PART 1 - GENERAL

1.1 SUMMARY

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

1. Copper-alloy ball valves.
2. Ferrous-alloy butterfly valves.
4. Iron swing check valves.
5. Spring-loaded, lift-disc check valves.
7. Cast-iron gate valves.

B. See Division 21 fire-suppression piping and fire pump Sections for fire-protection valves.

C. See Section 230923 “Instrumentation and Controls for HVAC” for control valves and actuators.

D. See Section 230553 “Identification for HVAC piping and equipment” for valve tags and schedules.

1.2 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; furnished specialties; and accessories.

1.3 QUALITY ASSURANCE

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

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.

D. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
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. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 VALVES, GENERAL

A. Refer to Part 3 “Valve Applications” Article for applications of valves.

B. Brass or Bronze Valves: NPS 6 and Smaller: Threaded or soldered ends, unless otherwise indicated.

C. Ferrous Valves, NPS 2-1/2 and Larger: 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. Handwheel: Non-heating style of cast, malleable iron or aluminum for gear-operated, quarter-turn valves and all valves other than quarter-turn types, located not more than 8 feet above walkways.

2. Chainwheel Actuators: For gear-operated, quarter-turn valves and all valves other than quarter-turn types, located more than 8 feet above walkways. Adjust chain length to maintain 7 feet clearance above walkway.

3. Lever Handle: For quarter-turn valves NPS 6 and smaller, except plug valves. Provide infinite-position handle with open-position memory stop in balancing applications, and where indicated on Drawings.

4. Gear Operators: For quarter-turn valves larger than NPS 6, except plug valves.

G. 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.


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

1. Caution: Use solder with melting point below 840 deg F for angle, check and gate valves; below 421 deg F for ball valves.
2.3 COPPER-ALLOY BALL VALVES

A. Manufacturers:

1. Two-Piece, Copper-Alloy Ball Valves:
   a. Honeywell Braukmann.
   b. Milwaukee Valve Company.

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

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

2.4 FERROUS-ALLOY BUTTERFLY VALVES

A. Manufacturers:

1. Single-Flange, Ferrous-Alloy Butterfly Valves:
   a. Bray Controls; a division of Bray International
   b. Milwaukee Valve Company.
   c. Mueller Steam Specialty.

2. Description:
   a. Standard: MSS SP-67, Type I.
   b. SWP Rating: minimum of 150 psig.
   c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
   d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
   e. Seat: EPDM.
   f. Stem: One- or two-piece stainless steel.
   g. Disc: Aluminum-bronze bronze.
   h. Shaft: one or two pieces with type 316 or 416 stainless steel

2.5 BRONZE SWING CHECK VALVES

A. Manufacturers:

1. Bronze, Swing Check Valves with Nonmetallic Disc:
   a. Grinnell Corporation.
2. Description:

a. Standard: MSS SP-80, Type 4.
b. SWP Rating: 150 psig.
c. Body Design: Horizontal flow.
e. Ends: Threaded.
f. Disc: PTFE or TFE.

2.6 IRON SWING CHECK VALVES

A. Manufacturers:

1. Iron Swing Check Valves with Metal Seats:

a. Grinnell Corporation.
b. Milwaukee Valve Company.
c. Mueller Co.

2. Description:

a. Standard: MSS SP-71, Type I.
b. SWP Rating: 125 psig.
c. Body Design: Clear or full waterway.
d. Body Material: ASTM A 126, iron with bolted bonnet.
e. Ends: Flanged.
f. Trim: Bronze.
g. Gasket: Asbestos free.

2.7 SPRING-LOADED, LIFT-DISC CHECK VALVES

A. Manufacturers:

1. Lift-Disc Check Valves:

a. Milwaukee Valve Company.
b. Mueller Steam Specialty.

2. Description:

b. SWP Rating: 125 psig.
c. Body Material: Bronze.
d. Ends: Threaded or solder joint.
e. Disc Holder: Bronze.
2.8 BRONZE GATE VALVES

A. Manufacturers:

1. Bronze, Rising-Stem, Solid-Wedge Gate Valves:
   a. Grinnell Corporation.
   b. Milwaukee Valve Company.

2. Description:
   a. Standard: MSS SP-80, Type 1.
   b. SWP Rating: 150 psig.
   d. Ends: Threaded or solder joint.
   e. Stem: Bronze.
   f. Disc: Solid wedge; bronze.
   g. Packing: Asbestos free.
   h. Handwheel: Malleable iron or bronze.

2.9 CAST IRON GATE VALVES

A. Manufacturers:

1. Type I, Cast-Iron, Nonrising-Stem or Rising-Stem Gate Valves:
   a. Grinnell Corporation.
   b. Milwaukee Valve Company.

2. Description:
   a. Standard: MSS SP-70, Type I.
   b. SWP Rating: 150 psig.
   c. Body Material: ASTM A 126, gray iron with bolted bonnet.
   d. Ends: Flanged.
   e. Trim: Bronze.
   f. Disc: Solid wedge.
   g. Packing and Gasket: Asbestos free.

2.10 BRONZE GLOBE VALVES

A. Bronze Globe Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Description:

   a. Standard: MSS SP-80, Type 2.
   b. SWP Rating: 150 psig.
   d. Ends: Threaded or solder joint.
   e. Stem: Bronze.
   f. Disc: PTFE or TFE.
   g. Packing: Asbestos free.
   h. Handwheel: Malleable iron or bronze.

2.11 IRON GLOBE VALVES

   A. Iron Globe Valves:
      1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
         a. Grinnell Corporation.
         b. Milwaukee Valve Company.

      2. Description:
         a. Standard: MSS SP-85, Type I.
         b. SWP 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.

PART 3 - EXECUTION

3.1 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.
      2. Throttling Service: Ball or butterfly.
      3. Pump Discharge: Triple-duty valve

   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. Chilled-Water Piping: Use the following types of valves:
1. Ball Valves, NPS 3 and Smaller: Two-piece, 600-psig CWP rating, copper alloy.
3. Swing Check Valves, NPS 2 and Smaller: Type 4, Class 125, bronze. (Horizontal piping only)
4. Swing Check Valves, NPS 2-1/2 and Larger: Type I, Class 125, gray iron. (Horizontal piping only)
5. Spring-Loaded, Lift-Disc Check Valves, NPS 2 and Smaller: Type IV, Class 125 minimum.
6. Spring-Loaded, Lift-Disc Check Valves, NPS 2-1/2 and Larger: Type III, Class 125, cast iron.

D. Condenser Water Piping: Use the following types of valves:

1. Ball Valves, NPS 3 and Smaller: Two-piece, 600-psig CWP rating, copper alloy.
3. Swing Check Valves, NPS 2 and Smaller: Type 4, Class 125, bronze. (Horizontal piping only)
4. Swing Check Valves, NPS 2-1/2 and Larger: Type I, Class 125, gray iron. (Horizontal piping only)
5. Spring-Loaded, Lift-Disc Check Valves, NPS 2 and Smaller: Type IV, Class 125 minimum.
6. Spring-Loaded, Lift-Disc Check Valves, NPS 2-1/2 and Larger: Type III, Class 125, cast iron.

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 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 or threaded ends.
6. For Steel Piping, NPS 5 and Larger: Flanged ends.

3.2 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. [Exception: Unions and flanges may be omitted on valves installed with pre-approved grooved-mechanical-joint couplings, ie. pipe connections to chillers]

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 quarter-turn valves so handle in open position is downstream of valve.

F. Install valves in position to allow full stem movement.
G. Install check valves for proper direction of flow and as follows:
   1. Swing Check Valves: In horizontal position with hinge pin level.
   2. Lift Check Valves: With stem upright and plumb.

3.3 JOINT CONSTRUCTION

   A. Refer to Division 23 Section "Common Work Results for 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.

   C. Grooved Joints (pre-approved): Assemble joints with keyed coupling housing, gasket lubricant, and bolts, according to coupling and fitting manufacturer’s written instructions.

3.4 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