

**SAN ANTONIO WATER SYSTEM
SPECIFICATIONS FOR
RUBBER-SEATED BUTTERFLY VALVES
4 INCHES THROUGH 54 INCHES
ANSI/AWWA C504 Class 250
FEBRUARY 2011**

1. SCOPE

This product specification covers class 250 rubber-seated butterfly valves, 4 inches through 54 inches. All products furnished shall be in conformance with the American National Standards Institute and American Water Works Association C504 (ANSI/AWWA C504) or latest revision thereof; however, the body construction of the valve shall exceed the ANSI/AWWA C504 by the values specified herein. All coatings in contact with potable water shall be certified to N.S.F. 61. A proof of design certification shall be provided upon request.

2. DEFINITIONS

All definitions are defined according to ANSI/AWWA C504.

- a. Actuator: A device attached to the valve for the purpose of rotating the valve disc to an open, closed, or intermediate position; preventing disc over travel; and maintaining the disc in any position.
- b. Butterfly Valve: A valve that uses a disc rotatable through an angle of approximately 90 degrees as a closure member. The valve is closed when the disc is perpendicular to the flow way, open when parallel to the flow way, or used for throttling when positioned between open and closed.
- c. Disc: The closure member that is positioned in the flow stream to permit flow or to obstruct flow (depending on closure position) and that rotates through an angle of 90 degrees from full open to full shutoff.
- d. Rubber Seat: A rubber ring around the inside of the valve body to affect a seal against the metal seating surface when the disc is closed. Or resilient seats shall be located on the valve disc and shall provide a 360 degrees continuous, uninterrupted seating surface. Seats shall be mechanically retained with a stainless steel retaining ring and stainless steel Nylok cap screws, which shall pass through both the resilient seat and the retaining ring.

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The resilient seat's mating surface shall be to a 360 degrees continuous, uninterrupted stainless steel body seat ring. The retaining ring shall be continuous or investment cast with overlapping sections serrated grooves, and shoulders. Resilient seats shall be field adjustable and replaceable and shall not require hypodermic needles or pressure vessels to replace or adjust.

3. GENERAL REQUIREMENTS

- a. Except as otherwise modified or supplemented herein, AWWA Standard C504 or the latest revision thereof, shall govern the design, component material construction, manufacture and testing of all butterfly valves.
- b. The San Antonio Water System reserves the right to limit the purchase of butterfly valves from manufacturers and to the models specified, as shown on Attachment I, provided such butterfly valves conform to the provisions contained herein.
- c. Valves shall be Class 250 of the short-body type with a 250 psig bi-directional shut-off rating, a 500 psig hydrostatic body shell test and a maximum upstream line velocity rating according to the table listed below unless specified otherwise.

<u>Diameter</u>	<u>Velocity</u>
4 inch through 20 inch	16 feet per second
24 inch through 54 inch	8 feet per second

- d. Valve shall be in the same alignment as a horizontal pipe and shall be for buried service, unless otherwise specified. Valve shall be configured with a horizontal valve shaft and a vertical actuator shaft with standard 2" AWWA operating nut. The actuator shall be side mounted.
- e. Valve body shall be of cast iron conforming to ASTM Specification A-26, Class B, or Ductile Iron ASTM A536, grade 65-45-12.
- f. Valve body ends shall be flat-faced flanged in accordance with ANSI B16.1, Class 250. All cast iron valves shall exceed minimum body shell thickness AWWA C504 Class 150B, Table 2 of Section 3.1 Valve Bodies,

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Laying lengths for flanged and wafer valves and minimum body shell thickness for all body types by the following: Sizes 4" through 10" - 15% or greater, Sizes 12" through 24" - 20% or greater, and Sizes 30" through 54" - 50% or greater. Ductile iron valve body thicknesses shall conform to the table below. Ductile iron and cast iron laying lengths shall be as specified in the table below unless otherwise specified.

<u>Ductile Iron Valve Diameter Inch</u>	<u>Ductile Iron Thickness Inch</u>	<u>Ductile Iron Laying Lengths Inch</u>
3	.37	5
4	.40	5
6	.43	5
8	.46	6
10	.54	8
12	.58	8
14	.63	8
16	.68	8
18	.79	8
20	.83	8
24	.93	8
30	1.10	12
36	1.22	12
42	1.35	12
48	1.48	15
54	1.63	15
60	1.89	15
66	2.00	18
72	2.375	18

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<u>Valve Diameter</u> <u>Cast Iron</u>	<u>Thickness</u> <u>Cast Iron</u>	<u>Laying Length</u> <u>Cast Iron Inch</u>
6 Inch	Per specification	6
8 Inch through 12 inch	Per specification	8
14 Inch through 30 inch	Per specification	12
36 Inch through 54 Inch	Per specification	15

- g. Valve shall be of such design that the disc will seat at 90 degrees with the pipe axis.
- h. Valve shall be of such design that the disc will not flutter or vibrate when operated in a throttled position.
- i. Valves disc shall be of Cast Iron A-48, class 40 Cast Iron A-126, class B or Ductile Iron ASTM A-536, grade 65-45-12 and shall be of disc design to provide 360 degree uninterrupted seating.
- j. The valve seat shall be natural or synthetic rubber applied integrally to the body or disc. For valves 24 inches or larger, the rubber seat shall be capable of mechanical adjustment in the field and shall be field replaceable. Special tools required for seat adjustment shall be provided with the valve. Special tools required for seat replacement shall be furnished with the replacement seat. Mechanical adjustment or attachment of the seat and seat ring does not include welding. The mating seat surface shall be type 304 or type 316 stainless steel, ni-chrome or monel. Sprayed or plate mating seat surfaces are not acceptable.
- k. Valve shafts shall be type 630 stainless steel conforming to ASTM A-564 condition H-1100 and shall have a diameter equal to or greater than that shown for Class 150B in Table 3 of AWWA C504. Shafts shall conform to the requirements of Section 3.3, Valves Shaft of AWWA C504 for one-piece or stub shaft types. Connection between the shaft and disc shall be dowel, taper pins, or torque plugs, which are mechanically secured.
- k. The valve assembly shall be furnished with a factory-set, non-adjustable disc shaft thrust bearing that insures the valve disc is centered within the valve body seat at all times.

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- m. Valve shaft bearings shall be permanent, self-lubricated, bearings which continuous, low-friction maintenance-free operation. Shaft bearing shall be contained in integral hubs of the valve body.
- n. Valve shaft seal shall consist of O-ring, V-type, or U-cup type packing where the shaft projects through the valve body for the actuator connection.
- o. The valve shall be provided with a fully enclosed, permanently lubricated actuator of the traveling nut or worm gear design. The actuator shall be connected to the valve shaft by means of a key and keyway connection.
- p. All actuators shall have adjustable, mechanical stop limits in accordance with AWWA C504 Section 3.8.2. All 4" - 54" valve actuators shall be capable of withstanding 450 ft-lbs of input torque against the open or closed stops without damage.
- q. Valves for below ground applications shall be provided with an AWWA wrench nut. The wrench nut shall have an arrow cast thereon, indicating the direction on of opening. The wrench nut shall be suitably fastened to the actuator input shaft. If the shaft is smooth, the wrench nut shall be fastened to the input shaft by means of a minimum 5/16" diameter steel pin passing entirely through the shaft and the wrench nut. Key with keyway will be acceptable. If the shaft is splined, the wrench nut shall be formed to fit the splined shaft. The actuator shall be designed to produce the specified torque with a maximum input of 150 ft-lbs applied to the wrench nut.
- r. Valves for aboveground applications shall be provided with a handwheel. The handwheel shall have an arrow thereon, indicating the direction of the opening. The handwheel shall be suitably fastened to the actuator input shaft. Actuators equipped with handwheels shall be designed to produce the specified torque with a maximum pull of 80 pounds of the handwheel rim.
- s. The requirement for either wrench nut or handwheel and the direction of opening will be specified on each purchase order.

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- t. 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.
- u. The supplier/manufacturer shall provide Affidavit of Compliance with applicable sections of AWWA C504 and/or San Antonio Water System Specification 21-05 to include the following: Results of ASTM testing procedures and requirements for materials will be provided to the Owner upon request, Manufacturer's Quality Assurance Program, leak-tightness testing and proof of design testing of representative actuators in accordance with AWWA C504 Section 3.8.5.2 as modified herein (450 ft.-lbs.). Compliance assurance will be required in accordance with AWWA C504 Section 5.1.2, Affidavits. Results of performance tests, proof of design test, AWWA C504 Section 5.2.4, hydrostatic test, leakage test, and Affidavit of Compliance shall be provided with the bid or with the shipping documents and shall be approved by the San Antonio Water System.
- v. Valves furnished under this specification shall be supplied by our approved manufacturer list.

4. WORKMANSHIP

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

5. PAINTING

- a. All interior and exterior ferrous surfaces of the valve, including the disc, shall be coated with epoxy, N.S.F. 61 certified. The epoxy shall have a nominal 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 AND INSPECTION

- a. Performance Tests: Performance tests shall be performed on each valve in accordance with Section 5.2.1 Testing of ANSI/AWWA C504 or latest revision thereof.
- b. Leakage Tests: Leakage tests shall be performed on each valve in accordance with Section 5.2.2 Testing of ANSI/AWWA C504 or latest revision thereof and at an operating pressure of 250 psig.
- c. Hydrostatic Tests: Hydrostatic tests shall be performed on each valve in accordance with Section 5.2.3 Testing of ANSI/AWWA C504 or latest revision thereof and at an maximum operating pressure of 500 psig.
- d. Proof-of-Design Tests: Proof-of-Design tests shall be performed on each valve in accordance with Section 5.2.4 Testing of ANSI/AWWA C504 or latest revision thereof.
- e. An Affidavit of Compliance certifying that all required tests have been performed shall be provided.
- f. The Affidavit of Compliance and the records of all tests performed on the valves shall be kept and provided in a single hard cover bound notebook.

7. QUALITY ASSURANCE

- a. Manufacturers shall have an ASME or I.S.O. 9001 registered commercial quality system. If on receipt of butterfly valves they are found to be non-compliant the manufacturer shall replace the defective butterfly valves according to butterfly valve size with a butterfly valve that meets the San Antonio Water System's specifications. The defective butterfly valves will be returned to the manufacturer, freight collect, and the manufacturer shall replace the butterfly valve, freight prepaid.

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If San Antonio Water System audits, product inspection and performance data review in accordance with these specifications determine excessive butterfly valve non-compliance, the manufacturer will be subject to removal by the Products Standards Committee. If the butterfly 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 butterfly valve according to size with a butterfly valve that meets the San Antonio Water System's specifications. The defective butterfly valve removed from the field will be returned to the manufacturer, freight collect, and the manufacturer shall replace the butterfly valve, freight prepaid. If the nonconformance 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 C504 (ANSI/AWWA C504).

APPROVED MANUFACTURER and PRODUCTS LIST

<u>Manufacture</u>	<u>Product</u>
Mueller	Linseal XP
Henry Pratt (above ground)	HP-250
Henry Pratt (below ground)	HP-250
DeZurik	BAW
Crispin Multiplex	K-Flo Model 504 and K-Flo Model 47
Val-Matic	Series 2000

Previous Specification

May-1998
April-2000
Aug - 2003