Section 11

Miscellaneous Valves and Appurtenances

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11.01 General

A. All of the types of valves and appurtenances shall be on the IRCDUS Approved Manufacturers' Products List.

B. All valves and appurtenances shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these specifications as applicable.

C. All valves and appurtenances shall have the name of the manufacturer, year manufactured, and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.

D. All buried valves and appurtenances shall be mechanical joint. All aboveground/exposed valves and appurtenances shall be flanged.

E. Gate valves shall be used on water, sewer, reclaimed, and brine mains.

F. Plug valves may be used in lift station valve vaults as approved by IRCDUS.

G. IRCDUS, on a case-by-case basis, may approve valves and appurtenances other than those specifically called out in this Section for use. Criteria for approval shall include the interchangeability of the valve or appurtenance, or its parts, with those brands specifically called out in these specifications.

H. All exposed valves and appurtenances shall be painted in accordance with IRCDUS Approved Manufacturers' Products List. Water mains shall be painted blue, force mains shall be painted "green", reuse mains shall be painted "purple" and brine shall be painted "brown".

11.02 Gate Valves – 3 Inches and Larger

A. All buried gate valves shall meet the requirements of AWWA Standard Specification C509-C515, or latest revision. Valves shall be rated for 150-psi working pressure and a minimum 300-psi test pressure. Valves shall be ductile iron body, bronze-mounted, resilient seated, non-rising stem type fitted with "O-Ring" seals. All bolts to be used in valve bonnet are to be 316 stainless steel. The operating nuts shall be Standard AWWA 2" square. All valves shall open counterclockwise. Stuffing boxes shall be the "O-Ring" type. Gate valves shall be mechanical joint, ANSI Standards 21.11, except where shown otherwise.

B. Gate valves shall be provided with a valve box, cover, and concrete pad. Box cover opening shall be for valve stem and nut. The Contractor shall provide valve wrenches and extension stems from the same manufacturer as the valve to actuate the valves. The box and cover shall be in accordance with IRCDUS Approved Manufacturers' Products List. (See Drawing M-5 and M-6 for details on the valve box, cover, and concrete pad.)

11.03 Check Valves

A. Check valves for ductile iron pipelines shall be swing type and shall meet the material requirements of AWWA Standard Specifications C508-01, or latest revision. The valves shall be iron body, bronze mounted, single disc, 150 psi working water pressure, non-shock, and non-slam, slow closing, and hydrostatically tested at 300 psi. Ends shall be 125 pound ANSI B16.1 flanges or 125 pound ANSI B2.1 threaded fittings, depending upon location.

B. When there is no flow through the line, the disc shall hang lightly against its seat. When open, the disc shall swing clear of the waterway.

C. Check valves shall have bronze seat and body rings, extended bronze hinge pins, and bronze nuts on the bolts of bolted covers.

D. Valves shall be so constructed that disc and body seat may easily be removed and replaced without removing the valve from the line. Valves shall be fitted with an extended hinge arm with outside lever and weight, as necessary.

E. Check valves for PVC pipe less than 3" in diameter shall be of PVC Type 1, Series BC, with union, socket, threaded, or flanged ends, as required and shall be per the Approved Manufacturers' Products List.

11.04 Plug Valves

A. Plug valves shall be non-lubricated eccentric type with semi-steel bodies, resilient faced plugs, and stainless steel or nickel seats in the body. Port area shall be at least 80 percent of full pipe area for valves 20 inches and smaller. Port area shall be 70 percent for all valves 24 inches and larger. All valves 4 inches and larger shall be of the bolted design. All exposed nuts, bolts, springs, and washers shall be hot dipped galvanized, except exposed hardware for submerged valves shall be of stainless steel. Valve bodies shall be semi-steel with 125-pound ANSI Standard flanged ends for interior or aboveground service; mechanical joint for buried service and for use with threaded cast iron or ductile iron piping shall have screwed end connections. The plug shall be one

piece and of sufficient design so as not to require a stiffening member opposite the face plug.

B. Plug valves 6 inches or greater in diameter shall be equipped with gear actuators, which shall clearly indicate valve position and an adjustable stop shall be provided. Construction of actuator housing shall be semi-steel. All gearing shall be enclosed, suitable for running in oil with seals provided on all shafts to prevent entry of dirt and water into the actuator. All shaft bearings shall be furnished with permanently lubricated bearing bushings.

C. Three-way plug valves shall be non-lubricated gear operated. Valve bodies shall be semi-steel with 125-pound ANSI Standard flanges, and plugs shall be resilient faced. Three-way valves shall be 3-way, 3-port, 270-degree turn.

D. Plug valves and actuators shall be as per the Approved Manufacturers' Products List.

11.05 Air Release Valves

A. The air release valves shall be installed as shown on the Drawings. Valves shall be provided with a vacuum check to prevent air from re-entering the line. Above ground air release valves for wastewater shall be per the Approved Manufacturers' Products List. (See Drawing M-9.)

B. The fittings shall be threaded. Belowground air release valves for wastewater shall be as on the Approved Manufacturers' Products List. (See Drawing M-9.) Air release valves for water lines shall be as per the Approved Manufacturers' Products List.

11.06 Fire Hydrants

Fire hydrants shall be traffic type, 5¼" valve opening and manufactured per the Approved Manufacturers' Products List. (See Drawing W-2 A.) Fire hydrants shall comply with the current AWWA Standard Specification C502-94, or latest revision, for fire hydrants for water works service. Each hydrant shall have 6" mechanical joint ends with harnessing lugs ("dog ears") and shall open by turning to the left (counterclockwise). Fire hydrant shall be of ample length for 18" clearance between the center of all nozzles and finished grade. Hydrant should be set so that the "bury line" on the barrel is set at finished grade. It shall be provided with two 2½" hose nozzles and one 5¼" pumper nozzle, all having National Standard hose threads. Nozzles shall have caps attached by chains. Operating nuts shall be AWWA Standard (pentagonal, measuring 1½" point to flat). Fire hydrants shall be equipped with "O-Ring" packing. Fire hydrant shall be painted "Federal Safety Red".

11.07 Backflow Preventers

All backflow preventers shall be mounted aboveground, in non-traffic areas on the customer's side of the meter. Above ground piping shall be flanged ductile iron. Brass or Copper pipe may be used for pipe 2" in diameter or smaller. Backflow preventers shall be of reduced pressure/double check type with two (2) independently operating check valves, and shall be designed to operate in a horizontal flow mode. An independent relief valve shall be located between the two check valves. Reduced pressure feature shall be included in all commercial applications. Preventers shall be University of Southern California (USC) approved as per the Approved Manufacturers' Products List.

11.08 Valve Boxes

A. All buried valves shall have cast iron two or three-piece valve boxes with cast iron covers. Valve boxes shall be provided with suitable heavy bonnets and extend to match finished grade surface as directed by the Engineer. The barrel shall be one or two-piece, screw or slide type, having 5¼" shaft. Covers shall have "WATER" cast into the top for all water mains, "SEWER" cast into the top for all wastewater force mains and "REUSE" cast into the top for all reuse mains. All valves shall have actuating nuts extended to within 24 inches of the top of the valve box cover. (See Drawing M-6.)

B. Valve boxes shall be provided with a concrete pad around the top of the box. A nameplate with a suitable anchor for casting in concrete shall be installed in valve pads in unpaved areas. Nameplate shall be 3" diameter brass disk with engraved lettering 1/8" deep, as shown on the Drawing M-6. and manufactured per the Approved Manufacturers' Products List.

C. A 3" diameter wire port box to house the trace wire shall be installed in valve boxes in unpaved areas.

D. Valve boxes shall be installed in a concrete pad, as specified in Drawings Detail M-6 & M-6 A.

E. Valve boxes shall be manufactured domestically (i.e.: "Made in USA") per the Approved Manufacturer's List.

11.09 Water Service

A. All water service fittings, including saddles, corporation stops, curb stops, and angled meter stops shall be no-lead brass or bronze suitable for 150 psi operating pressure, shall be iron pipe or AWWA tapered thread design, shall be of sizes required and/or noted on the Drawings, and comply with the Approved Manufacturer's Products List.

B. Saddles shall be no-lead brass/bronze bodies with double stainless steel strap.

11.10 Flexible Couplings

A. Flexible couplings shall be either the split type or the sleeve type.

1. Split type coupling shall be used with all interior piping and with exterior piping as noted. The couplings shall be mechanical type for radius groove piping. The couplings shall mechanically engage and lock grooved pipe ends in a positive couple and allow for angular deflection and contraction and expansion.

2. Couplings shall consist of ductile iron, ASTM Specification A47, Grade 32510 housing clamps in two or more parts, a single chlorinated butyl composition sealing gasket with a "C" shaped cross-section and internal sealing lips projecting diagonally inward, and two or more oval track head type bolts with hexagonal heavy nuts conforming to ASTM Specification A183 and A194 to assemble the housing clamps. Bolts and nuts shall be 316 stainless steel.

3. Sleeve type couplings shall be used with all buried piping. The couplings shall be of ductile iron and shall be per the Approved Manufacturers' Products List. The coupling shall be provided with 316 stainless steel bolts and nuts, unless indicated otherwise.

4. All couplings shall be furnished with the pipe stop removed.

5. Couplings shall be provided with gaskets of a composition suitable for exposure to the liquid within the pipe.

6. Ductile iron followers and middle rings conform to ASTM A-536, Grade 65-45-12, NSF-61 fusion bonded powder epoxy coating, testing per AWWA C-219 (ANSI A21-11), rating 200 psi working pressure per AWWA C-219, compounded gaskets conform to compression test ASTM D-395 Method A & B, approved for water application.

11.11 Steel Casing Pipe

A. Steel casings shall conform to the requirements of ASTM Designation A139 Grade "B" with a minimum yields strength of 35,000 psi and shall be coated inside and outside by a black bituminous coating, minimum 5 mils thick. The casing pipes shall

have the minimum nominal diameter and wall thickness as indicated below.

Casing Pipe Inside Diameter Inches	Casing Pipe Wall Thickness Inches
6-16	.250
18-20	.312
22-24	.375
26-28	.437
30-34	.500
36-38	.562
40-50	.625
52-58	.750
60-78	.813
84-90	.875
96-102	.937
108-114	1.000
120	1.125

B. Field and shop welds of the casing pipes shall conform to the American Welding Society Standard Specifications. Field welds shall be complete penetration, single-vee groove or single-bevel groove type joints.

11.12 Tapping Sleeves and Valves

A. See Section 11.02 for Tapping (Gate) Valves.
B. Tapping sleeves shall be fully-passivated stainless steel wraparound type per the Approved Manufacturers' Products List.
C. All force main taps shall be a minimum of 4" diameter.
D. All taps shall be performed under supervision of IRCDUS Inspector. A pre-construction meeting may be held on-site at Inspector's discretion.
E. Tapping contractor MUST be approved by IRCDUS.
F. Tapping machine shall be disinfected prior to tap per AWWA C651.
G. No taps will be performed on Fridays or days preceding holidays.
H. Tapping saddle and valve shall be hydrostatically tested at a minimum 150 psi for 15 minutes duration. Any loss of pressure during the test period shall indicate failure.

END OF SECTION