SECTION 33 12 16

MAIN LINE VALVES

(Sentences and/or paragraphs that are double underlined indicate revisions that were made from the 2009 specification.)

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section describes the manufacture, construction, and installation of waterline valves for ordinary waterworks service.

1.2 MEASUREMENT AND PAYMENT

A. GATE VALVES

Gate valves will be measured by the each.

Payment will be made at the unit price bid per each for furnishing and installing gate valves, which bid price will include all costs for the complete gate valve installation, including extension stems, valve boxes, concrete blocking, testing, and disinfection.

B. APPURTENANCES

Operator extensions, valve boxes, brass plug valves, manholes, and concrete blocking will not be measured items.

1.3 SUBMITTALS

A. Submit manufacturer's data on materials furnished, indicating compliance with the specifications regarding dimensions, thickness, weights, and materials.

B. Submit manufacturer's "Certificate of Compliance", stating that the materials furnished comply with this specification.

1.4 INSPECTION, STORAGE, AND HANDLING

A. All valves should be unloaded carefully. The valve should be carefully lowered from the truck to the ground, not dropped. In the case of larger valves, fork trucks or slings around the body of the valve or under the skids should be used for unloading. Only hoists and slings with adequate load capacity to handle the weight of the valve or valves should be used. Do not hook hoists into or fasten chains around bypasses, yokes, gearing, motors, cylinders, or handwheels.

B. Valves should be inspected at the time of receipt for damage in shipment. The initial inspection should verify compliance with specifications, direction of opening, size and shape of operating nut, number or turns, and type of end connections. A visual inspection of gate rings and body rings should be performed to detect any damage in shipment or scoring of the seating surfaces. Inspection personnel should look for bent stems, broken handwheels, cracked parts, missing parts and accessories, and any other evidence of mishandling during shipment. The valve should be cycled through one complete opening-and-closing cycle. All valves sixteen (16") inches and larger should be operated through one full operating cycle in the position in which they are to be installed.

C. Valves should be stored in the fully closed position to prevent entry of foreign material that could cause damage to the seating surfaces. Whenever practical, valves should be stored indoors. If outside storage is required, means should be provided to protect the operating mechanisms, such as gears, motor operators, and cylinders, from the weather and foreign materials. If valves may be subject to freezing temperatures, remove water from the valve interior and close the gates tightly before storage. Valves in outside storage in cold climates should be stored with the discs in a vertical position; if the discs are in a horizontal flat position, rain water can accumulate on top of the top disc, seep into the valve body cavity, freeze, and crack the casting. Any valves damaged by weather will not be installed.

PART 2 – PRODUCTS

2.1 MATERIALS

A. APPLICABLE STANDARDS

1. AWWA – C110, C111
2. ASTM – A48, C33, C150 and C478

B. GATE VALVES

All gate valves up to and including thirty (30”) inch shall conform to the current AWWA C515 standard. All valves shall be ductile iron body, resilient seat nonrising stem, internal wedging type and new. All gate valves shall have a square nut operated valve turning clockwise to close. Brass nut is not allowed. Valves shall have a working pressure rating of 250 psi.

1. Resilient-Seated Gate Valves per AWWA C515

a.) *General*

All valves up to and including thirty (30”) inch shall have a bronze stem, resilient-seated disc, drip tight shutoff. City of Brayn will accept ~~V~~”Resilient Seated” (Powder Coated) valves ~~shall be~~ manufactured by American Flow Control Series 2500 or M&H 7000 Series. ~~or Clow Model No. 2638 and be~~ City of College Station will accept “Resilient Seated” (Powder Coated) valves manufactured by American Flow Control Series 2500 or Clow Model No 2638.

b.) *Gates, Rings and Disc*

All gates shall be cast-iron with internally reinforced, molded rubber disc seat rings. All gate valves shall be manufactured with a modified wedge disc with steel reinforced, natural rubber disc seat ring. Disc shall slide on a vertical, machined guide surface and shall seat on a sloped, machined seating surface. Valves shall be tested for leakage per AWWA C515, Section 6.1.6.

c.) Gate valves twelve (12”) inches or smaller will be installed seated on a minimum of one (1) 12”x12”x 4” solid concrete blocks. Valves larger than 12” will be seated by a poured-in-place concrete saddle. The size of this saddle is as shown on the plans.

2. Stuffing Boxes

All valves up to and including sixteen (16”) inches shall be equipped with double O-rings, provided arrangement is made for replacement under pressure of the upper O-ring when the valve is fully open. All geared valves will be equipped with

conventional packing in the main stuffing box. Valves shall be installed in a vertical position. Stuffing box and bonnet bolts and nuts shall be 304 stainless steel.

3. Operating Nuts

   All valves shall be square nut operated. All valves shall open by turning to the left (counter clockwise). Operator nuts shall be two (2") inch square.

4. Miscellaneous Requirements

   a.) All exposed bolts, nuts, etc., for valves to be buried, shall be stainless steel. Cadmium plated bolts, nuts, etc., will not be accepted.

   b.) A valve nut extension will be installed to maintain 4' bury to operating nut when the operating nut is located 5' or more below finished grade after valve installation.

D. VALVE ENDS

1. Valves shall have mechanical joint ends. Mechanical joint ends shall conform to AWWA C111. Flanged ends shall conform to ASA B16.1, Class 125 lb. (unless otherwise noted).
2. Bolts and nuts for mechanical joints will be of high-strength low-alloy corrosion resistant steel and conform to AWWA C111. All mechanical joint glands will be ductile iron.
3. Bolts and nuts for flanged ends buried in the ground shall be Type 304 stainless steel.

E. OPERATOR EXTENSION SHAFTS

Operator extension shafts are required on all valves when the operating nut is over five (5') feet below finished grade. Extension shaft is to bring the operating nut to within four (4') to five (5') feet of the top of the valve box. Extension shaft shall have a centering collar placed directly below operating nut and shall be bolted to valve operating nut with stainless steel set screw.

F. VALVE BOXES

A valve box shall be furnished and installed over each underground valve. The boxes shall be cast iron of the two-piece screw type, with a shaft diameter of not less than five and one-fourth inches (5-1/4") and shall have the word "WATER" stamped on the lid. Provide extension stem for all buried valves terminating in a standard 2-inch square AWWA nut within four (4') to five (5') feet of valve box cover. All parts of the valve box, base and cover shall be coated with hot bituminous varnish. The box shall be furnished complete with cast iron cover and yoke to fit over the valve body. Concrete valve box collars (24"x24"x6") shall be installed with each gate valve. Valve boxes are to be installed plumb and adjusted to their proper grade by the Contractor.

G. BRASS PLUG VALVES

One-half (1/2") inch through two (2") inch plug valves, when shown on the plans or required, shall be of all brass construction, and warranted for a water working pressure of 200 pounds per square inch. Brass plug valves smaller than two (2") inches shall be Mueller Oriseal, or pre-approved equal. Two (2") inch brass plug valves shall be Ford B11-777W or Mueller H-10284, or pre-approved equal.

H. CONCRETE

Cement shall conform to ASTM C150, Type 1. Aggregates shall conform to ASTM C33. Twenty-eight (28) day compressive strength shall equal or exceed 3,000 psi.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Any and all instruction manuals supplied by the manufacturers should be reviewed in detail before installation of the valve. At the job site, prior to installation, the valve should be visually inspected and any foreign material in the interior portion of the valve should be removed. A detailed inspection of the valve should be performed prior to installation.

1. All bolts should be protected to prevent corrosion, either with a suitable paint or by polyethylene wrapping.
2. During installation, there exists the possibility of foreign materials inadvertently entering the valve. Valves should be installed in the closed position. The valve shall be seated on a minimum of one (1) 12”x12”x 4” solid concrete blocks. Valves larger than 12” will be seated by a poured-in-place concrete saddle in the trench to prevent settling and excessive strain on the connection to the pipe. Size of this saddle shall be shown on the plans.
3. A valve box or vault should be provided for each valve used in a buried service application. The valve box should be installed so as not to transmit shock or stress to the valve. The valve box should be centered over the operating nut of the valve, with the box cover flush with the surface of the finished area, or such other level as directed by the City. Valve boxes should be of such a design that a traffic load on the top of the box is not transmitted to the valve.
4. Valves buried in unusually deep trenches shall have extension stems for operating the valve.

B. Valves installed above ground or in plant piping systems should be supported in such a way as to minimize bending of the valve end connections as a result of pipe loading.

C. After installation and before pressurization of the valve, all pressure-containing bolting (bonnet, seal plate, bypass, and end connections) should be inspected for adequate tightness to prevent leakage. In addition, an inspection should be made for adequate tightness to prevent leakage. In addition, an inspection should be made for adequate tightness of all tapped and plug openings to the valve interior. Proper inspection at this time will minimize the possibility of leaks after pressurization of the piping system.

D. In order to prevent time lost searching for leaks, it is recommended that valve excavations not be backfilled until after pressure tests have been made.

1. If valves are used to isolate test section, the test pressures should not exceed twice the rated working pressure of the valve. After the test, steps should be taken to relieve any trapped pressure in the body of the valve. The valve should not be operated in either the opening or closing direction at differential pressures above the rated working pressures.

E. Upon completion of the installation, valve location, size, make, type, date of installation, and other information deemed pertinent should be entered on permanent records and given to the Engineer.

F. Valves should not be installed in applications or for service other than those recommended by the manufacturer.

1. Valves should not be installed in lines where service pressure will exceed the rated working pressure of the valve.
2. Mainline valves shall not be used for throttling service, unless the design is specifically recommended for that purpose or approved in advance by the manufacturer and Engineer.
3. Valves should not be used in applications for water distribution that is exposed to subfreezing temperatures unless sufficient flow is maintained through the gate valve to prevent freezing, or some other type of protection is provided to prevent freezing.
4. Valves should not be installed at the dead end of a pipeline without proper and adequate restraint to support the valve and prevent it from blowing off the end of the line. No concrete shall be used on the valve for blocking.
5. To prevent damage to the valve, gate valves, up to and including sixteen inches (16") in diameter shall not be operated with input torques greater than 300 ft-lbs. .

END OF SECTION