

**SECTION 02552  
WATER VALVES AND APPURTENANCES**

**1.0 GENERAL**

**A. Description**

Water valve and appurtenance installation shall include, but not necessarily be limited to, furnishing and installing gate, butterfly, air release, vacuum, combination air valves or assemblies with appurtenant valve vaults, 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 Structures: Section 03400
5. Mortar: Section 04100
6. Brickwork Masonry: Section 04200
7. Miscellaneous Metals: Section 05500

**C. Quality Assurance**

The Commission will inspect all materials before, during and after installation to ensure compliance with the Contract Documents.

**2.0 MATERIALS**

**A. General**

Materials shall be furnished in accordance with the Contract Documents.

**B. Materials Furnished by the Commission**

The Commission will not furnish any water valves or appurtenances.

**C. Contractor's Options**

None

**D. Detailed Material Requirements**

1. Aggregate for bedding, leveling, and drainage shall meet the gradation requirements of AASHTO M 43, Size Number 57.
2. Water mains and appurtenances 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 03300.
5. Precast concrete vaults, manhole sections and grade rings shall be as indicated on the Standard Details and 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 indicated on the Standard Details and as specified in Section 05500.
9. Valves 16" and greater shall not have less than 2 feet from top of operating nut to finish grade. All vertical adjustment shall be at no additional cost to the Commission.
10. Gate Valves
  - a. Gate valves shall be iron body, resilient-seated, non-rising stem, 2-inch square operating nut which shall turn left (counter-clockwise) to open, with ample strength to withstand and operate under a working pressure of 150 psi, unless otherwise noted. The thrust collar shall be effective for both opening and closing. Valves up to and including 12" shall be manufactured in accordance with AWWA C 509. Valves greater than 12" shall be manufactured in accordance with AWWA C 509 or C 515. Valves shall be furnished with mechanical joint ends unless flanged or other type ends are indicated in the Contract Documents.
  - b. Gate valves through 20-inch diameter shall be vertical type with O-ring stem seals. Gate valves 20-inches and greater shall have gearing as approved by the Commission.
  - c. Gate valves shall be coated in accordance with AWWA C550. Both the inside and outside surfaces of the body and bonnet shall be epoxy coated.
  - d. Buried valves shall be furnished with an extension in accordance with the Standard Details.
  - e. Wedge rubber shall be molded in place and bonded to the ductile iron portion, and shall not be mechanically attached with screws, rivets, or similar fasteners.
  - f. Waterway shall be smooth and shall have no depressions or cavities in seat area where foreign material can lodge and prevent closure or sealing.
  - g. Wedge shall be constructed of gray or ductile iron, fully encapsulated in synthetic rubber except for guide and wedge nut areas.
11. Tapping Valves and Sleeves

- a. Valves for tapping service shall meet all the requirements for gate valves. In addition, the body seat rings shall have a clear opening equal to the nominal size of the tapping valve. Tapping sleeves shall be stainless steel, or as approved by the Commission. 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.
  - b. Tapping sleeves shall be stainless steel, similar to types H 610, 611 or 613 as manufactured by the Mueller Company, Decatur, IL. Tapping valves shall be similar to types H 667 or H 642 as manufactured by the Mueller Company. The direction to open the valve shall be counterclockwise.
12. Butterfly Valves
- a. Butterfly valves shall be permitted only with the specific approval of the Chief Engineer on water mains 16-inches or more in diameter, where the depth of cover precludes use of vertical gate valves.
  - b. Butterfly valves shall be manufactured in accordance with AWWA C504 as modified herein. Valves shall be Class 150B, and designed for a differential pressure across the valve of 150 psi and a minimum flow of 16 feet per second for opening and closing.
  - c. Valves shall be furnished with mechanical joint ends unless otherwise noted in the Contract Documents. When flanged ends are specified, valves shall be of the short lay length configuration.
  - d. Valves shall be furnished with a rubber seat, either in the body or on the disc, and a seat mating surface of alloy cast iron conforming to ASTM A 436, Type I, or 18-8 stainless steel, Type 304 or 316. Valves 24-inch diameter and larger shall have adjustable seats of a design that permits replacement in the field without removal of the valve from the line.
  - e. Valve shafts shall be stainless steel or monel, and shall be horizontal when the valve is installed in the water main.
  - f. Valve actuators may be worm gear or traveling nut type with a 2-inch square operating nut which shall turn left (counter-clockwise) to open. Operators shall be fully enclosed in a gasketed grease-filled enclosure, and shall withstand an input of 350 foot pounds to the nut at extreme operator position without damage.
  - g. Valves shall be furnished with an extension stem terminating a maximum of 6-inches below finished grade. The operating nut shall be located in a standard valve box and shall include a sealed valve position indicator which shows a valve position, and direction and number of turns to open or close the valve.
13. Ball Valves
- a. Full port true union ball valves shall be used on pipelines 2 inches and smaller in size, and shall be provided with 2-inch by 2-inch operating nut.

- b. PVC valve body material shall meet ASTM D 1784, Class 12454-B. Seats shall be PTFE or Teflon. O-rings shall be EPDM.
  - c. End connections shall be socket-type.
  - d. Valves shall have pressure rating of 150 psi at 73°F.
14. Swing Check Valves
- a. Horizontal swing check valves shall meet the requirements of AWWA C 508 and shall be ductile iron as manufactured by Clow Valve Company or approved equal.
15. Rubber Flapper Check Valves
- a. Rubber flapper check valves shall be ductile iron or bronze body, as manufactured by APCO Valve and Primer Corp., or approved equal.
16. Air and/or Vacuum Release Valve
- a. Air-release, air/vacuum, and combination air valves shall be manufactured in accordance with AWWA C512 as modified herein. Valves shall be furnished with threaded ends unless otherwise noted in the Contract Documents.
  - b. The air/vacuum valve shall have a stainless steel body and stainless steel cover. The internal compound level 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 standards as follows:

<u>PART</u>	<u>MATERIAL</u>	<u>STANDARD</u>
Body and Cover	Stainless Steel (316SS)	ASTM A351 Gr CF8M
Internal Linkage	Stainless Steel	Type 316
Float and Internals	Stainless Steel	Type 316
Seat	Buna-N	
Exterior Paint	Phenolic Primer Red Oxide	FDA approved for Potable Water

- d. All internals shall be easily removed through the top cover without removing the main valve from the lines.
- e. An isolating valve shall be installed between main and air/vacuum release valve for maintenance.
- f. Air/vacuum release valve shall be installed in an easily accessible vault. Vault shall be adequately vented to meet air/vacuum release valve requirement.

- g. The valve manufacturer shall furnish installation and maintenance instruction manuals with each valve.

17. Roadway Boxes

Screw type roadway valve boxes and covers shall be made of cast 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 and Section 05500.

- E. Material Storage Note: Materials shall be stored in order to insure the preservation of their quantity, quality and fitness for Work. The Contractor shall place materials on wooden platforms, or other hard, clean surfaces, not on the ground, and the materials shall be placed under cover when directed by the Owner. Stored materials shall be located in order to facilitate prompt inspection by the Owner. Lawns, grass plots, or other private or public property shall not be used for storage purposes without written permission of the owner or lessee. Unless directed or noted otherwise in the Contract documents, there will be no payment for stored materials.

3.0 EXECUTION

A. General

- 1. Excavation, foundation preparation, backfill, and compaction shall be as specified in the Standard Details and Section 02250.
- 2. Valves shall be restrained, supported, and strapped and/or anchored in accordance with the Standard Details.

B. Gate and Butterfly Valves

- 1. Gate and butterfly valves shall be installed in accordance with the Standard Details and at the locations shown on the Plans or as directed by the Commission.
- 2. Roadway valve boxes shall be centered and plumb over the valve operating nut. Backfill shall be compacted under and around valve boxes to ensure that no vertical loads are transmitted to the valve operators.

C. Valves in Vaults or Manholes

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

D. Field Tests

- 1. 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.
- 2. Water valves and appurtenances installed in an existing water main will be visually inspected for leakage by the Commission at the existing water main line pressure before the excavation is backfilled. The valve and joints shall be leak free under line pressure.

3. 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 for 15 minutes with zero leakage, unless otherwise noted, and the Commission will visually inspect the tapping sleeve and valve for leakage. No leakage will be permitted.

**4.0 METHOD OF MEASUREMENT**

**A. Water Valves**

Measurement for furnishing and installing water valves (gate, tapping valves and sleeves, and butterfly) 4-inches in diameter and greater and appurtenances will be made of the number of each size and type installed complete.

**B. Air and/or Vacuum and Combination Air Valves**

Measurement for furnishing and installing air and/or vacuum and combination air valves and appurtenances will be made of the number of each size and type installed complete.

**5.0 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.
2. Payment for furnishing and installing water valves and appurtenances will include the following:
  - a. Excavation, backfill, compaction, and incidental items as specified in Section 02250.
  - b. Furnishing and installing aggregate, tie rods, retainer glands, and concrete valve support and restraint as shown on the Contract Documents.
3. Payment will be made for contingent items when approved by the Commission.

**B. Water Valves**

Payment for furnishing and installing water valves (gate, tapping valves and sleeves, and butterfly) 4-inches in diameter and greater and appurtenances will be made of the number of each size and type installed.

The price(s) bid shall include traffic control, furnishing and installing all valves, fittings, vaults, manholes, roadway boxes, jointing and restraining materials, buttresses, strapping, cradling, testing of the installation, removal and disposal of pavement, removal and disposal of sidewalk, removal and disposal of paved ditches, removal and disposal of curb and gutter , providing an approved spoil site, and disposing of all spoil or excess materials; backfilling, suitable bedding and backfill materials, all environmental and erosion or sediment control work including off-site requirements at spoil storage or borrow sites; restoration of all disturbed areas, milling, paving, pavement materials,

removing existing buttresses when necessary, valve extensions (if required); connecting to existing pipelines, structures; testing, and all incidentals required to complete the work.

C. Air and/or Vacuum and Combination Air Valves

Payment for furnishing and installing air and/or vacuum and combination air valves and appurtenances will be made for each size and type installed. The price(s) bid shall include traffic control, furnishing and installing all valves, saddles, vaults, manholes, pipe supports, angle valves, corporation stops, extensions, restoration; testing of the completion installation; and incidental items to complete the valve installation.

D. Payment for furnishing and installing valves on water service connections will be made as specified in Section 02553.

**\*\* END OF SECTION 02552\*\***