
**SECTION 02410
GATE VALVES**

PART I: GENERAL

1.1 GENERAL REQUIREMENTS

- A. Gate valves.

1.2 MEASUREMENT AND PAYMENT

- A. Unit Prices:

1. Payment for gate valves is on a unit price basis. The unit price includes cost of required box for gate valves and extensions.
2. Payment for two inch (2 In) blow-off valve with box is on a unit price basis for each installation.
3. Refer to Section 01270 – Measurement and Payment for unit price procedures.

- B. Stipulated Price (Lump Sum):

1. If Contract is Stipulated Price Contract, payment for work in this Section is included in Total Stipulated Price.

1.3 REFERENCES

- A. ASTM – American Society for Testing and Materials.

1. ASTM A307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
2. ASTM B62 – Standard Specification for Composition Bronze or Ounce Metal Casting.
3. ASTM B763 – Standard Specification for Copper Alloy Sand Casting for Valve Application.
4. ASTM D429 – Standard Test Methods for Rubber Property-Adhesion to Rigid Substrates.

- B. AWWA – American Water Works Association.

1. AWWA C500 – Standard for Metal-Seated Gate Valves for Water Supply Service.
2. AWWA C509 – Standard for Resilient-Seated Gate Valves for Water Supply Service.
3. AWWA C515- Standard for Reduced Wall, Resilient- Seated Gate Valves for Water Supply Service.
4. AWWA C550 – Standard for Protective Epoxy Interior Coatings for Valves and Hydrants.

- C. CFTS – City of Friendswood Technical Specifications.

1.4 SUBMITTALS

- A. Conform to requirements of Section 01330 – Submittal Procedures.
- B. Submit manufacturer's product data for proposed valves for approval.
- C. Provide detailed drawings of gearing mechanism for twenty inch (20 In)

and larger gate valves.

1.5 QUALITY CONTROL

- A. Submit manufacturer's affidavit that gate valves are manufactured in the United States and conform to stated requirements of AWWA C500, AWWA C509, AWWA C515 and this Section and that they have been satisfactorily tested in the United States in accordance with AWWA C500, AWWA C509 and AWWA C515.

PART II: PRODUCTS

2.1 MATERIALS

- A. Gate Valves: AWWA C500, AWWA C509, AWWA C515 and additional requirements of this Section. Direct bury valves and those in subsurface vaults shall open counterclockwise (left hand).
- B. If type of valve is not indicated on the Drawings, use gate valves as line valves for sizes twenty inches (20 In) and smaller. When type of valve is indicated, no substitute is allowed.
- C. Gate Valves one and one-half inches (1-1/2 In) in diameter and smaller: one hundred twenty-five pounds per square inch (125 psi) pressure rating; bronze; rising-stem; singlewedge; disc type; screwed ends
- D. Coatings for Gate Valves two inches (2 In) and larger: AWWA C550 non-toxic, imparts no taste to water, functions as physical, chemical and electrical barrier between base metal and surroundings, minimum eight (8) mil-thick, fusion-bonded epoxy. Prior to assembly of valve, apply protective coating to interior and exterior surfaces of body.
- E. Gate Valves two inches (2 In) in diameter: Iron body, double disc or resilient-seated, non-rising stem, one hundred fifty pounds per square inch (150 psi) pressure rating, two inch (2 In) square nut operating to open counterclockwise (left hand).
- F. Gate Valves three inches (3 In) to twelve inches (12 In) in diameter: Non-directional, standard-wall resilient seated (AWWA C509), parallel seat double disc (AWWA C500) or reduced-wall resilient seated gate valves (AWWA C515), two hundred pounds per square inch (200 psi) pressure rating, bronze mounting, push-on bell ends with rubber joint rings and nut-operated unless otherwise specified. Provide approved standard-wall resilient seated valves. Provide approved reduced-wall resilient seated valves. Provide approved double disc valves. Comply with following requirements unless otherwise specified in the Drawings:
 - 1. Design: Fully encapsulated rubber wedge or rubber seat ring mechanically attached with minimum 304 stainless-steel fasteners or screws; threaded connection isolated from water by compressed rubber around opening.
 - 2. Body: Cast or ductile iron, flange bonnet and stuffing box together with ASTM A307 Grade B bolts. Manufacturer's initials, pressure rating and year manufactured shall be cast in body.

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3. Bronze: Valve components in waterway shall contain not more than fifteen percent (15%) zinc and not more than two percent (2%) aluminum.
 4. Stems: ASTM B763 bronze, alloy number-995 minimum yield strength of forty thousand pounds per square inch (40,000 psi); minimum elongation in two inches (2 In) of twelve percent (12%), non-rising.
 5. O-rings: For AWWA C500, Section 3.12.2. For AWWA C509, Sections 2.2.6 and 4.8.2. For AWWA C515, Section 4.2.2.5.
 6. Stem Seals: Consist of three (3) O-rings, two (2) above and one (1) below thrust collar with anti-friction washer located above thrust collar for operating torque.
 7. Stem Nut: Independent or integrally cast of ASTM B62 bronze.
 8. Resilient Wedge: Molded, synthetic rubber, vulcanized and bonded to cast or ductile iron wedge or attached with 304 stainless steel screws tested to meet or exceed ASTM D429 Method B; seat against epoxy-coated surface in valve body.
 9. Bolts: AWWA C500 Section 3.4, AWWA C509 Section 4.4 or AWWA C515 Section 4.4.4; stainless steel; cadmium plated or zinc coated.
- G. Gate valves fourteen inch (14 In) and larger in Diameter: AWWA C500; parallel seat double disc gate valves; push-on bell ends with rubber rings and nut-operated unless otherwise specified. Provide approved double disc valves with one hundred fifty pounds per square inch (150 psi) pressure rating. Comply with following requirements unless otherwise specified on the Drawings:
1. Body: Cast iron or ductile iron; flange together bonnet and stuffing box with ASTM A307 Grade B bolts. Cast following into valve body manufacturer's initials, pressure rating and year manufactured. When horizontally mounted, equip valves greater than twelve inches (12 In) in diameter with rollers, tracks and scrapers.
 2. O rings: For AWWA C500, Section 3.12.2. For AWWA C515, Section 4.2.2.5.
 3. Stems: ASTM B763 bronze, alloy number-995 minimum yield strength of forty thousand pounds per square inch (40,000 psi); minimum elongation in two inches (2 In) of twelve percent (12%), non-rising.
 4. Stem Nut: Machined from ASTM B62 bronze rod with integral forged thrust collar machined to size; non-rising.
 5. Stem Seals: Consist of three (3) O-rings, two (2) above and one (1) below thrust collar with antifriction washer located above thrust collar for operating torque.
 6. Bolts: AWWA C500 Section 3.4 or AWWA C515 Section 4.4.4; stainless steel; cadmium plated or zinc coated.
 7. Discs: Cast iron with bronze disc rings securely pinned into

- machined dovetailed grooves.
8. Wedging Device: Solid bronze or cast-iron, bronze-mounted wedges. Thin plates or shapes integrally cast into cast-iron surfaces are acceptable. Other moving surfaces integral to wedging action shall be bronze monel or nickel alloy-to-iron.
 9. Provide bypass for valves sixteen inches (16 In) and larger.
 10. Bronze Mounting: Built as integral unit mounted over or supported on, cast-iron base and of sufficient dimensions to be structurally sound and adequate for imposed forces.
 11. Gear Cases: Cast iron; furnished on eighteen (18) inch and larger valves and of extended type with steel side plates, lubricated, gear case enclosed with oil seal or O-rings at shaft openings.
 12. Stuffing Boxes: Located on top of bonnet and outside gear case.
- H. Gate valves fourteen inches (14 In) to twenty-four inches (24 In): Provide AWWA C515; reduced-wall, resilient seated gate valves with 250 psi pressure rating. Furnish with spur or bevel gearing.
1. Mount valves horizontally if proper ground clearance cannot be achieved by normal vertical installation. For horizontally mounted gate valves, provide bevel operation gear mounted vertically for above ground operation.
 2. Use valve body, bonnet, wedge and operator nut constructed of ductile iron. Fully encapsulate exterior of ductile iron wedge with rubber.
 3. Ensure wedge is symmetrical and seals equally well with flow in either direction.
 4. Provide ductile iron operator nut with four (4) flats at stem connection to apply even input torque to the stem.
 5. Bolts: AWWA C515, Section 4.4.4, Stainless Steel; cadmium plated or zinc coated.
 6. Provide high strength bronze stem and nut.
 7. O-rings: AWWA C515, Section 4.2.2.5, pressure O-rings as gaskets.
 8. Provide stem sealed by three (3) O-rings. Top two (2) O-rings are to be replaceable with valve fully open at full rated working pressure.
 9. Provide thrust washers to the thrust collar for easy valve operation.
- I. Gate Valves Extension Stem: When shown on the Drawings, provide non-rising, extension stem having coupling sufficient to attach securely to operating nut of valve. Upper end of extension stem shall terminate in square wrench nut no deeper than four feet (4 Ft) from finished grade or as shown on the Drawings. Support extension stem with an arm attached to wall of manhole or structure that loosely holds extension stem and allows rotation in the axial direction only.
- J. Gate Valves in Factory Mutual (Fire Service) Type Meter Installations:

Conform to provisions of this specification; outside screw and yoke valves; carry label of Underwriters' Laboratories, Inc.; flanged, Class 125; clockwise to close.

- K. Gate Valves for Tapping Steel Pipe: Provide double disc gate valve. Resilient wedge gate valve shall only be installed in a vertical position.
- L. Provide flanged joints when valve is connected to steel or PCCP.

PART III: EXECUTION

3.1 INSTALLATION

- A. Earthwork: Conform to applicable provisions of Section 02125 – Excavation and Backfill for Utilities.
- B. Operation: Do not use valves for throttling without prior approval of the manufacturer.

3.2 SETTING VALVES AND VALVE BOXES

- A. Remove foreign matter from within valves prior to installation. Inspect valves in open and closed positions to verify that parts are in satisfactory working condition.
- B. Install valves and valve boxes where shown on the Drawings. Set valves plumb and as detailed. Center valve boxes on valves. Carefully tamp earth around each valve box for minimum radius of four feet (4 Ft) or to undisturbed trench face when less than four feet (4 Ft). Install valves completely closed when placed in water line.
- C. For pipe section of each riser, use only six inch (6 In), ductile iron Class 51 or DR18 PVC pipe cut to proper length. Riser must be installed to allow complete access for operation of valve. Assemble and brace box in vertical position as indicated on the Drawings.

3.3 DISINFECTION AND TESTING

- A. Contractor shall disinfect valves and appurtenances as required by Section 02455 – Disinfection of Waterlines and test as required by Section 02450 – Hydrostatic Testing of Waterlines.
- B. Double-Disc Gate Valves: Apply hydrostatic test pressure equal to twice rated working pressure of valve between discs. Valve shall show no leakage through metal, flanged joints or stem seals. Test at rated working pressure, applied between discs. Valve shall show no leakage through metal, flanged joints or stem seals. Do not exceed leakage rate of one ounce per hour per inch (1 Oz/Hr/In) of nominal valve size.
- C. Solid-Wedge Gate Valves: Apply hydrostatic pressure equal to twice rated working pressure of valve with both ends bulkheaded and gate open. Valve shall show no leakage through metal, flanged joints or stem seals. Test at rated working pressure, applied through bulkheads alternately to each side of closed gate with opposite side open for inspection. Valve shall show no leakage through metal, flanged joints or stem-seals. Do not exceed leakage rate of one ounce per hour per inch

(1 Oz/Hr/In) of nominal valve size.

D. Repair or replace valves which exceed leakage rate.

3.4 PAINTING OF VALVES

A. Paint valves in vaults, stations and above ground with approved paint.

END OF SECTION