

SECTION 230523 - GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following general-duty valves:

1. Copper-alloy ball valves.
2. Ferrous-alloy ball valves.
3. Ferrous-alloy butterfly valves.
4. Bronze check valves.
5. Ferrous-alloy wafer check valves.
6. Spring-loaded, lift-disc check valves.
7. Chainwheel actuators.

B. Related Sections include the following:

1. Division 23 Section " Identification for HVAC Piping and Equipment" for valve tags and charts.
2. Division 23 Section "HVAC Instrumentation and Controls" for control valves and actuators.

1.2 DEFINITIONS

A. The following are standard abbreviations for valves:

1. CWP: Cold working pressure.
2. EPDM: Ethylene-propylene-diene terpolymer rubber.
3. PTFE: Polytetrafluoroethylene plastic.

1.3 SUBMITTALS

- A. Product data for each valve type. Include body material, valve design, pressure and temperature classification, end connection details, seating materials, trim material and arrangement, dimensions and required clearances, and installation instructions. Include list indicating valve and its application.
- B. Maintenance data for valves to include in the operation and maintenance manuals. Include detailed manufacturer's instructions on adjusting, servicing, disassembling, and repairing.

1.4 QUALITY CONTROL

- A. Install devices in accordance with manufacturer's recommendations.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain valves from single source which assumes responsibility for compatibility with HVAC systems.
- B. ASME Compliance: ASME B31.1 for power piping valves and ASME B31.9 for building services piping valves.
- C. ASME Compliance for Ferrous Valves: ASME B16.10 and ASME B16.34 for dimension and design criteria.
- D. MSS Compliance: Comply with the various MSS Standard Practice documents referenced.
- E. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 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 ball and plug valves open to minimize exposure of functional surfaces.
 - 4. Set butterfly valves closed or slightly open.
 - 5. 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

2.1 VALVES, GENERAL

- A. Refer to Part 3 "Valve Applications" Article for applications of valves.
- B. Bronze Valves: DN 50 and smaller with threaded ends, unless otherwise indicated.

- C. Ferrous Valves: DN 65 and larger with flanged ends, unless otherwise indicated.
- D. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- E. Valve Sizes: Same as upstream pipe, unless otherwise indicated.
- F. Valve Actuators:
 - 1. Gear Drive: For quarter-turn valves DN 200 and larger.
 - 2. Handwheel: For valves other than quarter-turn types.
 - 3. Lever Handle: For quarter-turn valves DN 150 and smaller, except plug valves.
- G. Extended Valve Stems: On insulated valves.
- H. Valve Flanges: ASME B16.1 for cast-iron valves, ASME B16.5 for steel valves, and ASME B16.24 for bronze valves.
- I. Threaded: With threads according to ASME B1.20.1.
- J. Valve Bypass and Drain Connections: MSS SP-45.

2.2 COPPER-ALLOY BALL VALVES

- A. Copper-Alloy Ball Valves, General: MSS SP-110.
- B. Two-Piece, Copper-Alloy Ball Valves: Bronze body with regular-port, chrome-plated bronze ball; PTFE or TFE seats; and 4140-kPa minimum CWP rating and blowout-proof stem.

2.3 FERROUS-ALLOY BALL VALVES

- A. Ferrous-Alloy Ball Valves, General: MSS SP-72, with flanged ends.
- B. Ferrous-Alloy Ball Valves: Class 150, full port.

2.4 FERROUS-ALLOY BUTTERFLY VALVES

- A. Ferrous-Alloy Butterfly Valves, General: MSS SP-67, Type I, for tight shutoff, with disc and lining suitable for potable water, unless otherwise indicated.
- B. Flangeless, 1035-kPa CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer type with two-piece stem.

2.5 BRONZE CHECK VALVES

- A. Bronze Check Valves, General: MSS SP-80.
- B. Type 4, Class 125, Bronze, Swing Check Valves: Bronze body with nonmetallic disc and bronze seat.

2.6 FERROUS-ALLOY WAFER CHECK VALVES

- A. Ferrous-Alloy Wafer Check Valves, General: API 594, spring loaded.
- B. Dual-Plate, Class 125 or 150, Ferrous-Alloy, Wafer Check Valves: Flangeless body.

2.7 SPRING-LOADED, LIFT-DISC CHECK VALVES

- A. Lift-Disc Check Valves, General: FCI 74-1, with spring-loaded bronze or alloy disc and bronze or alloy seat.
- B. Type I, Class 125, Wafer Lift-Disc Check Valves: Wafer style with cast-iron shell with diameter matching companion flanges.
- C. Type IV, Class 125, Threaded Lift-Disc Check Valves: Threaded style with bronze shell and threaded ends.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. 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.
- C. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- D. Examine threads on valve and mating pipe for form and cleanliness.

- E. 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.
- F. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE APPLICATIONS

- A. Refer to piping Sections for specific valve applications. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball, butterfly, or plug valves.
 - 2. Throttling Service: Ball, butterfly, plug, or valves.
 - 3. Pump Discharge: Spring-loaded, lift-disc check valves.
- B. If valves with specified CWP ratings are not available, the same types of valves with higher CWP ratings may be substituted.
- C. Chilled-Water Piping: Use the following types of valves:
 - 1. Ball Valves, DN 50 and Smaller: Two-piece, 2760-kPa CWP rating, copper alloy.
 - 2. Ball Valves, DN 65 and Larger: Class 150, ferrous alloy.
 - 3. Butterfly Valves, DN 65 and Larger: Flangeless, 1035-kPa CWP rating, ferrous alloy, with EPDM liner.
 - 4. Swing Check Valves, DN 50 and Smaller: Type 4, Class 125, bronze.
 - 5. Swing Check Valves, DN 65 and Larger: Type II, Class 125, gray iron.
 - 6. Wafer Check Valves, DN 65 and Larger: Dual-plate, wafer, Class 125 or 150 ferrous alloy.
 - 7. Spring-Loaded, Lift-Disc Check Valves, DN 50 and Smaller: Type IV, Class 125 minimum.
 - 8. Spring-Loaded, Lift-Disc Check Valves, DN 65 and Larger: Type I, Class 125, cast iron.
- D. Select valves, except wafer and flangeless types, with the following end connections:
 - 1. For Copper Tubing, DN 50 and Smaller: Solder-joint or threaded ends, except provide valves with threaded ends for condenser water and heating hot water services.
 - 2. For Copper Tubing, DN 65 to DN 100: Flanged ends.
 - 3. For Copper Tubing, DN 125 and Larger: Flanged ends.
 - 4. For Steel Piping, DN 50 and Smaller: Threaded ends.
 - 5. For Steel Piping, DN 65 to DN 100: Flanged ends.
 - 6. For Steel Piping, DN 125 and Larger: Flanged ends.

3.3 VALVE INSTALLATION

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

- B. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- C. Locate valves for easy access and provide separate support where necessary.
- D. Install valves in horizontal piping with stem at or above center of pipe.
- E. Install valves in position to allow full stem movement.
- F. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Dual-Plate Check Valves: In horizontal or vertical position, between flanges.
 - 3. Lift Check Valves: With stem upright and plumb.

3.4 JOINT CONSTRUCTION

- A. Refer to Division 23 Section "Common Work Results for Fire Suppression, Plumbing and HVAC" for basic piping joint construction.
- B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 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.

END OF SECTION 230523