REGIONAL CONSTRUCTION STANDARDS

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Fusible PVC Pipe - Section 200
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7. Pipe sections shall be joined on the job site above ground into continuous lengths by the thermal butt-fusion or electrofusion method, which shall be performed in strict accordance with the manufacturer's recommendations. The butt-fusion equipment used in the joining procedures shall be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400 °F, alignment, and 75 psi interfacial fusion pressure. Butt-fusion joining shall be 100% efficient and shall provide a joint weld strength equal to or greater than the tensile strength of the pipe. Socket-fusion, extrusion welding or hot gas welding of HDPE shall not be used for pressure pipe applications. Flanges, unions, grooved-couplers, transition fittings, and some mechanical couplers may be used to mechanically connect HDPE pipe without butt-fusion, if specified in the Contract Documents and approved by the manufacturer.

8. The manufacturer's representative shall be made available a minimum of 2 working days (time on site) during the project when requested by the Owner, including the first 2 Days of pipeline installation.

9. The cost for the services of the manufacturer's representative, including expenses, shall be considered incidental to the project and will not be paid separately.

10. Transition couplings from HDPE to other pipe materials, shall be as indicated in the Contract Documents.

D. Fusible Polyvinylchloride (fPVC) Pipe

1. Pipe Supplier shall furnish fPVC pipe conforming to all standards and procedures, and meeting all testing and material properties as described in this specification. Pipe, 4 to 12 inches in diameter, shall conform to AWWA C900 – Class 150 (DR 18), unless otherwise indicated in the Contract Documents. Pipe greater than 12 inch shall conform to AWWA C905 – Class 235 (DR 18) or Class 150 (DR25), as specified in the Contract Documents.

2. fPVC pipe shall be tested at the extrusion facility for properties required to meet all applicable parameters as outlined in AWWA C900 or C905, as appropriate. Rework material shall be allowed per AWWA C900 and AWWA C905 standards. All piping shall be made from a PVC compound conforming to cell classification 12454 per ASTM D1784.

3. fPVC pipe shall be extruded with plain ends and shall normally be supplied in standard 40 foot lengths. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe. fPVC pipe shall be blue in color for potable water use or green for wastewater.

4. Acceptable fittings for use with fPVC pipe shall include standard ductile iron fittings conforming to AWWA/ANSI C110/A21.10 and AWWA/ANSI C153/A21.53.

5. Connections to fPVC pipe may be made using a restrained or non-restrained retainer gland product for PVC pipe, as well as for MJ or flanged fittings.

6. Bends, tees and other ductile iron fittings shall be restrained as indicated in the

Contract Documents.

7. **Ductile iron fittings and glands must be installed per the manufacturer's guidelines.**

8. **Pipe generally shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:**

   a. **Nominal pipe size**
   b. **PVC**
   c. **Dimension Ratio, Standard Dimension Ratio or Schedule**
   d. **AWWA pressure class and Standard number**
   e. **Extrusion production-record code**
   f. **Trademark or trade name**
   g. **Cell Classification 12454 and/or PVC material code 1120 may also be included.**
   h. **NSF-61 mark, if for potable water service.**

9. **The manufacturer's representative shall be made available a minimum of 2 working days (time on site) during the project when requested by the Owner, including the first 2 Days of pipeline installation.**

10. **The cost for the services of the manufacturer's representative, including expenses, shall be considered incidental to the project and will not be paid separately.**

E. Copper Water Pipe

Pipe shall be seamless copper tubing conforming to ASTM B 88, Type K, Temper 060, and shall be of the coiled type. Fittings shall be wrought copper solder-joint pressure fittings conforming to ASME B16.22. Copper tube and fittings shall be rated for a working pressure of 150 psi. Joints shall be compression style.

F. Valves

1. Gate Valves

   a. Resilient-seated gate valves shall be used on pipelines 3-inches in diameter up to and including 12-inches in diameter. Resilient-seated gate valves shall be in accordance with AWWA C509 or AWWA C515 and shall be supplied with an interior epoxy coating in accordance with AWWA C550. Resilient-seated gate valves shall be iron body, non-rising bronze or stainless steel stem, rubber encapsulated iron disc, o-ring seals, and suitable for buried service. Valve ends shall be flanged, mechanical joint, or mechanical joint by flange to suit the pipe or fittings as indicated in the Contract Documents.

      Gate valves shall be manufactured by Kennedy Valve Company, Mueller Company, or approved equal, or as specified in the Special Provisions.

   b. Gate valves smaller than 3-inches in diameter shall be cast bronze, solid-wedge disc, screwed bonnet, inside screw, non-rising stem valves with threaded connections. Valves shall conform to Standard SP-80, Type 2, Class

150, Manufacturer's Standardization Society of the Valve and Fitting Industry, Inc.

c. Gate valves larger than 16-inches in diameter shall meet the requirements of AWWA C500, except Section 4.4.8.1.1 will not be allowed. Valves shall be rated for 150 psi working pressure and a minimum 300 psi test pressure. Valves shall be iron body, bronze-mounted, double disc, parallel seat, non-rising stem type fitted with O-Ring seals. Valves shall be capable of drip tight, bi-directional shut off and operate in the horizontal position. The operating nuts shall be 2-in square. Valves shall open counter clockwise. Seats in the body shall be replaceable without removing the valve from the pipeline. Discs shall be cast iron and bronze faced and shall be free to revolve 360 degrees. Valves to be furnished with bronze rollers, bronze tracks and bronze scrapers.

d. Valve Operators

Buried valves shall have a 2-inch square operating nut conforming to AWWA C509, and shall open in a counterclockwise direction, unless otherwise noted. A valve key wrench of adequate length and of each type required shall be provided for each buried valve; however, not more than three of each type are required for each project. Valves in vaults shall have a hand wheel of cast iron conforming to ASTM A126, Class B.

2. Ball Valves

Owner-approved ball valves smaller than 3-inches in diameter shall be:

a. Brass with threaded connections, O-ring seals, and a coated ball conforming to AWWA C800 and Standard SP-80, Type 2, Class 150 Manufacturer's Standard Society of the Valve and Fittings Industry, Inc. Valves shall be manufactured by the Ford Meter Box Company B11, Mueller Company 300 Ball Curb Valve, B-20283, or approved equal.

b. PVC True Union Standards ball valve with steel reinforced threaded-end connectors, with a minimum pressure rating of 230 psi at 70°F, conforming to ASTM D1784, Cell Classification 12454, as manufactured by Asahi, Spears, or approved equal.

c. NSF approved.

3. Butterfly Valves

a. Butterfly valves may be used on pipelines 16-inches in diameter and larger and shall be Pressure Class 150B in accordance with the latest revision of AWWA C504. Butterfly valves and operators shall be suitable for buried service. Valve seats shall be of synthetic rubber compound and tested in accordance with ASTM D-429. The valve shall be operable with a maximum input of 150 foot-pounds on the operating nut, and be able to withstand an overload input torque of 150 foot-pounds at full open and full closed positions without damage to the operator nut. Actuator components shall be designed to withstand, without damage, a rim pull of 200 pounds for the hand wheel, and an input torque of 300 Ft-Lbs for wrench nuts, in accordance with AWWA

C504.The disc shall be capable of holding in any intermediate position without creep or flutter.

b. Butterfly valve operators may be side-mounted, shall meet the requirements of AWWA C504, pressure class 150B, shall be capable of seating and unseating the discs against the full design pressure and velocity, and shall transmit sufficient torque to the valve to accomplish this. Buried valves shall contain permanently lubricated operators. Valve operators shall be suitable for a minimum of 10,000 cycles of operations at its rated torque.

4. Coatings

All interior ferrous surfaces of all valves shall be coated in accordance with ANSI/AWWA C550 using a coating approved by the Virginia Department of Health for contact with potable water and shall not contain lead, coal tar resins, lampblack, carbon black or bituminous materials. The exterior surfaces shall receive a factory applied fusion bonded epoxy coating.

5. Valve Stem Extensions

Valve stem extensions, when allowed by the locality, shall be furnished when the distance from the operating nut to the top of the valve box frame is greater than 36-inches. Extension stems shall have a 2-inch square wrench nut on the top end and shall be at least as strong as the valve stem. Extension stems shall be coated in accordance with above.

6. Valve Markings

Valve markings shall be cast on the bonnet or body of each valve and shall show the manufacturer's name or mark, the year the valve casting was made, the size of the valve, and the designation of working pressure.

~~H.~~ **G.** Valve Boxes

Valve boxes shall be as indicated in the Standard Details.

~~I.~~**H.** Fire Hydrants

1. Fire hydrants shall be of the dry-barrel type and shall conform to AWWA C502.

2. The hydrant base shall have a 6-inch mechanical joint bell, designed for connection to a horizontal 6-inch ductile iron hydrant branch with retainer glands. The traffic coupling shall allow for 360-degree adjustment of the upper standpipe. The fire hydrant shall be painted with a high gloss, alkyd industrial enamel (colors shall be selected by the Owner). Extension spools shall be available from 6-inches to at least 48-inches, in 6-inch increments. Normal bury depth shall be 3.5 feet.

3. The flow rate shall be a minimum of 1000 gallons per minute with not more than 5-psi pressure drop through the steamer nozzle, per AWWA C502.

4. The internal valve shall be no smaller than 4½-inches in diameter and have bronze-to-bronze seating.

5. Hydrants shall include two (2) 2 1/2-inch hose nozzles placed 180 degrees apart; National Standard (American) fire hose coupling screw threads; and one steamer nozzle with 4 1/2-inch National Standard (American) fire hose coupling screw threads (unless specified otherwise by the Owner).

6. Fire Hydrants shall conform to Mueller Super Centurion 250 Model A421 or A-423, Kennedy Guardian K-81D, or Owner-approved equal.

~~H.~~ **I.** Appurtenances

1. Air Vent and Blow Off Assemblies

   a. Air Vent and Blow Off Assemblies shall be as indicated in the Standard Details.

   b. Brass Pipe shall be red brass pipe meeting the requirements of ASTM B 43. Pipe sizes, wall thickness and dimensions shall meet the requirements of ASTM B 251, Table I for regular pipe. Brass pipe fittings shall be screwed end malleable iron pattern meeting the requirements of ANSI B16.15. They shall be finished rough, unless otherwise specified. Unions shall be of all brass or bronze with ground joints and shall be left semi-finished. Fittings shall be rated for steam working pressures up to 125 psi. Joints shall be screwed type with threads clean cut, tapered and smooth, meeting the requirements of ANSI B2.1.

2. Water Sampling Stations

   Water sampling stations shall conform to Eclipse Model 88 as manufactured by the Kupferle Corporation, or approved equal, in accordance with the Special Provisions. Housing shall be either aluminum or plastic as approved by the Owner. If aluminum, housing shall be painted in a color approved by the Owner. If housing is plastic, the color shall be impregnated in the plastic and approved by the Owner.

3. Corporation Stops

   Corporation Stops shall be manufactured to meet or exceed the AWWA C-800 latest revision. The corporation stops shall also meet the following requirements:

   a. The valve shall be of the ball type construction. A plug valve is not approved.

   b. The corporation stops shall be designed to withstand working pressures up to 300 psi.

   c. The corporation stops shall be manufactured with AWWA/CC tapered threads.

   d. Corporation stops joining to copper and plastic tubing shall have pack joint compression couplings.

   e. Corporation stops joining to existing galvanized piping shall have female iron pipe threads.