

SECTION 90

VALVES

PART 1 - GENERAL

1.01 SCOPE

Under this section the Contractor shall furnish all the materials for and shall properly set in place at the location shown on the drawings, or as directed by the Engineer, all gate valves, butterfly valves, check valves, pressure relief valves, air release valve, pressure sustaining or back pressure valves, altitude valves, specialty valves, handwheels, valve boxes, etc. of the size, types and pressures specified which are necessary for the proper completion of the work included under this contract.

1.02 DETAILED DRAWINGS

- A. Before any valves or gates and floor stands are delivered to the work, the Contractor shall submit for the approval of the Engineer detailed drawings and specifications, dimensions, weights and operational data covering the same.
- B. No valves shall be installed until the Engineer has approved the detailed drawings.

1.03 PAINTING

All valves, extension stems, brackets, gates and fittings where not constructed of brass, aluminum, bronze or of finished steel, shall be painted at the point of manufacture in accordance with the American Water Works Association Specifications for Painting Cast Iron Water Pipes and Fittings, or in accordance with approved manufacturer's standards, except machined surfaces which shall be given a suitable coating of grease or other protective material. Floor stands shall be filled and painted with three coats of an approved machinery enamel of color selected by the Engineer. After erection, all valves, floor stands, etc. shall be painted as directed by the Engineer.

1.04 GUARANTEE

The Contractor shall provide a guarantee against defective equipment and workmanship in accordance with the requirements of the section entitled "Guarantees and Warranties" of these Specifications.

PART 2 - PRODUCTS

2.01 GENERAL

- A. For the purpose of designating the type and grade of a particular valve, gate, floor stand, etc. desired, a manufacturer's name and list or figure number is given on the drawings or specified. Valves, gates, floor stands, etc. of other manufacture may be substituted, provided the Contractor proves to the satisfaction of the Engineer that they are equal or superior to those designated for the particular work intended.
- B. All valves shall have the name of the manufacturer, pressure, and size of the valve cast upon the body or bonnet in raised letters.
- C. Valves and operating mechanisms shall be of the proper size and dimensions to fit the pipe connections thereto and shall be installed in the position and within the space shown on the plans.
- D. All castings, whether of bronze, iron or steel shall be sound and smooth, without swells, lumps, blisters, sand holes or other imperfections and shall be made in accordance with best foundry practice. All materials, unless specifically noted otherwise shall be of the grade and qualities as established by the specifications of the ASTM listed as follows:

All iron castings	A126, Grade B
All steel castings	A216
Stem, bolts and nuts	B21, Grade A, half hard
Stem nut and yoke nut	B132, Grade B
Stuffing box gland	B62) With some modifications
Bushings	B62) Permissible as approved

Disc facings for valves shall be of metal alloy composed of copper 89-92%; tin 0.5-1.5%; lead 0.75-2.0%; and zinc 7-8%.

2.02 GATE VALVE

- A. All gate valves shall be of a construction equal to those indicated herein, subject of the Engineer's approval, and shall be nut, wrench, chain or wheel operated with extension stems as required (See Construction Detail 200-435). All valves shall be of the stationary spindle type unless otherwise specified or shown.
- B. Unless otherwise designated, all valves used for wastes and drain lines shall be of the single disc, double-seat, solid wedge resilient seat type.
- C. Gate valves on potable water supply lines shall be either the double disc type or solid wedge resilient seat type and shall conform to AWWA specifications

for water valves, ANSI/AWWA C500 latest revision or AWWA C509-1985 respectfully. Types of valves must be shown on the contract drawings and approved by the Engineer.

- D. Except where otherwise specified, all one and one-half inch valves or smaller shall be of the best quality bronze body, bronze mounted, solid wedge type, non-rising stem gate valves.
- E. All gate valves two inches and larger in size shall be of iron body, bronze mounted, and shall have a non-rising bronze stem. Valves shall open by turning to the left by operating with a 2-inch nut. All gland bolts for iron body valves shall be steel with steel nuts. All gate valves shall be equipped with o-ring seals. Also see Item (G).
- F. Unless otherwise specified or shown, all gate valves for underground installation shall have mechanical joint ends.
- G. Alternate - Item (E) for iron body two inch gate valve - A 2 inch high tensile bronze gate valve with a strong and sturdy malleable-iron handwheel will be accepted. Valves shall contain a solid brass wedge and have a pressure rating of 150 psi/350 psi; and/or equal to No. 49-U as manufactured by Jenkins Brothers.

2.03 BUTTERFLY VALVE

- A. Butterfly valves shall be for water service and shall conform to ANSI/AWWA C504 latest revision Class 150B for Rubberseated Butterfly Valves.
- B. All butterfly valves shall be for buried service and shall have a 2-inch square geared operating nut. Seals shall be standard O-ring seals. All valves shall open by turning to the left (counter-clockwise).
- C. Butterfly valves shall have mechanical joint ends conforming to ANSI/AWWA C111/A21.11 latest revisions.
- D. All butterfly shall have the name of the manufacture, class, and size of the valve cast into the body in raised letters.
- E. All valves shall be furnished with necessary accessories including rubber gaskets, glands, and bolts.

2.04 CHECK VALVE

- A. Check valves one and one-half inches and smaller for use in water and sewage pipelines shall be brass or bronze body, swing type with bronze renewable discs and shall be equal to Chapman swing bronze check valve, List 20 for 300-pound water pressure.
- B. Check valves two inches and larger for use in water and sewage pipelines shall, unless otherwise specified, be iron body, bronze mounted, horizontal swing type, fitted with removable bronze seats and with removable covers or handhold plates. Check valves shall be equipped with extended hinge pin, an outside lever and adjustable weight. Where required, the valves shall be suitable for installation in vertical pipelines. Valves shall be equal to Chapman List 22A, Standard Pressure Swing Check Valves.

2.05 ALTITUDE VALVE

- A. Altitude valve to be furnished and installed in the concrete pit at the water storage tank shall have cast iron bodies and bonnets with bronze trim and shall be rated for 150 pounds working pressure.
- B. Altitude valves shall be designed for cushioned closing and to prevent surges on shutoff. Valve speed control shall be adjustable and an indicator shall show valve position.
- C. Renewable cups and seat washer shall eliminate metal-to-metal contact.
- D. Altitude valves shall be Golden Anderson Valve Specialty Company Standard Altitude Valve, Figure 32-D, or approved equal.

2.06 WATER PRESSURE REDUCING VALVE

- A. Water pressure reducing valves 2 inches in size and smaller shall have cast iron body, bronze trim, screwed ends, shall be rated for 250 pounds working pressure, and shall be Golden Anderson Valve Specialty Company Figure 43-U or approved equal.
- B. Water pressure reducing valves larger than 2 inches in size shall have cast iron body, bronze trim, flanged ends, shall be rated for 300 pounds working pressure, and shall be Golden Anderson Valve Specialty Company Figure 45-U or approved equal.

2.07 WATER PRESSURE RELIEF, PRESSURE SUSTAINING, OR BACK PRESSURE VALVE

Water pressure relief valves shall be specified according to actual field conditions and shall be of the Clayton 50-01 Series or approved equal.

2.08 ANGLE VALVE

Angle valves shall be all brass and equal to Ford KV43-332W.

2.09 GAUGE COCKS AND PET COCKS

- A. Gauge cocks shall be all brass with threaded female connections and lever handle and shall be equal to Crane No. 712.
- B. Pet cocks shall be all brass with lever handle of minimum .25" in size and shall be equal to Crane No. 702.

2.10 AIR RELEASE VALVE

- A. Air release valves shall be equal to AGFD type units with stainless steel float, manufactured by Simplex Control Systems. The Permutit Company, APCO Model No. 200-A as manufactured by the Valve and Primer Corporation, or Crispin Type N Pressure Air Valve as manufactured by the Multiplier Company. The valve shall be suitable for operating under a working pressure of 300 psi.
- B. Air release valves shall be installed complete with valve pit and cover, corporation stops, gate valves and at the locations shown on the plans. Concrete for pit shall be in accordance with Item 30 of these specifications. Cast iron frame and cover shall conform to requirements of Item 80 of these specifications.
- C. Air release valve shall be installed on discharge side of well and high service pumps.

2.11 FLOOR AND VALVE BOXES AND COVERS

- A. The valve boxes and covers shall be of the 2-piece slip type and shall be equal to standard valve box No. 5461-S of the required length as manufactured by the Acheson Foundry. The covers for valve boxes shall indicate the letter "S" cast thereon in raised letter where used on waste lines and the letter "W" where used on potable water lines.
- B. Floor boxes and covers shall be equal to Clow No. F-5690, F-5695, or approved equal, and similar equipment of approved manufacture, with "S" or "W" cast thereon in raised letters as specified in (B) above.

- C. The contractor shall furnish, where valve depth dictates, an additional short valve box bottom and a 6-inch diameter PVC pipe extension for bringing slip type cast iron valve boxes to finished grade. The additional short valve box bottom shall be installed on top of the valve. The PVC pipe extension shall be placed on top of the short valve box bottom. The normal slip type valve box (top and bottom) shall be placed on top of the PVC pipe extension and adjusted to the finished grade. The square nut must be centered in both the extension and valve box for free movement. Ductile iron pipe valve box extensions shall be substituted for PVC valve box extensions if shown on the contract drawings or directed by Cleveland Utilities. Where the valve operating nut is three feet or more below finished grade a valve key extension (see CU Construction Detail 200-435) shall be fabricated and installed to "transfer" the height of the valve operating nut to 1' – 6" below the finished grade.

2.12 CORPORATION STOP AND SERVICE SADDLES

Unless otherwise shown or specified, all taps in cast iron pipe shall be provided with corporation stops. Corporation stops shall be sized as required for services 3/4" minimum. Corporation stops shall conform to AWWA standard C800-66 Tapped CC Pipe Threads, Ford F1000 or equal. Brass service saddles shall be used on all PVC water pipe. The saddle shall be sized as required by the size of the water pipe and be Ford S70-603 or equal. Required corporation stops shall be Ford F1000 or equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All valves shall be set carefully and accurately to the lines and grades given and where set against concrete shall be thoroughly anchored to the same with approved expansion bolts or with anchor bolts cast in the concrete positioned accurately by means of secure and suitable templates.
- B. Operating stands shall be centered over the gate stem, shall be shimmed and grouted to true position and adequately bolted to the concrete. Suitable anchor bolts shall be furnished with all floor stands.
- C. All connections to pipe or specials shall have the necessary flange, or screwed joints, as specified for cast iron pipe under Section 50 , "Cast Iron and Ductile Iron Pipe".
- D. Particular attention is called to the fact that screwed connections shall be carefully made and care shall be taken in making screw joints so that the pipe does not disturb the proper functioning of the valve.

3.02 TESTING

All valves shall be tested at the point of manufacture and made drip tight when tested under the hydrostatic head specified. After the valves are set in place and are ready to operate, the Contractor shall test them under the rated working pressure and conditions and any valve found to leak shall be made watertight or airtight and if found to be of faulty design shall be satisfactorily repaired or replaced by the Contractor.

**** END OF SECTION ****