SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

This Section includes ball, butterfly, check, gate, and globe valves used in plumbing piping systems.

This Section includes valves common to more than one section in this Division. Specialty valves, such as valves used in medical gas systems, are included with applicable section. Special function valves, such as relief valves, pressure reducing valves, and flow control valves are located in applicable piping section.

This section is intended to be used as standalone section to specify valves for entire Division. When this section is used, suggest deleting valve specifications in individual piping system specification sections and reference this section.

Manufacturers found in SpecAgent for this Section were identified as representative and not as an endorsement for meeting the requirements of this specification.

This Section includes performance, proprietary, and descriptive type specifications. Edit to avoid conflicts among requirements.

This Section includes the term Architect/Engineer. "Architect" is used in AIA contract documents; "Engineer" is used in EJCDC contract documents. Retain appropriate term.

See the Drawing Coordination Considerations for information needed to coordinate this specification Section with the Drawings.

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

Gate valves.

Ball valves.

Plug valves.

Butterfly valves.

Check valves.

* + - * 1. Related Sections:

Section 220529 - Hangers and Supports for Plumbing Piping and Equipment: Product and installation requirements for pipe hangers and supports.

Section 220700 - Plumbing Insulation: Product and installation requirements for insulation for valves.

Section 221100 - Facility Water Distribution: Product and installation requirements for [**piping,**] [**piping specialties,**] and equipment used in domestic water systems.

Section 221300 - Facility Sanitary Sewerage: Product and installation requirements for [**piping,**] [**piping specialties,**] and equipment used in sanitary waste and vent systems.

Section 221400 - Facility Storm Drainage: Product and installation requirements for [**piping,**] [**piping specialties,**] and equipment used in storm drainage systems.

Section 225100 - Swimming Pool Plumbing Systems: Product and installation requirements for [**piping,**] [**piping specialties,**] and equipment used in swimming pool systems.

* + - 1. REFERENCES

List reference standards included within text of this section. Edit the following for Project conditions.

* + - * 1. ASTM International:

ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

ASTM D4101 - Standard Specification for Propylene Injection and Extrusion Materials.

* + - * 1. Manufacturers Standardization Society of the Valve and Fittings Industry:

MSS SP 67 - Butterfly Valves.

MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.

MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.

MSS SP 78 - Cast Iron Plug Valves, Flanged and Threaded Ends.

MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.

MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

* + - 1. SUBMITTALS

Only request submittals needed to verify compliance with Project requirements.

* + - * 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. Section 013300 - Submittal Procedures: Requirements for submittals.
        5. Product Data: Submit manufacturers catalog information with valve data and ratings for each service.
        6. Manufacturer's Installation Instructions: Submit hanging and support methods, joining procedures.
        7. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
      1. CLOSEOUT SUBMITTALS
         1. Project Record Documents: Record actual locations of [**valves**] <**\_\_\_\_\_\_\_\_**>.
         2. Operation and Maintenance Data: Submit installation instructions, spare parts lists, exploded assembly views.
      2. QUALITY ASSURANCE
         1. For drinking water service, provide valves complying with NSF 61 “Drinking Water Systems Components - Health Effects”.
         2. Perform Work in accordance with [**[State] [Municipality] of <\_\_\_\_\_\_\_\_> [Highways] [Public Work's] standard.**]

Include the following paragraph only when cost of acquiring specified standards is justified.

* + - * 1. Maintain [**one copy**] [**<\_\_\_\_\_\_\_\_> copies**] of [**each**] document on site.
      1. QUALIFICATIONS
         1. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years [**documented**] experience.
         2. Installer: Company specializing in performing work of this section [**with minimum <\_\_\_\_\_\_\_\_> years [documented] experience**] [**approved by manufacturer**].
      2. PRE-INSTALLATION MEETINGS
         1. Section 013000 - Administrative Requirements: Pre-installation meeting.
         2. Convene minimum [**one**] <**\_\_\_\_\_\_\_\_**> week prior to commencing work of this section.
      3. DELIVERY, STORAGE, AND HANDLING
         1. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
         2. Provide temporary protective coating on cast iron and steel valves.
      4. ENVIRONMENTAL REQUIREMENTS
         1. Do not install valves underground when bedding is wet or frozen.
      5. WARRANTY

This article extends warranty period beyond one year. Extended warranties increase construction costs and Owner enforcement responsibilities. Specify warranties with caution.

* + - * 1. Furnish [**five**] <**\_\_\_\_\_\_\_\_**> year manufacturer warranty for valves excluding packing.
      1. EXTRA MATERIALS
         1. Furnish [**two**] <**\_\_\_\_\_\_\_\_**> packing kits for each size valve.

1. PRODUCTS
   * + 1. GATE VALVES

In this paragraph, list manufacturers acceptable for this Project.

* + - * 1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=7944&mf=04&src=wd): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Milwaukee

Nibco

Stockham

Or equal.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**[State] [Municipality] of <\_\_\_\_\_\_\_\_> [Highways] [Public Work's] standards.**]

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturers' products specified above.

The following 2 valves may be used in low pressure steam systems.

* + - * 1. [**GA-1**] 2 inches and Smaller: MSS SP 80 “Bronze Gate, Globe, Angle, and Check Valves”, [**Class 125**] [**Class 150**] <**\_\_\_\_\_\_\_\_**>, bronze body, bronze trim, [**threaded**] [**union**] bonnet, [**non-rising**] [**rising**] stem, [**lock-shield stem**] [**hand-wheel**], inside screw [**with back-seating stem**], [**solid**] [**split**] wedge disc, [**alloy seat rings,**] [**solder**] [**or**] [**threaded**] ends.
        2. [**GA-2**] 2-1/2 inches and Larger: MSS SP 70 “Cast Iron Gate Valves, Flanged and Threaded Ends”, [**Class 125**] <**\_\_\_\_\_\_\_\_**>, cast iron body, bronze trim, bolted bonnet, [**rising**] [**non-rising**] stem, hand-wheel, outside screw and yoke, solid wedge disc with bronze seat rings, flanged ends. Furnish chain-wheel operators for valves 6 inches and larger mounted over 8 feet above floor.
      1. BALL VALVES

In this paragraph, list manufacturers acceptable for this Project.

* + - * 1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=7945&mf=04&src=wd): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Conbraco (Apollo)

Milwaukee

Nibco

Or equal.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturers' products specified above.

The following valve is economy type ball valve.

* + - * 1. [**BA-1**] 2 inches and Smaller: MSS SP 110 “Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends”, [**400 psi WOG**] [**600 psi WOG**] <**\_\_\_\_\_\_\_\_**>, [**one**] [**two**] piece bronze body, chrome plated brass ball, [**regular**] [**full**] port, teflon seats, blow-out proof stem, [**solder**] [**or**] [**threaded**] ends [**with union**], [**lever handle**] [**wing or tee handle**] [**locking lever handle**] [**extended lever handle**] [**round handle**] [**oval handle**] [**with balancing stops**].
        2. [**BA-2**] 2 inches and Smaller: MSS SP 110 “Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends”, [**Class 150**] <**\_\_\_\_\_\_\_\_**>, bronze, two piece body, [**chrome plated bronze**] [**type 316 stainless steel**] ball, [**regular**] [**full**] port, teflon seats, blow-out proof stem, [**solder**] [**or**] [**threaded**] ends [**with union**], [**lever handle**] [**wing or tee handle**] [**locking lever handle**] [**extended lever handle**] [**round handle**] [**oval handle**] [**with balancing stops**].

The following is 3-piece repairable ball valve.

* + - * 1. [**BA-3**] 2 inches and Smaller: MSS SP 110 “Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends”, [**Class 150**] <**\_\_\_\_\_\_\_\_**>, bronze, three piece body, [**chrome plated bronze**] [**type 316 stainless steel**] ball, [**regular**] [**full**] port, teflon seats, blow-out proof stem, [**solder**] [**or**] [**threaded**] ends, [**lever handle**] [**wing or tee handle**] [**locking lever handle**] [**extended lever handle**] [**round handle**] [**oval handle**] [**with balancing stops**].

The following is ball valve with stainless steel body and trim.

* + - * 1. [**BA-5**] 2 inches and Smaller: MSS SP 110 “Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends”, [**Class 150**] <**\_\_\_\_\_\_\_\_**> Stainless steel, [**two**] [**three**] piece body, stainless steel ball, [**teflon**] [**reinforced teflon**] seats and stuffing box ring, threaded ends, [**lever handle**] [**wing or tee handle**] [**locking lever handle**] [**extended lever handle**] [**round handle**] [**oval handle**] [**with balancing stops**].

The following is ball valve with PVC body and trim.

* + - * 1. [**BA-6**] 2 inches and Smaller: 150 psi at 73 degrees F water temperature, maximum service temperature: 140 degrees F ASTM D1785 “Standard Specification for Poly(Vinyl Chloride) Plastic Pipe, Schedules 40, 80, and 120” PVC body and ball, double lever handle, [**EPDM**] [**fluorocarbon**] seals, teflon seats, [**regular**] [**full**] port, [**single**] [**double**] union type with [**socket**] [**threaded**] ends.

The following is ball valve with CPVC body and trim.

* + - * 1. [**BA-7**] 2 inches and Smaller: 150 psi at 73 degrees F water temperature, maximum service temperature: 210 degrees F, ASTM D1785 “Standard Specification for Poly(Vinyl Chloride) Plastic Pipe, Schedules 40, 80, and 120” CPVC body and ball, double lever handle, [**EPDM**] [**fluorocarbon**] seals, teflon seats, [**regular**] [**full**] port, [**single**] [**double**] union type with [**socket**] [**threaded**] ends.

The following 2 valves are ball valves with polypropylene body and trim.

* + - * 1. [**BA-8**] 2 inches and Smaller: 150 psi at 100 degrees F water temperature, maximum service temperature 180 degrees F, ASTM D4101 natural polypropylene body and ball, double lever handle, [**EPDM**] [**fluorocarbon**] seals, teflon seats, [**regular**] [**full**] port, [**single**] [**double**] union type with [**socket**] [**threaded**] ends.
        2. [**BA-9**] 2 inches and Smaller: 150 psi at 73 degrees F water temperature, maximum service temperature: 180 degrees F, ASTM D4101 “Standard Classification System and Basis for Specification for Polypropylene Injection and Extrusion Materials” black polypropylene body and ball, double lever handle, [**EPDM**] [**fluorocarbon**] seals, teflon seats, [**regular**] [**full**] port, [**single**] [**double**] union type with [**socket**] [**threaded**] ends.
      1. PLUG VALVES

In this paragraph, list manufacturers acceptable for this Project.

* + - * 1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=7946&mf=04&src=wd): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Flowserve Co.

Henry Pratt Co.

Emerson Electric Company.

Or equal.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturers' products specified above.

* + - * 1. [**PL-1**] 2 inches and Smaller: MSS SP 78 “Cast Iron Plug Valves, Flanged and Threaded Ends”, [**Class 150**] [**Class 300**], [**semi-steel**] <**\_\_\_\_\_\_\_\_**> construction, [**round**] [**square**] [**rectangular**] port, [**full pipe area**] [**regular opening**], pressure lubricated, teflon packing, threaded ends. Furnish one plug valve wrench for every ten plug-valves with minimum of one wrench.
        2. [**PL-2**] 2-1/2 inches and Larger: MSS SP 78 “Cast Iron Plug Valves, Flanged and Threaded Ends”, [**Class 150**] [**Class 300**], [**semi-steel**] <**\_\_\_\_\_\_\_\_**> construction, [**round**] [**square**] [**rectangular**] port, [**full pipe area**] [**regular opening**], pressure lubricated, teflon packing, flanged ends. Furnish [**wrench-operated**] [**worm gear-operated**].
      1. BUTTERFLY VALVES

In this paragraph, list manufacturers acceptable for this Project.

* + - * 1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=7947&mf=04&src=wd): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Milwaukee.

Nibco.

WATTS.

Or equal.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturers' products specified above.

Use stainless steel disc for swimming pool applications. Use Buna N (Nitrile rubber) seats in compressed air applications.

* + - * 1. [**BF-1**] 2-1/2 inches and Larger: MSS SP 67 “Butterfly Valves”, [**Class 150**] [**Class 200**] [**Class 250**] <**\_\_\_\_\_\_\_\_**>.

Body: Cast or ductile iron, [**wafer**] [**lug**] [**or**] [**grooved**] ends, stainless steel stem, extended neck.

Disc: [**Nickel-plated ductile iron**] [**Aluminum bronze**] [**Elastomer coated ductile iron**] [**Chrome plated ductile iron**] [**or**] [**stainless steel**].

Seat: Resilient replaceable [**EPDM**] [**Buna N**] [**neoprene Viton**].

Handle and Operator: [**10 position lever handle.**] [**Infinite position lever handle with memory stop.**] [**Hand-wheel and gear drive.**] [**Furnish gear operators for valves 8 inches and larger, and chain-wheel operators for valves mounted over 8 feet above floor.**]

The following is butterfly valve with PVC body and trim.

* + - * 1. [**BF-2**] 2 inches through 10 inches: 150 psi at 73 degrees F water temperature, maximum service temperature: 140 degrees F, [**one**] [**two**] piece body, ASTM D1785 “Standard Specification for Poly(Vinyl Chloride) Plastic Pipe, Schedules 40, 80, and 120” PVC, lug type flange facing, disc encapsulated with EPDM, stainless steel shaft, locking lever handle.

The following is butterfly valve with CPVC body and trim.

* + - * 1. [**BF-3**] 2 inches through 10 inches: 150 psi at 73 degrees F water temperature, maximum service temperature 210 degrees F, [**one**] [**two**] piece body, ASTM D1785 “Standard Specification for Poly(Vinyl Chloride) Plastic Pipe, Schedules 40, 80, and 120” CPVC, lug type flange facing, disc encapsulated with EPDM, stainless steel shaft, locking lever handle.
      1. CHECK VALVES
         1. Horizontal Swing Check Valves:

In this paragraph, list manufacturers acceptable for this Project.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=7948&mf=04&src=wd): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Milwaukee.

Nibco

Stockham

Or equal.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturers' products specified above.

Use Buna-N type disc in water-oil-gas applications and teflon disc in steam applications.

[**CK-1**] 2 inches and Smaller: MSS SP 80 “Bronze Gate, Globe, Angle, and Check Valves”, [**Class 150**] <**\_\_\_\_\_\_\_\_**>, bronze body and cap, bronze seat, [**Buna-N**] [**teflon**] disc, [**solder**] [**or**] [**threaded**] ends.

[**CK-2**] 2-1/2 inches and Larger: MSS SP 71 “Cast Iron Swing Check Valves, Flanged and Threaded Ends”, [**Class 125**] <**\_\_\_\_\_\_\_\_**>, cast iron body, bolted cap, bronze or cast iron disc, [**renewable disc seal and seat,**] flanged ends.

The following is check valve with lever and weight and lever and spring accessories.

[**CK-3**] 2-1/2 inches and Larger: MSS SP 71 “Cast Iron Swing Check Valves, Flanged and Threaded Ends”, [**Class 125**] <**\_\_\_\_\_\_\_\_**>, cast iron body, bronze swing disc, [**renewable disc seal and seat,**] flanged ends, [**outside lever and weight**] [**outside lever and spring**].

* + - * 1. Spring Loaded Check Valves:

In this paragraph, list manufacturers acceptable for this Project.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8007&mf=04&src=wd): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Milwaukee.

Nibco

Stockham

Or equal.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturers' products specified above.

[**CK-6**] 2 inches and Smaller: MSS SP 80 “Bronze Gate, Globe, Angle, and Check Valves”, [**Class 250**] <**\_\_\_\_\_\_\_\_**>, bronze body, in-line spring lift check, silent closing, [**Buna-N**] [**teflon**] disc, integral seat, [**solder**] [**or**] [**threaded**] ends.

[**CK-7**] 2-1/2 inches and Larger: MSS SP 71 “Cast Iron Swing Check Valves, Flanged and Threaded Ends”, [**Class 125**] <**\_\_\_\_\_\_\_\_**>, [**wafer**] [**globe**] style, cast iron body, bronze seat, center guided bronze disc, stainless steel spring and screws, flanged ends.

1. EXECUTION
   * + 1. EXAMINATION
          1. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.
          2. Verify piping system is ready for valve installation.
       2. INSTALLATION
          1. Install valves with stems upright or horizontal, not inverted.
          2. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
          3. Install 3/4 inch [**gate**] [**ball**] valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.
          4. Install valves with clearance for installation of insulation and allowing access.
          5. Provide access where valves and fittings are not accessible. [**Coordinate size and location of access doors with Section 083113.**]
          6. Refer to Section [**220529**] <**\_\_\_\_\_\_\_\_**> for pipe hangers.
          7. Refer to Section [**220700**] <**\_\_\_\_\_\_\_\_**> for insulation requirements for valves.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Use the following statements when valves are specified in this section but installation requirements are included with applicable piping system section.

* + - * 1. For installation of valves in domestic water systems refer to Section [**221100**] <**\_\_\_\_\_\_\_\_**>.
        2. For installation of valves in sanitary systems refer to Section [**221300**] <**\_\_\_\_\_\_\_\_**>.
        3. For installation of valves in storm systems refer to Section [**221400**] <**\_\_\_\_\_\_\_\_**>.
        4. For installation of valves in swimming pool systems refer to Section [**225100**] <**\_\_\_\_\_\_\_\_**>.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Install Work in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.
      1. VALVE APPLICATIONS
         1. Install [**shutoff**] [**and**] [**drain**] valves at locations indicated on Drawings in accordance with this Section.
         2. Install [**ball**] [**butterfly**] [**or**] [**gate**] valves for shut-off and to isolate equipment, part of systems, or vertical risers.
         3. Install [**ball**] [**butterfly**] [**or**] [**globe**] valves for throttling, bypass, or manual flow control services.
         4. Install spring loaded check valves on discharge of water pumps.
         5. Install [**lever and weight**] [**lever and spring**] check valves on discharge of pumps in [**pumped sanitary**] [**pumped storm water**] piping.
         6. Install lug end butterfly valves adjacent to equipment when functioning to isolate equipment.

The following statements include application requirements for specific system edit to meet project requirements.

* + - * 1. Install [**ball**] [**butterfly**] [**and**] [**gate**] valves in domestic water systems for shut-off service.
        2. Install [**ball**] [**and**] [**butterfly**] valves in domestic water systems for throttling service.
        3. Install [**ball**] [**butterfly**] [**and**] [**gate**] valves in sanitary systems for shut-off service.
        4. Install [**ball**] [**butterfly**] [**and**] [**gate**] valves in storm water systems for shut-off service.
      1. SCHEDULES

Include schedules when identifying valves applicable to system. Assign number to each valve. Numbers can be assigned numerically or by valve type such as gate valve GA-1, globe valve GL-1, ball valve BA-1, plug valve PL-1, butterfly valve BF-1 and check valve CK-1. Coordinate schedule in conjunction with identification method used on Drawings.

* + - * 1. Consider the following examples when developing Project schedule. Indicate whether service is "shutoff," "throttling," or "check."
        2. Domestic Cold and Hot Water:

Type: GA-1.

Service: Shutoff.

END OF SECTION 220523