

**810 VALVES AND HYDRANTS****810.01 VALVES**

**(A) STANDARD GATE VALVES.** Standard gate valves shall be per AWWA C 500, hand operated, iron-body, bronze-mounted, double-disc, for water works service under operating pressure of 150 psi.

AWWA C 500 is modified or supplemented as follows:

- (1) Valves shall be per New York Pattern, Metropolitan Gate Valves.
- (2) Size and type – Size shall be 12-inch and smaller. Type shall be iron-body, bronze-mounted, gate valves with double-disc gates having parallel seats and side wedges intended for ordinary water service. Each valve shall have 1/2-inch diameter pipe plug in the bonnet for testing. Valves shall be non-rising stem inside screw type except for exposed valves at the Wastewater Treatment Plan (WWTP) which shall be rising stem, outside screw and yoke type.
- (3) Intended Position of Valve – Valves shall be installed in the line in vertical position.
- (4) Type of Valve Ends – Valves shall be furnished with mechanical-joint ends complete with bolts, nuts, retainer glands and gaskets.
- (5) Orientation of Bolt Holes in Flanges of Mechanical joint – Manufacturer’s option.
- (6) Solid-Bronze Disc Gates – Not required.
- (7) Method of Fastening Gate Rings – Manufacturer’s option.
- (8) Type of Stem Seal – Double O-ring seals shall be furnished on all gate valves (stuffing boxes prohibited). O-ring seal plates shall be cast-iron; seal plate bolts and nuts shall be zinc coated per AASHTO M232.
- (9) Wrench Nuts – Special pentagonal operating nut shall be furnished for 6-inch and 8-inch diameter valves; drawing furnished by the District upon request. Square operating nut furnished for 12-inch valves.
- (10) Direction of Wrench Nut Rotation to Open – Right (clockwise) except for exposed valves at the WWTP which shall open left (counter-clockwise).
- (11) Steel Gears – Not permitted on gate valves.
- (12) Cast-Iron Gears – Not permitted on gate valves.
- (13) Type of Gear Case – Not permitted on gate valves.
- (14) Position Indicator – Not required.
- (15) Markings – Insofar as practicable, markings shall be readable by an observer looking down on the valve in line position.
- (16) Disc and Disc Seat Rings – Cast-iron discs in valves 6-inch through 12-inch diameter shall be accurately machined to receive bronze disc seat rings. The disc seat ring surfaces in contact with the iron disc and the dovetail projections shall be fully machined and the disc rings rolled, peened, or pressed into the machine

grooves on the iron disc and, when secured in place, a rough and finish cut shall be taken over the disc seat bearing surface.

(17) Minimum Diameter of Stem and Minimum Thickness of Body and Bonnet:

<b>Valve Diam. (Inches)</b>	<b>Diam. of Valve Stem at Base of Thread (Inches)</b>	<b>Min. Body/Bonnet Thickness (Inches)</b>
6	1.125	0.625
8	1.25	0.6875
12	1.50	0.750

(18) Valve Stems – Stem material shall be per ASTM B 584, alloy UNS No. 86700, or equivalent alloy with minimum 30,000 psi yield and approved for use in potable water service.

(19) Valve Wedges – Valve wedges for 6- and 8-inch valves shall be bronze; wedges for 10- and 12-inch valves shall be cast-iron.

(20) Valve Stem Thrust Collar Housings – Housings for valve stem thrust collars shall be carefully machined and fully bronze lined for all gate valves.

(21) Painting – Exterior surfaces of buried valves shall be coated with asphaltic varnish per AWWA C 500. Exposed valves shall be shop painted as directed.

(B) **RESILIENT-SEATED GATE VALVES.** Resilient-seated gate valves shall be per AWWA C 509, modified and supplementd as follows:

(1) Size and Type – Size shall be 12-inch and smaller. Valves shall be non-rising stem, inside screw type except for exposed valves at the WWTP which shall be rising stem, out side screw and yoke type.

(2) Waterway shall be smooth and shall have no depressions or cavities in seat area.

(3) Type of Valve Ends – Valves shall be furnished with mechanical-joint ends complete with bolts, nuts, retainer glands and gaskets.

(4) Type of Stem Seal – Double O-ring seals shall be furnished on all gate valves. O-ring seal plates shall be cast- iron; seal plate bolts and nuts shall be zinc coated per AASHTO M232.

(5) Valve Stems – Stem material shall be per ASTM B 584, alloy UNS No. 86700, or equivalent alloy with minimum 30,000 psi yield and approved for use in potable water service.

(6) Gate shall seat against seating surfaces arranged symmetrically about centerline of the valve stem.

(7) Wrench Nuts – Special pentagonal operating nuts shall be furnished for 6-inch and 8-inch diameter valves; drawing furnished by the District upon request. Square operating nut furnished for 12-inch valves.

(8) Direction of Wrench Nut Rotation to Open – Right (clockwise) except for exposed valves at the WWTP which shall open left (counter-clockwise). The number of turns

for 6-inch valves shall be 20; the number of turns for 8-inch valves shall be 26; the number of turns for 12-inch valves shall be 38.

- (9) If bonnet is two-piece, parts shall be through-bolted; tapped holes with stud bolts prohibited.
  - (10) Valve body and bonnet shall be coated on all exterior and interior surfaces with a fusion-bonded epoxy per AWWA C 550. Painted surfaces and spray applied epoxy coatings are not acceptable.
  - (11) The manufacturer's name, pressure rating, year of manufacture and size shall be cast on valve body.
  - (12) Each valve shall be tested to 400 psi hydrostatic pressure.
- (C) **BUTTERFLY VALVES.** Butterfly valves shall be per AWWA C 504 except as otherwise supplemented herein. Butterfly valves of the "wafer type" are not acceptable.

The manufacturer shall be regularly engaged in the design, manufacture, and maintenance of butterfly valves. The manufacturer must furnish satisfactory evidence of adequate facilities for furnishing repair parts and for maintenance of valves furnished.

AWWAC 504 is modified or supplemented as follows:

- (1) Size – Size shall be 16-inch and larger as specified.
- (2) Valve Bodies – Butterfly valves 16-inches through 24-inches in diameter shall be furnished with mechanical joint ends complete with bolts, nuts, retainer glands and gaskets.  
Butterfly valves 30-inches diameter and larger shall be furnished with flanged joint ends with accompanying flanges and plain-end pieces assembled to the valve's flanged ends with bolts, nuts and gaskets. Each flanged and plain-end piece shall have an overall laying length of not less than 12 inches nor more than 18 inches.
- (3) Class – All parts shall be designed for Class 150B for use on water mains carrying filtered water with an approximate average pH of 7.5.
- (4) Valve Shafts – Valve shafts shall be fabricated of either Type 316 or Type 304 wrought stainless steel and shall be either a one-piece unit extending completely through the valve disc or be of the "stub shaft" type.
- (5) Valve Discs – Discs shall be cast-iron per ASTM A 48, Class 40 or ductile-iron per ASTM A 536, Grade 65-45-12.
- (6) Valve Seats – Seats shall be mechanically retained either in the valve disc or in the body:
  - (a) 360 degree rubber seat edge on disc, retained by corrosion- resistant disc retainer ring and Type 304 stainless cap screws. Mating seat in valve body shall consist of a Type 304 stainless steel separate ring, set integral with body.
  - (b) 360 degree rubber seat in valve body, retained by corrosion- resistant disc retainer ring segments and Type 304 stainless cap screws. Mating seat on valve disc shall consist of either Type 316 stainless steel or monel disc edge on the case or ductile-iron disc.

- (7) Valve Bearings – A jacking or adjusting device to provide axial adjustment of the shaft and attached disc shall be provided for valves larger than 24-inch diameter. The jacking or adjusting assembly shall be protected from break-off or thread damage by recessing, cover plate, or other approved method. As an alternate to the aforementioned, a factory adjusted and set thrust bearing, may be provided to carefully center the disc in the valve body. The thrust bearing shall be of adequate strength to carry all axial loads.
- (8) Shaft Seals – Shaft seals shall be designed for use of standard O-ring seals only. Seals of the type utilizing a stuffing box and pull-down packing gland are prohibited.
- (9) Type of Installation – Buried, except for WWTP which may be buried or exposed.
- (10) Type of Operator – Manual unless otherwise specified.
- (11) Direction of Operating Stem Rotation to Open Valve – Right (clockwise) except for exposed valves at the WWTP which shall open left (counter-clockwise).
- (12) Valve Operators – Unless otherwise approved or shown on the drawings, a manual operator shall be furnished, assembled to each valve. The operating stem shall be provided with a 2-inch square nut. Manual operators shall be totally enclosed worm gear or link lever design.  
  
Operators on valves 24-inch and smaller diameter may be of the traveling nut design per AWWA C 504, but in either case, the valve operator shall require a minimum of 35 turns from closed to open position.  
  
Operators shall have adjustable stop limiting devices, for open and closed position, that must withstand an input torque of 300 foot-pounds on the square key nut without damaging the valve or operator. Stop limiting devices shall be factory set at the time of valve testing.
- (13) Valve Position Indicators shall be totally enclosed with no exposed moving parts. A highly visible and corrosion resistant valve position indicator shall be provided on all valves. The valve position indicator shall be such that the position of the valve (open-closed) may be determined from above at the operating level. The valve-operating stem shall be in the vertical position at all times. Indicators shall be Beacon type or approved equivalent product manufactured by Westlock Controls Corporation, 280 Midland Avenue, Saddle Brook, New Jersey.
- (14) Markings – All identifying or data plates or markings bearing serial numbers, ratings, and other essential information shall be placed on the valve body or operator so they are readable from above.
- (15) Painting – Exterior surfaces of buried valves shall be coated with asphaltic varnish per AWWA C 504. Exposed valves shall be shop painted as directed.

#### **810.02 FIRE HYDRANTS**

Fire hydrants shall be compression type, hand operated for fire protection service under operating pressure of 200 psig manufactured per AWWA C 502. All fire hydrants furnished shall be tested to 300 psig operating pressure.

The manufacturer shall be regularly engaged in the design, manufacture and maintenance of fire hydrants. The manufacturer must furnish satisfactory evidence of adequate facilities for furnishing repair parts for hydrants furnished.

Hydrant Models – Mueller Centurion 200-Model No. A-423, (made by Mueller Company, Decatur, Illinois), Kennedy Guardian-Model No. K-81-A (made by Kennedy Valve, Elmira, New York), U.S. Pipe Metropolitan-Model No. 250 (made by U.S. Pipe and Foundry Company, Birmingham, Alabama), American-Darling – Model No. B-84-B, (made by American Flow Control, Birmingham, Alabama), Clow Medallion – Model No. 2545, (made by Clow Valve Company, Oskaloosa, Iowa) or approved equal.

Alternate fire hydrants shall be submitted in advance with the Contractor's Preliminary Construction Scheduling, [108.03](#), for approval.

AWWA C 502 is modified or supplemented as follows:

- (1) When required, the manufacturer shall furnish catalog and maintenance data.
- (2) Certified drawings showing the principal dimensions, construction details, and materials shall be submitted for approval per "Plans and Working Drawings", [105.02](#).
- (3) Affidavit of compliance required.
- (4) Size – 5-1/4 inch minimum, nominal I.D. main valve opening.
- (5) Bury Length – 4-1/2 feet of cover.
- (6) Barrel Sections – Hydrants shall be "traffic" type fire hydrants with frangible cross section near the ground line designed to break on vehicle impact.
- (7) Hydrant Top – Hydrants shall be permanently lubricated and require one man maintenance, no special tools.
- (8) Outlet Nozzles – Two 2-1/2 inch nominal I.D. hose nozzles; one 4-inch nominal I.D. pumper connection.  
 Threads for 2-1/2 inch nozzles per National Fire Standard Hose Coupling Screw Threads; threads for 4-inch pumper connection:  
 major diameter: 5-3/32 inch  
 thread form: V  
 number threads/inch: four
- (9) Operating Stem and Mechanism – Operating and outlet nozzle cap nuts shall be pentagonal in shape. The pentagon shall measure 1-51/64 inch from point to flat at the base of the nut and 1-47/64 inch at the top. Height of the nut shall be 1 inch. Direction of operating nut rotation to open: Left (counterclockwise). Drawings furnished by the District upon request.
- (10) O-Ring Seals – O-ring seals shall be used in lieu of stuffing box.
- (11) Gaskets – Material shall be rubber composition; asbestos prohibited.
- (12) Hydrant Inlet – Boot side inlet shall be 6-inch diameter with retainer gland mechanical joint per [809.01\(C\)](#).

- (13) Cap Chains – hose cap chains and steamer cap chains are required with all hydrants. Chain links (zinc plated steel) shall be fabricated not less than 1/8 inch in diameter and with S hook device (zinc plated) attached.
- (14) Painting – Above grade line, outside of hydrant shall be painted with two coats of zinc chromate primer and two finish coats of No. 209 medium green enamel manufactured by Purity Paint Products Corp., Brooklyn, New York; or approved equivalent product.

Gravel for Dry Well: Washed gravel.

Filter Fabric:

- (1) Woven filter fabric shall be composed of polypropylene monofilament yarns woven into sheets of approximately sixteen-(16) mil thickness. The tensile strength of the fabric shall be per ASTM D1682. The weave of the fabric shall be dense and tight so the openings are barely visible.
- (2) The test results shall indicate the filter fabric can effectively retain particles coarser per opening of U.S. 140-sieve mesh for all conditions.
- (3) Tests shall also demonstrate that the filter permeability is between 3.3 and 3.8 x 100 centimeters per second.
- (4) Filter fabric shall be manufactured by Mirafi Company, P.O. Box 240967, Charlotte N.C. or approved equal.