SECTION 220523.12 - BALL VALVES FOR PLUMBING PIPING

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

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

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.
      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.

Retain subparagraph below if products come into contact with potable water.

Certification that products comply with NSF 61 and NSF 372.

* + - 1. 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 soldered 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

See Editing Instruction No. 1 in the Evaluations for cautions about named manufacturers and products.

* + - 1. GENERAL REQUIREMENTS FOR VALVES

Plumbing valve applications specified in this Section are limited to NPS 12 (DN 300). Many valves specified are available in larger sizes.

* + - * 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 connections are common in smaller sizes of plumbing 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 B31.9 for building services piping valves.

Retain "NSF Compliance" paragraph below if products come into contact with potable water.

* + - * 1. NSF Compliance: NSF 61 and NSF 372 for valve materials for potable-water service.
        2. 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.

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 4 inch.

* + - * 1. Valves in Insulated Piping:

Include 2-inch stem extensions.

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

Memory stops that are fully adjustable after insulation is applied.

* + - 1. BRASS BALL VALVES

Retain one or more of paragraphs below if brass 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. Brass Ball Valves, One-Piece:

Description:

Standard: MSS SP-110.

CWP Rating: 400 psig.

Body Design: One piece.

Body Material: Forged brass or bronze.

Ends: Threaded and soldered.

Seats: PTFE.

Stem: Brass or stainless steel.

Ball: Chrome-plated brass or stainless steel.

Port: Reduced.

* + - * 1. Brass Ball Valves, Two-Piece with Full Port and Brass Trim, Threaded or Soldered Ends:

Description:

Standard: MSS SP-110 or MSS SP-145.

CWP Rating: 600 psig.

Body Design: Two piece.

Body Material: Forged brass.

Ends: Threaded and soldered.

Seats: PTFE.

Stem: Brass.

Ball: Chrome-plated brass.

Port: Full.

* + - * 1. Brass Ball Valves, Two-Piece with Full Port and Brass Trim, Press Ends:

Description:

Standard: MSS SP-110 or MSS SP-145.

CWP Rating: Minimum 200 psig.

Body Design: Two piece.

Body Material: Forged brass.

Ends: Press.

Press Ends Connections Rating: Minimum 200 psig.

Seats: PTFE or RPTFE.

Stem: Brass.

Ball: Chrome-plated brass.

Port: Full.

O-Ring Seal: Buna-N or EPDM.

* + - * 1. Brass Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim, Threaded or Soldered Ends:

Description:

Standard: MSS SP-110 or MSS SP-145.

CWP Rating: 600 psig.

Body Design: Two piece.

Body Material: Forged brass.

Ends: Threaded and soldered.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Full.

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

Description:

Standard: MSS SP-110 or MSS SP-145.

CWP Rating: Minimum 200 psig.

Body Design: Two piece.

Body Material: Forged brass.

Ends: Press.

Press Ends Connections Rating: Minimum 200 psig.

Seats: PTFE or RPTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Full.

O-Ring Seal: Buna-N or EPDM.

* + - * 1. Brass Ball Valves, Two-Piece with Regular Port and Brass Trim:

Description:

Standard: MSS SP-110.

CWP Rating: 600 psig.

Body Design: Two piece.

Body Material: Forged brass.

Ends: Threaded and soldered.

Seats: PTFE.

Stem: Brass.

Ball: Chrome-plated brass.

Port: Regular.

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

Description:

Standard: MSS SP-110.

CWP Rating: 600 psig.

Body Design: Two piece.

Body Material: Brass or bronze.

Ends: Threaded and soldered.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Regular.

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

Description:

Standard: MSS SP-110.

CWP Rating: 600 psig.

Body Design: Three piece.

Body Material: Forged brass.

Ends: Threaded and soldered.

Seats: PTFE.

Stem: Brass.

Ball: Chrome-plated brass.

Port: Full.

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

Description:

Standard: MSS SP-110.

CWP Rating: 600 psig.

Body Design: Three piece.

Body Material: Forged brass.

Ends: Threaded and soldered.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Full.

* + - 1. BRONZE BALL VALVES

Retain one or more of paragraphs below 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, One-Piece with Bronze Trim:

Description:

Standard: MSS SP-110.

CWP Rating: 400 psig.

Body Design: One piece.

Body Material: Bronze.

Ends: Threaded.

Seats: PTFE.

Stem: Bronze.

Ball: Chrome-plated brass.

Port: Reduced.

* + - * 1. Bronze Ball Valves, One-Piece with Stainless-Steel Trim:

Description:

Standard: MSS SP-110.

CWP Rating: 600 psig.

Body Design: One piece.

Body Material: Bronze.

Ends: Threaded.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Reduced.

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

Description:

Standard: MSS SP-110 or MSS-145.

CWP Rating: 600 psig.

Body Design: Two piece.

Body Material: Bronze.

Ends: Threaded and soldered.

Seats: PTFE.

Stem: Bronze or brass.

Ball: Chrome-plated brass.

Port: Full.

* + - * 1. Bronze Ball Valves, Two-Piece with Full Port, and Bronze or Brass Trim, Press Ends:

Press-end connections are not suitable for flammable gas service.

Description:

Standard: MSS SP-110 or MSS-145.

CWP Rating: Minimum 200 psig.

Body Design: Two piece.

Body Material: Bronze.

Ends: Press.

Press Ends Connections Rating: Minimum 200 psig.

Seats: PTFE or RTPFE.

Stem: Bronze or brass.

Ball: Chrome-plated brass.

Port: Full.

O-Ring Seal: EPDM or Buna-N.

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

Description:

Standard: MSS SP-110 or MSS-145.

CWP Rating: 600 psig.

Body Design: Two piece.

Body Material: Bronze.

Ends: Threaded or soldered.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Full.

* + - * 1. Bronze Ball Valves, Two-Piece with Regular Port and Bronze or Brass Trim:

Description:

Standard: MSS SP-110.

CWP Rating: 600 psig.

Body Design: Two piece.

Body Material: Bronze.

Ends: Threaded.

Seats: PTFE.

Stem: Bronze or brass.

Ball: Chrome-plated brass.

Port: Regular.

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

Description:

Standard: MSS SP-110.

CWP Rating: 600 psig.

Body Design: Two piece.

Body Material: Bronze.

Ends: Threaded.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Regular.

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

Description:

Standard: MSS SP-110.

CWP Rating: 600 psig.

Body Design: Three piece.

Body Material: Bronze.

Ends: Threaded.

Seats: PTFE.

Stem: Bronze or brass.

Ball: Chrome-plated brass.

Port: Full.

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

Description:

Standard: MSS SP-110.

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. Bronze Ball Valves, Three-Piece with Regular Port and Bronze Trim:

Description:

Standard: MSS SP-110.

CWP Rating: 600 psig.

Body Design: Three piece

Body Material: Bronze

Ends: Threaded or soldered.

Seats: PTFE.

Stem: Bronze.

Ball: Chrome-plated brass.

Port: Regular.

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

Description:

Standard: MSS SP-110.

CWP Rating: 600 psig.

Body Design: Three piece.

Body Material: Bronze.

Ends: Threaded or soldered.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Regular.

* + - * 1. Bronze Ball Valves, Two-Piece, Safety-Exhaust:

Description:

Standard: MSS SP-110.

CWP Rating: 600 psig.

Body Design: Two piece.

Body Material: Bronze, ASTM B584, Alloy C844.

Ends: Threaded.

Seats: PTFE.

Stem: Stainless steel.

Ball: Chrome-plated brass, with exhaust vent opening for pneumatic applications.

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, Class 150:

Description:

Standard: MSS SP-72.

CWP Rating: 285 psig.

Body Design: Split body.

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

Ends: Flanged or threaded.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Full.

* + - * 1. Steel Ball Valves with Regular Port, Class 150:

Description:

Standard: MSS SP-72.

CWP Rating: 285 psig.

Body Design: Uni-body.

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

Ends: Flanged or threaded.

Seats: PTFE.

Stem: Stainless steel.

Ball: Stainless steel, vented.

Port: Regular.

* + - 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:

Description:

Standard: MSS SP-72.

CWP Rating: 200 psig.

Body Design: Split body.

Body Material: ASTM A126, gray iron.

Ends: Flanged or threaded.

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.
       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 CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.
        2. Select valves with the following end connections:

Press-end connections are not for use with 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, 5 inch and Larger: Flanged ends.

* + - 1. LOW-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE 150 PSIG OR LESS
         1. Pipe 2 inch and Smaller:

Retain "Bronze (and Brass) Valves" subparagraph below to permit solder-joint valve ends for this application.

Bronze and Brass Valves: May be provided with solder-joint ends instead of threaded ends. Use threaded ends at equipment connections.

Caution: This Section does not include one-piece brass ball valves with stainless-steel trim; three-piece, regular-port, brass ball valves with brass trim; or bronze ball valves with bronze trim. Retain brass or stainless-steel trim with brass ball valves, or retain bronze or stainless-steel trim with bronze ball valves.

Brass ball valves, two-piece with full port and stainless steel trim.

Bronze ball valves, two-piece with full port and stainless steel trim.

Brass ball valves, three-piece with full port and stainless steel trim.

Bronze ball valve, three-piece with full port and stainless steel trim.

* + - * 1. Pipe 2-1/2 inch and Larger:

Retain first subparagraph below to permit threaded valve ends for this application.

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

Steel ball valves, Class 150 with full port.

Iron ball valves, Class 150.

* + - 1. HIGH-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE 150 TO 200 PSIG
         1. Pipe 2 inch and Smaller:

Retain "Bronze( and Brass) Valves" subparagraph below to permit solder-joint valve ends for this application.

Bronze and Brass Valves: May be provided with solder joint ends instead of threaded ends. Use threaded ends at equipment connections.

Caution: This Section does not include one-piece brass ball valves with stainless-steel trim; three-piece regular-port brass ball valves with brass trim; or bronze ball valves with bronze trim. Retain brass or stainless-steel trim with brass ball valves, or retain bronze or stainless-steel trim with bronze ball valves.

Brass ball valves, two-piece with full port and stainless steel trim.

Bronze ball valves, two-piece with full port and stainless steel trim.

Brass ball valves, three-piece with full port and stainless steel trim.

Bronze ball valves, three-piece with full port and stainless steel trim.

* + - * 1. Pipe 2-1/2 inch and Larger:

Retain first subparagraph below to permit threaded valve ends for this application.

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

Steel ball valves, Class 150 with full port.

Iron ball valves, Class 150.

* + - 1. DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE
         1. Pipe 2 inch and Smaller:

Brass ball valves, two-piece with full port and brass trim. Provide with threaded, solder, or press connection joint ends. Use threaded ends at equipment connections.

Caution: This Section does not include one-piece brass ball valves with stainless-steel trim; three-piece regular-port brass ball valves with brass trim; or bronze ball valves with bronze trim. Retain brass or stainless-steel trim with brass ball valves, or retain bronze or stainless-steel trim with bronze ball valves.

Press-end connections are not for use with flammable gases. Press-end connections are typically only available for two-piece, full port, ball valves. Edit first two subparagraphs accordingly.

Brass ball valves, two-piece with full port and stainless steel trim. Provide with threaded, solder, or press connection joint ends. Use threaded ends at equipment connections.

Brass ball valves, two-piece with regular port and brass trim. Provide with threaded, solder, or press connection joint ends. Use threaded ends at equipment connections.

Caution: This Section does not include one-piece brass ball valves with stainless-steel trim; three-piece regular-port brass ball valves with brass trim; or bronze ball valves with bronze trim. Retain brass or stainless-steel trim with brass ball valves, or retain bronze or stainless-steel trim with bronze ball valves.

Press-end connections are not for use with flammable gases. Press-end connections are typically only available for two-piece, full port, ball valves. Edit first two subparagraphs accordingly.

Brass ball valves, two-piece with regular port and stainless steel trim. Provide with threaded, solder, or press connection joint ends. Use threaded ends at equipment connections.

Bronze ball valves, two-piece with full port and stainless steel trim. Provide with threaded, solder, or press connection joint ends. Use threaded ends at equipment connections.

Bronze ball valves, two-piece with full port and bronze or brass trim. Provide with threaded, solder, or press connection joint ends. Use threaded ends at equipment connections.

Brass ball valves, three-piece with full port and stainless steel trim. Provide with threaded, or soldered ends. Use threaded ends at equipment connections.

Bronze ball valves, three-piece with full port and stainless steel trim. Provide with threaded, or soldered ends. Use threaded ends at equipment connections.

* + - * 1. Pipe 2-1/2 inch and Larger:

Retain first subparagraph below to permit threaded valve ends for this application.

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

Steel ball valves, Class 150 with full port.

Iron ball valves, Class 150.

END OF SECTION 220523.12