

SECTION 02552**WATER VALVES AND APPURTENANCES****02552.01 GENERAL****A. Description**

Water valve and appurtenance installation shall include, but not necessarily be limited to, furnishing and installing gate, air release and vacuum valves or assemblies with appurtenant valve vaults or roadway valve boxes and accessories in accordance with the Contract Documents.

B. Related Work Included Elsewhere

1. Trench excavation, backfill, and compaction; Section 02250.
2. Water main installation and chlorination; Section 02551.
3. Cast-in-place concrete; Section 03300.
4. Precast concrete utility structure installation; Section 03400.
5. Brickwork, unit masonry; Section 04200.

C. Quality Assurance

1. Materials

The Engineer will inspect all materials before and after installation to insure compliance with the Contract Documents.

2. Field Tests

- a. Water valves and appurtenances installed at the same time as a new water main shall be tested, after installation, by the Contractor along with the water main in accordance with Section 02551.
- b. Water valves and appurtenances installed in an existing water main will be visually inspected for leakage by the Engineer at the existing water main line pressure before the excavation is backfilled. The valve and joints shall be leak free under line pressure.
- c. Tapping sleeves and valves shall be tested after assembly on the existing water main but prior to making the tap. The Contractor shall pressurize the complete assembly to 150 psi, unless otherwise noted, and the Engineer will

visually inspect the tapping sleeve and valve for leakage. No leakage will be permitted.

D. Submittals

1. Shop Drawings

Shop drawings shall be submitted as specified in the "General Provisions" for all valves furnished, and shall include the following information: product description; pressure, torque, or other operating ratings when specified; parts and materials list; detailed assembly drawings; direction of opening; and maintenance requirements and procedures.

2. Certificates of Compliance

Certificates of compliance shall be submitted as specified in the "General Provisions" for all gate valves stating the valve and all materials used in its construction conform to the applicable requirements of the following AWWA standards as modified herein:

- a. Gate valves 3-inch through 30-inch diameter nominal pipe size, resilient seat type -AWWA C509-01.
- b. Interior coatings for resilient seated gate valves - AWWA C550.

02552.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any water valve or appurtenances.

B. Contractor's Options

None.

C. Detailed Material Requirements

- 1. Washed gravel for dewatering and air release and vacuum valve manhole fill shall meet the gradation requirements of AASHTO M 43, Size number 57, as specified in Section 02621.
- 2. Ductile iron and concrete pressure fittings, shall be as specified in Section 02551.
- 3. Tapping saddles and corporation stops shall be as specified in Section 02553.

4. Portland cement concrete for miscellaneous valve appurtenances and cast-in-place vaults shall be the Mix Number indicated on the Standard Details and as specified in Section 03310.
5. Precast concrete vault and manhole sections and grade rings shall be as specified in Section 03400.
6. Brick for valve support and miscellaneous valve appurtenances shall be sewer brick as specified in Section 04200.
7. Mortar for brickwork shall be as specified in Section 04100.
8. Frames, covers, and steps shall be as specified in Section 05500. Covers shall be labeled "WATER".
9. Gate Valves
 - a. General

Gate valves shall be iron body, resilient-wedge, non-rising stem, 2-inch square operating nut which shall turn left (counterclockwise) to open, with ample strength to withstand and operate under a cold water working pressure of 250 psi, unless otherwise noted. The trust collar shall be effective for both opening and closing. Valves shall be manufactured in accordance with AWWA C509 for valves three to twelve inches in diameter, and ANSI/AWWA C515-09 for valve diameters greater than 12-inches. Valves shall be furnished with mechanical joint ends unless flanged or other type ends are indicated on the Plans. Bonnet bolts shall be (minimum) 316 stainless steel.
 - b. Gate valves shall be buried in a vertical orientation unless otherwise shown on the Contract Drawings. Gate valves that are oriented horizontally will require a flushing port (diameter as recommended by the valve manufacturer) with adjacent valve box and flushing assembly. The diameter of the flushing assembly will be the same as the valve port.
 - c. Gate valves through 12-inch diameter shall be vertical type with "O"-ring stem seals without gearing or by-pass valves.
 - d. Buried valves up to 12-inches in diameter shall be furnished with a valve box adaptor that centers the operating nut in the valve box. Minimum number of turns shall be diameter multiplied by 3, plus 3. Permanent marker shall be provided in valves box indicating number of turns and direction of closing/opening the valve, per details on the drawing.
 - e. Gate valves shall be coated in accordance with AWWA C504 and lined with material meeting NSF approval for potable water use and AWWA C550.

- f. Valve body, bonnet, stuffing box and wedge shall be constructed of ductile iron. The exterior of the wedge shall be fully encapsulated with rubber. Mechanically attached rubber to wedge shall not be permitted. The wedge shall be symmetrical and set properly with flow in either direction.
- g. Gate valves shall be American Flow Control Series 2500, Mueller-Resilient Seat Gate Valve, or equal.

10. Tapping Valves and Sleeves

Valves for tapping service shall meet all the requirements for gate valves, including stainless steel fasteners and valve bolts (316 SS). In addition the body seat rings shall have clear inside openings sufficient to pass a cutter of full diameter and equal to the nominal size of the tapping valve. Tapping sleeves shall be iron body mechanical joint type, or stainless steel type with full 360° gasket. Tapping valves for ductile iron pipe shall have flange by mechanical type ends unless otherwise shown on the Plans. All tapping sleeves shall be furnished with an outlet for testing. Tapping sleeves for prestressed concrete pipe shall be furnished and installed in accordance with the pipe manufacturer's recommendations.

11. Air/Vacuum Release Valve

- a. The air/vacuum valve shall be of the type that automatically releases to atmosphere large amounts of air found in pipe lines during filling cycle and allows air into a line when it is being drained or when a vacuum occurs.
- b. The air/vacuum valve shall have a cast iron body and cast iron cover. The internal compound lever mechanism shall be stainless steel and all other internals including float shall be stainless steel to avoid galvanic action. The stainless steel float shall withstand a minimum pressure of 1,000 psi.
- c. All materials of construction shall be certified in writing to conform to ASTM specifications as follows:

<u>PART</u>	<u>MATERIAL</u>	<u>SPECIFICATION</u>
Body and Cover	Cast Iron	ASTM A48, Class 30
Internal Linkage	Stainless Steel	Series 300
Float & Internals	Stainless Steel	Series 300
Seat	Buna-N	
Exterior Paint	Phenolic Primer Red Oxide	FDA approved for potable water
Fasteners	Stainless Steel	Series 300

- d. The interior coating shall be per AWWA C550 and FDA approved for potable water contact. Unless otherwise noted, the air and vacuum valves shall be 2-inch size. Seats shall be designed for 100 – 200 psi operating pressure.
 - e. All internals shall be easily removed through the top cover without removing the main valve from the lines.
 - f. An isolating valve shall be installed between water main and air/vacuum release valve for maintenance.
 - g. Air/Vacuum release valve shall be installed in an easily accessible vault. Vault shall be adequately vented to meet air/vacuum release valve requirement.
 - h. The valve manufacturer shall furnish installation and maintenance instruction manuals with each valve.
 - i. Valve shall be APCO series 140C as manufactured by Valve Primer Corporation, Schaumburg, IL, GA Industries Model 100, Val-Matic Series #100 as manufactured by Val-Matic Valve and Manufacturing Corp. or approved equal.
12. Sliding type roadway valve boxes and covers shall be made of gray iron conforming to the requirements of ASTM A 48, Class 30 B and shall meet the dimensional and marking requirements indicated on the Standard Details.

13. Miscellaneous Small Pipe and Appurtenances

When indicated on the Standard Details or the Plans, the following materials shall meet the material requirements of the referenced standards or specifications:

- a. PVC – Schedule 80
- b. Galvanized steel pipe - ASTM A 120, Schedule 40.

- c. Standard malleable iron fittings, galvanized - ASTM A 153, A 197.
 - d. Brass pipe - ASTM B 43.
 - e. Bronze gate valves - FSS WW-V-54c.
14. Fiberglass witness post – for valves and hydrants in cross country rights of way/easements. Fiberglass posts to extend 5 feet above the top of grade; posts to be reflective and identified as Water (blue posts with black lettering).

02552.03 EXECUTION**A. General**

- 1. Excavation, foundation preparation, backfill, and compaction shall be as specified in Section 02250.
- 2. Construction methods shall be in accordance with Section 02251.
- 3. Valves shall be restrained, supported, and strapped to tees, crosses, dead ends, stubs, or outlets in accordance with the Standard Details.

B. Buried Gate Valves

- 1. Buried gate valves shall be installed in accordance with the Standard Details and at the locations shown on the Plans or as directed by the Engineer.
- 2. All gate valves shall be supported as shown in the Standard Details, and shall be installed with an adjustable roadway valve box.
- 3. Roadway valve boxes shall be set at right angles to the water main, centered and plumb over the valve operating nut. Valve box adaptors shall be used in to center the valve in the valve box. Backfill shall be compacted under and around valve boxes to insure that no vertical loads are transmitted to the valve operators. Valves box sections shall overlap a minimum of 6 inches.

C. Valves in Vaults or Manholes

Dewatering and air release and vacuum valves shall be installed in manholes in accordance with the Standard Details.

02552.04 METHOD OF MEASUREMENT

Measurement for water valves with appurtenant vaults, manholes, or roadway valve boxes will be made of the number of each size and type valve installed complete.

02552.05 BASIS OF PAYMENT**A. General**

1. Payment will be made at the unit price bid. The price bid shall include furnishing all labor, tools, equipment, and materials necessary to satisfactorily complete the work as shown and specified in strict accordance with the Contract Documents, and accepted by the Engineer.
2. Payment for furnishing and installing water valves and appurtenances will include the following:
 - a. Excavation and backfill as specified in Section 02250.
 - b. Furnishing and installing gravel or crushed stone, tie rods, retainer glands, and concrete valve support and restraint as shown on the Standard Details and/or Plans.
3. Payment will be made for contingent items when ordered by the Engineer. Payment will be as specified in Sections 02951, 02952, 02953, 02954, 02955, 02956, and 02957.

B. Water Valves

1. Payment for furnishing and installing water valves and appurtenances complete and operational will be made for each size and type of valve installed and will be in addition to the payment for furnishing and installing water mains. The price bid shall include furnishing and installing all valves, pizeometer corporations within vaults, vaults, manholes, roadway valve boxes; the testing of the complete installation; and all items necessary to satisfactorily complete the work.
2. Payment for furnishing and installing valves on water service connections will be made as specified in Section 02553.