

800 WATER SUPPLY & DISTRIBUTION

ITEM 802 - VALVES AND APPURTENANCES

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802.01 Description. The Contractor shall provide all work necessary for furnishing and installing valves of the type, sizes and locations shown on the plans and as herein specified.

802.02 Gate Valves. All gate valves provided shall conform to AWWA C500 or AWWA C-509 except as modified herein. Valves shall be Division of Water approved double disc, parallel seats or resilient seated; non-rising stem, left hand open (counter-clockwise), and shall have rubber "O" ring, packing seals and mechanical joint ends unless otherwise specified or approved by the Engineer. All valves 20 inches (508 mm) and larger shall be butterfly valves with the exception of tapping valves.

All valves 16 inches (406 mm) and smaller shall be gate valves of vertical design without by-pass valves.

Gate valves 20 inches (508 mm) and larger used for tapping valves shall be of horizontal design with by-pass valves. Horizontal valves shall have totally enclosed extended gear cases and shall be designed for buried service.

Mechanical joint ends shall conform to the requirements of Item 801. Where flanged joint ends are specified they shall conform to requirements of AWWA C500 and shall be provided with bolts, nuts and full face rubber sheet gaskets. Where hub and bell and spigot joints are specified they shall be furnished and installed with all necessary jointing material.

802.03 Butterfly Valves. Butterfly valves shall conform to the AWWA Standard Specification for Rubber-Seated Butterfly Valves; Designation AWWA C504 except as herein specifically modified. Bonded Seat Butterfly Valves *shall be Pratt model groundhog type, as approved by the Administrator, Division of Water, or approved equal.*

1. **Design.** Valves shall be AWWA Class 150B designed for 150 psi (5 kg/m²) non-shock shut-off pressure and a velocity of 16 feet (4.9 m) per second. Valves and appurtenances, including operators, shall be suitable for buried and submerged service.

Valves for use with ductile iron pipe shall have mechanical joint ends or push-on ends. *Ends shall be furnished with high strength cast iron tee head bolts, hex nuts, retainer glands, and rubber gaskets.*

Valves for use with prestressed concrete pipe shall have Victaulic ends, Style 44, or mechanical joint ends, as per "Standard Detail L-7602, Concrete Pipe Valve Piping Connection."

2. **Bodies.** Bodies shall be either cast iron conforming to ASTM A126, Class B or ASTM A48, Class 40 or ductile iron conforming to ASTM A536, Grade 65-45-12.
3. **Shafts.** Unless otherwise approved, shafts shall be high strength steel, stainless steel, or monel, *in accordance with AWWA C504, Class 150B. The disc to shaft connection shall be of stainless steel Type 18-8 or Monel squeeze pin or taper pin held by means of a nut. The disc position on the valve shaft shall be indicated with a scribed line or other approved method.*
4. **Discs.** Valves shall be designed to seat at 90° to the pipe axis. *Disc shall be of the flow-through design for 30 inches (762 mm) and larger, and all discs shall have a 316 Type 18-8 stainless steel edge.*
5. **Seats.** Seats shall be designed and installed in the valve body. *For 20 inches (508 mm) valves, seats shall be bonded to the valve body in accordance with AWWA C504. For valves 24 inch (610 mm) and larger, seats shall be retained in a dove tail groove by an epoxy cast retaining ring or mechanical fasteners or other approved method. Should mechanical fasteners be used, all internal seat retainers will be aircraft wired.*
6. **Operators.** Operators shall be suitable for buried and submerged service and installed by the valve manufacturer, and tested in accordance with AWWA C504. Operators shall be designed to deliver an output torque to the valve shaft equal to that shown on Table 1.

Table 1
Operating Torques

Valve Diameter Inches (mm)	Torques Foot-Pounds (Nim)
3 (76)	19 (26)
4 (102)	36 (49)
6 (152)	93 (126)
8 (203)	175 (237)
10 (254)	320 (433)
12 (305)	510 (691)
14 (356)	720 (976)
16 (406)	1,030 (1,346)
20 (508)	2,050 (2,780)
24 (610)	3,500 (4,745)
30 (762)	6,750 (9,150)
36 (914)	11,600 (15,730)
42 (1,067)	18,400 (24,945)
48 (1,219)	27,500 (37,285)

Operators having an output torque rating less than that shown in Table 1 shall be permitted only if the manufacturer submits acceptable certified test results that substantiates the maximum torque required to operate his valve under the design conditions specified is less than that shown in Table 1.

Operators shall be designed to produce the specified output torque with a maximum input torque of 120 foot-pounds (163 Nim) applied to the operating nut. *Operator shall be of the worm gear or traveling nut type or as approved by the Administrator, Division of Water. Operators shall be designed to accept 450 foot-pounds (611 Nim) of input torque without damage to the operator.*

The total number of turns, applied to the wrench nut, required to completely open (close) the valve from completely closed (open) position shall be not less than 30 turns.

All operators shall be for left-hand (counter clockwise) opening.

802.04 Inserting Valves. The Contractor shall furnish all labor, tools, material and equipment to insert valves at locations shown on plans or as ordered by the Administrator, Division of Water.

Unless otherwise approved by the Administrator, Division of Water, the only inserting valves approved for use in the City of Columbus are the "Mueller" inserting valve or the "Smith" inserting valve manufactured by the U.S. Pipe Company.

All inserting valves shall be left hand open (counter-clockwise). Also approved is the insertion of an approved gate valve by the "Line-Stop" method or equal.

802.05 Valves 2 Inches (51 mm) and Smaller. Wherever a valve 2 inches (51 mm) or smaller is required on a water line it shall be a curb stop type conforming to requirements of Section 805.04 or a 2 inch (51 mm) gate valve.

802.06 Extension Stems. If the top of the operating nut is more than 36 inches (0.9 m) below the finished grade an extension stem shall be provided to place the operating wrench nut between 24 inches (0.6 m) and 36 inches (0.9 m) of the finished grade. The extension stem shall be pinned to the valve operating nut in a manner approved by the Division of Water Administrator. Cost of extension items shall be included in the unit price bid for the various valve types and sizes. If an extension stem is required on an existing valve, the cost of the extension stem shall be included under Item 807, Adjust Valve Boxes and Service Boxes to Grade.

802.07 Certification. Prior to manufacture, the manufacturer shall submit for approval by the Engineer, 3 sets of drawings, certified as to the accuracy of the information contained thereon, showing the principal dimensions, general construction features and materials proposed for use for all parts of the valve and operator. Drawings shall be in sufficient detail to enable the Engineer to verify conformance to the requirements of the specifications. The drawings shall include data on the number of turns to fully open or close the valve and for butterfly valves the input and output torque rating of the operator. The valves shall be manufactured in accordance with these certified drawings after they have been approved by the Engineer.

The Contractor shall furnish a sworn and notarized statement from the manufacturer certifying the valves comply with all requirements of these specifications.

802.08 Valve Boxes. Unless otherwise noted on the plans or directed by the Engineer all valves 16 inches (406 mm) and larger, and valves within *traveled* areas shall be provided with Columbus Standard Heavy Duty Three Piece Valve Boxes. All other valves 3 inches (76 mm) and larger shall be furnished with Columbus Standard Regular Duty Three Piece Valve Boxes which is hereby defined as a Clow F-2450 valve box or equal. Both standard and heavy duty boxes shall conform to the requirements of Item 804. Bases for regular duty valve boxes shall be as follows: 3 inch (76 mm) through 4 inch (102 mm) valves, Clow F-2480 No. 4 or equal; 6 inch (152 mm) and 8 inch (203 mm) valves, Clow F-2465 No. 6 or equal; 10 inch (254 mm) and larger, Clow F-2484 No. 160 or equal. Covers for the regular duty boxes shall be marked "WATER." All boxes shall be *installed to finished grade*.

Where 2 inch (51 mm) and smaller curb stops are installed in the water line and outside traveled areas they shall be furnished with a Buffalo Type box per Section 805.04 or equal. Where curb stops are installed within traveled areas, the top section of the valve box shall be replaced with a Columbus Standard Ferrule box and cover.

All valve boxes shall be installed such that they are centered vertically over the valve operating nut and such that the box provides maximum cover of the operating

housing. No separate payment for those valve boxes shall be made as their cost is to be included in the unit price bid for the various valve types and sizes.

802.09 Valve Supports. Concrete piers or supports of the size shown on the *Standard Detail Drawing L-6306* shall be provided under all valves. No separate payment for these supports shall be made as their cost is to be included in the unit price bid for the various valve types and sizes.

802.10 Operation. All valves which affect the flow of water through water lines in service are to be operated by the Division of Water personnel only as stated in Chapter 1113 of the Columbus City Codes.

802.11 Basis of Payment. The payment for all work performed under this item shall be at the unit price as bid therefore, which is full compensation for furnishing and installing the various types and sizes of valves specified including operation extension stems, concrete valve supports and valve boxes.

Payment shall be at the contract price for:

Item	Unit	Description
802	Each	Inch (mm) Valves and Appurtenances
802	Each	Inch (mm) Butterfly Valves and Appurtenances
802	Each	Inch (mm) Inserting Valves and Appurtenances