

**SECTION 40 05 64.13**  
**AWWA RESILIENT-SEATED BUTTERFLY VALVES**

**PART 1 GENERAL**

1.1 SUMMARY

- A. Section includes general information, products, and execution for rubber-seated butterfly valves.

1.2 REFERENCES

- A. American Society of Mechanical Engineers (ASME):
1. B16.1 – Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250
- B. ASTM International (ASTM):
1. A 564 – Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes
  2. D 429 – Standard Test Methods for Rubber Property—Adhesion to Rigid Substrates
- C. American Water Works Association (AWWA):
1. C207 – Steel Pipe Flanges for Waterworks Service, Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm)
  2. C504 – Rubber-Seated Butterfly Valves
  3. C509 – Resilient-Seated Gate Valves for Water-Supply Service
  4. C516 – Large-Diameter Rubber-Seated Butterfly Valves, 78 in (2000mm) and Larger
  5. C550 – Protective Epoxy Interior Coatings for Valves and Hydrants
- D. The Society for Protective Coatings/National Association of Corrosion Engineers (SSPC/NACE):
1. SP 10/NACE No. 2 – Near-White Blast Cleaning

1.3 COORDINATION

- A. Type V504 butterfly valves: Except as modified or supplemented herein, butterfly valves supplied under this Section shall be designed and manufactured in accordance with AWWA C504 for valves up to 72 inches in diameter, and AWWA C516 for valves 78 inches diameter and larger. Class 250 valves shall have ductile iron bodies with flange dimensions and drilling in accordance with ANSI B16.1, Class 125.
- B. Provide butterfly valves as listed in the Bill of Materials at the end of this Section.
- C. Valves supplied under this Section may include 3 installation types: Buried, in-plant, and submerged. The type of valves, class of valves and type of actuators to be supplied are identified in the Bill of Materials.
- D. Valves shall be identified by the tag/item numbers listed in the Bill of Materials.

1.4 SUBMITTALS

- A. Shop Drawings:
1. Make and model of each equipment assembly.
  2. Weights of valve assemblies and individual components.
  3. Manufacturer's catalog information, descriptive literature, Specifications, and identification of materials of construction.
  4. Detailed structural and mechanical drawings showing the equipment fabrications and interface with other items. Include dimensions, size, and locations of connections to other work, and weights of equipment associated therewith.
  5. Submit the following calculations for each valve and service condition:
    - a. Maximum valve torque.
    - b. Valve actuator torque capacity.
    - c. Shaft sizing if valve is beyond scope of AWWA C504 or AWWA C516.
- B. Quality Control Submittals:
1. Manufacturer's Proof-of-Design test documentation in accordance to AWWA C504 or C516
    - a. Actuator
    - b. Valve
  2. Manufacturer's Factory Testing and Functional Operation Reports
- C. O&M Manual:
1. Complete, detailed operating instructions for each piece of equipment, including actuators.
  2. Explanations of all safety considerations relating to operation.
  3. Information and instructions for lubrication and adjustments.
  4. Special shipping, storage and protection, and handling instructions.
  5. Manufacturer's written/printed installation instructions.
  6. Routine maintenance requirements prior to startup.
  7. Maintenance instructions with illustrations as necessary.
  8. Recommended schedule of maintenance.
  9. Lubrication schedule and table of alternate lubricants.
  10. List of special tools and equipment required for maintenance.
  11. Recommended spare parts list.
  12. Include all information submitted for Shop Drawings listed in this Section.
- D. Extra Materials: Furnish, tag, and box for shipment and storage any special tools required to maintain or maintenance valve.

1.5 QUALITY ASSURANCE

- A. Valve Manufacturer Qualifications: A minimum of 5 years of documented experience in the Work of this Section

1.6 WARRANTY

- A. The Equipment Supplier shall provide Manufacturer's standard warranty:
1. Valve
  2. Gear Actuator

## **PART 2 PRODUCTS**

### **2.1 APPROVED MANUFACTURERS**

- A. Valves:
  - 1. DeZurik
  - 2. Henry Pratt
  - 3. Mueller
  - 4. Val-Matic
- B. Valve Actuators:
  - 1. Buried valves:
    - a. Auma Model GS
    - b. Limitorque, Type HBC
    - c. EIM, Type WD
    - d. Rotork, IW
  - 2. In-plant and submerged valves:
    - a. Worm gear actuators:
      - 1) Auma Model GS
      - 2) EIM, Type WO
      - 3) Limitorque, Type PT
      - 4) Rotork IW
    - b. Traveling nut actuators:
      - 1) Manufactured by the Valve Manufacturer
- C. Finishes for Internal Surfaces:
  - 1. Epoxy Coating:
    - a. Amercoat 370
    - b. Amerlock 400
    - c. Corvel ECA-1626
    - d. Themec Series 141F Pota-Pox 80
- D. Finishes for External Surfaces:
  - 1. Flange Faces:
    - a. Houghton, Rust-Veto M.P.
    - b. Rust-Oleum, R-9

### **2.2 MATERIALS**

- A. General:
  - 1. Service: Valves shall be suitable for throttling service and/or frequent operation as well as 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.
  - 2. Installation:
    - a. Buried: Valves specified as buried in the Bill of Materials shall be for buried service in horizontal waterlines with the valve shaft horizontal and operating nut shaft vertical. Body of valves will be buried and the actuators will be installed in manholes.
    - b. In-Plant: Valves specified as in-plant in the Bill of Materials shall be for service inside buildings or other structures in a relatively dry environment, protected from weather. The actuator shall be directly mounted to the valve body.
    - c. Submerged: Valves specified as submerged in the Bill of Materials shall be for service inside basins or reservoirs. The valves will be installed with the valve shaft vertical, and will be mounted to a pipe flange. Submerged valves shall be supplied with torque tubes and actuator stands as shown in Drawings and as specified below.
  - 3. 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.
- B. Class of Valve: As specified in the Bill of Material.
- C. Valve Bodies: Short body pattern. Class 250 valve bodies shall be DI. Disc stops on the body will not be allowed.
- D. Valve Discs: Gray iron or DI. Class 250 valve discs shall be DI. Discs having hollow chambers that can entrap water will not be allowed.
- E. Valve Seat:
  - 1. Rubber seats shall be peroxide cured EPDM.
  - 2. Rubber seats may be applied to either the body or the disc. The mating seat surface, in either case, shall be 304 stainless steel or sprayed in accordance with AWWA C504.
  - 3. Rubber seats shall be full circle 360 degree seal with no segmenting or breaks in the rubber seat.
  - 4. 24-inch diameter and smaller: rubber seats mounted in the groove of the valve body may be bonded to the body. Bonded seats must withstand a 75-pound pull in accordance with ASTM D 429, test procedure Method B (90 degree stripping).
  - 5. 30-inch diameter and larger: rubber seats mounted in the valve body or the disc shall be retained by mechanical means such that the seat can be adjusted to provide a tight shutoff. Valve shaft shall not penetrate the rubber seat.
  - 6. Seat retaining hardware shall be 304 stainless steel, same as the mating seat surface material.
- F. Valve Shaft: The valve shaft shall be 304 stainless steel. Shafts for Class 250B valves shall be ASTM A564, UNS Designation S17400, condition H1150.

- G. Shaft Seal:
  - 1. For valves 24 inches in diameter and smaller:
    - a. Self-compensating V-type packing.
    - b. O-ring type contained in a corrosion resistant cartridge.
  - 2. For valves 30 inches in diameter and larger:
    - a. Self-compensating V-type packing.
    - b. Adjustable packing with bronze or stainless steel pull down packing gland follower.
  - 3. On buried valves, the shaft seal area and exposed valve shaft shall be totally enclosed to prevent infiltration of material around the shaft seal and valve shaft during backfilling. Adjustable packing glands shall be accessible either through the bonnet or by removing the enclosure around the packing gland.
- H. Valve Bearings: Valves furnished with an externally adjustable thrust bearing shall have the external adjusting mechanism enclosed in an O-ring sealed watertight housing.
- I. Type of Valve Ends:
  - 1. 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 true plane surfaces within a tolerance limit of 0.005 inch. The finished face shall be normal to the longitudinal valve axis within 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.
  - 2. The flanges shall have full-sized bolt holes through the flanges, except that 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.
- J. Valve Bonnet: Buried valves shall be furnished with a separate one piece cast iron or fabricated steel extension bonnet with (if applicable) access openings fitted with removable covers, located to permit access to the stuffing box for tightening the adjustable packing. The extension bonnet shall be 24 inches in length and shall be of a single diameter over its entire length. Minimum thickness of removable cover shall be 14 gauge (.0747 inch) and shall be attached to extension sleeve with a minimum of four 1/4-inch diameter cap screws. Gasketing of the opening is not required.
- K. Name Plates: Corrosion-resistant nameplates shall be provided. There shall be one valve nameplate attached to the valve body, or for buried or submerged valves, attached to the valve actuator, extension bonnet or support stand. The valve nameplates shall include the normal valve data and the serial number. There shall be one actuator nameplate attached to the valve actuator.
- L. Valve Actuators:
  - 1. Unless otherwise specified in the Bill of Material, valves shall be furnished with manual actuators. The maximum velocity for actuator design shall be based on operating requirements shown in the Bill of Material.
  - 2. Buried valves:
    - a. The actuators shall be worm gear type.
    - b. Actuators shall be equipped with 2-inch square wrench nuts in accordance with AWWA C509. The valves shall open with a clockwise rotation of the nut.
  - 3. In-plant and submerged valves:
    - a. Manual actuators shall be traveling nut type or worm gear type. Electrically actuated valves shall have worm gears only. Traveling nut actuators shall be manufactured by the Valve Manufacturer, and shall be capable of withstanding 450 foot-pounds of input torque. Actuators shall be provided with hand wheels of suitable size to open the valves with the specified maximum pull and hand wheel diameter shall not to exceed two feet.
    - b. Direction of rotation for open/closing operation as shown in the Bill of Materials.
  - 4. Design details:
    - a. Worm gear actuators shall have high tensile bronze worm gears, and a worm of hardened alloy steel. Gearing of the manual actuator shall be totally enclosed and sealed for food grade accepted and formulated for a temperature range of -10°F to +150°F. Manufacturer shall fill the gear case with lubricant to 90% of full prior to shipment from the factory.
    - b. Primary gearing shall be supplemented by spur gear attachment to comply with the following conditions of operation for all sizes of valves:
      - 1) Buried valves: Minimum number of turns for complete opening or closing of valve disc shall not be less than 40.
    - c. Actuators, including buried service, shall have a mechanical valve position indicator.

## 2.3 FINISHES

- A. Internal Surfaces: Internal ferrous surfaces except machined or bearing surfaces shall be prepared for coating by blasting to a near white metal finish in accordance with SSPC SP 10/NACE No. 2. These surfaces shall then be coated with a 2-part thermosetting polyamide epoxy in 2 or more uniform coats, or with fusion bonded epoxy, to a minimum dry film thickness of 10 mils. Epoxy coating shall be in accordance with AWWA C550.
- B. External Surfaces:
  - 1. External surfaces except machined or bearing surfaces shall be carefully prepared by removing all dirt, grease, and rust and shall be cleaned to the extent that the coating will bond to all surfaces.
  - 2. Buried valves: The exterior of each valve except flange faces shall be shop coated with two coats of asphalt varnish, or shall be prepared and coated the same as the internal surfaces.
  - 3. 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.
  - 4. Submerged valves: The external surfaces of the torque tubes, and the external and internal surfaces of the support stands, shall be prepared and coated the same as for internal surfaces as specified in this Section.

- C. Flange faces shall be shop coated with a rust preventive compound prior to shipment.
- D. After above painting is completed, a lubricant compatible with the rubber seat shall be applied to surface of this seat and the mating metal surface to prevent bonding of the two surfaces during shipment and storage. Following application of the seal lubricant, the valve disk shall be placed in a slightly open position for shipment.

### **PART 3 EXECUTION**

#### **3.1 INSTALLATION**

- A. In accordance with the Manufacturer's written instructions and the Shop Drawings.
- B. Installation shall be completed by the OWNER.
- C. Prior to installation, rust preventative compounds to be removed and flange faces cleaned.
- D. Valve Assembly:
  - 1. Buried and in-plant valves shall be shipped fully assembled.
  - 2. Submerged valves shall be assembled in the Manufacturer's shop such that the torque tube is assembled to the valve shaft and the actuator adapter is mounted to the torque tube to ensure proper fit. If the submerged valves are to be disassembled for shipment, the Manufacturer shall match-mark all parts for assembly in the field. 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.

#### **3.2 QUALITY CONTROL**

- A. Quality Control shall be completed by the OWNER.
- B. Factory Testing:
  - 1. Manufacturer shall test all valves and furnish certified copies of the reports on the performance test, the leakage test, hydrostatic test and holiday test.
- C. Factory Functional Tests: Operate each valve 2 complete open-close cycles.
- D. Manufacturer's Services:
  - 1. If the valve is not functioning properly at the time of installation, the Manufacturer shall furnish an authorized service person to repair or adjust the valve to the satisfaction of the OWNER at no additional cost to the OWNER.

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