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 butterfly valves with epoxy coating, operators, and accessories. 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 conditons and only for 16-inch and larger transmission mains.

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
2.	AWWA	C213	Fusion Bonded Epoxy Coating
3.	AWWA	C504	Rubber Seated Butterfly Valves
4.	AWWA	C550	Protective Interior Coatings for Valves and Hydrants

1.3 SUBMITTALS

A. The following shall be submitted in compliance with Section 01300.

1. Shop Drawings

   a. Manufacturer’s catalog data.

   b. Manufacturer’s detailed drawings showing dimensions, materials, size, and weight.

   c. Manufacturer’s installation instructions.

   d. Manufacturer’s certification that products comply with the indicated requirements.

2. OWNER’s Manual

   a. Manufacturer’s catalog data.

   b. Manufacturer’s installation and operations instructions.

   c. Manufacturer’s maintenance procedures.

d. List of special tools.

1.4 TESTING

A. Butterfly valves shall be tested in compliance with Paragraph 1.5 of Specification Section 05100 and as specified herein.

B. Butterfly valves shall be hydrostatically tested per AWWA C504 in both directions and as specified herein.

C. Proof-of-design test reports shall be submitted in compliance with Paragraph 1.5 of Specification Section 05100 and AWWA C504.

D. Test certificates shall be submitted as requested by the ENGINEER or as specified herein.

PART 2 - PRODUCTS

2.1 GENERAL

A. Butterfly valves shall conform to AWWA C504 and shall be flanged and of the size and class indicated.

B. Flanged valves shall have 125 lb. flanges complying with ANSI B 16.5, or 250 lb. where so indicated, and may be either short-bodied or long-bodied except as otherwise indicated.

C. Class 150B butterfly valves with AWWA Class D or E flanges (125 psi drilling per ANSI B16.1) shall be used with all Class 150 pipe.

D. Class 250B butterfly valves with AWWA Class F flanges (250 psi drilling per ANSI B16.1) shall be used with all Class 200 and above rated pipe.

E. 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.

F. 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.

G. 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.

H. 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.

I. 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.

J. All bolts, nuts and studs shall conform to ASTM A307, Grade B; or ASTM A354.

K. Bolts and nuts shall have hexagon heads and nuts.

L. Gasket material and installation shall conform to manufacturer's recommendations.

M. Valves shall have manufacturer's name, year manufactured, and working pressure cast in raised letters on valve body.

N. Corrosive ferrous surfaces of valves, 4 inch and larger, which will be in contact with water shall be epoxy coated (exclusive of flange faces) complying with Section 04100.

O. Materials shall be stored to permit easy access for identification and inspection purposes.

P. Valves shall be kept off ground using pallets, platforms, or other supports.

Q. Valves and packaged materials shall be protected from corrosion, deterioration and sun damage.

2.2 RUBBER-SEATED BUTTERFLY VALVES

A. General

1. All butterfly valves shall conform to 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.

2. Butterfly valves shall be tested in accordance with AWWA C504 and the requirements specified below.

a. Each butterfly valve shall be subjected to the performance, leakage, and hydrostatic tests required in Section 5.3 and 5.4, respectively, of AWWA C504.

b. The pressure differential specified in Section 5.3 of AWWA C504 shall be applied in both directions.

c. Each valve shall be completely assembled prior to testing.

B. Construction

1. Type: Tight-closing rubber seated. 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 fabricated from cast iron conforming to ASTM A126, Class b, or ductile iron conforming to ASTM A536, Grade 65-45-12, with integrally-cast hubs for shaft bearings. Valve bodies shall be cast hubs for shaft bearings. All valves shall be short body. Valve bodies shall be designed for the shutoff pressure specified with a factor of safety of not less than five. All valves shall have flanged ends. Flanged ends shall be flat faced.

3. Discs: Ductile iron ASTM A536, Grade 65-45-12, cast iron ASTM A48, Class 40, or ASTM A126, Class B. 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. Butterfly valves shall be furnished with an epoxy coating of all internal wetted components. Epoxy coating system shall be NSF 61 approved and shall have a dry film thickness of 16 mils. Internal coating system shall be shop-applied and shall be furnished in accordance with the manufacturer's recommendations.

2.3 MANUAL OPERATORS

A. Operators shall conform to AWWA C504.

B. Except as otherwise indicated, manually operated butterfly valves shall be equipped with a 2 inch square operating nut and position indicator.

C. Actuators for valves located above ground or in vaults and structures shall have handwheels. 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, and submerged or buried valves, shall be equipped with worm-gear operators, lubricated and sealed to prevent entry of dirt or water into the operator at a water pressure of 40 feet of head.

E. Screw type operators shall not be installed for valves 35 inches in diameter or larger.

F. Operators shall require a minimum of 40 turns to rotate the disc from fully open to fully closed position.

G. Manual valve operators shall turn clockwise to close unless otherwise specified. Valves shall indicate the direction of operation.

H. Enclosed worm gear operators shall have a gear ratio designed not to exceed 80 pounds pull to meet the required operator torque.

I. Gears shall be permanently lubricated and totally enclosed.

J. Operators shall be designed to hold the valve disc in any intermediate position without creeping or fluttering.

K. Adjustable stops shall be provided to prevent overtravel in either position, to withstand a pull of 300 pounds.

L. The valve manufacturer shall be responsible for mounting the actuator to the valve, at the valve manufacturer's facility.

2.4 VALVE APPURTENANCES

A. Extension Stems and Stem Guides.

1. Extension stems shall be at least as large as the valve stem it operates.

2. Provide intermediate stem guide for extensions more than 7 feet long.

3. 2 inch square operating nuts shall be included with each extension stem.

2.5 PAINTING

A. Clean and prime coat ferrous metal surfaces of equipment in the shop.

B. Coat machined, polished and non-ferrous metal surfaces with corrosion prevention compounds which shall be maintained during storage and until equipment begins operation.

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