SECTION 221516 - GENERAL SERVICE COMPRESSED-AIR VALVES

This Section includes valves and accessories for compressed-air systems in plant or process applications.

Coordinate location of valves with other Sections in this Division.

Compressed-air piping and appurtenances are specified in Section 221513. Air compressors and receivers are specified in Section 221519.

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

This Section includes performance, proprietary, and descriptive specifications. Edit to avoid conflicting requirements.

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

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

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

Gate valves.

Ball valves.

Butterfly valves.

Horizontal swing check valves.

Pressure relief valves.

Pressure-reducing valves.

Pressure regulators.

* + - * 1. Related Requirements:

List other Sections directly related to or affecting Work of this Section. Include Sections specifying information expected to be found in this Section as well as Sections required to describe complete system or assembly requirements.

Section 220523 - General-Duty Valves for Plumbing Piping: Referencing number scheme and sample schedule for valves applicable to this Section.

Section 220529 - Hangers and Supports for Plumbing Piping and Equipment: Requirements for pipe hangers and supports for placement by this Section.

Section 220548 - Vibration and Seismic Controls for Plumbing Piping and Equipment: Requirements for vibration isolators for placement by this Section.

Section 220553 - Identification for Plumbing Piping and Equipment: Requirements for valve identification for placement by this Section.

Section 221513 - General Service Compressed-Air Piping: Requirements for piping, fittings, and accessories for compressed-air systems in plant applications.

Section 221519 - General Service Packaged Air Compressors and Receivers: Requirements for compressors, components, and accessories for use in compressed-air systems in plant applications.

* + - 1. REFERENCE STANDARDS

List reference standards included within text of this Section, with designations, numbers, and complete document titles.

* + - * 1. ASME International:

ASME Boiler and Pressure Vessel Code (BPVC), Section VIII Rules for Construction of Pressure Vessels.

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

MSS SP-67 - Butterfly Valves.

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

MSS SP-71 - Gray Iron Swing Check 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. NSF International:

NSF 61 - Drinking Water System Components - Health Effects.

NSF 372 - Drinking Water System Components - Lead Content.

* + - 1. PREINSTALLATION MEETINGS
				1. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.
				2. Convene minimum [**one week**] [**<\_\_\_\_\_\_\_\_> weeks**] prior to commencing Work of this Section.
			2. 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).

Only request submittals needed to verify compliance with Project requirements.

* + - * 1. Section 013300 - Submittal Procedures: Requirements for submittals.
				2. Product Data: Submit manufacturer catalog information with valve data and ratings for each service.
				3. Shop Drawings: Indicate location and type of valves on piping system schematic.
				4. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

Include separate paragraphs for additional certifications.

* + - * 1. Manufacturer Instructions: Submit hanging and support methods and joining procedures.
				2. Source Quality-Control Submittals: Indicate results of [**shop**] [**factory**] tests and inspections.
				3. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
				4. Qualifications Statements:

Coordinate following subparagraph with requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer and installer.

* + - 1. CLOSEOUT SUBMITTALS
				1. Project Record Documents: Record actual locations of equipment valves and accessories.
				2. Operation and Maintenance Data: Submit assembly views, lubrication instructions, and replacement part numbers and availability.
			2. QUALITY ASSURANCE

Include this Article to specify compliance with overall reference standards affecting products and installation included in this Section.

* + - * 1. Materials in Contact with Potable Water: Certified to NSF Standards 61 “Drinking Water Systems Components - Health Effects” and 372 “Drinking Water System Components - Lead Content”.

In following Paragraph insert "State of \_\_\_\_\_\_\_\_ Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

* + - * 1. Perform Work according to <**\_\_\_\_\_\_\_\_**> standards.

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

* + - * 1. Maintain <**\_\_\_\_\_\_\_\_**> [**copy**] [**copies**] of each standard affecting Work of this Section on Site.
			1. QUALIFICATIONS

Coordinate following paragraphs with requirements specified in SUBMITTALS Article.

* + - * 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 [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience.
			1. DELIVERY, STORAGE, AND HANDLING
				1. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
				2. Storage:

Store materials according to manufacturer instructions.

Maintain factory packaging and caps in place until installation.

Keep valves and accessories in sealed containers and keep sealed until installation.

* + - * 1. Protection:

Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

Provide additional protection according to manufacturer instructions.

* + - 1. EXISTING CONDITIONS
				1. Field Measurements:

Verify field measurements prior to fabrication.

Indicate field measurements on Shop Drawings.

* + - 1. WARRANTY

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

* + - * 1. Furnish [**five**] <**\_\_\_\_\_\_\_\_**>-year manufacturer's warranty for valves, excluding packing [**, and pressure regulators**].
1. PRODUCTS

Valves included in this Section are applicable to compressed-air piping systems. Numbers used in Section 220523 have been retained for ease of cross referencing. Consider renumbering valves after editing this Section based on Project requirements.

* + - 1. GATE VALVES
				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] \*\*\*\*\*\*

In following subparagraph insert "State of \_\_\_\_\_\_\_\_ Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. [**GA-1**] 2 Inches and Smaller:

Comply with MSS SP-80 “Bronze Gate, Globe, Angle, and Check Valves”.

Class: [**125**] [**150**] <**\_\_\_\_\_\_\_\_**>.

Body and Trim: Bronze.

Bonnet: [**Threaded**] [**Union**].

Stem: [**Rising**] [**Nonrising**] [**; lock-shield**].

Operation: Handwheel.

Furnish inside screw [**with back-seating stem**], [**solid**] [**split**]-wedge disc [**, and alloy seat rings**].

End Connections: [**Soldered**] [**or**] [**threaded**].

* + - * 1. [**GA-2**] 2-1/2 Inches and Larger:

Comply with MSS SP-70 “Cast Iron Gate Valves, Flanged and Threaded Ends”.

Class: [**125**] <**\_\_\_\_\_\_\_\_**>.

Body: Cast iron.

Trim: Bronze.

Bonnet: Bolted.

Stem: [**Rising**] [**Nonrising**].

Operation:

Handwheel, and outside screw and yoke.

Furnish chainwheel operators for valves 6 inches and larger mounted 7 feet and greater above operating floor.

Disc: Solid wedge.

Seat Rings: Bronze.

End Connections: Flanged.

* + - 1. BALL VALVES
				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:

Conbroco (Apollo)

Milwaukee

Nibco

Or equal.

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

In following subparagraph insert "State of \_\_\_\_\_\_\_\_ Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Full-port ball valves are typically used in compressed-air systems.

* + - * 1. [**BA-2**] 2 Inches and Smaller:

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

Class: [**150**] <**\_\_\_\_\_\_\_\_**>.

Body:

Material: Bronze.

Type: Two-piece.

Ball: [**Chrome-plated bronze**] [**Type 316 stainless steel**].

Port: [**Full**] <**\_\_\_\_\_\_\_\_**>.

Seats: PTFE.

Stem: Blowout proof.

Operation: [**Lever**] [**Wing or tee**] [**Locking lever**] [**Extended lever**] [**Round**] [**Oval**] handle [**with balancing stops**].

End Connections: [**Soldered**] [**or**] [**threaded**] [**, with union**].

Following paragraph specifies a three-piece, repairable ball valve.

* + - * 1. [**BA-3**] 2 Inches and Smaller:

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

Class: [**150**] <**\_\_\_\_\_\_\_\_**>.

Body:

Material: Bronze.

Type: Three-piece.

Ball: [**Chrome-plated bronze**] [**Type 316 stainless steel**].

Port: [**Full**] <**\_\_\_\_\_\_\_\_**>.

Seats: PTFE.

Stem: Blowout proof.

Operation: [**Lever**] [**Wing or tee**] [**Locking lever**] [**Extended lever**] [**Round**] [**Oval**] handle [**with balancing stops**].

End Connections: [**Soldered**] [**or**] [**threaded**].

Following paragraph specifies ball valve with stainless-steel body and trim.

* + - * 1. [**BA-5**] 2 Inches and Smaller:

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

Class: [**150**] <**\_\_\_\_\_\_\_\_**>.

Body:

Material: Stainless steel.

Type: [**Two**] [**Three**]-piece.

Ball: Stainless steel.

Seats and Stuffing Box Ring: [**Reinforced**] PTFE.

Operation: [**Lever**] [**Wing or tee**] [**Locking lever**] [**Extended lever**] [**Round**] [**Oval**] handle [**with balancing stops**].

End Connections: Threaded.

* + - 1. BUTTERFLY VALVES
				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] \*\*\*\*\*\*

In following subparagraph insert "State of \_\_\_\_\_\_\_\_ Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Consider using Buna-N (nitrile rubber) seats in compressed-air applications.

* + - * 1. [**BF-1**] 2-1/2 Inches and Larger:

Comply with MSS SP-67 “Butterfly Valves”.

Class: [**150**] [**200**] [**250**] <**\_\_\_\_\_\_\_\_**>.

Body: Cast or ductile iron.

Stem: Stainless steel.

Neck: Extended.

Disc: [**Nickel-plated ductile iron**] [**, aluminum bronze**] [**, elastomer-coated ductile iron**] [**, chrome-plated ductile iron**] [**, or**] [**stainless steel**].

Seat: Resilient, replaceable [**Buna-N**] <**\_\_\_\_\_\_\_\_**>.

Operation:

[**Ten-position lever handle**] [**Infinite-position lever handle with memory stop**] [**Handwheel and gear drive**].

Furnish gear operators for valves 8 inches and larger, and chainwheel operators for valves mounted 7 feet and greater above operating floor.

End Connections: [**Wafer**] [**, lug**] [**, or**] [**grooved**].

* + - 1. CHECK VALVES - HORIZONTAL SWING TYPE
				1. [Manufacturers:](http://www.specagent.com/LookUp/?ulid=8008&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] \*\*\*\*\*\*

In following subparagraph insert "State of \_\_\_\_\_\_\_\_ Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Consider using Buna-N (nitrile rubber) disc in water-oil-gas applications.

* + - * 1. [**CK-1**] 2 Inches and Smaller:

Comply with MSS SP-80 “Bronze Gate, Globe, Angle, and Check Valves”.

Class: [**150**] <**\_\_\_\_\_\_\_\_**>.

Body, Cap, and Seat: Bronze.

Disc: [**Buna-N**] <**\_\_\_\_\_\_\_\_**>.

End Connections: [**Soldered**] [**or**] [**threaded**].

* + - * 1. [**CK-2**] 2-1/2 Inches and Larger:

Comply with MSS SP-71 “Cast Iron Swing Check Valves, Flanged and Threaded Ends”.

Class: [**125**] <**\_\_\_\_\_\_\_\_**>.

Body: Cast iron.

Cap: Bolted.

Disc: Bronze or cast iron.

[**Disc Seal and Seat: Renewable.**]

End Connections: Flanged.

* + - 1. PRESSURE RELIEF VALVES
				1. [Manufacturers:](http://www.specagent.com/LookUp/?ulid=8021&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:

The Lee Company

Rheem Manufacturing

Watts Co.

Or equal.

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

In following subparagraph insert "State of \_\_\_\_\_\_\_\_ Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description:

Body: Bronze.

Seat: PTFE.

Stem and Springs: Stainless steel.

Actuated Capacities: Automatic; direct pressure.

ASME certified and labeled according to BPVC.

* + - 1. PRESSURE-REDUCING VALVES
				1. [Manufacturers:](http://www.specagent.com/LookUp/?ulid=8064&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:

The Lee Company

Rheem Manufacturing

WATTS

Or equal.

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

In following subparagraph insert "State of \_\_\_\_\_\_\_\_ Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description:

Automatic reducing valve and bypass.

Low-pressure side relief valve and gage.

[**Furnish oil separator.**] [**Furnish oil separator as indicated on Drawings.**]

* + - * 1. Pressure Reduction:

From 200 psig to 30 psig.

Adjustable upward from reduced pressure.

* + - 1. PRESSURE REGULATORS
				1. [Manufacturers:](http://www.specagent.com/LookUp/?ulid=8065&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:

Camco

Emerson

Husky

Or equal.

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

In following subparagraph insert "State of \_\_\_\_\_\_\_\_ Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description:

Operation: [**Diaphragm**] [**Pilot**].

Type: Direct acting, spring loaded.

Body: Bronze.

Pressure Setting Adjustment: Manual.

Inlet Pressure Rating: 250 psig.

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

* + - * 1. Description:

Operation: Diaphragm.

Type: Direct acting, spring loaded.

Body: Aluminum alloy or plastic.

Pressure Setting Adjustment: Manual.

Inlet Pressure Rating: 250 psig.

* + - 1. SOURCE QUALITY CONTROL
				1. Provide shop inspection and testing of completed assembly.

Include one or both of following paragraphs to require Owner's inspection or witnessing of test at factory.

* + - * 1. Director’s Representative Inspection:

Make completed [**valves and accessories**] [**and**] [**pressure regulators**] available for inspection at manufacturer's factory prior to packaging for shipment.

Notify Director’s Representative at least [**seven**] <**\_\_\_\_\_\_\_\_**> days before inspection is allowed.

* + - * 1. Director’s Representative Witnessing:

Allow witnessing of factory inspections and test at manufacturer's test facility.

Notify Director’s Representative at least [**seven**] <**\_\_\_\_\_\_\_\_**> days before inspections and tests are scheduled.

Include following paragraph if reliance on manufacturer's approved quality-control program is sufficient for Project requirements.

* + - * 1. Certificate of Compliance:

If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.

Specified shop tests are not required for Work performed by approved manufacturer.

1. EXECUTION
	* + 1. EXAMINATION
				1. Verify that piping system is ready for valve installation.
			2. INSTALLATION
				1. Hangers and Supports:

As specified in Section 221513 - General Service Compressed-Air Piping.

* + - * 1. Valves:

Install valves and accessories according to manufacturer instructions.

Firmly support valves to avoid undue stresses on piping.

Coat studs, bolts, and nuts with anti-seizing lubricant.

Install valves with stems upright or horizontal, not inverted.

Install brass male adapter on each side of valves in copper piped system, and solder adapters to pipe.

Install 3/7 inch [**gate**] [**ball**] valves with cap for drains at main shutoff valves, low points of piping, bases of vertical risers, and equipment.

Install valves with clearance for installation of insulation and to allow access.

Provide access where valves and fittings are not accessible.

Install insulation as specified in Section 221513 - General Service Compressed-Air Piping.

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

Install insulation as indicated on [**Drawings**] [**Shop Drawings**] [**pipe schedule**].

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

In following paragraph insert "State of \_\_\_\_\_\_\_\_ Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

* + - * 1. Installation Standards: Install Work according to <**\_\_\_\_\_\_\_\_**> standards.
			1. FIELD QUALITY CONTROL
				1. Testing:

Test valves with piping as specified in Section 221513 - General Service Compressed-Air Piping.

Ensure proper alignment.

Director’s Representative will witness field testing.

* + - 1. CLEANING
				1. Blow systems clear of moisture and foreign matter.
			2. ATTACHMENTS

When relying on separate schedules, tables, illustrations, or forms to specify product requirements, include list of each attachment. Include identical list of attachments in Project Manual table of contents.

Assign number to each valve and coordinate schedule in conjunction with identification method used on Drawings.

Insert attachments following END OF SECTION.

* + - * 1. Schedule: As specified in Section 220523 - General-Duty Valves for Plumbing Piping.

END OF SECTION 221516