

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Gate valves.
2. Globe valves.
3. Ball valves.
4. Plug valves.
5. Butterfly valves.
6. Check valves.

B. Related Sections:

1. Section 23 05 03 - Pipes and Tubes for HVAC Piping and Equipment: Product and installation requirements for piping materials applying to various system types.
2. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment: Product and installation requirements for pipe hangers and supports.
3. Section 23 07 00 - HVAC Insulation: Product and installation requirements for insulation for valves.
4. Section 23 21 16 - Hydronic Piping Specialties: Product and installation requirements for piping specialties used in hydronic piping systems.
5. Section 23 22 16 - Steam and Condensate Piping Specialties: Product and installation requirements for piping specialties used in steam and steam condensate, piping systems.
6. Section 23 23 00 - Refrigerant Piping: Product and installation requirements for valves and piping specialties used in refrigeration systems.

1.02 REFERENCES

A. ASTM International:

1. ASTM A216/A216M - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service.

B. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP 68 - High Performance Butterfly Valves.
2. MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.

- 3. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
 - 4. MSS SP 78 - Cast Iron Plug Valves, Flanged and Threaded Ends.
 - 5. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
 - 6. MSS SP 85 - Cast Iron Globe & Angle Valves, Flanged and Threaded.
 - 7. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
- C. Underwriters Laboratories Inc.:
- 1. UL 842 - Valves for Flammable Fluids.
- D. Code Compliance:
- 1. Furnish materials in accordance with IBC-NJ.

1.03 SUBMITTALS

- A. Division 01 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturers catalog information with valve data and ratings for each service.
- C. Manufacturer's Installation Instructions: Submit hanging and support methods, joining procedures.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

- A. Division 01 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of valves.
- C. Operation and Maintenance Data: Submit installation instructions, spare parts lists, exploded assembly views.
- D. Valve charts and tags.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with IBC-NJ.
- B. All valves shall have a rating exceeding system operating pressure at system temperature and not less than a minimum working pressure of 125 psig or 150 psig.

1.06 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Division 01 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- C. Provide temporary protective coating on cast iron and steel valves.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Division 01 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install valves underground when bedding is wet or frozen.

1.09 EXTRA MATERIALS

- A. Division 01 - Execution and Closeout Requirements: Requirements for extra materials.
- B. Furnish two packing kits for each size valve.

PART 2 - PRODUCTS

2.01 GATE VALVES

- A. Manufacturers: Subject to requirements of the specification, provide the following manufacturer's products by one of the following or approved equal:
 - 1. Crane Valve, North America.
 - 2. Milwaukee Valve Company.
 - 3. NIBCO, Inc.
 - 4. Stockham Valves & Fittings.
 - 5. Substitutions: Division 01 - Product Requirements.

- B. 2 inches (50 mm) and Smaller: MSS SP 80, Class 125, bronze body, bronze trim, threaded bonnet, non-rising stem, hand-wheel, inside screw with back-seating stem, solid wedge disc, alloy seat rings, threaded ends.
- C. 2-1/2 inches (65 mm) and Larger: MSS SP 70, Class 125, cast iron body, bronze trim, bolted bonnet, rising stem, hand-wheel, outside screw and yoke, solid wedge disc with bronze seat rings, flanged ends. Furnish chain-wheel operators for valves 6 inches (150 mm) and larger mounted over 8 feet (2400 mm) above floor.
- D. 2 inches (50 mm) and Smaller: MSS SP 80, Class 200, bronze body, bronze trim, union bonnet, rising stem, hand-wheel, solid wedge disc, stainless steel rings, threaded ends.
- E. 2-1/2 inches (65 mm) and Larger: MSS SP 70, Class 200, cast iron body, bronze trim, bolted bonnet, rising stem, hand-wheel, outside screw and yoke, solid wedge disc, flanged ends. Furnish chain-wheel operators for valves 6 inches (150 mm) and larger mounted over 8 feet (2400 mm) above floor.

2.02 GLOBE VALVES

- A. Manufacturers: Subject to requirements of the specification, provide the following manufacturer's products by one of the following or approved equal:
 - 1. Crane Valve, North America.
 - 2. Milwaukee Valve Company.
 - 3. NIBCO, Inc.
 - 4. Stockham Valves & Fittings.
 - 5. Substitutions: Division 01 - Product Requirements.
- B. 2 inches (50 mm) and Smaller: MSS SP 80, Class 125, bronze body, bronze trim, threaded bonnet, hand wheel, teflon composition disc, threaded ends.
- C. 2-1/2 inches (65 mm) and Larger: MSS SP 85, Class 125, cast iron body, bronze trim, hand wheel, outside screw and yoke, flanged ends. Furnish chain-wheel operators for valves 6 inches (150 mm) and larger mounted over 8 feet (2400 mm) above floor.
- D. 2 inches (50 mm) and Smaller: MSS SP 80, Class 200, bronze body, bronze trim, union bonnet, rising stem, hand wheel, renewable stainless steel seat ring and disc, threaded ends.
- E. 2-1/2 inches (65 mm) and Larger: MSS SP 85, Class 150 ASTM A216/A216M, cast carbon steel body, bronze trim, bolted bonnet, rising stem hand wheel, outside screw and yoke, flanged ends. Furnish chain-wheel operators for valves 6 inches (150 mm) and larger mounted over 8 feet (2400 mm) above floor.

2.03 BALL VALVES

- A. Manufacturers: Subject to requirements of the specification, provide the following manufacturer's products by one of the following or approved equal:

1. Crane Valve, North America.
 2. Milwaukee Valve Company.
 3. NIBCO, Inc.
 4. Stockham Valves & Fittings.
 5. Substitutions: Division 01 - Product Requirements.
- B. 2 inches (50 mm) and Smaller: MSS SP 110, 400 psi (2760 kPa) WOG, one piece bronze body, chrome plated brass ball, full port, teflon seats, blow-out proof stem, solder or threaded ends, vinyl clad lever handle with balancing stops. Valves 1 inch and smaller size shall be full open port type.
- C. 1-1/4 inch (32 mm) to 3 inch (76 mm) for fuel oil: MSS SP 110, Class 125, two piece, threaded ends, bronze body, chrome plated bronze ball, reinforced teflon seats, blow-out proof stem, vinyl clad lever handle, UL 842 listed for flammable liquids and LPG, conventional port.

2.04 PLUG VALVES

- A. Manufacturers: Subject to requirements of the specification, provide the following manufacturer's products by one of the following or approved equal:
1. DeZURIK, Unit of SPX Corp.
 2. Flow Control Equipment, Inc.
 3. Homestead Valve.
 4. Substitutions: Division 01 - Product Requirements.
- B. 2 inches (50 mm) and Smaller: MSS SP 78, Class 150, semi-steel construction, rectangular port, full pipe area, pressure lubricated, teflon packing, threaded ends. Furnish one plug valve wrench for every ten plug-valves with minimum of one wrench.
- C. 2-1/2 inches (65 mm) and Larger: MSS SP 78, Class 150, semi-steel construction, rectangular port, full pipe area, pressure lubricated, teflon packing, flanged ends. Furnish worm gear-operated.

2.05 BUTTERFLY VALVES

- A. Manufacturers: Subject to requirements of the specification, provide the following manufacturer's products by one of the following or approved equal:
1. Crane Valve, North America.
 2. Fisher.
 3. Jamesbury.
 4. Substitutions: Division 01 - Product Requirements.

- B. 2-1/2 inches (65 mm) and Larger: MSS SP 68, Class 150.
 - 1. Body: Carbon steel ASTM A105, lug ends, stainless steel stem, extended neck.
 - 2. Disc: 316L stainless steel.
 - 3. Seat: Resilient replaceable PTFE.
 - 4. Handle and Operator: Infinite position lever handle with memory stop for 2-1/2" to 6". Furnish gear operators for valves 8 inches (200 mm) and larger, and chain-wheel operators for valves mounted over 8 feet (2400 mm) above floor.
- C. Valves shall be high performance bubble-tight, dead-end service and bi-directional type.

2.06 CHECK VALVES

- A. General Requirements:
 - 1. Manufacturers: Subject to requirements of the specification, provide the following manufacturer's products by one of the following or approved equal:
 - a. Crane Valve, North America.
 - b. Milwaukee
 - c. Jamesbury.
 - d. Stockham Valves & Fittings.
 - 2. Substitutions: Division 01 - Product Requirements.
- B. Horizontal Swing Check Valve:
 - 1. 2 inches (50 mm) and Smaller: MSS SP 80, Class 150, bronze body and cap, bronze seat, Buna-N disc, solder or threaded ends.
 - 2. 2-1/2 inches (65 mm) and Larger: MSS SP 71, Class 125, cast iron body, bolted cap, bronze or cast iron disc, renewable disc seal and seat, flanged ends.
 - 3. 2 inches (50 mm) and Smaller: MSS SP 80, Class 200, bronze body and cap, Y-pattern, bronze regrinding disc, solder or threaded ends.
 - 4. 2-1/2 inches (65 mm) and Larger: MSS SP 71, Class 250, cast iron body, bolted cap, bronze or cast iron disc, flanged ends.
 - 5. Provide valves capable of being refitted while the valve remains in the line.
- C. Wafer Check Valves :
 - 1. Class 250, cast-iron body; with replaceable bronze seat, and non-slam design lapped and balanced twin bronze flappers and stainless steel trim and torsion spring.

2. Provide valves designed to open and close at approximately one foot differential pressure.
- D. Lift Check Valves, 2 inches and Smaller:
1. Class 125; cast-bronze body and cap conforming to ASTM B 62; horizontal or angle pattern, lift-type valve, with stainless steel spring, bronze disc holder with renewable "Teflon" disc, and threaded ends.
 2. Provide valves capable of being refitted and ground while the valve remains in the line.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Division 01 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify piping system is ready for valve installation.
- C. Examine valve interior through the end ports for cleanliness, freedom from foreign matter and corrosion. Remove special packing materials, such as blocks used to prevent disc movement during shipping and handling.
- D. Actuate valve through an open-close and close-open cycle. Examine functionally significant features such as guides and seats made accessible by such actuation. Following examination, return the valve closure member to the shipping position.
- E. Examine threads on both valve and the mating pipe for form (i.e., out-of-round or local indentation) and cleanliness.
- F. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length and material. Check gasket material for proper size, material composition suitable for service and freedom from defects and damage.
- G. Prior to valve installation, examine the piping for cleanliness, freedom from foreign materials and proper alignment.
- H. Replace defective valves with new valves.
- I. All steam pipe joints and fittings shall be inspected for welding defects by an approved Testing and Inspection Agency retained by the Contractor, per IBC-NJ.
- J. Any weld deemed defective, in the opinion of the certified welding inspection and testing agency, shall be ground out for the full depth and re-welded to the testing agency's satisfaction, at no cost to the Owner.

3.02 INSTALLATION

- A. Install valves with stems upright or horizontal, not inverted.

- B. Install brass male adapters at both ends of the valves in copper piping system.
- C. Install 3/4 inch (20 mm) ball valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.
- D. Install valves with clearance for installation of insulation and allowing access.
- E. Provide access where valves and fittings are not accessible. Coordinate size and location of access doors with Division 08.
- F. Valves shall be installed so they shall be readily accessible. For operation of valves not accessible for direct operation, furnish and install chain wheel, guide and sufficient length of chain to operate from floor level. Provide hooks for fastening chains out of the way. No valve shall be installed with the handle pointing downward. If, in the opinion of the Engineer, valves have been installed so as to create a hazardous and unsafe condition, Contractor shall make corrections as directed, without additional charge.
- G. Valves in Mechanical or Fan Rooms more than 8'-0" above the floor shall be chain operated, with either double end chain wrenches or chain wheels.
- H. Valves 8" and larger shall be provided with a 1" bypass valve of same pressure rating.
- I. Systems shall be supplied with valves in all branch mains, risers, drains, at all pumps, equipment, cooling coils, at all automatic valves and at all apparatus using steam or chilled water so located and arranged to give complete isolation and regulating control of the water.
- J. The entire system shall be supplied with valves so located, arranged and operated as to give a complete regulating control to all fixtures and apparatus. Shut-off valves shall be provided on all risers, branch lines, branch lines from mains, mains and at each piece of equipment or fixture. Every section of branch supply and return piping and all risers of all services shall be controlled by a valve at the main. Every item of equipment shall be independently isolated by means of valves.
- K. Valves, except as noted, shall be properly supported, independent of the piping.
- L. Valves in copper tubing shall have soldered or brazed ends.
- M. Valves, where exposed and used in connection with finished piping, shall be same finish as the pipe.
- N. Valve manufacturer's representative shall instruct building operating personnel in proper maintenance of plug valves. Furnish equipment and lubricant for one (1) year service.
- O. Furnish and connect to all valves, brass tags, polished or lacquered with stamp lettering or numbers filled in with black paint. Also furnish a schedule of all valve tags, framed in a polished hardwood frame and covered with plate glass.

3.03 VALVE APPLICATIONS

- A. Valves 2-1/2" size and smaller used for water shutoff shall be ball valve type.
- B. Valves 3" size and larger used for hot or cold water shutoff shall be high performance butterfly valve.
- C. Valves 2-1/2" size and smaller used for hydronic bypass or for flow control shall be ball valve type. All by pass or flow control valves in steam piping shall be of the globe type.
- D. Valves 3" size and larger used for controlling water flow at pumps and at equipment, and for bypass control shall be lubricated plug type.
- E. Check valves used for water piping, 2" and smaller, shall be all bronze swing check valves with finished bronze trimmings and brazed or threaded ends.
- F. Check valves used for water piping, 2-1/2" and larger, shall be cast iron body, bronze trimmings, swing check valves with flanged ends.
- G. Check valves at discharge of water pumps shall be horizontal or vertical "silent" swing type, 200 psig design.
- H. Gate valves shall be of the solid wedge type and shall be provided with gland and packing boxes, and have top seat for packing under pressure when wide open.
- I. Valves for steam shut-off shall be gate type. Valves for steam throttling, control shall be globe type.

END OF SECTION