

Materials Specification – 6 for FLANGED RUBBER SEATED BUTTERFLY VALVES

1. GENERAL

Butterfly valves shall be designed and manufactured in accordance with AWWA C504 with the following additional requirements or exceptions.

Valve sizes beyond the scope of AWWA C504 shall be based on the maximum service conditions with minimum safety factors of 3:1 on yield strength and 5:1 on ultimate strength. Class 250B valves shall have DI bodies with flange dimensions and drilling in accordance with ANSI B16.1, Class 125.

Valves supplied under this Specification may include buried, in-plant, and submerged. The type and class of valves and the type of actuators to be supplied should be specified.

2. SERVICE

Valves shall be suitable for throttling service, frequent operation, and long periods of inactivity. Valves shall be capable of operating satisfactorily with flows in either direction and suitable for use in potable and nonpotable service. Components shall be suitable for exposure to chloraminated water.

3. INSTALLATION

Valves specified as buried shall be used for buried service in horizontal waterlines with the valve shaft positioned horizontally and the operating nut shaft positioned vertically. The body of valves shall be buried and the actuators installed in manholes.

Valves specified as in-plant shall be used for service inside buildings or other structures in a dry environment protected from weather. Valves shall be installed with the valve shaft positioned horizontally and the actuator directly coupled to the valve body.

Valves specified as submerged shall be used for service inside basins and reservoirs. Valves shall be installed with the valve shaft positioned vertically and mounted to a pipe flange. Submerged valves shall be supplied with torque tubes and actuator stands as shown on the [Standard Drawings](#).

4. SHUT OFF PRESSURE

The maximum static differential pressure across the valve shall be the same as the class of the valve. At rated pressure, the valve shall be bubble tight for flows in either direction.

5. CLASS OF VALVE

The class of valves shall be as specified.

6. VALVE BODIES

Valve bodies shall be short body. Disc stops on the body are not allowed.

7. VALVE DISCS

The valve disc shall seat at 90 degrees to the pipe axis. Discs having hollow chambers that can entrap water are not allowed. Class 250B valve discs shall be DI.

8. VALVE SEAT

Rubber seats may be applied to the body or the disc. In either case, the mating seat surface shall be stainless steel or sprayed in accordance with AWWA C504.

Rubber seats shall be constructed of natural or synthetic rubber and may be reinforced by the manufacturer.

Rubber seats that are mounted on the disc shall be a continuous, full circle 360 degree seal clamped on with corrosion-resistant retaining rings and threaded fasteners.

Rubber seats that are mounted in the groove of the valve body on 24-inch and smaller valves may be bonded to the body. Bonded seats shall withstand a 75 pound pull in accordance to the 90 degree stripping test procedure, Method B of ASTM D 429.

Rubber seats that are mounted in the valve body on valves larger than 24-inches shall be full circle 360 degree and shall be retained in the valve body by mechanical means in such a manner that the seat can be adjusted to provide a tight shutoff. The valve shaft shall not penetrate the rubber seat.

9. VALVE SHAFT

The valve shaft shall be stainless steel and through or stub type. Shafts for Class 250B valves shall be ASTM A 564, UNS Designation S17400, condition H1150.

10. SHAFT SEAL

Where the valve shaft projects through the valve body for the actuator connection, a shaft seal that is designed for positive pressure within the valve shall be provided for 24-inch and smaller and 30-inch and larger valve sizes. For 24-inch and smaller valves, the seal shall be self-compensating V-type packing or an O-ring type contained in a corrosion resistant cartridge. For 30-inch and larger valves, the seal shall be self-compensating V-type packing or adjustable packing type with bronze or stainless steel pull-down packing gland follower.

On buried valves, the shaft seal area and exposed valve shaft shall be completely enclosed to prevent the infiltration of material around the shaft and the shaft seal during backfilling. Adjustable packing glands shall be accessible through the bonnet as specified in Paragraph 14 or by removing the enclosure around the packing gland.

11. VALVE BEARINGS

Valves furnished with an externally adjustable thrust bearing shall have the external adjusting mechanism enclosed in a substantial watertight housing.

12. TYPE OF VALVE ENDS

Valves shall be furnished with flanged ends. Dimensions and drilling shall be in accordance with ANSI B16.1, Class 125. Flanges shall be finished to the true plane surfaces within a tolerance limit of 0.005 inch. The finished face shall be normal to the longitudinal axis with a maximum angular variation tolerance of 0.002 inch per foot (0.017%) of flange diameter. Flanges shall be machined to a flat surface with a serrated finish in accordance with AWWA C207 and shall have full-sized bolt holes through the flanges. Drilled and tapped holes will be acceptable only in areas where the shaft passes through the body; flanges with all holes tapped are not allowed.

13. VALVE ACTUATORS

Valves shall be furnished with manual actuators designed and sized to develop output torques for the specified operating service; they shall be sufficient to seat, unseat, and rigidly hold the disc in any position. The maximum velocity through the valve for actuator design shall be 16 fps.

The gearing of the actuator shall be totally enclosed and sealed with a lubricant for a temperature range of minus 10°F to 150°F.

Worm-gear actuators shall have worm-gear of high tensile bronze and a worm of hardened alloy steel with ground and polished threads that are supplemented by a spur gear attachment, as required.

The diameter of the output shaft or spline of the actuator shall be equal or greater in size than the turned-down section of the valve shaft.

Actuators shall have a position indicator.

- A. Buried Valves:** Actuators shall be Auma Model GS, EIM Type WD, Rotork IW, or Limitorque Type HBC that are designed to operate temporarily in a submerged condition (i.e., 10 feet of water).

Actuators shall be equipped with 2-inch square wrench nuts in accordance with AWWA C509. The valve shall open with a clockwise rotation of the nut.

For the complete opening or closing of the valve, the minimum number of turns shall be at least 40.

- B. In-Plant and Submerged Valves:** The actuators shall be traveling nut or worm-gear type. Worm-gear actuators shall be Auma Model GS, Limitorque Type PT, Rotork IW, or EIM Type WO. Traveling nut actuators shall be manufactured by the valve manufacturer and capable of withstanding 450 foot-pounds of input torque.

14. EXTENSION BONNET

Buried valves shall be furnished with a separate one-piece CI or fabricated steel extension bonnet with access openings fitted with removable covers and located to permit access to the stuffing box for tightening the packing, if applicable. The extension bonnet shall be 24 inches in length and of a single diameter over the entire length. The minimum thickness of the removable cover shall be 14 gauge (0.0747 inches); it shall be attached to an extension sleeve with a minimum of four 1/4-inch diameter cap screws. Gasketing of the opening is not required.

15. TORQUE TUBES

Submerged valves shall be supplied with torque tube type shaft extensions and actuator support stands as shown on the [Standard Drawings](#). Each torque tube and actuator support stand shall be sized to operate under the maximum service conditions for the valve. The torque tube shall transmit the required torque to the valve without excessive twisting such that the valve will always provide a tight shut-out. The torque tube shall be connected to the valve shaft with a taper pin and nut or with a keyed connection.

16. NAMEPLATES

Corrosion-resistant nameplates shall be provided. A valve nameplate shall be attached to the valve body and an actuator nameplate attached to the valve actuator. For buried or submerged valves, the nameplate shall be attached to the valve actuator. Valve nameplates shall include the normal valve data and the serial number.

17. COATINGS

- A. Internal Surfaces:** If constructed of fabricated steel, the valve internal ferrous surfaces and extension bonnet, except machined or bearing surfaces, shall be prepared for coating in accordance with SSPC SP10. These surfaces shall then be coated with a two-part thermosetting polyamide epoxy in two or more uniform coats or with fusion-bonded epoxy to a minimum DFT of 12 mils in accordance with AWWA C550.
- B. External Surfaces:** External surfaces, except machined or bearing surfaces, shall be carefully prepared by removing dirt, grease, and rust and cleaned to the extent that the coating will effectively bond to all surfaces.
- For buried valves, the exterior of each valve, except flange faces, shall be shop coated with two coats of asphalt varnish or prepared and coated in the same manner as the internal surfaces.
- For in-plant valves, the exterior of each valve, except flange faces, shall be shop coated with one coat of polyamide anti-corrosive epoxy primer to a DFT of at least 3 mils.
- For submerged valves, the external surfaces shall be prepared and coated in the same manner as the internal surfaces.
- Flange faces shall be shop coated with a rust preventive compound.
- C. Rubber Seal:** After coating is complete, a lubricant compatible with the rubber seal shall be applied to the seal surface and the mating metal surface to prevent bonding during shipment and storage. Following the application of the seal lubricant, the valve disk shall be placed in a slightly open position for shipment.

18. VALVE ASSEMBLY

Buried and in-plant valves shall be shipped fully assembled. Submerged valves shall be assembled in the manufacturer's shop, i.e., the torque tube assembled to the valve shaft and the actuator adapter mounted to the torque tube to ensure proper fit. The assembled valves shall be performance tested in accordance with AWWA C504. If submerged valves are to be disassembled for shipment, the manufacturer shall match-mark parts for field assembly. The torque tube connection to the valve shaft and the actuator shall also be scribed or otherwise marked to indicate relative orientation between the parts for field assembly.

19. CERTIFICATION

The manufacturer shall furnish a sworn statement that the inspection and all specified tests have been completed and that results comply with the requirements of these Standards. A copy of the Certification, including compliance with NSF/ANSI 61, shall be provided to Denver Water.

20. ACCEPTABLE MANUFACTURERS

Dezurik
M&H Valve Company
Mueller
Pratt
Rodney Hunt
Val-Matic

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