

**SECTION 230523  
GENERAL-DUTY VALVES FOR HVAC PIPING**

**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
  - 1. Bronze ball valves
  - 2. Cast iron ball valves
  - 3. Iron, single-flange butterfly valves
  - 4. Bronze lift check valves
  - 5. Bronze swing check valves
  - 6. Iron swing check valves
  - 7. Eccentric plug valves
  - 8. Chainwheels
- B. Related Sections:
  - 1. Division 23 HVAC piping Sections for specialty valves applicable to those Sections only.
  - 2. Division 23 Section "Identification for HVAC Piping and Equipment" for valve tags and schedules.

**1.02 DEFINITIONS**

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

**1.03 SUBMITTALS**

- A. Product Data: For each type of valve indicated.

**1.04 QUALITY ASSURANCE**

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
  - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
  - 2. ASME B31.1 for power piping valves.
  - 3. ASME B31.9 for building services piping valves.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Prepare valves for shipping as follows:
  - 1. Protect internal parts against rust and corrosion.
  - 2. Protect threads, flange faces, grooves, and weld ends.
  - 3. Set angle, gate, and globe valves closed to prevent rattling.
  - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
  - 5. Set butterfly valves closed or slightly open.
  - 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
  - 1. Maintain valve end protection.
  - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

**PART 2 PRODUCTS****2.01 GENERAL REQUIREMENTS FOR VALVES**

- A. Refer to HVAC valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
  - 1. Gear Actuator: For quarter-turn valves NPS 8 and larger.
  - 2. Handwheel: For valves other than quarter-turn types.
  - 3. Handlever: For quarter-turn valves NPS 6 and smaller except plug valves.
  - 4. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 10 plug valves, for each size square plug-valve head.
  - 5. Chainwheel: Device for attachment to valve handwheel, stem, or other actuator; of size and with chain for mounting height, as indicated in the "Valve Installation" Article.
- E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
  - 1. Gate Valves: With rising stem.
  - 2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
  - 3. Butterfly Valves: With extended neck.
- F. Valve-End Connections:
  - 1. Flanged: With flanges according to ASME B16.1 for iron valves.
  - 2. Grooved: With grooves according to AWWA C606.
  - 3. Solder Joint: With sockets according to ASME B16.18.
  - 4. Threaded: With threads according to ASME B1.20.1.
- G. Valve Bypass and Drain Connections: MSS SP-45.

**2.02 BRONZE BALL VALVES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Conbraco Industries, Inc.; Apollo Valves.
  - 2. Crane Co.; Crane Valve Group; Crane Valves.
  - 3. Hammond Valve.
  - 4. Lance Valves; a division of Advanced Thermal Systems, Inc.
  - 5. Milwaukee Valve Company.
  - 6. NIBCO INC.
  - 7. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- B. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:
  - 1. Standard: MSS SP-110.
  - 2. SWP Rating: 250 psig.
  - 3. CWP Rating: 600 psig.
  - 4. Body Design: Two piece.
  - 5. Body Material: Bronze.
  - 6. Ends: Threaded.
  - 7. Seats: PTFE or TFE.
  - 8. Stem: Stainless steel.
  - 9. Ball: Stainless steel, vented.
- C. Two-Piece, Full-Port, Brass Ball Valves with Stainless-Steel Trim:
  - 1. Description:
    - a. Standard: MSS SP-110.
    - b. SWP Rating: 250 psig (1035 kPa).

- c. CWP Rating: 600 psig (4140 kPa).
- d. Body Design: Two piece.
- e. Body Material: Forged brass.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Stainless steel.
- i. Ball: Stainless steel, vented.
- j. Port: Full.

### 2.03 CAST IRON BALL VALVES

- A. Class 200 Cast Iron Ball Valves: Floating ball design capable of providing bi-directional tight shutoff in accordance with MSS-SP72.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Valve.
    - b. Crane Co.; Crane Valve Group; Stockham Division.
    - c. Hammond Valve.
    - d. Milwaukee Valve Company.
    - e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - 2. Description:
    - a. Standard: MSS SP-72.
    - b. WOG Rating: 200 psig.
    - c. WSP Rating: 125 psig.
    - d. Body Material: Cast iron ASTM A126 Class B.
    - e. Ends: ANSI flat face flanges.
    - f. Ball: PTFE infused cast iron.
    - g. Stem: 304 stainless steel.
    - h. Locking handles.
    - i. American Valve Series 4000.
- B. Class 300 Cast Iron Ball Valves: Floating ball design capable of providing bi-directional tight shutoff in accordance with MSS-SP72.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Valve.
    - b. Crane Co.; Crane Valve Group; Stockham Division.
    - c. Hammond Valve.
    - d. Milwaukee Valve Company.
    - e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - 2. Description:
    - a. Standard: MSS SP-72.
    - b. WOG Rating: 300 psig.
    - c. WSP Rating: 150 psig.
    - d. Body Material: Cast iron ASTM A126 Class B.
    - e. Ends: ANSI flat face flanges.
    - f. Ball: PTFE infused cast iron.
    - g. Stem: 304 stainless steel.
    - h. Locking handles.
    - i. American Valve Series 4000D.

### 2.04 HIGH-PERFORMANCE BUTTERFLY VALVES

- A. Class 150, Single-Flange, High-Performance Butterfly Valves:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
    - b. Bray Controls; a division of Bray International.

- c. Cooper Cameron Valves; a division of Cooper Cameron Corp.
  - d. Crane Co.; Crane Valve Group; Flowseal.
  - e. Crane Co.; Crane Valve Group; Stockham Division.
  - f. DeZurik Water Controls.
  - g. Hammond Valve.
  - h. Milwaukee Valve Company.
  - i. NIBCO INC.
  - j. Tyco Valves & Controls; a unit of Tyco Flow Control.
2. Description:
- a. Standard: MSS SP-68.
  - b. CWP Rating: 285 psig (1965 kPa) at 100 deg F (38 deg C).
  - c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
  - d. Body Material: Carbon steel, cast iron, ductile iron, or stainless steel.
  - e. Seat: Reinforced PTFE or metal.
  - f. Stem: Stainless steel; offset from seat plane.
  - g. Disc: Carbon steel.
  - h. Service: Bidirectional.

## 2.05 BRONZE LIFT CHECK VALVES

- A. Class 125, Lift Check Valves with Bronze Disc:
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Co.; Crane Valve Group
  - 2. Description:
    - a. Standard: MSS SP-80, Type 1.
    - b. CWP Rating: 200 psig.
    - c. Body Design: Vertical flow.
    - d. Body Material: ASTM B 61 or ASTM B 62, bronze.
    - e. Ends: Threaded.
    - f. Disc: Bronze.

## 2.06 BRONZE SWING CHECK VALVES

- A. Class 150, Bronze Swing Check Valves with Bronze Disc:
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Valve, Inc.
    - b. Crane Co.; Crane Valve Group; Crane Valves.
    - c. Crane Co.; Crane Valve Group; Jenkins Valves.
    - d. Crane Co.; Crane Valve Group; Stockham Division.
    - e. Hammond Valve.
    - f. Kitz Corporation.
    - g. Milwaukee Valve Company.
    - h. NIBCO INC.
    - i. Powell Valves.
    - j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - 2. Description:
    - a. Standard: MSS SP-80, Type 3.
    - b. CWP Rating: 200 psig.
    - c. Body Design: Horizontal flow.
    - d. Body Material: ASTM B 62, bronze.
    - e. Ends: Threaded.
    - f. Disc: Bronze.

**2.07 IRON SWING CHECK VALVES**

- A. Class 150, Iron Swing Check Valves with Metal Seats:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Co.; Crane Valve Group
    - b. Hammond Valve.
    - c. Milwaukee Valve Company.
    - d. NIBCO INC.
    - e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - 2. Description:
    - a. Standard: MSS SP-71, Type I.
    - b. NPS 2-1/2 to NPS 12, CWP Rating: 200 psig.
    - c. NPS 14 to NPS 24, CWP Rating: 150 psig.
    - d. Body Design: Clear or full waterway.
    - e. Body Material: ASTM A 126, gray iron with bolted bonnet.
    - f. Ends: Flanged.
    - g. Trim: Bronze.
    - h. Gasket: Asbestos free.
- B. Class 150, Iron Swing Check Valves with Nonmetallic-to-Metal Seats:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Co.; Crane Valve Group; Crane Valves.
    - b. Crane Co.; Crane Valve Group; Stockham Division.
  - 2. Description:
    - a. Standard: MSS SP-71, Type I.
    - b. NPS 2-1/2 to NPS 12 (DN 65 to DN 300), CWP Rating: 200 psig (1380 kPa).
    - c. NPS 14 to NPS 24 (DN 350 to DN 600), CWP Rating: 150 psig (1035 kPa).
    - d. Body Design: Clear or full waterway.
    - e. Body Material: ASTM A 126, gray iron with bolted bonnet.
    - f. Ends: Flanged.
    - g. Trim: Composition.
    - h. Seat Ring: Bronze.
    - i. Disc Holder: Bronze.
    - j. Disc: PTFE or TFE.
    - k. Gasket: Asbestos free.

**2.08 IRON GLOBE VALVES**

- A. Class 150, Iron Globe Valves:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Co.; Crane Valve Group; Crane Valves.
    - b. Crane Co.; Crane Valve Group; Jenkins Valves.
    - c. Crane Co.; Crane Valve Group; Stockham Division.
    - d. Hammond Valve.
    - e. Milwaukee Valve Company.
    - f. NIBCO INC.
    - g. Powell Valves.
    - h. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - 2. Description:
    - a. Standard: MSS SP-85, Type I.
    - b. CWP Rating: 200 psig.
    - c. Body Material: ASTM A 126, gray iron with bolted bonnet.
    - d. Ends: Flanged.
    - e. Trim: Bronze.

- f. Packing and Gasket: Asbestos free.

## 2.09 ECCENTRIC PLUG VALVES

- A. 175 CWP, Eccentric Plug Valves with Resilient Seating.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Clow Valve Co.; a division of McWane, Inc.
    - b. DeZurik Water Controls.
    - c. Homestead Valve; a division of Olson Technologies, Inc.
    - d. M&H Valve Company; a division of McWane, Inc.
    - e. Milliken Valve Company.
    - f. Henry Pratt Company.
  - 2. Description:
    - a. Standard: MSS SP-108.
    - b. CWP Rating: 175 psig minimum.
    - c. Body and Plug: ASTM A 48/A 48M, gray iron; ASTM A 126, gray iron; or ASTM A 536, ductile iron.
    - d. Bearings: Oil-impregnated bronze or stainless steel.
    - e. Ends: Flanged.
    - f. Stem-Seal Packing: Asbestos free.
    - g. Plug, Resilient-Seating Material: Suitable for potable-water service unless otherwise indicated.

## 2.10 CHAINWHEELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Babbitt Steam Specialty Co.
  - 2. Roto Hammer Industries.
  - 3. Trumbull Industries.
- B. Description: Valve actuation assembly with sprocket rim, brackets, and chain.
  - 1. Brackets: Type, number, size, and fasteners required to mount actuator on valve.
  - 2. Attachment: For connection to butterfly and plug valve stems.
  - 3. Sprocket Rim with Chain Guides: Ductile iron, of type and size required for valve.
  - 4. Chain: Hot-dip, galvanized steel, of size required to fit sprocket rim.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

### 3.02 VALVE INSTALLATION

- A. Install valves with grooved-end couplings, unions, or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.

- D. Install valves in position to allow full stem movement.
- E. Install chainwheels on operators for butterfly, gate, globe and plug valves NPS 6 and larger and more than 96 inches above floor. Extend chains to 60 inches above finished floor.
- F. Install check valves for proper direction of flow and as follows:
  - 1. Swing Check Valves: In horizontal position with hinge pin level.
  - 2. Center-Guided and Plate-Type Check Valves: In horizontal or vertical position, between flanges.
  - 3. Lift Check Valves: With stem upright and plumb.

### 3.03 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

### 3.04 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
  - 1. Shutoff Service: Ball.
  - 2. Balancing Valves: Calibrated venturi ball valves up to 2" and calibrated orifice plug or globe valves as specified in Section 232113 for 3" and larger.
  - 3. Pump-Discharge Check Valves:
    - a. NPS 2 and Smaller: Bronze swing check valves with bronze disc.
    - b. NPS 2-1/2 and Larger: Iron swing check valves with lever and weight or with spring or iron, center-guided, metal-seat check valves.
- B. Select valves, except wafer types, with the following end connections:
  - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
  - 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
  - 3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
  - 4. For Steel Piping, NPS 2 and Smaller: Threaded ends.
  - 5. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
  - 6. For Steel Piping, NPS 5 and Larger: Flanged ends.

### 3.05 CHILLED-WATER VALVE SCHEDULE

- A. Pipe NPS 3 and Smaller:
  - 1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
  - 2. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
  - 3. Ball Valves: Two piece, full port, brass with stainless-steel trim.
  - 4. Bronze Swing Check Valves: Class 125, bronze disc.
  - 5. Bronze Globe Valves: Class 125, bronze disc.
- B. Pipe NPS 4 and Larger:
  - 1. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
  - 2. Ball Valves: Cast Iron Ball Valves
  - 3. High-Performance Butterfly Valves: Class 150, single flange.
  - 4. Iron Swing Check Valves: Class 125, metal or nonmetallic-to-metal seats.
  - 5. Iron Globe Valves: Class 125.
  - 6. Eccentric Plug Valves: 175 CWP, resilient seating.

### 3.06 HEATING-WATER VALVE SCHEDULE

- A. Pipe NPS 3 and Smaller:
  - 1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
  - 2. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
  - 3. Ball Valves: Two piece, full port, brass with stainless-steel trim.
  - 4. Bronze Swing Check Valves: Class 125, bronze disc.
  - 5. Bronze Globe Valves: Class 125, bronze disc.

- B. Pipe NPS 4 and Larger:
1. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
  2. Ball Valves: Cast Iron Ball Valves
  3. High-Performance Butterfly Valves: Class 150, single flange.
  4. Iron Swing Check Valves: Class 125, metal or nonmetallic-to-metal seats.
  5. Iron Globe Valves: Class 125.
  6. Eccentric Plug Valves: 175 CWP, resilient seating.

**END OF SECTION 230523**