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SECTION 15110 - VALVES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1. Copper-alloy ball valves.
2. Ferrous-alloy butterfly valves.
3. Bronze check valves.
4. Gray-iron swing check valves.
5. Spring-loaded, lift-disc check valves.
6. Bronze globe valves.

B. Related Sections include the following:

1. Division 15 Section "Basic Materials and Methods" for valve tags.
2. Division 15 Section "HVAC Instrumentation and Controls" for control valves and actuators.
3. Division 15 piping Sections for specialty valves applicable to those Sections only.

1.3 DEFINITIONS

A. The following are standard abbreviations for valves:

1. CWP: Cold working pressure.
2. EPDM: Ethylene-propylene-diene terpolymer rubber.
3. NBR: Acrylonitrile-butadiene rubber.
4. PTFE: Polytetrafluoroethylene plastic.
5. SWP: Steam working pressure.
6. TFE: Tetrafluoroethylene plastic.

1.4 SUBMITTALS

A. Product Data: For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

1.5 QUALITY ASSURANCE

A. ASME Compliance: ASME B31.9 for building services piping valves.

1. Exceptions: Domestic hot- and cold-water piping valves unless referenced.

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- B. ASME Compliance for Ferrous Valves: ASME B16.10 and ASME B16.34 for dimension and design criteria.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - a. Conbraco Industries, Inc.; Apollo Div.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Crane Co.; Crane Valve Group; Jenkins Valves.
 - d. Crane Co.; Crane Valve Group; Stockham Div.
 - e. Hammond Valve.
 - f. Honeywell Braukmann.
 - g. Jamesbury, Inc.
 - h. Milwaukee Valve Company.
 - i. NIBCO INC.
 - j. Red-White Valve Corp.
 - k. Richards Industries; Marwin Ball Valves.
 - l. Watts Industries, Inc.; Water Products Div.

2.2 VALVES, GENERAL

- A. Refer to Part 3 "Valve Applications" Article for applications of valves.
- B. Bronze Valves: NPS 2 and smaller with threaded ends, unless otherwise indicated.
- C. Ferrous Valves: NPS 2-1/2 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. Lever Handle: For quarter-turn valves NPS 6 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.

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I. Valve Grooved Ends: AWWA C606.

1. Solder Joint: With sockets according to ASME B16.18.

a. Caution: Use solder with melting point below 840 deg F for angle, check, gate, and globe valves; below 421 deg F for ball valves.

2. Threaded: With threads according to ASME B1.20.1.

J. Valve Bypass and Drain Connections: MSS SP-45.

2.3 COPPER-ALLOY BALL VALVES

A. Copper-Alloy Ball Valves, General: MSS SP-110.

B. Two-Piece, Copper-Alloy Ball Valves: Forged brass body with full -port, chrome-plated bronze ball; PTFE seats; and 400-psig minimum CWP rating and blowout-proof stem.

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, 150-psig CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer or lug type with two-piece stainless stem, 10-position throttling lever handle, memory plate, and EPDM seat.

2.5 BRONZE CHECK VALVES

A. Bronze Check Valves, General: MSS SP-80.

B. Type 1, Class 125, Bronze, Swing Check Valves: Bronze body with bronze disc and seat

C. Type 1, Class 125, Bronze, Horizontal Lift Check Valves: Bronze body with bronze disc and seat.

D. Type 1, Class 125, Bronze, Vertical Lift Check Valves: Bronze body with bronze disc and seat.

2.6 GRAY-IRON SWING CHECK VALVES

A. Gray-Iron Swing Check Valves, General: MSS SP-71.

B. Type I, Class 125, gray-iron, swing check valves with metal seats.

2.7 BRONZE GLOBE VALVES

A. Bronze Globe Valves, General: MSS SP-80, with ferrous-alloy handwheel.

B. Type 1, Class 125, Bronze Globe Valves: Bronze body with bronze disc and union-ring bonnet.

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2.8 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 1, Class 125, Wafer Lift-Disc Check Valves: Wafer style with cast iron shell with diameter matching companion flanges.

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 or butterfly valves.
 - 2. Throttling Service: Ball, butterfly, or globe valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Domestic Water Piping: Use the following types of valves:
 - 1. Ball Valves, NPS 2 and Smaller: Two -piece, 400-psig CWP rating, copper alloy.
 - 2. Swing Check Valves, NPS 2 and Smaller: Type 4, Class 125, bronze.
 - 3. Spring-Loaded, Lift-Disc Check Valves, NPS 2 and Smaller: Type IV, Class 125 minimum.
- D. Heating Water Piping: Use the following types of valves:
 - 1. Ball Valves, NPS 2 and Smaller: Two -piece, 400-psig CWP rating, copper alloy.
 - 2. Lift Check Valves, NPS 2 and Smaller: Type 2, Class 125, horizontal or vertical, bronze.
 - 3. Swing Check Valves, NPS 2 and Smaller: Type 4, Class 125, bronze.
 - 4. Spring-Loaded, Lift-Disc Check Valves, NPS 2 and Smaller: Type IV, Class 125 minimum.
 - 5. Globe Valves, NPS 2 and Smaller: Type 2, Class 125, bronze.

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- E. Select valves, except wafer and flangeless types, with the following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Solder-joint or threaded ends.
 - 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged or threaded ends.
 - 3. For Steel Piping, NPS 2 and Smaller: Threaded ends.
 - 4. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged or threaded ends.
 - 5. For Grooved-End, Steel Piping: Valve ends may be grooved.

3.3 VALVE INSTALLATION

- A. Piping installation requirements are specified in other Division 15 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, if possible.
- 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 15 Section "Basic Mechanical Materials and Methods" for basic piping joint construction.
- B. Grooved Joints: Assemble joints with keyed coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.
- C. 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 15110