

San Antonio Water System Material Standard Specifications

SPECIFICATIONS FOR REDUCED-WALL, RESILIENT-SEATED GATE

AND TAPPING VALVES FOR WATER SUPPLY SERVICE

4IN. THROUGH 48IN. ANSI/AWWA C515-01

REVISED DECEMBER 2011

1. SCOPE

This product specification covers reduced wall resilient seated gate valves, with nominal diameters of 4 in. through 48 in. Sizes refer to the nominal diameter, in inches, of the waterway through the inlet and outlet connections and the closure area. All products furnished shall conform to the American National Standards Institute and American Water Works Association C515-01 Standard (ANSI/AWWA C515-01) or latest revision thereof and Manufacturers Standardization Society Standard Practice for Connecting Flange Joint Between Tapping Sleeves and Tapping Valves MSS SP-60 or latest revision thereof.

2. DEFINITIONS

All definitions are defined according to ANSI/AWWA C515-01.

- a) Cosmetic Defect: A blemish, which has no effect on the ability of the component to meet the structural design and production test requirements of this standard. Should the activity of plugging, welding, grinding, or repairing of such blemish cause the component to fail these requirements, and then the blemish shall be considered a structural defect.
- b) Flanged Joint: The flanged and bolted joint as described in ANSI/AWWA C110/A21.10 or ANSI B16.1, Class 125.
- c) Mechanical Joint: The gasketed and bolted joint as described in ANSI/AWWA C110/A21.10, ANSI/AWWA C111/A21.11, or ANSI/AWWA C153/21.53.
- d) Push-on Joint: The single rubber gasket joint as described in ANSI/AWWA C111/A21.11.

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- e) Structural Defect: Flaws that cause the component to fail the structural design or test requirements of this standard. This includes, but is not limited to imperfections that result in leakage through the walls of a casting, failure to meet the minimum wall- thickness requirement, or failure to meet production tests.
- f) Tapping Valve: A special gate valve designed with end connections and an unobstructed waterway to provide proper alignment and positioning of a tapping sleeve, valve, and machine for tapping pipe dry or under pressure.

3. GENERAL REQUIREMENTS

- a) Except as otherwise modified or supplemented herein, ANSI/AWWA Standard C515-01 or the latest revision thereof, shall govern the design, component materials, construction; manufacture and testing of all reduced wall resilient seated gate valves. Valves shall be suitable for frequent operation as well as service involving long periods of inactivity. Valves shall be NSF-61 certified.
- b) The San Antonio Water System reserves the right to limit the purchase of reduced wall resilient seat gate valves from manufacturers and to the models specified, as shown on Attachment I, provided such reduced wall resilient seat gate valves conform to the provision contained herein.
- c) The minimum design working water pressure for gate valves with nominal diameters of 4 in., 6 in., 8 in., 10 in., 12 in., 14 in. and 16 in. shall be 200 psig unless otherwise specified.
- d) The maximum fluid velocity for flow through the valve in full open position shall be 16 ft/s.
- e) Valves shall be reduced wall, resilient-seated types, bronze mounted with non-rising stems. The closure member shall be fully encapsulated by an elastomer without thin spots or voids. When open the valve shall have a clear, full-port, unobstructed waterway.

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- f) Gray iron, ductile iron, steel, brass and bronze materials shall meet or exceed the material requirements of Section 4.2: Materials of AWWA C515-01 and the table below.

<u>Material</u>	<u>Standard</u>
Gray Iron	ASTM A126, Class B
Ductile iron	ASTM A536 no more than .08% phosphorous
Steel	SAE Grade 2, ASTM A307, and zinc plated
Bronze	ASTM B763 UNS C99500
Bronze Stem Nuts Only	ASTM B62 UNS C83600 ASTM B584 UNS C84400

- g) Gaskets, O-rings, Coatings, and elastomers shall meet or exceed the material requirements of Section 4.2 Materials of AWWA C515-01.
- h) The gate valves shall be designed and constructed for installation in either a horizontal or vertical position. Valves designed for buried installation shall have a stem in the vertical position and shall be furnished for mounting in a horizontal pipeline, unless otherwise specified.
- i) Valve components of brass or bronze shall be manufactured to ASTM recognized alloy specifications of low zinc content bronze, as shown in Section 4.2 Materials ANSI/AWWA Standard C515-01 or the latest revision thereof. Material for the stem shall have minimum yield strength of 40,000 psi. A minimum elongation in 2 inches of 12% and shall be made of bronze per ASTM B763, alloy number UNS C99500. A maximum zinc content of 2% as shown in Table 2 Chemical Requirements of ASTM B763-96 or the latest revision thereof. Stem nut material shall comply with the requirements shown in 3f above. The stem shall have a visible external marking at the top to indicate low-zinc, high strength material. The marking shall include a red plastic or neoprene washer placed around the top of the stem under the operating nut.

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- j) Valve ends shall be either flanged, tapping valve, mechanical joint, push-on joint or any combination thereof, as specified. All mechanical joint valves shall be supplied with glands, bolts, and gaskets. Valve body bolts and nuts shall meet the strength requirements of ASTM A307 with dimensions conforming to ANSI B18.2.1. The size of the bolt head shall be equal to the size of the nut and shall be stainless steel in accordance with ASTM 276.
- k) All gate valves shall open right (clockwise), unless otherwise specified.
- l) The following parts of the valve shall be made of ductile iron: bonnet and body. Shell thickness shall meet the minimum thickness requirements of Table 1 Minimum Thickness of Body and Bonnet of Section 4.4 Detailed Design of ANSI/AWWA C515-01. Valves larger than sixteen-inch shall meet the performance requirements of the San Antonio Water System resilient seat reduced gate valve specification.
- m) If glands and bushings are used for the valves shall be made of ASTM B763 bronze UNS C99500. The stem shall be made of cast, forged, or rolled ASTM B763 bronze UNS C99500. The gate may be made of bronze ASTM B763 UNS C99500. Stem seals shall be “O” ring type. The seals shall be designed for dynamic applications. The design shall be such that the seal above the stem collar can be replaced with the valve under full pressure in the fully open position. Materials for the “O” ring packing plate shall be in accordance with Section 4.4.6 Stem Sealing of the ANSI/AWWA C515-01 Standard or the latest revision thereof.
- n) Enclosed and buried valves shall be coated inside and outside with a fusion bonded epoxy having a nominal 8 mils dry film thickness, which meets or exceeds AWWA C550-01 and to the maximum extent possible shall be free of holidays. All coatings in contact with the potable water shall be approved for potable water immersion service per ANSI/NSF Standard 61.

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- o) The bidder shall submit with his proposal three sets of certified drawings showing the principal dimensions, general construction and material specification of the valve proposed. The number of turns to open (close) shall be clearly noted in the valve information submitted with the proposal documents. The number of turns to open or close the valve shall be consistent for each valve size for each approved manufacturer.
- p) Valves furnished under this specification shall be supplied from the San Antonio Water System approved manufacturer list.
- q) All gate valve parts shall be designed to withstand the following two pressure requirements, without being structurally damaged. (1) An internal test pressure of twice the rated design working pressure of the valve. In no case shall the pressure be less than 500 psi without any visual deformation. (2) The full rated internal working pressure when the closure member is cycled once from a fully open to a fully closed position against the full rated unbalanced working water pressure. In addition to these pressure requirements, the valve assembly and mechanism shall be capable of withstanding an input torque as follows: 200 ft.-lbs. for a 4-in. nominal diameter. 300 ft.-lbs. for a 6-in. nominal diameter. 300 ft.-lbs. for an 8-in. nominal diameter. 300 ft.-lbs. for a 10-in. nominal diameter. 300 ft.-lbs. for a 12-in. nominal diameter. 400 ft.-lbs. for a 14-inch through 20-inch nominal diameter. 600 ft.-lbs. for a 24-inch nominal diameter.
- r) Resilient seats shall be applied to the gate and shall seat against a corrosion resistant surface. The non-metallic seating surface shall be applied in a manner to withstand the action of line fluids and the operation of the sealing gate under long-term service. A metallic surface shall have a corrosion resistance equivalent to or better than bronze. A non-metallic surface shall be in compliance with ANSI/AWWA C550. The gate must be fully encapsulated by an elastomer without thin spots or voids. Resilient seats shall be bonded. ASTM D429 either method A or method B shall prove the method used for bonding or vulcanizing. For method A, the minimum strength shall not be less than 250 psi. For method B, the peel strength shall be 75 lb./in.

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- s) Flanged Ends: The end flanges of flanged valves shall conform to dimensions and drillings of ANSI/AWWA C110/A21.10 or ANSI B16.1, Class 125.
- t) Mechanical Joint Ends: Mechanical joint bell dimensions shall conform to ANSI/AWWA C111/A21.11.
- u) Push-on Joints: Push-on joints shall conform to the requirements of ANSI/AWWA C111/A21.11.
- v) Markings shall be cast on the bonnet or body of each valve and shall show the manufacturer's name or mark, the year the valve casting was made, the size of the valve, the letters "C515", and the designation of working water pressure, for example "200 W". Markings shall conform to Section 6.1 Marking of ANSI/AWWA C515-01 or latest revision thereof.
- w) The San Antonio Water System may, at no cost to the manufacturer, subject random valves to testing by an independent laboratory for compliance with these standards. Any visible defect or failure to meet the quality standards herein will be grounds for rejecting the entire order and removal of the manufacturer from the attached approval list.
- x) The attached qualified product list identifies specified manufacturers that are approved.
- y) The tapping valves shall be configured with a mechanical joint on one end and a tapping flange on the other end. The tapping valves shall be furnished complete with glands, bolts, and gaskets. The tapping valve shall have a clear unobstructed waterway. The seat rings shall be of a large diameter to permit the entry of the full diameter tapping machine cutters. The valve end which mates with the tapping sleeve shall have an alignment lip to fit the recess in the tapping sleeve flange for proper alignment. The lip will be dimensioned in accordance with MSS SP-60 for valves 20-inch nominal pipe size and smaller.

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4. WORKMANSHIP

- a) All parts of the reduced wall resilient seat gate valve shall be designed and manufactured to the tolerances specified in ANSI/AWWA C515-01 or latest revision thereof and this specification.
- b) All parts of the reduced wall resilient seat gate valve manufactured by a given manufacturer shall be interchangeable with like parts from another reduced wall resilient seat gate valve of the same model and size and by the same manufacturer.
- c) All interchangeable parts shall conform to their required dimensions and shall be free from defects that could prevent proper functioning of the valve.
- d) All castings shall be clean and sound, without defects that will weaken their structure or impair their service. Plugging, welding, or repairing of cosmetic defects is allowed. Repairing of structural defects is not allowed. Repaired valves shall comply with the testing requirements of this specification after repairs have been made. Repairs within the bolt circle of any flange face are not allowed.
- e) The reduced wall resilient seat gate valve shall be well fitted.
- f) Operation of the reduced wall resilient seat gate valve shall be smooth.
- g) All parts shall be free of structural defects.
- h) The reduced wall resilient seat gate valve shall be watertight.

5. PAINTING

- a) All exterior and interior surfaces of the valve shall be coated with epoxy, N.S.F. 61 certified. The epoxy shall have a nominal dry film thickness of 8 mils, and shall be in accordance with AWWA C550, latest revision.

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- b) Coating shall be as close to holiday free as is technologically possible.

6. TESTING

- a) Hydrostatic Gate Test: Hydrostatic Gate Test shall be performed on the valve in accordance with Section 5.1 Testing of ANSI/AWWA C515-01 or latest revision thereof.
- b) Torque Test: Torque Test for prototype valves shall be performed on the valve in accordance with Section 5.1 Testing of ANSI/AWWA C515-01 or latest revision thereof. Prototype valves larger than sixteen-inch shall meet the torque requirements of section 3q above.
- c) Leakage Test: Leakage Test shall be performed on the valve in accordance with Section 5.1 Testing of ANSI/AWWA C515-01 or latest revision thereof.
- d) Hydrostatic Shell Test: Hydrostatic Shell Test shall be performed on the valve in accordance with Section 5.1 Testing of ANSI/AWWA C515-01 or latest revision thereof. Valves larger than sixteen-inch shall be shell tested at twice the rated working pressure but no less than 500 psi.
- e) Production Test: Production Test shall be performed on the valve in accordance with Section 5.1 Testing of ANSI/AWWA C515-01 or latest revision thereof. This same test shall apply to valves larger than sixteen inch.
- f) Operation Test: Operation Test shall be performed on the valve in accordance with Section 5.1 Testing of ANSI/AWWA C515-01 or latest revision thereof.
- g) Seat Test. Seat Test shall be performed on the valve in accordance with Section 5.1 Testing of ANSI/AWWA C515-01 or latest revision thereof.
- h) An Affidavit of Compliance certifying that all required tests have been performed shall be provided in accordance with Section 6.3 Affidavit of Compliance of ANSI/AWWA C515-01.

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- i) The Affidavit of Compliance, the results of ASTM testing procedures and requirements for materials, Manufacturer's Quality Assurance Program, and the records of all tests performed on the valve shall be kept and provided by the supplier/manufacturer in a single hard cover bound notebook with the bid or with the shipping documents and shall be approved by the San Antonio Water System.

7. **QUALITY ASSURANCE**

- a) Manufacturers shall have an ASME or I.S.O. 9001 registered commercial quality system. If on receipt of reduced wall resilient seated gate valves they are found to be non-compliant the manufacturer shall replace the defective reduced wall resilient seated gate valves according to reduced wall resilient seated gate valve size with a reduced wall resilient seated gate valve that meets the San Antonio Water System's specifications. The defective reduced wall resilient seated gate valve will be returned to the manufacturer, freight collect, and the manufacturer shall replace the reduced wall resilient seated gate valve, freight prepaid. If San Antonio Water System audits, product inspection and data review in accordance with these specifications determine excessive reduced wall resilient seated gate valve non-compliance, the manufacturer will be subject to removal by the Products Standards Committee. If the reduced wall resilient seated gate valve becomes defective during the manufacturer's specified warranty period a San Antonio Water System quality assurance and manufacturer review will ensue. If the review determines manufacturing non-conformance the manufacturer shall replace the reduced wall resilient seated gate valve according to size with a reduced wall resilient seated gate valve that meets the San Antonio Water System's specifications. The defective reduced wall resilient seated gate valve removed from the field will be returned to the manufacturer, freight collect, and the manufacturer shall replace the reduced wall resilient seated gate valve, freight prepaid. If the non-conformance product amounts are excessive and result in increased product replacement by San Antonio Water System field staff the manufacturer may be subject to time and material charges.

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8. **REFERENCES**

- a) American National standards Institute and American Water Works Association Standard C509-01 (ANSI/AWWA C509-01).
- b) Manufacturers Standardization Society MSS SP-60.

APPROVED MANUFACTURER

PRODUCTS LIST

Sizes Four through Sixteen Inch

<u>Manufacturer</u>	<u>Model</u>
American Flow Control	2500
Mueller Company	A2361
United States Pipe & Foundry Company	Reduced Wall Metroseal
Clow Valve Company	2638

Sizes Eighteen Inch through Twenty-Four Inch

<u>Manufacturer</u>	<u>Model</u>
American Flow Control	2500
Mueller Company	A2361
United States Pipe & Foundry Company	Reduced Wall Metroseal
Clow Valve Company	2638

Sizes Thirty Inch And Thirty-Six Inch

<u>Manufacturer</u>	<u>Model</u>
American Flow Control	2500
Clow Valve Company	2638

Sizes Forty-Two Inch And Forty-Eight Inch

<u>Manufacturer</u>	<u>Model</u>
American Flow Control	2500

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