

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. For valve sizes beyond the scope of AWWA C504, the valve design 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 ductile iron bodies with flange dimensions and drilling per ANSI B16.1, Class 125.

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

2. SERVICE:

Valves shall be suitable for throttling service, frequent operation and service involving long periods of inactivity. Valves shall be capable of operating satisfactorily with flows in either direction. Valves shall be suitable for use in potable and non-potable service.

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 will be buried and the actuators will be installed in manholes.

Valves specified as in-plant shall be used for service inside buildings or other structures in a relatively dry environment that is protected from weather. The valves will 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 or reservoirs. The valves will be installed with the valve shaft positioned vertically and will be mounted to a pipe flange. Submerged valves shall be supplied with torque tubes and actuator stands as shown in the [Standard Drawings](#).

4. SHUT OFF PRESSURE:

The maximum static differential pressure across the valve will 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 will NOT be allowed. Class 250 valve bodies shall be ductile iron.

7. VALVE DISCS:

The valve disc shall seat at 90 degrees to the pipe axis. Discs having hollow chambers that can entrap water will NOT be allowed. Class 250B valve discs shall be ductile iron.

8. VALVE SEAT:

Rubber seats may be applied to either the body or the disc. The mating seat surface, in either case, 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 valves that are 24-inches in diameter or smaller 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 either 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 the following valve sizes:

A. For valves 24-inches in diameter and smaller:

The seal shall be one of the following types:

- 1) Self-compensating V-type packing.
- 2) O-ring type contained in a corrosion resistant cartridge.

B. For valves 30-inches in diameter and larger:

- 1) Self-compensating V-type packing.
- 2) 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 in order to prevent the infiltration of material around the shaft and shaft seal during backfilling. Adjustable packing glands shall be accessible either 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 conform to 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. The flanges shall have full-sized bolt holes through the flanges; drilled and tapped holes will be acceptable only in the areas where the shaft passes through the body. Flanges with all holes tapped will NOT be allowed.

13. VALVE ACTUATORS:

Valves shall be furnished with manual worm gear actuators that are 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 -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 of an equal or greater 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 Limatorque 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.

The minimum number of turns for the complete opening or closing of the valve shall not be less than 40.

B. In-Plant and Submerged Valves

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

14. EXTENSION BONNET:

Buried valves shall be furnished with a separate one piece cast iron or fabricated steel extension bonnet with access openings that are 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 its entire length. The minimum thickness of the removable cover shall be 14-gauge (0.0747 inches) and it shall be attached to an extension sleeve with a minimum of four one-quarter inch diameter cap screws. The 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 in 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. There shall be one valve nameplate attached to the valve body and one actuator name plate attached to the valve actuator. For buried or submerged valves, the nameplate shall be attached to the valve actuator. The valve nameplates shall include the normal valve data and the serial number.

17. MANUFACTURE:

Valves that are furnished shall be the latest standard products of a manufacturer who has been regularly engaged in the production of equipment of this nature for at least 5 years.

18. COATINGS:

A. Internal Surfaces:

The valve internal ferrous surfaces and extension bonnet, if constructed of fabricated steel, except machined or bearing surfaces, shall be prepared for coating per SSPC-SP-10. 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 dry film thickness of 12 mils. Epoxy coating shall conform to AWWA C550.

B. External Surfaces:

External surfaces, except machined or bearing surfaces, shall be carefully prepared by the removal of dirt, grease and rust and shall be 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 either 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 dry film thickness of not less than 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 completed, a lubricant compatible with the rubber seal shall be applied to the seal surface and the mating metal surface in order to prevent the bonding of the two surfaces during shipment and storage. Following the application of the seal lubricant, the valve disk shall be placed in a slightly open position for shipment.

19. 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 is assembled to the valve shaft and the actuator adapter is mounted to the torque tube to ensure a proper fit). The assembled valves shall be performance tested in accordance with AWWA C504. If the 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 in order to indicate relative orientation between the parts for field assembly.

20. CERTIFICATION:

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

21. ACCEPTABLE MANUFACTURERS:

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

*Material Specification – 6
Flanged Rubber Seated Butterfly Valves*