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SECTION 220523.12 - BALL VALVES FOR PLUMBING PIPING

1. GENERAL
   * + 1. SUMMARY
          1. Section Includes:

Bronze ball valves.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project. Include only essential definitions or acronyms not well understood by the affected industry of trade.

* + - * 1. CWP: Cold working pressure.
        2. RPTFE: Reinforced polytetrafluoroethylene.
        3. WOG: Water, oil, gas.
      1. ACTION SUBMITTALS

Action submittals are submittals requiring responsive action and return of reviewed documents to Contractor.

* + - * 1. Product Data:

Brass ball valves.

Bronze ball valves.

Steel ball valves.

Iron ball valves.

Stainless steel ball valves.

CPVC ball valves.

PVC ball valves.

* + - 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
   * + 1. SOURCE LIMITATIONS
          1. Obtain each type of valve from single source from single manufacturer.
       2. PERFORMANCE REQUIREMENTS
          1. Standards:

The U.S. Safe Drinking Water Act (SDWA) requires national compliance with less than or equal to 0.25 percent weighted average lead content at wetted surfaces for pipe, fittings, and devices intended to convey or dispense water for human consumption. The IPC and the UPC have the same requirements. Items in compliance with NSF 61 and NSF 372 also meet this requirement. Some manufacturers choose to meet this requirement through independent testing and have "Certified Lead-Free" products, which may or may not have NSF 61 or NSF 372 certification.

Domestic water valves intended to convey or dispense water for human consumption must comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or must be certified to be in compliance with NSF 61 and NSF 372 (by an ANSI-accredited third-party certification body) that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

* + - * 1. 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. Caution: Soldering and brazing methods used to achieve required pressure-temperature ratings may damage internal valve parts. Installers must follow manufacturer's written installation instructions and avoid heating above recommended maximum permitted when soldering and brazing.

ASME B16.18 for cast copper solder-joint connections.

ASME B16.22 for wrought copper and copper alloy solder-joint connections.

ASME B16.34 for flanged and threaded end connections

ASME B31.9 for building services piping valves.

* + - * 1. Provide bronze valves made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
        2. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
        3. Valve Sizes: Same as upstream piping unless otherwise indicated.
        4. Valve Actuator Type:

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

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

* + - * 1. Valves in Insulated Piping:

Provide 2-inch extended neck stems.

Extended operating handles with nonthermal-conductive covering 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. BRONZE BALL VALVES

Retain one or more 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 brass or bronze ball valves, or both.

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

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed.

Basis-of-Design Product: Subject to compliance with requirements, provide **Zurn Industries, LLC; Model 850XL** or comparable product by one of the following:

<**Insert manufacturer's name**>

Standard: MSS SP-110; MSS SP-145; IAPMO/ANSI Z1157.

CWP Rating: Minimum 200 psig.

Body Design: Two piece.

Body Material: Bronze.

Ends: Press.

Press-End 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. 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. Remove defective valves from site.
       2. INSTALLATION OF VALVES
          1. Install valves with unions or flanges at each piece of equipment arranged to allow space for service, maintenance, and equipment removal without system shutdown.
          2. Provide support to piping adjacent to valves such that no force is imposed upon valves.
          3. Locate valves for easy access.
          4. For valves in horizontal piping, install valves with stem at or above center of pipe.
          5. Install valves in position to allow full valve actuation movement.
          6. Valve Tags: Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
          7. Adhere to manufacturer's written installation instructions. When soldering or brazing valves, do not heat valves above maximum permitted temperature. Do not use solder with melting point temperature above valve manufacturer's recommended maximum.
       3. ADJUSTING
          1. Adjust or replace valve packing after piping systems have been tested and put into service, but before final adjusting and balancing. Replace valves exhibiting leakage.
       4. 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 this article and in schedules below. Coordinate with valves specified in Part 2.

* + - * 1. If valves with specified CWP ratings are unavailable, provide the same types of valves with higher CWP ratings.
        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 (DN 50) 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 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.

For Copper Tubing, NPS 5 (DN 125) and Larger: Flanged ends.

For Steel Piping, NPS 2 (DN 50) and Smaller: Threaded ends.

For Steel Piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.

For Steel Piping, NPS 5 (DN 125) and Larger: Flanged ends.

For Stainless Steel Piping, NPS 2 (DN 50) and Smaller: [**Threaded ends**] [**Press ends**].

For Stainless Steel Piping, NPS 2-1/2to NPS 4 (DN 65 to DN 100): Flanged ends.

* + - 1. LOW-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE - 150 PSIG (1035 kPa) OR LESS
         1. Pipe NPS 2 (DN 50) 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.

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, one piece.

Bronze ball valves, one piece with [**bronze**] [**stainless steel**] trim.

Brass ball valves, two piece with [**full**] [**regular**] port, and [**brass**] [**stainless steel**] trim.

Bronze ball valves, two piece with [**full**] [**regular**] port, and [**bronze or brass**] [**stainless steel**] trim.

Brass ball valves, three piece with full port, and [**brass**] [**stainless steel**] trim.

Bronze ball valve, three piece with full port, and [**bronze or brass**] [**stainless steel**] trim.

Bronze ball valves, two piece with regular port, and [**bronze**] [**stainless steel**] trim.

* + - * 1. Pipe NPS 2-1/2 (DN 65) and Larger:

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

Steel and Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.

Steel ball valves, Class 150 with [**full**] [**regular**] port.

Iron ball valves, Class 150.

* + - 1. HIGH-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE - 150 TO 200 PSIG (1035 TO 1380 kPa)
         1. Pipe NPS 2 (DN 50) 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.

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 valve.

Bronze ball valve, one piece with [**bronze**] [**stainless steel**] trim.

Brass ball valves, two piece with [**full**] [**regular**] port, and [**brass**] [**stainless steel**] trim.

Bronze ball valves, two piece with [**full**] [**regular**] port, and [**bronze or brass**] [**stainless steel**] trim.

Brass ball valves, three piece with full port, and [**brass**] [**stainless steel**] trim.

Bronze ball valves, three piece with full port, and [**bronze or brass**] [**stainless steel**] trim.

Bronze ball valves, two piece with regular port, and [**bronze**] [**stainless steel**] trim.

* + - * 1. Pipe NPS 2-1/2 (DN 65) and Larger:

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

Steel and Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.

Steel ball valves, Class 150 with [**full**] [**regular**] port.

Iron ball valves, Class 150.

* + - 1. DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE
         1. Pipe NPS 2 (DN 50) and Smaller:

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 valve, one piece. Provide with [**threaded**] [**solder**] [**or**] [**press-connection**]-joint ends.

Bronze ball valve, one piece with [**bronze**] [**stainless steel**] trim. Provide with [**threaded**] [**solder**] [**or**] [**press-connection**]-joint ends.

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

Brass ball valves, two piece with [**full**] [**regular**] port, and [**brass**] [**stainless steel**] trim. Provide with [**threaded**] [**solder**] [**or**] [**press-connection**]-joint ends.

Bronze ball valves, two piece with [**full**] [**regular**] port, and [**bronze or brass**] [**stainless steel**] trim. Provide with [**threaded**] [**solder**] [**or**] [**press-connection**]-joint ends.

Brass ball valves, three piece with full port, and [**brass**] [**stainless steel**] trim.

Bronze ball valves, three piece with full port, and [**bronze or brass**] [**stainless steel**] trim.

Bronze ball valves, two piece with regular port, and [**bronze**] [**stainless steel**] trim.

Stainless steel ball valves with [**threaded**] [**or**] [**press-connection**]-joint ends.

* + - * 1. Pipe NPS 2-1/2 (DN 65) and Larger:

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

Steel and Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.

Steel ball valves, Class 150 with [**full**] [**regular**] port.

Iron ball valves, Class 150.

Stainless steel ball valves with flanged ends.

The majority of, but not all, manufacturers offer CPVC and PVC union ball and non-union ball valves in sizes through NPS 4 (DN 100). However, a common choice is to limit ball valve use to NPS 2 (DN 50) and smaller. Coordinate with manufacturers and with Section 220523.13 "Butterfly Valves for Plumbing Piping."

Retain one of first two paragraphs below if retaining CPVC pipe in Part 2.

* + - * 1. CPVC Pipe, NPS 2 (DN 50) and Smaller: [**Union**] [**Non-union**] ball valve.
        2. CPVC Pipe, NPS 4 (DN 100) and Smaller: [**Union**] [**Non-union**] ball valve.

Retain one of two paragraphs below if retaining PVC pipe in Part 2.

* + - * 1. PVC Pipe, NPS 2 (DN 50) and Smaller: [**Union**] [**Non-union**] ball valve.
        2. PVC Pipe, NPS 4 (DN 100) and Smaller: [**Union**] [**Non-union**] ball valve.

END OF SECTION 220523.12