SECTION 15100
PLUG VALVES

PART 1 – GENERAL

1.01 SCOPE

A. The work covered by this section includes furnishing all labor, equipment, and materials required to install all valves, including operators, boxes, and accessories, as specified herein, shown on the Drawings, or required for proper completion of the work of this Section.

B. The **Contractor** shall supply all products and perform all work in accordance with applicable American Society for Testing and Material (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), Steel Structures Painting Council (SSPC), and other recognized standards. Latest revisions of all standards are applicable.

1.02 SUBMITTALS

A. Submittals shall be made in accordance with the requirements of the General Requirements of the Contract Documents and Section 01300. In addition, the following specific information shall be provided:

1. Complete product data and engineering data, including shop drawings.
2. Documentation that manufacturers have consistently produced products of satisfactory quality and performance for a period of at least two (2) years.
3. Written certification to the **County** that all products furnished comply with all applicable requirements of these Specifications.

1.03 QUALITY ASSURANCE

A. American Society of Testing Materials (ASTM)

B. American National Standards Institute (ANSI)

C. American Water Works Association (AWWA)

D. American Standards Association (ASA)

E. Commercial Standard (CS)

1.04 TRANSPORTATION AND HANDLING

A. Protection:
Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all other trades.

B. STORAGE:

Provide a covered storage area for stockpiled products.

C. REPLACEMENT:

In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

PART 2 – PRODUCTS

2.01 GENERAL

A. Unless otherwise specified or indicated, valves shall be suitable for 175-pound working pressure.

B. All castings, regardless of material, shall be free from surface defects, swells, lumps, blisters, sandholes, to other imperfections.

C. All valves shall have the name of the manufacturer, rated working pressure, and size of the valve cast upon the body or bonnet in raised letters. Alternately, the name of the valve manufacturer, rated working pressure, and size may be stamped on a stainless steel identification plate permanently attached to the valve body or bonnet. Valves specified to conform with AWWA requirements shall have the letters "AWWA" cast upon the valve body or bonnet in raised letters.

D. Unless otherwise specified, the direction of rotation of the operator to open the valve shall be to the left (counter-clockwise). Each valve body or operator shall have cast thereon the word OPEN and an arrow indicating the direction to open.

E. Where required for satisfactory operation of valves, provide extension stems, stem guides, cast iron valve boxes, floor boxes, handwheels, floor stands and

other valve appurtenances. Extension stems shall be complete with guide bearings, wrench nut and tee-handle wrench. All valve items and machinery stuffing boxes shall be packed with materials selected for the service intended. All packing shall be maintained until final acceptance by the Owner.

F. Buried valves shall be installed where shown. They shall be cleaned and manually operated before installation. Valves shall be set vertically and in a closed position and shall be kept closed until otherwise directed by the Engineer. An approved valve box constructed of cast iron with a round base shall be provided on each valve. The valve box shall be of the sliding type with a 5-inch shaft and the cover shall be slotted for easy removal. The valve box shall be set carefully, truly vertical, and accurately centered over the valve with top at finished graded elevation and shall have a protective concrete pad as shown on the Drawings. It shall be set so as not to transmit traffic loads to the valve.

2.02 SHOP PAINTING

A. All interior ferrous metal surfaces of valves except for seating surfaces shall receive two (2) coats of epoxy paint.

B. All exterior ferrous metal surfaces of valves that will not be buried shall receive at least one (1) coat of epoxy paint.

C. All exterior ferrous metal surfaces of valves that will be installed in buried locations shall receive a heavy bituminous coating or two (2) coats of epoxy paint.

2.03 ECCENTRIC PLUG VALVES

A. Plug valves shall be of the 90 degree turn, non-lubricated, serviceable (able to be repacked) under full line pressure and capable of sealing in both directions at the rated pressure. The disc shall be completely out of the flow path when open. Plug valves specified herein shall be by DeZurik, Val-Matic, M & H Valve Company or Engineer approved alternate.

B. Valves 24-inch and smaller shall have a minimum 80 percent open port area. Valves larger than 24-in shall have a minimum 80 percent port area as measured by the percent cross-sectional area of equivalent size (nominal same diameter) pipe.

C. Manufacturer shall submit tables showing Cv values versus percent open for ENGINEER's review.

D. Valves shall be rated at minimum 175 psi W.O.G. (Water, Oil and Gas) working pressure for sizes 4-inch to 12-inch inclusive and at minimum 150 psi W.O.G. working pressure for sizes 14-inch and larger.

1. All plug valves under this paragraph shall be performance, leakage and hydrostatically tested in accordance with AWWA C504, except as herein modified.

2. At the above rated minimum working pressures, the valves shall be certified by the manufacturer as permitting zero leakage for a period of at least one-half hour with pressure applied to the seating face.

3. At the direction of the Engineer, the valve manufacturer may be requested to perform a valve seat leakage test, witnessed by the Engineer to prove compliance with these Specifications.

E. Valve bodies shall be of cast iron, 30,000 psi tensile strength, ASTM A126, Grade B, and of the top entry, bolted bonnet design, cast with integral flanges conforming to the connecting piping. All exposed bolts, nuts and washers shall be zinc or cadmium-plated, except for buried or submerged valves, which shall have Type 316 stainless steel hardware.

F. Plugs shall be ASTM A126 Class B cast iron. Plugs shall have a cylindrical seating surface eccentrically offset from the center of the plug shaft. With the plug in the closed position, the interference between the plug face and the body seat shall be externally adjustable in the field with the valve in line under pressure. The plug shall be completely coated with a hycar compound suitable for use with sewage. Plugs on valves in chemical sludge piping (any sludge piping exposed to alum, ferric chloride, etc.) shall be coated with a pure synthetic viton compound of a minimum of 70 durometer hardness bonded to the plug. The hycar and viton shall be applied at the factory to ensure that the plug is completely coated and then heat-treated to ensure a positive bond. Following this process, bare cast iron shall not be visible nor exposed in the flow area to ensure that the plug is abrasion resistant and suitable for service in raw wastewater, sludge, and chemically treated wastewater and sludge applications.

G. Valves shall have sleeve type metal bearings and shall be of sintered, oil impregnated permanently lubricated Type 316 ASTM A743 Grade CF-8M in 1/2-in to 36-in valve sizes. For valves larger than 36-in, the upper and lower plug journals shall be fitted with ASTM A-240 Type 316 stainless steel sleeves with bearings of ASTM B30 Alloy C95400 aluminum bronze. Non-metallic bearings shall not be acceptable.

H. True eccentric action shall be required. Design of the valve shall provide for a rectangular port that allows contact between the welded nickel seat and the plug to occur only in the final 3 degrees of plug movement. Round ported valves as well as other non-eccentric action valves shall not be acceptable.

ENGINEER reserves the right to visit the manufacturing facility to witness the eccentric action of partially assembled valves and to verify size and shape of the port area as well as the welded nickel seat.

I. The methods of mounting the actuator to the valve shall provide an air gap between the two. Actuator shall clearly indicate valve position and an adjustable stop shall be provided. Construction of actuator housing shall be semi steel. Hardware on actuators shall be of the same materials as the valves.

J. Valve actuators for manual valves shall have lever or gear actuators and tee wrenches, extension stems, floorstands, extended bonnets, etc., as shown on the Drawings. Extended bonnets shall have the gear located at the operator. Stem extensions with handwheel operators shall not be acceptable. Valves 4-in and larger shall be equipped with gear actuators. Gearing shall be enclosed in a semi-steel housing and shall be suitable for running in a lubricant with seals provided on all shafts to prevent entry of dirt and water into the actuator. The actuator shaft and the quadrant shall be supported on permanently lubricated bronze bearings. Actuators shall clearly indicate valve position and an adjustable stop shall be provided to set closing torque and to provide seat adjustment to compensate for changes in pressure differential or flow direction. Exposed nuts, bolts and washers shall be zinc plated.

K. Valve and gear actuators for buried or submerged service shall have seals on the shafts and gaskets on the valve and actuator covers to prevent entry of liquid. Actuator mounting brackets for buried or submerged service shall be totally enclosed and shall have gasket seals. Exposed nuts, bolts, and washers shall be stainless steel.

L. Valves and actuators shall be fully manufactured in the USA. Foreign and/or imported components, castings, and assembly shall not be acceptable. Documentation of this requirement shall be furnished upon request.

M. Plug valves shall be installed so that the plug rotates around a horizontal axis. The plug shall be stored in the top when the valve is in the open position and shall seat in the direction opposite the high-pressure side.

PART 3 – EXECUTION

3.01 INSTALLATION

A. All valves shall be installed in accordance with the Drawings, approved shop drawing and manufacturer's instructions.

3.02 FIELD TESTING

A. Following installation, all valves shall be tested by the Contractor under the anticipated operating conditions. The ability of the valves to operate properly without leakage, binding, sticking, fluttering, or excessive operating torque shall be demonstrated to the satisfaction of the Engineer. The Contractor shall at his own expense adjust or replace any valve as necessary to assure satisfactory operation.

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