SECTION 230523.12 - BALL VALVES FOR HVAC PIPING

Revise this Section by deleting and inserting text to meet Project-specific requirements.

1. GENERAL
   * + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
      1. SUMMARY
         1. Section Includes:

Brass ball valves.

Bronze ball valves.

Steel ball valves.

Iron ball valves.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

* + - * 1. CWP: Cold working pressure.
        2. SWP: Steam working pressure.
      1. SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions
         2. Manufacturer’s installation instructions shall be provided along with product data.
         3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
         4. Product Data: For each type of valve.
      2. DELIVERY, STORAGE, AND HANDLING

Information in this article is paraphrased from MSS publications.

* + - * 1. Prepare valves for shipping as follows:

Protect internal parts against rust and corrosion.

Protect threads, flange faces, and weld ends.

Set ball valves open to minimize exposure of functional surfaces.

* + - * 1. Use the following precautions during storage:

Maintain valve end protection.

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.

* + - * 1. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and Masterworks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications. For definitions of terms and requirements for Contractor's product selection, see Section 016000 "Product Requirements."

* + - 1. GENERAL REQUIREMENTS FOR VALVES
         1. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
         2. ASME Compliance:

ASME B1.20.1 for threads for threaded-end valves.

ASME B16.1 for flanges on iron valves.

ASME B16.5 for flanges on steel valves.

ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.

Valve solder-joint end connections are not recommended for valves in HVAC piping. Soldering and brazing methods used to achieve required pressure-temperature ratings may damage internal valve parts. Special installation requirements for soldered valves may make threaded valves more cost-effective.

Caution: Use solder with melting point below 421 deg F (216 deg C).

ASME B16.18 for solder-joint connections.

ASME B31.1 for power piping valves.

ASME B31.9 for building services piping valves.

* + - * 1. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

HVAC ball valve applications specified in this Section are limited to NPS 10 (DN 250).

* + - * 1. Refer to HVAC valve schedule articles for applications of valves.

Caution: Revise pressure ratings and insert temperature ratings in valve articles if valves with higher ratings are required. Valves larger than NPS 12 (DN 300) typically have a lower pressure rating than smaller valves. Verify pressure requirements for large valves.

* + - * 1. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
        2. Valve Sizes: Same as upstream piping unless otherwise indicated.
        3. Valve Actuator Types:

Gear Actuator: For quarter-turn valves [**NPS 4**] <**Insert size**> and larger.

Handlever: For quarter-turn valves smaller than [**NPS 4**] <**Insert size**>.

* + - * 1. Valves in Insulated Piping:

Include 2-inch stem extensions.

Extended operating handle of nonthermal-conductive material, and protective sleeves that allow operation of valves without breaking the vapor seals or disturbing insulation.

Memory stops that are fully adjustable after insulation is applied.

* + - * 1. Valve Bypass and Drain Connections: MSS SP-45.
      1. BRONZE BALL VALVES

Retain one or more of nine "Bronze Ball Valves" paragraphs in this article if bronze ball valves are required. MSS SP-110 covers both brass and bronze, copper-alloy ball valves from NPS 1/4 to NPS 4 (DN 8 to DN 100). See the Evaluations and manufacturers' catalogs before selecting either brass or bronze ball valves or including both.

Caution: Two-piece ball valves with a full or regular port are recommended for most services. One-piece ball valves have a reduced port and one fewer leak path. Three-piece ball valves are recommended if disassembly without removing valve from piping is required.

Where pressure drop is a concern, use full-port ball valves. For corrosive or high-temperature applications, use stainless-steel-trim ball valves.

* + - * 1. Bronze Ball Valves, Two-Piece with Full Port and Bronze, Threaded Ends:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=9693) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Apollo Flow Controls; Conbraco Industries, Inc](http://www.specagent.com/Lookup?uid=123457115109).

[NIBCO INC](http://www.specagent.com/Lookup?uid=123457115115).

[WATTS](http://www.specagent.com/Lookup?uid=123457115117).

Approved equivalent

Description:

Standard: MSS SP-110.

SWP Rating: 150 psig.

CWP Rating: 600 psig.

Body Design: Two piece.

Body Material: Bronze.

Ends: Threaded.

Seats: PTFE.

Stem: Bronze.

Ball: Chrome-plated brass.

Port: Full.

* + - * 1. Bronze Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=9694) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Apollo Flow Controls; Conbraco Industries, Inc](http://www.specagent.com/Lookup?uid=123457115119).

[NIBCO INC](http://www.specagent.com/Lookup?uid=123457115124).

[WATTS](http://www.specagent.com/Lookup?uid=123457115125).

Approved equivalent.

Description:

Standard: MSS SP-110.

SWP Rating: 150 psig.

CWP Rating: 600 psig.

Body Design: Two piece.

Body Material: Bronze.

Ends: Threaded.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Full.

* + - * 1. Bronze Ball Valves, Three-Piece with Full Port and Bronze Trim:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=9697) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Apollo Flow Controls; Conbraco Industries, Inc](http://www.specagent.com/Lookup?uid=123457115145).

[NIBCO INC](http://www.specagent.com/Lookup?uid=123457115149).

[WATTS](http://www.specagent.com/Lookup?uid=123457115151).

Approved equivalent.

Description:

Standard: MSS SP-110.

SWP Rating: 150 psig.

CWP Rating: 600 psig.

Body Design: Three piece.

Body Material: Bronze.

Ends: Threaded.

Seats: PTFE.

Stem: Bronze.

Ball: Chrome-plated brass.

Port: Full.

* + - * 1. Bronze Ball Valves, Three-Piece with Full Port Stainless-Steel Trim:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=9698) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Apollo Flow Controls; Conbraco Industries, Inc](http://www.specagent.com/Lookup?uid=123457115153).

[NIBCO INC](http://www.specagent.com/Lookup?uid=123457115156).

[WATTS](http://www.specagent.com/Lookup?uid=123457115157).

Approved equivalent.

Description:

Standard: MSS SP-110.

SWP Rating: 150 psig.

CWP Rating: 600 psig.

Body Design: Three piece.

Body Material: Bronze.

Ends: Threaded.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Full.

* + - 1. STEEL BALL VALVES

Retain this article if steel ball valves are required. MSS SP-72 covers steel ball valves from NPS 1/2 to NPS 36 (DN 15 to DN 900).

* + - * 1. Steel Ball Valves with Full Port and Stainless-Steel Trim, Class 150:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=9700) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Apollo Flow Controls; Conbraco Industries, Inc](http://www.specagent.com/Lookup?uid=123457115163).

[Jamesbury; Metso](http://www.specagent.com/Lookup?uid=123457115164).

[NIBCO INC](http://www.specagent.com/Lookup?uid=123457115165).

Approved equivalent.

Description:

Standard: MSS SP-72.

CWP Rating: 285 psig.

Body Design: Split body.

Body Material: Carbon steel, ASTM A216, Type WCB.

Ends: Flanged.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Full.

* + - * 1. Steel Ball Valves with Full Port and Stainless-Steel Trim, Class 300:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=9701) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Apollo Flow Controls; Conbraco Industries, Inc](http://www.specagent.com/Lookup?uid=123457115168).

[Jamesbury; Metso](http://www.specagent.com/Lookup?uid=123457115169).

[NIBCO INC](http://www.specagent.com/Lookup?uid=123457115170).

Approved equivalent.

Description:

Standard: MSS SP-72.

CWP Rating: 720 psig.

Body Design: Split body.

Body Material: Carbon steel, ASTM A216, Type WCB.

Ends: Flanged.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Full.

* + - 1. IRON BALL VALVES

Retain this article if iron ball valves are required. MSS SP-72 covers iron ball valves from NPS 1/2 to NPS 36 (DN 15 to DN 900).

* + - * 1. Iron Ball Valves, Class 125:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=9702) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Apollo Flow Controls; Conbraco Industries, Inc](http://www.specagent.com/Lookup?uid=123457115173).

[KITZ Corporation](http://www.specagent.com/Lookup?uid=123457115174).

[WATTS](http://www.specagent.com/Lookup?uid=123457115176).

Approved equivalent.

Description:

Standard: MSS SP-72.

CWP Rating: 200 psig.

Body Design: Split body.

Body Material: ASTM A126, gray iron.

Ends: Flanged.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel.

Port: Full.

1. EXECUTION
   * + 1. EXAMINATION
          1. 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.
          2. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
          3. Examine threads on valve and mating pipe for form and cleanliness.
          4. 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.
          5. Do not attempt to repair defective valves; replace with new valves.
       2. VALVE INSTALLATION
          1. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
          2. Locate valves for easy access and provide separate support where necessary.
          3. Install valves in horizontal piping with stem at or above center of pipe.
          4. Install valves in position to allow full stem movement.
          5. Install valve tags. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for valve tags and schedules.
       3. GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

The Section Text is arranged to provide bronze or brass valves in NPS 2 (DN 50) and smaller and iron valves from NPS 2-1/2 to NPS 12 (DN 65 to DN 300).

Caution: Verify that valve classes and pressure-temperature ratings are adequate for system fluid. Repeat each category listing if necessary and insert required pressure range for each listing. Indicate location of each different pressure system on Drawings.

Retain and revise valve applications in paragraphs and schedules below. Coordinate with valves specified in Part 2.

* + - * 1. If valves with specified SWP classes or CWP ratings are unavailable, the same types of valves with higher SWP classes or CWP ratings may be substituted.
        2. Select valves with the following end connections:

Press-end connections are not for use with steam or flammable gases. Press-end connections are limited to 200 psig (1380 kPa).

For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.

For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.

For Copper Tubing, NPS 5 and Larger: Flanged ends.

For Steel Piping, NPS 2 and Smaller: Threaded ends.

For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.

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

* + - 1. CHILLED-WATER VALVE SCHEDULE

Caution: No one-piece, reduced-port, brass ball valves with stainless-steel trim; three-piece, regular-port, brass ball valves with brass trim; or bronze ball valves with bronze trim are included in the Section Text. Retain brass or stainless-steel trim with brass ball valves, or bronze or stainless-steel trim with bronze ball valves. Press-end connections are typically only available for two-piece, full port, ball valves. Edit first paragraph below accordingly.

* + - * 1. Pipe NPS 2 and Smaller: [**bronze**] ball valves, [**two**] [**three**] piece, with [**bronze**] trim, [**full**] port, [**threaded**] [**solder**] [**or**] [**press connection**]-joint ends.

Retain subparagraph below if solder-joint valve ends are permitted for this application.

Valves may be provided with solder-joint ends instead of threaded ends.

* + - * 1. Pipe NPS 2-1/2 and Larger:

Retain one of two subparagraphs below.

Iron ball valves, Class 125.

Retain first subparagraph below if threaded valve ends are permitted for this application.

Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.

Steel ball valves, Class 150.

* + - 1. CONDENSER-WATER VALVE SCHEDULE

Caution: No one-piece, reduced-port, brass ball valves with stainless-steel trim; three-piece, regular-port, brass ball valves with brass trim; or bronze ball valves with bronze trim are included in the Section Text. Retain brass or stainless-steel trim with brass ball valves, or bronze or stainless-steel trim with bronze ball valves. Press-end connections are typically only available for two-piece, full port, ball valves. Edit first paragraph below accordingly.

* + - * 1. Pipe NPS 2 and Smaller: [**bronze**] ball valves, [**two**] [**three**] piece with [**bronze**] trim, [**full**] port, [**threaded**] [**solder**] [**or**] [**press connection**]-joint ends.

Retain subparagraph below if solder-joint valve ends are permitted for this application.

Valves may be provided with solder-joint ends instead of threaded ends.

* + - * 1. Pipe NPS 2-1/2 and Larger:

Retain one of two subparagraphs below.

Iron ball valves, Class 125.

Retain first subparagraph below if threaded valve ends are permitted for this application.

Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.

Steel ball valves, Class 150.

* + - 1. HEATING-WATER VALVE SCHEDULE

Caution: No one-piece, reduced-port, brass ball valves with stainless-steel trim; three-piece, regular-port, brass ball valves with brass trim; or bronze ball valves with bronze trim are included in the Section Text. Retain brass or stainless-steel trim with brass ball valves, or bronze or stainless-steel trim with bronze ball valves. Press-end connections are typically only available for two-piece, full port, ball valves. Edit first paragraph below accordingly.

* + - * 1. Pipe NPS 2 and Smaller: [**bronze**] ball valves, [**two**] [**three**] piece with [**bronze**] trim, [**full**] port, [**threaded**] [**solder**] [**or**] [**press connection**]-joint ends.
        2. Pipe NPS 2-1/2 and Larger:

Retain one of two subparagraphs below.

Iron ball valves, Class 125.

Retain first subparagraph below if threaded valve ends are permitted for this application.

Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.

Steel ball valves, Class 150.

* + - 1. LOW-PRESSURE STEAM VALVE SCHEDULE (15 PSIG OR LESS)

Caution: No one-piece, reduced-port, brass ball valves with stainless-steel trim; three-piece, regular-port, brass ball valves with brass trim; or bronze ball valves with bronze trim are included in the Section Text. Retain brass or stainless-steel trim with brass ball valves, or bronze or stainless-steel trim with bronze ball valves.

* + - * 1. Pipe NPS 2 and Smaller: [**bronze**] ball valves, [**two**] [**three**] piece, with [**bronze**] trim, and [**full**] port.
        2. Pipe NPS 2-1/2 and Larger:

Retain one of two subparagraphs below.

Iron ball valves, Class 125.

Retain first subparagraph below if threaded valve ends are permitted for this application.

Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.

Steel ball valves, Class 150.

* + - 1. HIGH-PRESSURE STEAM VALVE SCHEDULE (MORE THAN 15 PSIG

Caution: No one-piece, reduced-port, brass ball valves with stainless-steel trim; three-piece, regular-port, brass ball valves with brass trim; or bronze ball valves with bronze trim are included in the Section Text. Retain brass or stainless-steel trim with brass ball valves, or bronze or stainless-steel trim with bronze ball valves.

* + - * 1. Pipe NPS 2 and Smaller: [**bronze**] ball valves, [**two**] [**three**] piece with [**bronze**] trim, and [**full**] port.
        2. Pipe NPS 2-1/2 and Larger:

Retain one of two subparagraphs below.

Iron ball valves, Class 125.

Retain first subparagraph below if threaded valve ends are permitted for this application.

Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.

Steel ball valves, Class 300.

* + - 1. STEAM-CONDENSATE VALVE SCHEDULE

Caution: No one-piece, reduced-port, brass ball valves with stainless-steel trim; three-piece, regular-port, brass ball valves with brass trim; or bronze ball valves with bronze trim are included in the Section Text. Retain brass or stainless-steel trim with brass ball valves, or bronze or stainless-steel trim with bronze ball valves.

* + - * 1. Pipe NPS 2 and Smaller: [**bronze**] ball valves, [**two**] [**three**] piece with [**bronze**] trim, and [**full**] port.
        2. Pipe NPS 2-1/2 and Larger:

Retain one of two subparagraphs below.

Iron ball valves, Class 125.

Retain first subparagraph below if threaded valve ends are permitted for this application.

Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.

Steel ball valves, Class 300.

END OF SECTION 230523.12