

**SAN ANTONIO WATER SYSTEM
SPECIFICATIONS FOR
RESILIENT-SEATED GATE AND TAPPING VALVES
FOR WATER SUPPLY SERVICE
ANSI/AWWA C509-01
3 IN., 4 IN., 6 IN., 8 IN., 10 IN., 12 IN., 16 IN., & 20 IN.
Revised October 2008**

1. **SCOPE**

This product specification covers resilient seated gate valves, with nominal diameters of 3 in., 4 in., 6 in., 8 in., 10 in., 12 in., 16 in., and 20 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 C509 Standard (ANSI/AWWA C509- 01) or latest revision thereof.

2. **DEFINITIONS**

All definitions are defined according to ANSI/AWWA C509-01.

- 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 blemish or the activity of plugging, welding, grinding, or repairing of such blemish cause the component to fail these requirements, 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.
- c. **Mechanical Joint:** The gasket and bolted joint as described in ANSI/AWWA C111/A21.11.
- d. **Push-on Joint:** The single rubber gasket joint as described in ANSI/AWWA C111/A21.11.
- e. **Structural Defect:** A flaw that causes the component to fail the structural design or test requirement 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.

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- 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 as described in AWWA C509 Section 1.2 Definitions and MSS SP-60.

3. **GENERAL REQUIREMENTS**

- a. Except as otherwise modified or supplemented herein, AWWA Standard C509-01 or the latest revision thereof, shall govern the design, component materials, construction; manufacture and testing of all 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 resilient seat gate valves from manufacturers and to the models specified, as shown on ATTACHMENT I, provided such resilient seat gate valves conform to the provision contained herein.
- c. The minimum design working water pressure for gate valves with nominal diameters of 3 in., 4 in., 6 in., 8 in., 10 in., and 12 in. shall be 200 psig unless otherwise specified.
- d. The minimum design working water pressure for gate valves with nominal diameters of 16 in., and 20 in. shall be 150 psig unless otherwise specified.
- e. Valves shall be 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.
- f. Gray iron, ductile iron, steel, brass and bronze materials shall meet or exceed the material requirements of Section 2: Materials of AWWA C509-01.
- g. Gaskets, O-rings, Coatings, and elastomers shall meet or exceed the material requirements of Section 2: Materials of AWWA C509-01.

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- h. The gate valves shall be designed and constructed for installation in either a horizontal or vertical position. Valves shall be designed for buried installation with 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 Table 1 of Section 2.2.4. of ANSI/AWWA Standard C509-01 or the latest revision thereof. Materials for the stem 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 be ASTM B62 UNS C83600 or ASTM B584 UNS C84400. 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.
- 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 either gray or ductile iron: bonnet, body, yoke, wrench nut, O-ring packing plate or seal plate, and gland follower. The gate may be made of gray or ductile iron.
- m. If glands and bushings are used for NRS valves they 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 stem nut material shall be ASTM B62 bronze UNS C83600 or ASTM B584 bronze UNS C84400. The gate may be made of bronze ASTM B763 bronze UNS C99500. Stem seals shall be “O” ring type. The seals shall be designed for dynamic applications.

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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 4.8.3 of the ANSI/AWWA C509-01 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.
- 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. To be included on the qualified product list, the manufacturer shall provide an Affidavit of Compliance in accordance with the Section 1.5 of the ANSI/AWWA C509-01 Standard or latest revision thereof, to include compliance with San Antonio Water System Specification No. 21-02. Records of all tests performed in accordance with Section 6.1 and Section 6.2 of the ANSI/AWWA C509-01 Standard or latest revision thereof will be made available or provided. These records will be representative test results for Section 6.1 and certificate of testing for Section 6.2. An affidavit of testing for the valve assembly as outlined in Section 6.2.2 of the ANSI/AWWA C509-01 Standard, (350 ft-lbs) will also be provided. A copy of the manufacturer’s Quality Assurance Program will be submitted. Blueprints and parts list for the valve shall also be provided.

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- 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. (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 3-in. nominal diameter. 200 ft.-lbs. for a 4-in. nominal diameter. 300 ft.-lbs. for a 6-in. nominal diameter. 300 ft.-lbs. for a 8-in. nominal diameter. 300 ft.-lbs. for a 10- in. nominal diameter. And 300 ft.-lbs. for a 12-in. nominal diameter. For sizes larger than a 12 in. nominal diameter refer to the manufacturer's specifications.
- 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.
- 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. The tapping valves shall be mechanical joints with 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.

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The seat rings shall be of a large diameter to the permit 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.

- w. All interchangeable parts shall conform to their required dimensions and shall be free from defects that could prevent proper functioning of the valve. When assembled, valves manufactured in accordance with this standard shall be well fitted and shall operate smoothly. All like parts of valves of the same model and size produced by the same manufacturer shall be interchangeable.
- x. 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.
- y. All gate valves shall be hydrostatically tested with twice the specified rated pressure applied to one side of the gate and zero pressure applied to the other side. The test is to be made in each direction across the gate. All tests are to be performed at the manufacturer's plant.
- z. All gate valves shall be operated through a complete cycle in the position for which it was designed to ensure free and proper functioning of all parts in the intended manner. Any defects in workmanship shall be corrected and the test repeated until satisfactory performance is demonstrated. All tests are to be performed at the manufacturer's plant.
- aa. A hydrostatic test pressure equal to twice the rated working pressure of the valve shall be applied to all assembled valves with the gates in the open position. The test shall show no leakage through the metal, pressure containing joints, or stem seals. All tests are to be performed at the manufacturer's plant.

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- bb. A test shall be made from each direction at rated working pressure to prove the sealing ability of each valve from both directions of flow. The test shall show no leakage through the metal, pressure containing joints, or past the seat. All tests are to be performed at the manufacturer's plant.
- cc. 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, and the designation of working water pressure, for example "200 W".
- dd. 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.
- ee. The attached qualified product list identifies specified manufacturers that are approved.

4. **WORKMANSHIP**

- a. All parts of the resilient seat gate valve shall be designed and manufactured to the tolerances specified in ANSI/AWWA C509-01 or latest revision thereof and this specification.
- b. All parts of the resilient seat gate valve manufactured by a given manufacturer shall be interchangeable with like parts from another 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.

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- e. The resilient seat gate valves shall be well fitted.
- f. Operation of the resilient seat gate valve shall be smooth.
- g. All parts shall be free of structural defects.
- h. The resilient seat gate valve shall be watertight.

5. **PAINING**

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

6. **TESTING**

- a. Hydrostatic Test: Hydrostatic Test shall be performed on the valve in accordance with Section 6.1 Proof of Design Testing of ANSI/AWWA C509-01 or latest revision thereof.
- b. Torque Test: Torque Test for prototype valves shall be performed on the valve in accordance with Section 6.1 Proof of Design Testing of ANSI/AWWA C509-01 or latest revision thereof.
- c. Leakage Test: Leakage Test shall be performed on the valve in accordance with Section 6.1 Proof of Design Testing of ANSI/AWWA C509-01 or latest revision thereof.
- d. Pressure Test: Pressure Test shall be performed on the valve in accordance with Section 6.1 Proof of Design Testing of ANSI/AWWA C509-01 or latest revision thereof.
- e. Operation Test: Operation Test shall be performed on the valve in accordance with Section 6.2 Production Testing of ANSI/AWWA C509-01 or latest revision thereof.

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- f. Shell Test: Shell Test shall be performed on the valve in accordance with Section 6.2 Production Testing of ANSI/AWWA C509-01 or latest revision thereof.
- g. Seat Test: Seat Test shall be performed on the valve in accordance with Section 6.2 Production Testing of ANSI/AWWA C509-01 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 C509-01.
- 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 or is in the process of achieving this certification by June 2001. Noncompliance to this registered commercial quality system requirement by June 2001 will result in removal of the manufacturer's product from Attachment I of this specification. If on receipt of resilient seat gate valves they are found to be non-compliant the manufacturer shall replace the defective resilient seat gate valves according to resilient seat gate valve size with a resilient seat gate valve that meets the San Antonio Water System's specifications. The defective resilient seat gate valve will be returned to the manufacturer, freight collect, and the manufacturer shall replace the resilient seat gate valve, freight prepaid. If San Antonio Water System audits, product inspection and performance data review in accordance with these specifications determine excessive resilient seat gate valve non-compliance, the manufacturer will be subject to removal by the Products Standards Committee. If the resilient seat gate valve becomes defective during the manufacturer's specified warranty period a San Antonio Water System quality assurance and manufacturer review will

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ensue. If the review determines manufacturing non-conformance the manufacturer shall replace the resilient seat gate valve according to size with a resilient seat gate valve that meets the San Antonio Water System's specifications. The defective resilient seat gate valve removed from the field will be returned to the manufacturer, freight collect, and the manufacturer shall replace the resilient seat 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.

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 Three through Twelve Inch

Manufacturer

Model

American Flow Control	Series 500
Clow Valve Company	2640
Kennedy Valve	Ken-Seal II
M&H Valve Company	4067
Mueller Company	2360 Series Gate Valve
United States Pipe & Foundry Company	A-USPO

Sizes Sixteen through Twenty-Four Inch

Manufacturer

Model

United States Pipe & Foundry Company	A-USPO
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