

## SECTION 15110 - PROCESS VALVES

### PART 1 - GENERAL

#### SUMMARY

Section Includes. Furnish labor, materials and equipment necessary for fabrication, production, installation and erection of the items specified in this Section as shown on the Drawings.

Products Furnished But Not Installed Under This Section. Hanger rods, inserts and supports, flange bolts, and gaskets for valves shall be furnished and installed under Section 15070, Pressure Piping.

#### REFERENCES

<u>Reference No.</u>	<u>Subject</u>
ANSI B16.1	Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800
ANSI/AWWA C110/A21.10	Ductile Iron and Gray Iron Fittings, 3 in. through 48 in. for Water and Other Liquids
ANSI/AWWA C111/A21.11	Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.
ANSI/AWWA C500	Gate Valves for Water and Sewage Systems
ASTM A48	Specification for Gray Iron Castings
ASTM A126	Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings
ASTM A182/A182M	Specification for Forged or Rolled Alloy Steel Pipe Flanges, Forged Fittings and Valves and Parts for High Temperature Service
ASTM A183	Specification for Carbon Steel Track Bolts and Nuts
ASTM A194/194M	Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service
ASTM A276	Specification for Stainless and Heat Resisting Steel Bars and Shapes
ASTM A436	Specification for Austenitic Gray Iron Castings
ASTM A536	Specification for Ductile Iron Castings
ASTM B148	Specification for Aluminum Bronze Castings
ASTM B584	Specification for Copper Alloy Sand Castings for General Applications
ASTM B61	Specification for Steam of Bronze Castings
AWWA/ANSI C504	Rubber Seated Butterfly Valves
ANSI B16.3, B2.1	Threaded Valve Joint Standards
ANSI B16-104	Reinforced Teflon Steel Standard
AWWA/ANSI C509	Resilient Seated Gate Valves for Water Supply Service

#### SUBMITTALS

Shop Drawings. Furnish shop drawings covering the items included under this Section of the Work.

Warranty. Furnish warranties covering the items included under this Section of the Work.

Operation and Maintenance Manuals. Furnish operation and maintenance manuals for items included under this Section.

## QUALITY ASSURANCE

All Work under this Section of Work shall be performed in accordance with standard practices as recommended by the manufacturer and AWWA.

## PART 2 - PRODUCTS

### MANUFACTURERS

Butterfly Valves (B) shall be the product of one of the following manufacturers, or equal:

Allis-Chalmers	Kennedy Valve
BIF	Henry Pratt
Dresser	Center Line

Resilient Seated Gate Valves (RA) shall be the product of one of the following manufacturers, or equal:

U.S. Pipe Metroseal 250	Clow
Mueller A-2360 Resilient Wedge	M&H
American Darling	EJIW

Standard Swing Check Valves (C) shall be the product of one of the following manufacturers, or equal:

Clow	Kennedy
M & H	Rensselaer

Combination Air and Vacuum Release Valves (ARV)

APCO  
Crispin

Combination Air and Vacuum Release Valves (Pipe) (ARV)

APCO  
Crispin

Plug Valves (P) shall be the product of one of the following manufacturers, or equal:

Clow  
DeZurik  
Homestead  
Pratt

Tapping Sleeves and Valves (TPSV) shall be the product of one of the following manufacturers, or equal:

A.P. Smith Company  
Clow  
M & H

Hydrant Assemblies (FH) shall be East Jordan Iron Works WaterMaster 5-BR

T-handle Wrench shall be Clow valve wrench, or equal.

## COMPONENTS

Butterfly Valves (B). Butterfly valves shall be Class 150B and meet the requirements of AWWA Specification C504. Butterfly valves shall be short body laying length and be provided with square wrench nut operators.

Butterfly valves shall be installed in manholes and be furnished with valve extension stems and flanges which are ductile iron and meet the requirements of AWWA C115 (ANSI 21.15).

Resilient Seated Gate Valves (RA). Resilient seated gate valves shall be designed for 150 psi working pressure and shall meet the requirements of AWWA Specification C509 except as otherwise specified herein. Valves shall be cast or ductile iron body, bronze stem, O-ring stem seal, and non-rising stem. The interior and exterior surfaces of the valve body shall be coated with an epoxy coating meeting the requirements of AWWA C550. The bronze or iron or ductile iron wedge shall be fully encapsulated with molded rubber. No bare metal shall be left exposed. The valve shall seal on both sides of the wedge. Gate valves shall have a clear waterway equivalent in area, when fully open, to that of the connecting pipe. Valves shall be made to open when turned to the left, or counterclockwise. The gate valves shall have square wrench nuts mounted on non-rising stems. All fasteners shall be stainless steel. Ground-buried gate valves shall be furnished with valve boxes. Flanges shall meet the requirements of AWWA C115 (ANSI 21.15). Two complete sets of joint accessories shall be furnished with each valve.

The water mains will be laid with a minimum 5.5 feet of cover or as noted on the Drawings. One operating wrench of suitable length shall be provided under this Section.

Standard Swing Check Valves (C). Standard swing check valves shall meet the requirements of ANSI/AWWA C508. In quality of material and workmanship, check valves shall fulfill the requirements of the specification set forth above for gate valves insofar as they are applicable to the construction of check valves. Check valves shall be cast iron body and fully bronze mounted with an elastomer seating ring. Check valves shall be of the balanced single disc type with the disc hinged at the top, with outside lever and adjustable weight or spring. A clear waterway opening equal to the full area of the connecting pipe shall be provided when the valve is open.

Disc on sizes smaller than 10-inches shall be solid bronze and on larger sizes shall be cast iron with bronze facing. Hinge pins shall be stainless steel.

Combination Air And Vacuum Release Valves (ARV). Air valves for submersible pumps shall be designed to allow large quantities of air to escape out the orifice when the pump is started and close watertight when the liquid enters the valve. The air valve shall also permit large quantities of air to re-enter through the orifice when the pump is stopped to prevent a vacuum from forming in the pump column.

The valve shall consist of a body, cover, baffle, float and seat. The baffle will be designed to protect the float from direct contact of the rushing air and water to prevent the float from closing prematurely in the valve. The seat shall be fastened into the valve cover, without distortion, and shall be easily removed, if necessary.

The entire float and baffle assembly must be shrouded with a perforated water diffuser to prevent the water column entering the valve, from slamming the float shut and eliminate water hammer in the system.

The discharge orifice shall be fitted with an adjustable throttling device to regulate the flow of air escaping to establish a pressure loading on the rising column of water to minimize shock to the pump and check valve.

The float shall be stainless steel, designed to withstand a minimum of 1000 psi. The float shall be center guided and not free floating for positive seating. The valve body shall be cast iron, ASTM A48.

Combination Air And Vacuum Release Valves (Pipe). Combination valve shall be the compound lever type with the size as noted on the Drawings and designed for 100 psi working pressure. The valve body shall be cast iron with a stainless steel float and internal parts. Valves shall be provided with isolation valves.

Plug Valves (P). Plug valves shall be nonlubricated, eccentric type with nitrile butadiene (hycar) or Buna-N resilient faced plugs. End connections shall generally be flanged or grooved for inside valves and mechanical joint for exterior ground-buried valves. Port areas shall be equal to at least 80 percent of the nominal size pipe area. Valve bodies shall be suitably marked to indicate whether the valve is open or closed.

The seating surface of the valve body shall be welded in stainless steel or nickel. Bearings at the top and bottom supporting the rotating element shall be self-lubricating, corrosion-resistant type, suitable for sewage plant service. The valve shall be of the bolted bonnet design. Packing shall be visible for inspection without dismantling valve or removing operator. The packing shall be adjustable and replaceable without disassembling of the valve. The valve body shall be cast or ductile iron marked to show seat side of valve.

Plug valves shall be of adequate design to operate with a pressure of 50 psi on both sides or on either side of the valve without leakage.

Pressure Control and Regulation Valves (PV). Pressure control and regulation valves will maintain a constant downstream pressure regardless of varying inlet pressure. Valves shall be globe pattern or angle pattern as required by the installation shown on the Drawings and/or as called for in the Schedule. Valves shall be hydraulically operated, pilot-controlled and of the diaphragm operated type; the diaphragm shall be nylon fabric reinforced synthetic rubber, and the disc shall have a rectangular cross section. The valve may also be a self-contained differential piston type with the small end of the piston representing one of the sealing contacts, and the large end representing the effective area to provide the closing force.

The external pilot valves and piping shall be arranged for either pressure-sustaining or pressure-reducing service for the pressure range as listed in the Schedule.

Valves shall be cast iron or semi-steel body, bronze trim and be designed for 150 psi working pressure. The valve piston shall be of cast bronze provided with renewable leather cup and rubber seat securely held in place. The liner of the valve shall be of cast bronze provided with a leather cup securely held in place. There shall be a cast bronze seat crown screwed into place within the valve body and it shall be provided with cored "V" port opening to permit water passage.

The pilot control shall be a direct-acting, adjustable, spring-loaded diaphragm type, permitting convenient adjustment over a range of no less than 30 psi.

Valves shall be furnished with a valve position indicator, opening and closing speed controls and a strainer in the pilot system. Flow symbols shall be cast in the valve body, or the inlet end shall be identified to facilitate correct installation in the piping. Valves shall have ANSI 125 lb. flanged connections.

The valve shall be air and water cushioned to prevent hammer and shock. It shall, when required, close off tightly, and when necessary, open wide to permit full pipe line opening.

Bronze castings shall conform to ASTM Specifications B-62, and the cast iron body and lid shall conform to ASTM Specifications A-126, Class B.

Tapping Sleeve and Valve (TPSV). Tapping sleeves shall be designed for a water working pressure of 150 psi and shall be mechanical joint end type. Tap shall be done under pressure and without interruptions of service.

Tapping valves shall be as specified hereinafter under Gate Valves.

Fire Hydrant Assembly (FH). At the points indicated on the Drawings, there shall be installed a hydrant assembly consisting of a hydrant, a 6-inch valve, a cast iron valve box, and all piping necessary for a complete job. Valves shall be located 3 feet  $\pm$  from the hydrant as shown on the typical setting detail on the Drawings. Hydrants shall be furnished for 6 feet of cover minimum. Valves furnished as part of hydrant assemblies shall conform to the requirements for gate valves specified in this Section.

Hydrants shall meet the requirements of AWWA C502 and shall be made to open in conformance with OWNER's standards. Generally, hydrants shall be 5-1/4-inch MVO with 6-inch M/J inlet as noted on the Drawings with two (2) 2-1/2-inch bibs and one (1) 4-inch bib. The pumper nozzle shall have a storz fitting as specified below. Hydrants shall be East Jordan Iron Works 5-BR with 1- 1/2 inch pentagon cast iron operating nut, one 4 - 1/2 inch pumper connection with a 5" cast iron storz coupling and cap and two 2-1/2-inch hose connections conforming to National Standard Thread Specifications. The hydrant shall be of adequate length to meet minimum depth requirements. Hydrant shall be of safety coupling and break flange construction.

Storz Fitting (for use with East Jordan hydrant and 5-inch storz coupling, pentagon cap). The fire hydrant pumper nozzles installed shall be either a Kocheck "Big Water" Brass/Aluminum Fire Hydrant Storz Nozzle and Cap or Harrington, Inc. Integral Hydrant Storz Cap Part # HIHS-EJIW-50-45 and shall be of a one piece design, compatible with 5-inch storz coupled large diameter fire hose. The nozzle and fittings shall be made of a lead free brass alloy or aluminum forged alloy, ensuring long life free from oxidation and lead, which may contaminate public water supplies. The nozzle shall be colored red using a baked powder coat finish.

The nozzle shall become an integral part of the fire hydrant assembly, resistant to tamper or removal by persons not familiar with the art of fire hydrant construction. Add on storz compatible adapters shall not be acceptable.

All fire hydrants shall be provided with spring steel hydrant markers with reflective bands.

Surface Preparation. All hydrants shall be supplied painted red. Each fire hydrant shall be tagged with its distinguishing mark letter and number. Mark letter and number will be as listed in the Schedule. Identification tag shall be 1-1/2-inch diameter, 18-gauge polished brass or aluminum with 1/2-inch high, embossed, black-filled mark letter and number placed thereon.

Testing. Each hydrant assembly shall be tested by CONTRACTOR; the test shall consist of flushing the hydrant for a minimum of ten minutes. During the test period the 6-inch gate valve shall be closed and opened. CONTRACTOR shall furnish necessary hoses for the disposal of OWNER-furnished water.

ENGINEER or ENGINEER's representative will make such inspections and tests upon delivery which ENGINEER deems necessary to determine that the valve and its appurtenances conform to the Specifications and the approved shop drawings.

Valve Joints.

Flange Joint. Flanges shall meet the requirements of ANSI-B16.1 Standard Class 125, except that bolt holes at shaft hubs may be drilled and tapped on the flanges. Flanges' faces shall be coated with a rust inhibitor immediately after drilling.

Grooved Coupling. Grooved coupling joints shall be the rigid type and shall have housing fabricated in two or more parts of malleable iron in accordance with ASTM Specification A47 Grade C32510. Ends shall be factory grooved in accordance with the coupling manufacturer's standard groove dimension. Bolts shall be oval neck track head type with hexagonal heavy nuts, per ASTM A-183 and A-194/A-194M. Gasket material shall be Grade "H", "E" chlorinated butyl or E.P.D.M. for water service and grade "T" Buna-N for sewage.

Mechanical Joints. Mechanical joints shall conform to ANSI/AWWA C110/A-21.10 and ANSI/AWWA C111/A-21.11.

Push-On Joint. Push-on joints shall conform to ANSI A21.11 and AWWA C111.

## ACCESSORIES

Wrench Head. Wrench heads shall be cast iron with set screw. They shall be furnished for wrench nuts except where extension stems or T-handle wrenches are required.

Wrench Nut. Wrench nuts shall be provided with a 2-inch operating nut when a T-handle wrench or extension stem is required. Other wrench nuts shall be furnished with a wrench head.

Extension Stem/Shaft (Length). Extension stems shall be 304 or 303 stainless steel with bronze couplings. Stems of more than one section shall be jointed by bronze couplings threaded and keyed to the stems. Extension stems shall have a 2-inch wrench nut end connection for T-handle wrench operation.

Extension shafts shall be 304 or 303 stainless steel with universal joint couplings.

Valve Box (Length). Valve boxes shall be either cast iron. Cast iron lids shall be furnished with valve boxes and shall be marked "WATER" in raised letters.

Cast Iron Boxes. Cast iron boxes shall be of the three-piece adjustable type. A number 6 base shall be furnished with valves 8 inches or less, and a number 8 base shall be provided for valves over 8 inches.

Cast iron material shall meet requirements of ASTM A-126-B.

Bolt material shall meet requirements of ASTM B-316 and B-253.

## PART 3 - EXECUTION

### ERECTION

Equipment furnished and installed under this Section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with detail drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer as approved by ENGINEER. Equipment furnished under this Section will be installed under Section 15070, Pressure Process Piping.

## FIELD QUALITY CONTROL

Installation. Special attention shall be given by CONTRACTOR to ensure that items furnished under this Section of the Work are installed in accordance with manufacturer's recommendations.

END OF SECTION 15110