

SECTION 05110 - BUTTERFLY VALVES

PART 1 - GENERAL

1.1 WORK INCLUDED IN THIS SECTION

- A. The WORK of this Section includes materials and installation of epoxy coated butterfly valves. Refer to Section 05100 for additional general requirements.

1.2 REFERENCE SPECIFICATIONS

- A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section.
 - 1. ANSI B16.1 Pipe Flanges and Flanged Fittings, Class 25, 125 and 250
 - 2. ANSI B16.5 Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special
 - 3. AWWA C213 Fusion Bonded Epoxy Coating
 - 4. AWWA C504 Rubber Seated Butterfly Valves
 - 5. AWWA C550 Protective Interior Coatings for Valves and Hydrants

1.3 SERVICE APPLICATION

- A. The DISTRICT requires the use of gate valves for all distribution and transmission pipe sizes. The DISTRICT, at its sole discretion, may allow the use of butterfly valves in certain operating conditions and only for 16-inch and larger transmission mains.

1.4 SUBMITTALS

- A. Provide submittals in compliance with Section 05100.

1.5 MANUFACTURER TESTING AND FIELD INSPECTION

- A. Butterfly valves shall be tested and inspected in compliance with AWWA C504 and Section 05100.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Butterfly valves shall be rubber-seated type in accordance with the requirements of AWWA C504 in all respects, except as may be specifically modified herein. Both workmanship and material shall be of the very best quality and shall be entirely suitable for the service conditions specified.
- B. Class 150B butterfly valves shall be used when static pressures are less than 150 psi. Where static pressures exceed 150 psi, Class 250B butterfly valves shall be used.

- C. Valves shall be of the latest manufactured type which meet requirements as specified herein and which shall have replacement parts available for a minimum ten (10) year period.
- D. Valves shall be satisfactory for frequent operation after long periods of inactivity. Valve discs shall rotate 90 degrees from the full open position to the tight shut position.
- E. Shaft seals shall be designed for use with standard split-V type packing or other approved seals, and the interior passage shall not have any excessive obstructions or stops.
- F. Cartridge-type valve seats, or valves employing snap rings to retain the rubber seats, will not be acceptable. The rubber seat shall be mounted in the valve body.
- G. On valves 30 inches and larger, the valve port diameter shall not be reduced more than 1-1/2 inches of the nominal pipe diameter.
- H. See Section 05100-2.1 for additional general requirements.

2.2 RUBBER-SEATED BUTTERFLY VALVES

A. Materials

1. Type: Tight-closing, rubber seated in conformance with AWWA C504 except as modified herein. Valves will be manually operated and shall be opened by rotating the operating nut or hand wheel in a counterclockwise direction. Valves shall have an AWWA C504 Class B designation, suitable for a maximum velocity of 16 feet per second in the upstream pipe section.
2. Bodies: Bodies shall be ductile iron as defined within AWWA C504, with integrally-cast hubs for shaft bearings. All valves shall be short body designed for the shutoff pressure specified with a factor of safety of not less than five. All valves shall have flat faced flanged ends with dimensions and drilling patterns conforming to ANSI B16.1 Class 125/250.
3. Discs: Ductile iron or cast iron as defined within AWWA C504. The disc edge shall have a corrosion-resistant edge for mating with the rubber seat and shall be machined or ground through 360 degrees of the seat. All keys and pins used to secure the valve disc to the shaft shall be of stainless steel or monel construction. All other pins and fasteners employed in the disc assembly shall be of austenitic stainless steel.
4. Shafts: Turned, ground, polished and fabricated from Type 304, stainless steel or monel. The shafts shall be of one or two piece construction and designed for a factor of safety of not less than five for the rated shutoff pressure and the maximum torque required. Connection of the valve disc to the shaft shall be suitable for the service conditions specified. The outboard end of the shafts shall be permanently marked to show the disc position in relation to the shaft.
5. Seats: Natural or synthetic rubber mounted in the valve body and which, together with the mating seat surface, shall be designed to provide tight closure at the shutoff

pressures specified herein. Seats which form, or are incorporated in the flange gasketing will not be acceptable. The mating surfaces for valve seats shall be Type 316 stainless steel. Rubber seats shall be field adjustable around the full 360-degree circumference and shall be replaceable without dismantling the operator, disc or shaft and without removing the valve from the pipeline. Adjusting segments and retainer screws, if used, shall be Type 316 stainless steel. If retaining segments are used, the bolts used to attach the retainer to the body shall not penetrate the rubber seat. The seats shall be retained by both cementing and vulcanizing and an additional approved positive means of retention. The positive retention shall be by means of corrosive-resistant device such as wedge-action segmented retainers or heavy stainless steel rings, epoxy-filled hollow rubber seats inserted in an inverted wedge-shaped recess, or other approved means. Design of the seats shall permit the valve to remain in a closed position with full unbalanced pressure on either side of the disc and adjoining pipeline flange on the other side removed without bulge or water penetration under the seat.

6. Bearings: Self-lubricating sleeve type. Thrust bearings shall be provided to keep the disc centered regardless of valve position.
7. Shaft seals: Valves shall be furnished with stuffing boxed. The packing shall be split self-adjusting "V" type of conventional type. Gland assemblies for conventional packing shall be of cast bronze with Type 316 stainless steel studs and nuts.
8. All bolts, nuts and studs shall conform to ASTM A307, Grade B; or ASTM A354. Bolts and nuts shall have hexagon heads.

2.3 MANUAL ACTUATORS

- A. Actuators shall conform to AWWA C504.
- B. Except as otherwise indicated, buried butterfly valves shall be equipped with a 2-inch square operating nut and position indicator with a maximum input torque of 150 pounds required to operate the valve.
- C. Actuators for valves located above ground or in vaults and structures shall have handwheels with a maximum input torque of 80 pounds required to operate the valve. The minimum hand wheel diameter shall be 12 inches. The actuator shall be equipped with a dial indicator which shows the position of the valve disc.
- D. Valves 30 inches and larger shall be equipped with worm-gear actuators, lubricated and sealed to prevent entry of dirt or water into the actuator at a water pressure of 40 feet of head, and totally enclosed and self-locking.
- E. Traveling nut actuators may be used on valves 24 inches or less.
- F. Actuators shall require a minimum of 40 turns and maximum of 100 turns to rotate the disc from fully open to fully closed position.
- G. Manual valve actuators shall turn clockwise to close unless otherwise specified. Valves shall indicate the direction of operation.

- H. All valve actuators shall be watertight, designed for buried or submerged uses. Actuators shall be fully gasketed, sealed, and factory-packed with grease, and gears shall be permanently lubricated and totally enclosed.
- I. Actuators shall be designed to hold the valve disc in any intermediate position without creeping or fluttering.
- J. Adjustable stops shall be provided to prevent overtravel in either position, field adjustable without having to remove the actuator from the valve, and able to withstand a minimum pull of 300 pounds at the full open and full closed positions without damage to the actuator or the valve.
- K. The valve manufacturer shall be responsible for mounting the actuator to the valve, at the valve manufacturer's facility.
- L. See Section 05100-2.2 for additional requirements.

2.4 VALVE APPURTENANCES AND OTHER REQUIREMENTS

- A. See Section 05100-2 for requirements on extension stems, valve wells, protective lining and coating, valve identification, storage and handling, concrete support blocks, and polyethylene sheet encasement.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation shall be in accordance with Section 05100.
- B. Exposed butterfly valves shall be installed to permit removal of valve assembly without dismantling the valve or operator.

END OF SECTION