
SECTION 23 05 23
GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Applications.
- B. General requirements.
- C. Globe valves.
- D. Ball valves.
- E. Butterfly valves.
- F. Check valves.
- G. Plug valves.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 08 31 00 - Access Doors and Panels.
- C. Section 23 05 53 - Identification for HVAC Piping and Equipment.
- D. Section 23 07 16 - HVAC Equipment Insulation.
- E. Section 23 07 19 - HVAC Piping Insulation.
- F. Section 23 21 13 - Hydronic Piping.

1.3 REFERENCE STANDARDS

- A. API STD 594 - Check Valves: Flanged, Lug, Wafer, and Butt-Welding 2022.
- B. ASME B1.20.1 - Pipe Threads, General Purpose, Inch 2013 (Reaffirmed 2018).
- C. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250 2020.
- D. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard 2020.
- E. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2021.
- F. ASME B16.34 - Valves — Flanged, Threaded, and Welding End 2020.
- G. ASTM A48/A48M - Standard Specification for Gray Iron Castings 2022.
- H. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings 2004 (Reapproved 2019).
- I. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures 1999 (Reapproved 2022).
- J. ASTM A536 - Standard Specification for Ductile Iron Castings 1984, with Editorial Revision (2019).
- K. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings 2017.
- L. AWWA C606 - Grooved and Shouldered Joints 2015.
- M. MSS SP-45 - Drain and Bypass Connections 2020.
- N. MSS SP-67 - Butterfly Valves 2022.
- O. MSS SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Service 2010a.
- P. MSS SP-78 - Gray Iron Plug Valves, Flanged and Threaded Ends 2011.
- Q. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves 2019.
- R. MSS SP-85 - Gray Iron Globe and Angle Valves, Flanged and Threaded Ends 2011.
- S. MSS SP-108 - Resilient-Seated Cast Iron Eccentric Plug Valves 2020.

- T. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010, with Errata .
- U. MSS SP-125 - Check Valves: Gray Iron and Ductile Iron, In-Line, Spring-Loaded, Center-Guided 2018.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.
- E. Maintenance Materials: Furnish Owner with one wrench for every five plug valves, in each size of square plug valve head.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

PART 2 PRODUCTS

2.1 APPLICATIONS

- A. See drawings for specific valve locations.
- B. Provide the following valves for the applications if not indicated on drawings:
 - 1. Throttling (Hydronic): Ball.
 - 2. Isolation (Shutoff): Butterfly and Ball.
 - 3. Swing Check (Pump Outlet):
 - a. 2 NPS and Smaller: Bronze with bronze disc.
 - b. 2-1/2 NPS and Larger: Iron with center-guided with resilient seat.
- C. Required Valve End Connections for Non-Wafer Types:
 - 1. Steel Pipe:
 - a. 2 NPS and Smaller: Threaded ends.
 - b. 2-1/2 NPS and Larger: Grooved ends.
 - 2. Copper Tube:
 - a. 2 NPS and Smaller: Threaded ends (Exception: Solder-joint valve-ends).
 - b. 2-1/2 NPS and Larger: Grooved ends.
- D. Heating Hot Water Valves:
 - 1. 2 NPS and Smaller, Brass and Bronze Valves:
 - a. Threaded ends.
 - b. Ball: Full port, one piece, brass trim.
 - 2. 2-1/2 NPS and Larger, Iron Valves:
 - a. 2-1/2 NPS to 4 NPS: Threaded ends.
 - b. Ball: 2-1/2 NPS to 10 NPS, Class 150.
 - c. Single-Flange Butterfly: 2-1/2 NPS to 12 NPS, aluminum-bronze disc, EPDM seat, 200 CWP.
 - d. Center-Guided Check: Compact-wafer, metal seat, Class 125.
 - e. Globe: 2-1/2 NPS to 12 NPS, Class 125.

2.2 GENERAL REQUIREMENTS

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- A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.
 - B. Valve Sizes: Match upstream piping unless otherwise indicated.
 - C. Valve Actuator Types:
 - 1. Hand Lever: Quarter-turn valves 6 NPS and smaller except plug valves.
 - 2. Wrench: Plug valves with square heads.
 - D. Valves in Insulated Piping: Provide 2 NPS stem extensions and the following features:
 - 1. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
 - 2. Butterfly Valves: Extended neck.
 - 3. Memory Stops: Fully adjustable after insulation is installed.
 - E. Valve-End Connections:
 - 1. Threaded End Valves: ASME B1.20.1.
 - 2. Flanges on Iron Valves: ASME B16.1 for flanges on iron valves.
 - 3. Pipe Flanges and Flanged Fittings 1/2 NPS through 24 NPS: ASME B16.5.
 - 4. Solder Joint Connections: ASME B16.18.
 - 5. Grooved End Connections: AWWA C606.
 - F. General ASME Compliance:
 - 1. Building Services Piping Valves: ASME B31.9.
 - G. Bronze Valves:
 - 1. Fabricate from dezincification resistant material.
 - 2. Copper alloys containing more than 15 percent zinc are not permitted.
 - H. Valve Bypass and Drain Connections: MSS SP-45.
 - I. Source Limitations: Obtain each valve type from a single manufacturer.

2.3 IRON, GLOBE VALVES

- A. Class 125: CWP Rating: 200 psig; and Class 250: CWP Rating: 500 psig:.
 - 1. Comply with MSS SP-85, Type I.
 - 2. Body: Gray iron; ASTM A126, with bolted bonnet.
 - 3. Ends: Flanged.
 - 4. Trim: Bronze.
 - 5. Packing and Gasket: Asbestos free.
 - 6. Operator: Handwheel or chainwheel.
 - 7. Manufacturers:
 - a. Apollo Valves: www.apollovalves.com/#sle.
 - b. Ferguson Enterprises Inc: www.fnw.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 BRASS, BALL VALVES

- A. Two Piece, Regular Port with Stainless Steel Trim:
 - 1. Comply with MSS SP-110.
 - 2. SWP Rating: 150 psig.
 - 3. CWP Rating: 600 psig, WOG.
 - 4. Body: Forged brass.
 - 5. Ends: Threaded.
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6. Seats: PTFE, TFE, or PTFE or TFE.
7. Stem: Stainless Steel.
8. Ball: Chrome-plated brass.
9. Manufacturers:
 - a. Apollo Valves: www.apollovalves.com/#sle.
 - b. Ferguson Enterprises Inc: www.fnw.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.5 BRONZE, BALL VALVES

- A. General:
 1. Fabricate from dezincification resistant material.
 2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Two Piece, Regular Port with Bronze or Brass Trim:
 1. Comply with MSS SP-110.
 2. SWP Rating: 150 psig.
 3. CWP Rating: 600 psig.
 4. Body: Forged bronze or dezincified-brass alloy.
 5. Ends: Threaded.
 6. Seats: PTFE.
 7. Stem: Bronze or brass.
 8. Ball: Chrome plated brass.
 9. Manufacturers:
 - a. Apollo Valves: www.apollovalves.com/#sle.
 - b. Viega LLC: www.viega.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.6 IRON, BALL VALVES

- A. Split Body, Full Port:
 1. Comply with MSS SP-72.
 2. CWP Rating: 200 psig.
 3. Body: ASTM A126, gray iron.
 4. Ends: Flanged.
 5. Seats: PTFE.
 6. Stem: Stainless steel.
 7. Ball: Stainless steel.

2.7 IRON, SINGLE FLANGE BUTTERFLY VALVES

- A. Lug Style: Bi-directional dead-end service without use of downstream flange.
 1. Comply with MSS SP-67, Type I.
 2. CWP Rating: 150 psig and 200 psig.
 3. Body Material: ASTM A126 cast iron or ASTM A536 ductile iron.
 4. Stem: One or two-piece stainless steel.
 5. Seat: NBR.
 6. Disc: Coated ductile iron.
 7. Manufacturers:

- a. Apollo Valves: www.apollovalves.com/#sle.
- b. Substitutions: See Section 01 60 00 - Product Requirements.

2.8 IRON, GROOVED-END BUTTERFLY VALVES

- A. CWP Rating: 175 psig (1200 kPa) and 200 psig (1389 kPa): 10 NPS (250 DN) or larger.
 - 1. Comply with MSS SP-67, Type I.
 - 2. Body: Coated ductile iron.
 - 3. Stem: Stainless steel.
 - 4. Disc: Coated ductile iron.
 - 5. Disc Seal: EPDM.
 - 6. Manufacturers:
 - a. Victaulic _____
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.9 BRONZE, LIFT CHECK VALVES

- A. Class 125:
 - 1. Comply with MSS SP-80, Type 1, Metal Disc to Metal Seat and Type 2, Nonmetallic Disc to Metal Seat.
 - 2. CWP Rating: 200 psig.
 - 3. Design: Vertical flow.
 - 4. Body: Bronze.
 - 5. Ends: Threaded.
 - 6. Disc (Type 1): Bronze.
 - 7. Disc (Type 2): NBR or PTFE.
 - 8. Manufacturers:
 - a. Metraflex.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.10 BRONZE, SWING CHECK VALVES

- A. Class 125: CWP Rating: 200 psig (1380 kPa) and Class 150: CWP Rating: 300 psig (2070 kPa).
 - 1. Comply with MSS SP-80, Type 3.
 - 2. Body Design: Horizontal flow.
 - 3. Body Material: Bronze, ASTM B62.
 - 4. Ends: Threaded.
 - 5. Disc: Bronze.

2.11 IRON, CENTER-GUIDED CHECK VALVES

- A. Class 125, Compact-Wafer:
 - 1. Comply with MSS SP-125.
 - 2. 2-1/2 NPS to 12 NPS, CWP Rating: 200 psig.
 - 3. Body Material: ASTM A126, gray iron.
 - 4. Metal Seat: Bronze.
 - 5. Resilient Seat: EPDM or NBR.
 - 6. Manufacturers:
 - a. Apollo Valves: www.apollovalves.com/#sle.

- b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Class 150, Compact-Wafer:
 - 1. Comply with MSS SP-125.
 - 2. 2-1/2 NPS to 12 NPS, CWP Rating: 300 psig.
 - 3. Body Material: ASTM A395/A395M or ASTM A536, ductile iron.
 - 4. Metal Seat: Bronze.
 - 5. Resilient Seat: EPDM or NBR.
 - 6. Manufacturers:
 - a. Metraflex.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.12 LUBRICATED PLUG VALVES

- A. Regular Gland and Cylindrical with Threaded Ends:
 - 1. Comply with MSS SP-78, Type II.
 - 2. Class 125: 2-1/2 NPS to 12 NPS, CWP Rating: 200 psig.
 - 3. Body Material: Cast iron with lubrication sealing system.
 - 4. Pattern: Regular or short.
 - 5. Plug: Cast iron or bronze with sealant groove.

2.13 ECCENTRIC PLUG VALVES

- A. Resilient Seating with Flanged Ends.
 - 1. Comply with MSS SP-108.
 - 2. CWP Rating: 175 psig minimum.
 - 3. Body and Plug: Gray or ductile iron.
 - 4. Bearings: Oil-impregnated bronze or Stainless Steel.
 - 5. Stem-Seal Packing: Asbestos free.
 - 6. Plug, Resilient-Seating Material: Approved for potable water service.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Discard all packing materials and verify that valve interior, including threads and flanges, are completely clean without signs of damage or degradation that could result in leakage.
- B. Verify valve parts to be fully operational in all positions from closed to fully open.
- C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.
- D. Should valve is determined to be defective, replace with new valve.

3.2 INSTALLATION

- A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.
 - B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.
 - C. Where valve support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welds.
 - D. Install check valves where necessary to maintain direction of flow as follows:
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1. Lift Check: Install with stem plumb and vertical.

END OF SECTION 23 05 23