

**SECTION 15102  
BUTTERFLY VALVES (BFV'S)**

**PART 1 GENERAL**

**1.01 DESCRIPTION.**

This section includes materials, testing, and installation of manually operated butterfly valves (BFV).

**1.02 REFERENCE STANDARDS.**

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. References shall be made to the latest edition of said standards unless otherwise called for.

AWWA C210	Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.
AWWA C213	Fusion Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
AWWA C504	Rubber Seated Butterfly Valves
AWWA C550	Protective Epoxy Interior Coatings for Valves and Hydrants.
SSPC	Steel Structures Painting Council

**1.03 RELATED WORK SPECIFIED ELSEWHERE.**

- A. VCMWD Standard Drawings
- B. Standard Specifications 02221, 03300, 09900, 15000, 15041, 15044, 15056, 15061 and 15064

**1.04 SERVICE APPLICATION.**

- A. Butterfly valves (BFV) shall be installed on potable mains and appurtenances where shown on the Approved Plans and in accordance with VCMWD Standard Drawings.
- B. Butterfly valves shall be used for open/closed operations and throttling service and frequent operation after long periods of inactivity.

**1.05 SUBMITTALS.**

- A. The following items shall be submitted for review and approval by the District Engineer prior to ordering or delivery of butterfly valves.
  - 1. An affidavit from the valve manufacturer showing the following:
    - a) Actuators used were furnished and installed by the valve manufacturer.
    - b) Valves have successfully passed hydrostatic testing per AWWA C504

and coatings testing the valve manufacturer.

2. The valve manufacturer's catalog data showing the size to be used, valve dimensions, pressure rating and materials of construction.
3. Actuator manufacturer's catalog data and detail construction sheets showing the dimensions, materials, number of turns, and required torque input of the actuator to be used.
4. Manufacturer's catalog data and proof of NSF certification on the lining materials to be used.

#### **1.06 SIZING OF VALVES.**

Valves shall be the same size as the line in which they are installed unless otherwise shown on the Approved Plans.

#### **1.07 VALVE ENDS.**

- A. Valve ends shall be flanged ductile-iron unless otherwise called for on the Approved Plans or as directed by the District Engineer.
- B. Ductile-iron flanges shall generally be in accordance with AWWA C115, rated at a working pressure of 250 psi. When Class 250 butterfly valves are shown on the Approved Plans or are otherwise required, ductile-iron flanges shall be compatible with AWWA C207, Class "F".
- C. Maximum working pressure of the flange shall as specified in AWWA or ASME/ANSI. Flanges shall be integrally cast per AWWA C110.

#### **1.08 VALVE TESTING.**

Butterfly valves shall be hydrostatically tested and coatings holiday detected prior to shipment to the field. Valves delivered to the site prior to successful hydrostatic testing and holiday detection will be subject to rejection.

#### **1.09 DELIVERY, STORAGE AND HANDLING.**

Valves shall be delivered and stored in accordance with AWWA C504 and AWWA C550. The port openings shall be covered with plastic, cardboard or wood while in transit and during storage in the field. These covers shall remain in place until the valve is ready to be installed. Valves shall not be stored in contact with bare ground. Valves shall not be stacked.

#### **1.10 POLYETHYLENE WRAP.**

Polyethylene wrap shall be used for buried installation of butterfly valves in accordance with Section 15000.

### **PART 2 MATERIALS**

#### **2.01 BUTTERFLY VALVES (BFV).**

- A. Butterfly valves and appurtenant components and materials shall be as per this spec

- B. Butterfly valves shall be short body, leak-tight closing, and rubber-seated in accordance with AWWA C504 except as modified herein.
- C. Butterfly valve bodies shall be ductile-iron as defined within AWWA C504.
- D. Except as modified below, BFV's shall be Class 150B in accordance with AWWA C504, rated for a flow velocity of 16ft/s.
- E. Where the static pressure of the pipeline in which the BFV is to be installed exceeds 150 psi, a Class 250B butterfly valve in general conformance with AWWA C504 shall be required. Class 250B butterfly valves shall be submitted to the Engineer for approval prior to ordering or delivery.
- F. Butterfly valves shall open by turning left (counterclockwise). Valve disc shall rotate ninety degrees (90°) from the full open position to the tight shut position.
- G. Butterfly valve interior and exterior surfaces shall be coated as described below.

## **2.02 MANUAL VALVE ACTUATORS.**

### **A. General:**

1. All valve actuators shall be watertight, designed for buried or submerged uses. Actuators shall be fully gasketed, sealed, and factory packed with grease.
2. As directed by the District Engineer, actuators for valves located above ground or in vaults and structures may have hand wheels or chain wheels. Minimum hand wheel diameter shall be 12". The actuator shall be equipped with a dial indicator, which shows the position of the valve disc. The District Engineer may require the use of a 2" square operating nuts in some cases.
3. Actuators for valves shall be provided with a 2" square-operating nut when buried or when indicated on the Approved Plans..
4. Actuators shall have travel stops, which can be adjusted in the field without having to remove the actuator from the valve.
5. Actuators shall be sized for opening and closing the valve at the valve's full rated working pressure and at a flow velocity of 16 ft/s.
6. Actuators shall accept a minimum of 300 foot-pounds of input torque at the full open and full closed positions without damage to the actuator or the valve.
7. Actuators equipped with 2" operator nuts shall require a maximum input torque of 150 foot-pounds to operate the valve. A maximum input torque of 80 foot-pounds shall be required to operate valves with hand wheels.
8. Actuators shall be of the same manufacturer as the valve where possible or as directed by the District Engineer.
9. Actuators shall be installed, adjusted, tested and certified by the valve manufacture prior to shipping.
10. Actuators shall require a maximum of one hundred (100) input turns for the complete ninety-degree (90°) movement of the disc.
11. Actuators shall receive an epoxy coating on the exterior surface as described below.

### **B. Traveling Nut Actuators:**

1. Actuators for butterfly valves sizes 16" through 24" may be the manual traveling nut type. Traveling nut actuators shall not be used on valves requiring motor driven actuators or where the District has specified a worm gear type actuator.
2. Actuators shall be capable of producing the below listed output torque at the closed position:

<u>Valve Size in inches</u>	<u>Output Torque foot-pounds</u>
16"	2050
18"	2750
20"	2750
24"	4700

C. Worm Gear Type Actuators:

1. Actuators for butterfly valves 30" or larger shall be the worm gear type. In addition, worm gear type actuators shall be used on butterfly valves requiring motor driven actuators or where the District has specified a worm gear actuator.
2. Worm gear actuators shall be totally enclosed and self-locking.

**2.03 EPOXY LINING AND COATING.**

- A. Epoxy linings and coatings for valves and actuators shall be provided in accordance with AWWA C210, C213 and C550, with the following modifications:
- B. Epoxy lining and coating of valve surfaces shall be performed by the manufacturer in a facility with qualified personnel, where the environment can be controlled. Epoxy lining and coating of valves in the field is prohibited.
- C. Repairs made to shop-applied coatings shall be performed in a facility with qualified personnel, where the environment can be controlled. The facility shall be one that is approved by the valve manufacturer.
- D. Surface preparation shall be as detailed in SSPC-SP5 White Metal Blast Cleaning.
- E. Liquid epoxy lining and coating materials shall be listed in the NSF Listing for Drinking Water Additives, Standard 61, certified for use in contact with potable water.
- F. The minimum dry film thickness for epoxy linings shall be (0.008" or 8 mils). Liquid epoxy lining shall be applied in two (2) coats in accordance AWWA C210.
- G. Powder epoxy coating materials shall contain one hundred percent (100%) solids, in accordance with AWWA 213.

**2.04 VALVE WELLS AND EXTENSION STEMS.**

Gate wells and extension stems for buried valves shall be in accordance with Section 15000.

## **2.05 CONCRETE.**

Concrete used for anchor or thrust blocks shall be in accordance with Section 03300.

## **2.06 POLYETHYLENE WRAP.**

Polyethylene wrap shall be in accordance with Section 15000.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION.**

- A. Install valves with the bolt holes straddling the vertical and horizontal centerlines of pipe, with the operating nut in the vertical position, unless otherwise noted on the Approved Plans.
- B. Valves shall be installed per the manufacturer's recommendation in accordance with the applicable specification for the piping material and joint type being used for the valve and the water main.
- C. Joints shall be cleaned and installed in accordance with Section 15056.

### **3.02 FLANGE INSULATING KITS.**

Flange insulating kits shall be installed only where shown on the Approved Plans.

### **3.03 WAX TAPE COATINGS.**

Wax tape coatings shall be installed only where shown on the Approved Plans or as directed by the District Engineer.

### **3.04 POLYETHYLENE WRAP.**

Installation of polyethylene wrap for buried valves shall be performed in accordance with Section 15000.

### **3.05 CONCRETE.**

Concrete thrust, anchor, and support blocks shall be installed as called for in Section 03300 in accordance with VCMWD Standard Drawings, The concrete shall be placed so that valves and valve operators will be accessible for repairs or replacement. Prior to filling the pipeline with water, refer to Section 03300 for minimum concrete curing time required,

### **3.06 VALVE WELLS AND EXTENSION STEMS.**

Gate wells and extension stems for buried valves shall be installed in accordance with Section 15000 and VCMWD Standard Drawings.

### **3.07 DISINFECTION OF THE VALVES.**

Disinfection and flushing shall be performed in accordance with Section 15041, as part of the process of disinfecting the main pipeline, The valves shall be operated during the disinfection period to completely disinfect all internal parts,

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### **3.08 HYDROSTATIC TESTING.**

Valves shall be hydrostatically tested in conjunction with the pipeline in which it is connected in accordance with Section 15044.

### **3.09 FIELD PAINTING AND COATING**

The exterior of valves installed above ground or exposed in vaults or enclosures shall be field painted in accordance with Section 09900,

**END OF SECTION 15102**