY**

- A. This Section includes general duty valves common to most plumbing water distribution piping systems.
  - 1. Special purpose valves are specified in individual piping system specifications.
- B. Contractors Option:
  - 1. The Division 22 contractor may provide mechanically joined plumbing piping systems to connect mechanical joints, couplings, fittings, valves and related components as an option in lieu of, in whole or in part, copper sweat, brazing, threaded or flanged piping methods. Mechanically joined plumbing piping systems to connect plumbing piping where used shall be provided in compliance with specification Section 221111 "Mechanically Joined Plumbing Piping Systems".

**1.02 DEFINITIONS**

- A. Lead Free: Refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content  $\leq 0.25\%$  per Safe Drinking Water Act as amended January 4th, 2011 Section 1417.

**1.03 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
  - 1. Product data, including body material, valve design, pressure and temperature classification, end connection details, seating materials, trim material and arrangement, dimensions and required clearances, and installation instructions.
- B. Submit certification that valves for domestic water distribution comply with NSF 61 Annex G and / or NSF 372.

**1.04 QUALITY ASSURANCE**

- A. Single Source Responsibility: Provide products specified in this section from the same manufacturer where products are available and conform to the specification requirements.
- B. American Society of Mechanical Engineers (ASME) Compliance: Comply with ASME B31.9 for building services piping and ASME B31.1 for power piping.

- C. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) Compliance: Comply with the MSS Standard Practices below:
1. MSS SP 67 “Butterfly Valves”
  2. MSS SP 70 “Gray Iron Gate Valves, Flanged and Threaded Ends”
  3. MSS SP 71 “Gray Iron Swing Check Valves, Flanged and Threaded Ends”
  4. MSS SP 72 “Ball Valves with Flanged or Butt Welding Ends”
  5. MSS SP 80 “Bronze Gate, Globe, Angle and Check Valves”
  6. MSS SP 85 “Gray Iron Globe and Angle Valves, Flanged and Threaded Ends”
  7. MSS SP 110 “Ball Valves, Threaded, Socket Welding, Solder Joint, Grooved and Flared Ends”
  8. MSS SP 125 “Check Valves: Gray Iron and Ductile Iron, In-Line, Spring Loaded, Center-Guided”
  9. MSS SP 139 “Copper Alloy Gate, Globe, Angle and Check Valves for Low Pressure/Low Temperature Plumbing Applications”
- D. Valves shall be manufactured in plants located in the United States or certified that they comply with applicable ANSI, ASTM and MSS standards.
- E. Comply with NSF 61 Annex G and / or NSF 372 for wetted surfaces of valves containing no more than 0.25% lead by weight compliance for valves for domestic water distribution.

## **PART 2 - PRODUCTS AND MATERIALS**

### **2.01 MANUFACTURERS**

- A. Manufacturer: Subject to compliance with requirements, provide products from one of the manufacturers listed in valve schedule.

### **2.02 VALVE FEATURES, GENERAL**

- A. Valve Design: Rising stem or rising outside screw and yoke stems.
1. Non-rising stem valves may be used where headroom prevents full extension of rising stems.
- B. Pressure and Temperature Ratings: As scheduled and required to suit system pressures and temperatures.
- C. Sizes: Same size as upstream pipe, unless otherwise indicated.
- D. Operators: Provide the following special operator features:
1. Handwheels, fastened to valve stem, for valves other than quarter turn.
  2. Lever handles, on quarter-turn valves 6-inch and smaller.

3. Chain-wheel operators, for valves 2-1/2-inch and larger, installed 72 inches or higher above finished floor elevation. Extend chains to an elevation of 5'-0" above finished floor elevation.
  4. Gear drive operators, on quarter-turn valves 8-inch and larger.
- E. Extended Stems: Where insulation is indicated or specified, provide extended stems arranged to receive insulation.
- F. End Connections: As indicated in the valve specifications.
1. Threads: Comply with ANSI B1.20.1.
  2. Flanges: Comply with ANSI B16.1 for cast iron, ANSI B16.5 for steel, and ANSI B16.24 for bronze valves.
  3. Solder-Joint: Comply with ANSI B16.18.
    - a) Caution: Where soldered end connections are used, use solder having a melting point below 840 deg F for gate, globe, and check valves; below 421 deg F for ball valves.

### **2.03 BALL VALVES**

- A. Ball Valves, 2 Inch and Smaller: Meeting MSS SP 110, Class150, 600-psi CWP; two-piece construction; with ASTM B 584 cast lead free bronze, full port, blowout-proof stem and chrome-plated lead free brass ball, with replaceable "Teflon" or "TFE" seats and seals, solder ends and vinyl-covered steel handle.
- B. Cast Iron Body Ball Valves, 2-1/2" and larger: Meeting MSS SP 72, 200 CWP, lead free with FDA epoxy coating, maximum operating temperature of 140F; two piece cast iron body meeting ASTM A126 Class B with flanged ends, 304 stainless steel full port ball and shaft, ductile iron handle, FDA epoxy coating, PTFE gasket, stem seal and seat.

### **2.04 BUTTERFLY VALVES**

- A. Butterfly Valves, 2-1/2-Inch and Larger: Meeting MSS SP-67 and lead free; 200-psi CWP; lug-type body constructed of ductile iron conforming to ASTM A 536. Provide valves with field replaceable EPDM sleeve/seat, aluminum-bronze disc, 416 stainless steel stem, and EPDM O-ring stem seals. Provide lever operators, (10 position minimum), with lock and stops with locks for sizes 2-1/2 through 6 inches and gear operators with position indicator for sizes 8 inch and larger. Drill and tap valves on dead-end service or requiring additional body strength. Valves must be rated for dead end service at 150 psi with no downstream flange required.

### **2.05 CHECK VALVES**

- A. Swing Check Valves, 2-Inch and Smaller: Meeting MSS SP-80; Class 125, 200-psi CWP, body and cap of ASTM B 584 cast lead free bronze; with horizontal swing, Y-pattern, disc and disc holder of ASTM B 283 alloy C46400 naval brass;

solder ends. Provide valves capable of being reground while the valve remains in the line.

- B. Swing Check Valves, 2-1/2-Inch and Larger: Meeting MSS SP-71 and lead free; Class 125 200-psi CWP, cast iron body and bolted cap conforming to ASTM A 126, Class B; with FDA epoxy coating, horizontal swing, lead free bronze disc with lead free bronze disc face ring, and bronze seat ring; and flanged ends. Provide valves capable of being refitted while the valve remains in the line.
- C. Swing Check Valves, 2-1/2-Inch and Larger: Meeting MSS SP-71 and lead free; Class 250 500-psi CWP, cast iron body and bolted cap conforming to ASTM A 126, Class B; with FDA epoxy coating, horizontal swing, lead free bronze disc with lead free bronze disc face ring, and bronze seat ring; and flanged ends. Provide valves capable of being refitted while the valve remains in the line.
- D. Lift Check Valves, 2-Inch and Smaller: Meeting MSS SP-139; 250-psi CWP, body, disc holder and cap of ASTM B 584 cast lead free bronze; horizontal or angle pattern, lift-type valve, with stainless steel spring, renewable "Teflon" disc and solder ends. Provide valves capable of being refitted and ground while the valve remains in the line.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATIONS**

- A. Install valves in accordance with manufacturer's installation instructions.
- B. Locate valves for easy access and provide separate support where necessary. Provide access doors and fire rated access doors as required.
- C. Install valves and unions for each fixture and item of equipment arranged to allow equipment removal without system shutdown. Unions are not required on flanged devices.
- D. Install three-valve bypass around each pressure reducing valve using throttling-type valves.
- E. Install valves in horizontal piping with stem at or above the center of the pipe.
- F. Install valves in a position to allow full stem movement.
- G. Installation of Check Valves: Install for proper direction of flow as follows:
- H. Swing Check Valves: Horizontal position with hinge pin level.
- I. Lift Check Valve: With stem upright and plumb.

### 3.02 VALVE ENDS SELECTION

A. Select valves with the following ends or types of pipe/tube connections:

1. Copper Tube Size, 2-Inch and Smaller: Solder ends.
2. Copper Tube Sizes 2-1/2 Inch and Larger: flanged end.

### 3.03 VALVE PRESSURE/TEMPERATURE CLASSIFICATION SCHEDULES

A. Domestic Hot and Cold Water Service

<u>VALVE TYPE</u>	<u>2" AND SMALLER</u>	<u>2-1/2" AND LARGER</u>
Ball	150	200
Butterfly	N/A	200
Check	125	125

### 3.04 VALVE SCHEDULE

A. Ball Valves (full port) – 2 inch and smaller:

<u>MANUFACTURER</u>	<u>SOLDER ENDS</u>	<u>THREADED ENDS</u>
Apollo (Conbraco)	77C-LF-200	77C-LF-100
Hammond	UP8311A	UP8301A
Milwaukee	UPBA-450	UPBA-400
NIBCO	S-585-80-LF	T-585-80-LF

B. Iron Body Ball Valves (full port) – 2-1/2" and larger:

<u>MANUFACTURER</u>	<u>FLANGED ENDS</u>
Apollo (Conbraco)	6PLF
Watts	G4000-FDA

C. Butterfly Valves (aluminum-bronze disc) - 2-1/2 inch and larger:

<u>MANUFACTURER</u>	<u>LEVER</u>	<u>GEAR</u>
Apollo (Conbraco)LD141	xx BE1*	LD141 xx BE2*
Hammond	6411-01	6411-03
NIBCO	LD-2000-3	LD-2000-5
Watts	XXBF-03-121-15	XBF-03-121-1G

\* xx = Valve Size

D. Swing Check Valves – 2 inch and smaller:

<u>MANUFACTURER</u>	<u>SOLDER ENDS</u>	<u>THREADED ENDS</u>
Apollo	161S-LF	161T-LF
Milwaukee	UP1509	UP509
NIBCO	S-413-Y-LF	T-413-Y-LF

E. Swing Check Valves - 2-1/2 inch and larger – Class 125:

<u>MANUFACTURER</u>	<u>Flanged Ends</u>
Apollo	910F-LFA

F. Lift Check Valves – 2 inch and smaller:

<u>MANUFACTURER</u>	<u>SOLDER ENDS</u>	<u>THREADED ENDS</u>
Hammond	UP947	UP943
Milwaukee	UP1548T	UP548T
NIBCO	S-480-Y-LF	T-480-Y-LF

### 3.05 APPLICATION SCHEDULE

- A. General Application: Use gate, ball, and butterfly valves for shutoff duty; globe, ball, and butterfly for throttling duty. Refer to piping system Specification Sections for specific valve applications and arrangements.
- B. Domestic Water Systems: Use the following valve types:
  - 1. Ball Valves, 2" and Smaller: Class 150, 600-psi CWP, with stem extension if installed in insulated pipe.,.
  - 2. Butterfly Valves, 2-1/2" and larger 200-psi working pressure with cast or ductile iron body
  - 3. Swing Check, 2-1/2" and smaller: Class 125, cast bronze, with rubber seat.
  - 4. Check Valves, 2-1/2" and larger: Class 125, swing or wafer type as indicated.
- C. Domestic Water Systems – High Pressure: Use the following valve types:
  - 1. Ball Valves, 2" and Smaller: Class 150, 600-psi CWP, with stem extension if installed in insulated pipe.

### 3.06 FIELD QUALITY CONTROL

- A. Tests: After piping systems have been tested and put into service, but before final adjusting and balancing, inspect valves for leaks. Adjust or replace packing to stop leaks; replace valves if leak persists.

### **3.07 ADJUSTING AND CLEANING**

- A.     Cleaning: Clean mill scale, grease, and protective coatings from exterior of valves and prepare valves to receive finish painting or insulation.
- B.     Inspect valves for leaks after piping systems have been tested and put into service, but before final adjusting and balancing. Adjust or replace packing, as required, on valves with leaks. Replace valve if leak persists.

**END OF SECTION**

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