

SECTION 02610 VALVES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Gate Valves.
2. Eccentric Plug Valves.
3. Automatic Air Release Valves
4. Ball Valves for Air Release
5. Corporation Stops.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 - General Requirements.
3. *{Section XXXXX - Trenching, Backfilling and Compaction for Utilities}*.
4. 02510 – Ductile Iron Pipe and Fittings

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):
 - a. A48, Standard Specification for Gray Iron Castings.
 - b. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - c. A276, Standard Specification for Stainless Steel Bars and Shapes.
 - d. A536, Standard Specification for Ductile Iron Castings.
 - e. B16, Standard Specification for Free-Cutting Brass Rod, Bar, and Shapes for Use in Screw Machines.
 - f. B584, Standard Specification for Copper Alloy Sand Castings for General Applications.
 - g. D2240, Standard Test Method for Rubber Property-Durometer Hardness.
2. American Water Works Association (AWWA), latest revision:
 - a. C500, Standard for Metal-Seated Gate Valves for Water Supply Service.
 - b. C509, Standard for Resilient-Seated Gate Valves for Water Supply Service.
 - c. C515, Standard for Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
 - d. C517, Resilient-Seated Cast Iron Eccentric Plug Valves.
 - e. C550, Standard for Protective Epoxy Interior Coatings for Valves and Hydrants.
3. Manufacturers Standardization Society of the Valve and Fittings Industry Inc. (MSS):
 - a. SP-9, Spot Facing for Bronze, Iron, and Steel Flanges.
 - b. SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.
 - c. SP-72, Ball Valves with Flanged or Butt-Welding Ends for General Service.
 - d. SP-110, Ball Valves; Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

1.3 DEFINITIONS

A. The following are definitions of abbreviations used in this section:

1. SWP: Steam working pressure.
2. WOG: Water, oil, gas working pressure.
3. CWP: Cold Working Pressure

1.4 SUBMITTALS

A. Shop Drawings:

1. See Specification “Section 01340 – Submittals” for requirements for the mechanics and administration of the submittal process.

2. Bi-directional hydrostatic testing of valves shall be conducted by the valve manufacturer. A certificate of compliance, including test methods and results, shall be provided to HRSD for each valve and included with the shop drawing submittal to Owner and Engineer. Minimal acceptable test pressures shall be in accordance with applicable AWWA valve standards (C-500, C-509, C-515 and C-517) for the valve type to be installed.
3. Certified maximum operating torque on the valve shaft and the mechanical advantage of the geared actuator shall be provided by the manufacturer and included in the shop drawing submittal to HRSD.
4. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
5. Operation and Maintenance Manuals:
 - a. Refer to Specification "Section 01340 – Submittals" for requirements for the content of Operation and Maintenance manuals.
6. Valve Turn Count Verification and Inspection Information
 - a. Refer to "Field Quality Control – Valve Turn Count Verification and Inspection Procedures" within this section for required information to be included.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect valves, linings, and coatings during handling using methods recommended by the manufacturer. Use of bare cables, chains, hooks, metal bars, or narrow skids in contact with coated pipe is not permitted.
- B. Prevent damage to valves during transit. The operator nut and stem for gate valves and plug valves shall be protected during shipping and installation. Repair abrasions, scars, and blemishes. If repair of satisfactory quality cannot be achieved, replace damaged material immediately.

PART 2 - PRODUCTS

2.1 RESILIENT WEDGE SEATED GATE VALVES

- A. Valves 14 IN and smaller shall be resilient wedge gate valves to be installed in the vertical position only.
 1. Vertical position refers to the position of the traveling gate.
- B. Acceptable Manufacturers:
 1. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - a. Clow.
 - b. Mueller.
 - c. American Flow Control.
 - d. M&H.
 - e. U.S. Pipe Valve and Hydrant.
 - f. Or Approved Equal
- C. Design Requirements:
 1. Valves shall be designed for a working pressure of not less than 150 psi and tested at a pressure of not less than 300 psi.
 2. Valves shall be capable of drip-tight, bidirectional shutoff.
 3. Valves shall operate in a vertical position.
 - a. Operator: Non-rising stem with standard 2 IN wrench nut, open left (counter-clockwise).
 - 1) Extension stems are not allowed.
 4. Valves shall be approved by the manufacturer for buried service.
 5. Gear cases and shafts shall be totally enclosed type, suitable for buried service.
 - a. Reduction gears are not permitted.
- D. Materials:
 1. Furnish materials in full compliance with the following requirements:
 - a. Valves shall conform to AWWA C509 or AWWA C515.
 - b. Wedges: Ductile iron encapsulated with EPDM.

- c. Body: Ductile iron with fusion bonded epoxy coating on interior and exterior in accordance with AWWA C550.
- d. Valve ends shall be as indicated in the Drawings.

2.2 DOUBLE DISC, PARALLEL SEAT GATE VALVES

A. Buried Gate Valves 16 IN and larger shall be double disc parallel seated gate valves to be installed in the horizontal position only.

- 1. Horizontal position refers to the position of the traveling gate.

B. Acceptable Manufacturers:

- 1. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - a. Clow.
 - b. Mueller.
 - c. M&H.
 - d. Or Approved Equal

C. Design Requirements:

- 1. Valves shall be designed for a working pressure of not less than 150 psi and tested at a pressure of not less than 300 psi.
- 2. Valves shall be capable of drip-tight, bidirectional shutoff.
- 3. Valves shall operate in a horizontal position.
 - a. Operator: Non-rising stem with standard 2 IN wrench nut, open left (counter-clockwise).
 - 1) Extension stems are not allowed.
- 4. Valves shall be approved by the manufacturer for buried service.
- 5. Bypasses shall be provided on double disc gate valves 36 inches and larger.
- 6. Gear cases and shafts shall be totally enclosed type, suitable for buried service.
 - a. Provide 4:1 gearing ratio for horizontal installed valves.

D. Materials:

- 1. Furnish materials in full compliance with the following requirements:
 - a. Valves shall conform to AWWA C500.
 - b. Seats in the body shall be replaceable without removing the valve from the pipeline.
 - c. Discs shall be cast or ductile iron and bronze faced.
 - d. Discs may be free to revolve 360 degrees.
 - e. Valve to be furnished with bronze rollers, bronze or stainless steel tracks and bronze scrapers.
 - f. Body: Ductile iron with fusion bonded epoxy coating on interior and exterior in accordance with NSF-61 unless otherwise specified.
 - g. Valve ends shall be as indicated in the Drawings.

2.3 ECCENTRIC PLUG VALVES

A. Valves 16 IN and larger.

B. Acceptable Manufacturers:

- 1. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - a. DeZurik, Inc.
 - b. Milliken Valve Company, Inc.
 - c. Val-Matic Valve & Manufacturing Corp.

C. Design Requirements:

- 1. Valves shall be designed for a working pressure of not less than 150 psi. Valve actuator shall be sized based upon the working pressure.
- 2. Valves shall be given bidirectional leakage test and low-pressure 5 psi seat test in accordance with the procedures outlined in AWWA C517. Certified copies of the Proof-of-Design test reports documenting that all requirements of AWWA C517 were successfully met shall be furnished to HRSD prior to installation.

3. Valves shall operate in a horizontal position.
 - a. Horizontal position refers to the alignment of the rotating shaft on which the plug is affixed.
 - b. Operator: Non-rising stem with standard 2 IN wrench nut, open left (counter-clockwise).
 - 1) Extension stems are not allowed.
 - 2) Stem shear and coupling pins shall be solid 316 stainless steel.
4. For exposed service applications, plug valve shaft seals shall be externally adjustable and repackable without removing the actuator or bonnet from the valve under pressure. The actuator mounting bracket shall allow access to the packing gland and provide an air gap to visually inspect the packing.
5. For buried service applications, plug valve shaft seals shall be fully enclosed and protected from the surrounding groundwater and soil via full circumferential metal to metal contact between the bonnet and the actuator body or by other means as approved by the Owner.
6. Operator stems and nuts shall be provided with an enclosure that will protect the stem from being bent and provide a base and guide for the riser pipe.
7. All exposed nuts, bolts, springs and washers shall be 316 stainless steel.

D. Materials: Furnish materials in full compliance with the following requirements:

1. Valves shall conform to AWWA C517 and shall have an interior and exterior epoxy coating.
2. Valve body and plugs shall be ASTM A126 Class B cast iron or ASTM A-536 Grade 65-45-12 ductile iron with thickness in accordance with AWWA C-517.
3. Plugs shall be solid one piece with a cylindrical seating surface eccentrically offset from the center of the shaft. Plug facing shall be Buna-N with a minimum hardness (Shore A) of 70 durometer.
4. Seats shall be welded in overlay minimum 1/8 IN thick nickel raised surface of not less than 95% pure nickel. Bearings shall be sintered, permanently lubricated 316 stainless steel.
5. Packing shall be multiple v-type or "U" cup type.
6. Washers at the top and bottom of the plug journal shall be provided to keep grit and debris out of the bearings and packing.
7. Plug valves in the horizontal position shall be installed so that the plug rotates upward as the valve opens.
8. Valves shall be furnished with a standard 2 IN wrench nut and shall open left (counter-clockwise).
9. Valve ends shall be mechanical joint unless otherwise specified.
10. Port area shall be not less than 70% of the pipe area for a given size valve.

2.4 BALL VALVES

A. Acceptable Manufacturers:

1. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - a. NIBCO #T5857066-2.

B. Comply with MSS SP-110.

C. Materials:

1. Body: Brass.
2. Stem, stem gland nut: Brass.
3. Ball: Brass, chrome plated.
4. Seats, stuffing box ring, and thrust washer: Reinforced Teflon.
5. Handle: Vinyl coated or zinc- or cadmium-plated steel.

D. Design Requirements:

1. Rated for 600 psi WOG.
2. 100 percent full opening.
3. Handles showing direction of opening.
4. Stuffing boxes capable of being repacked under pressure and adjustable for wear.
5. Stem with reinforced Teflon stuffing box ring and blowout-proof design.
6. Renewable reinforced Teflon seats.

7. Ball design which does not allow media contact with stem.
8. Balancing stop for all applications.
9. Bodies with mounting pad for applications requiring actuators.

2.5 AUTOMATIC AIR RELEASE VALVES {approval on a case by case basis}

A. General:

1. Automatic air release valves and appurtenances shall be provided and installed at locations shown on the plan and per the details in the Contracts Documents.

2.6 CORPORATION STOPS FOR AIR VENTS

A. General:

1. The Contractor shall provide corporation stops for manual air vents at all high points in the force main. The corporation outlets shall be field tapped. All field taps shall be verified from the inside of the pipe and a repair kit shall be used to touch up the interior lining of the pipe. A tapping saddle with CC threads shall be provided at every 2-inch tap. Use Teflon tape or approved pipe thread compound on threads of the corporation stops to ensure tight seal. The Contractor shall keep the corporation stops in a closed position, unless air is being removed from the main, until the brass riser pipe and ball valve is installed. Corporation stops shall be opened prior to backfilling. Install air vent assembly in accordance with the Contract Drawings.

B. Acceptable Manufacturers:

1. Mueller 2" Corporation Stop model # H10045N
2. A.Y. McDonald model #731488
3. Cambridge Brass model #301NL-A7F7
4. No other products nor manufacturers are acceptable

C. Air Vent Assembly

1. Parts and installation per the Contract Drawings

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Setting Buried Valves:

1. Locate valves installed in pipe trenches where buried pipe is indicated in the Contract Drawings.
2. Set valves and valve boxes plumb.
3. Place valve boxes directly over valves with top of box being brought to surface of finished grade.
4. Place valve on firm footing in trench to prevent settling.
5. After installation, backfill up to top of box for a minimum distance of 4 FT on each side of box.

C. Installation of Plug Valves:

1. The installation of plug valves shall include a bedding and support system designed to bear the anticipated weight. The bedding and support system, including materials and installation methods, shall be in accordance with the Contract Drawings, and approved by the Engineer prior to placement of the valve. Geogrid support pad (Tensar TX 160) to be installed below stone base and between 12 inch stone (VDOT 21A or 21B) lifts. Refer to detail on Contract Drawings. {Engineer to develop bedding design include referenced detail based on each valve size}
2. Valve shall be oriented so the plug rotates 90 degrees to the top of the pipe when open.
3. Closed face of plug valve to installed facing the normal direction of flow in the pipe. Refer to detail on Contract Drawings. {Engineer to include referenced detail}

3.2 FIELD QUALITY CONTROL

A. Valve Turn Count Verification and Inspection Procedures

1. Provide notification to HRSD Interceptors 48-hrs prior to the installation of all valves.
2. Contractor must stage valves near the point of installation to allow the construction inspector, a member of Interceptor Operations (if deemed necessary), and the contractor to verify turn counts and to inspect both the interior and exterior of the valve during operation.
3. Prior to inspection, contractor must label each valve with the proposed stationing of the installation location.
4. Once a valve is staged at the installation site but prior to installation, valve turn counts must be verified and recorded by the construction inspector. The station labelling must also be confirmed by the construction inspector. No valve shall be installed if deviations in turn counts or station labelling are observed. HRSD, at its discretion, will witness the process.
5. Prior to the installation of a valve, it must be physically inspected by the construction inspector and the contractor during the valve open & close operations to ensure proper operation & seating. Torque measurements of the full operation must also be measured and recorded. Photographs shall be taken in the fully open, partially closed, and fully closed position prior to installation.
6. All documentation, including photographs, torque measurements, actual stationing, and number of turns must be provided to HRSD 48 hours after the valve has been installed.
7. A formal draft valve guide listing verified turn counts and all other required information must be submitted and approved by HRSD prior to the testing of any piping or valve assemblies.
8. Any deviations to these procedures will be cause for the contractor to excavate and potentially replace the valves at Contractor cost.

B. Air Vent Assemblies:

1. Saddles used for corporation stop installations shall be hydrostatically tested at 50 psi for 30 minutes with zero leakage prior to tapping the pipe. Failed tests shall be redone at the Contractor's expense.
2. HRSD Representative shall be present at all saddle tests. Failure to have the HRSD Representative present shall result in retesting at the Contractor's expense.

END OF SECTION