

SECTION 100.00

WATER SYSTEM MATERIALS

MATERIALS

All pipe, fittings, valves, devices, appurtenances, and materials shall be lead free in accordance with the requirements of Section 116875 of the California Health and Safety Code.

1. PIPES AND FITTINGS

A. SERVICES:

1 ½" and 2" shall be 200 psi polyethylene tubing (CTS) meeting the requirements of ASTM D2737, AWWA C901, and NSF 14 and 61. If HDPE service pipe is used, the size shall be one size larger than the copper size required. No copper services are permitted.

B. MAINS:

4" shall be Ductile Iron Pipe (DIP) AWWA C 151-09 (Pressure Class 350)*, or Polyvinyl Chloride (PVC) (C900) AWWA DR18 (CLASS 235)*.

6" AND 8" shall be DIP AWWA C151-09 (Pressure Class 350)*, OR PVC (C900) AWWA DR18 (CLASS 150)*.

12", 16", 18", 20", 24", 30", 36", 42", AND 48" shall be DIP AWWA C151-09 (PRESSURE CLASS 350)*.

** Class is subject to change with higher pressures.*

C. TRANSMISSION MAINS:

- Transmission Mains, 12" and larger, shall conform to the Centerville CSD's Water Master Plan.
- System design layout, pipe sizing, and technical specifications shall be a required component of the proposed improvement plans.
- Fire Hydrants and Water Services shall not be directly connected to transmission mains with the exception of hydrants acting as blow-offs.

NOTES:

a. MINIMUM SIZE:

- Service: 1" (contingent on meeting fire flow). See Section 122.31 for minimum residential fire service.
- Main: 8" (6" for fire hydrant) contingent on meeting fire flow.

b. Size and pipe material other than what is shown above is subject to approval by the District.

c. MAIN DEPTH:

- Top of pipe from finish grade: 36" minimum, 48" maximum.
- Pipe depth installation **NOT** meeting this requirement shall be with prior approval of the District and District Engineer.
- Concrete cap, if required, shall be per Section 210.00.
- Depth must meet District Standards as well as the applicable jurisdiction of either the City of Redding or Shasta County.

- d. All new water services 1" through 2" shall be a continuous run of pipe with no 3-part unions. It will be a continuous run of pipe from the main to the angle meter stop.
- e. All mains in undeveloped or unpaved areas, between parcels, or within 20 feet of structures shall be Ductile Iron Pipe (DIP) AWWA C151.
- f. POLYETHYLENE ENCASEMENT:
- All buried DIP shall be tube encased with (8 mil) Polyethylene (AWWA C105).
 - All buried cast iron or ductile iron fittings shall be encased (8 mil) Polyethylene sheet held together with adhesive tape (AWWA C105).
- g. All DIP shall be cement mortar lined and bituminous coated (AWWA C104 and C153).
- h. Field welding shall not be allowed on Ductile Iron Pipe. Welding shall only be permitted by the pipe manufacturer under factory-controlled conditions.
- i. PVC (C900 & C905) pipe shall not be stored or handled in a manner that will permit prolonged exposure to sunlight or high temperatures for extended periods.
- j. Permeation regulations:
- DIP shall be used in areas of known or suspected soil contamination.
 - Such areas include: gasoline stations, fuel storage areas, landfill/solid waste disposal sites, industrial and/or commercial areas.
 - PVC (C900 & C905) pipe shall not be used when a petroleum odor exists in the trench.
 - The installation of PVC (C900 & C905) pipe in direct contact with natural gas service is prohibited.
 - Any PVC (C900 & C905) pipe that has been permeated by organic compounds shall be replaced.
- k. Distance between service taps:
- DUCTILE IRON PIPE:
- 1" through 2" taps shall be 2 feet apart.
 - Larger than 2" tap shall be 4 feet apart.
- Taps for both cases shall be 4 feet from any bell fitting or coupling.
- POLYVINYL CHLORIDE (PVC) C900 PIPE:
- 1" taps shall be 2 feet apart
 - Larger than 1" taps shall be 4 feet apart
- Taps for both cases shall be 4 feet from any bell fitting or coupling.
- l. Pipe materials used for the connection between the water meter and a Backflow Prevention Device shall be consistent with the size and material requirements listed on Section 131.00 or 131.10.
- m. Water mains crossing sewer or storm drains shall be installed per California Department of Public Health (CDPH) Title 22 standards. PVC water mains at crossings shall be AWWA DR14 (Class 305).
- n. Contractor shall obtain an Encroachment Permit from either the City of Redding or Shasta County as applicable.
- o. All Ductile Pipe and fittings shall be encased in (8 mil) Polyethylene sheets held together with adhesive tape (AWWA C105).

2. FITTINGS

FOR 1" THROUGH 2":

- All fittings shall be brass threaded, compression, or pack joint (A.Y. McDonald, Ford, Jones, or Mueller) AWWA C800. **NO SUBSTITUTES.**
- Complimentary threaded brass (i.e. 45, 90, unions, etc.) shall be domestically manufactured.
- Brass fittings installed above ground shall be threaded.

FOR DIP – 4" AND LARGER:

- Fittings shall be either tyton joint, flanged, or mechanical joint (ductile iron AWWA C110 or AWWA C153).

FOR PVC C-900 PIPE - 4" THROUGH 8":

- Fittings shall be either push on, flanged, or mechanical joint (ductile iron AWWA C110 or AWWA C153).

NOTES:

- a. All ductile iron fittings shall be cement mortar lined (AWWA C104) and outside coating shall be a petroleum asphaltic coating 1 mil thick (AWWA C110).
- b. Bolts and nuts shall be low alloy steel with zinc coating/plating or stainless steel such that the bolts are cathodic to the coupling.
- c. All main line fitting nuts and bolts shall be sprayed with rubberized undercoating. In addition, all main line valves and fittings (including service saddles) shall be wrapped with (6 mil) Polyethylene plastic and securely taped closed. Polyethylene plastic shall be manufactured and installed in conformance with ANSI A21.5 and AWWA C105.
- d. Joint Restraints: All joint restraint glands and harnesses shall be of ductile iron casting, shall be of the type and size to fit the pipe being used (Cast Iron OD), shall have a pressure rating at least equal to that of the appurtenance the gland is attaching to, and shall be capable of restraining joints that are fully deflected within the guidelines of AWWA C600, C900 or C905 as applicable.
- e. Mechanical Joint Restraints: Mechanical joint restraint glands shall consist of one restraint gland coated with shopcoat, one wedge pipe gasket, and nuts and t-bolts as needed, shall be capable of restraining standardized mechanical joint bells that conform to the requirements of AWWA C151 for sizes 3-inch through 64-inch, and shall employ radial restraining pads with torque-off bolts. Full-circumference restraint rings are not allowed.
- f. Bell Joint Restraints: Bell and spigot restraint harness assemblies shall consist of two restraint glands coated with shopcoat and restraining rods (quantity as required). The bell-end gland shall either be a full-circumference plain-ring gland (with no restraint grooves) or a half-circumference plain-ring gland (with no restraint grooves) or a half-circumference split-ring gland (with restraint grooves). The spigot-end gland shall be a half-circumference split-ring gland (with restraint grooves). Restraint glands shall employ either radial restraining pads with torque-off bolts or half-circumference restraint grooves.

NOTE: For hot tap saddles 4" and larger, see standard Section 100.70.

3. VALVES

NOTE: Shut-off valves are required on all branches of tees and crosses, or as directed by the District.

A. Resilient Wedge (RW) Gate Valve *

Valves 2" through 8" shall be 125-pound, fully encapsulated wedge in synthetic rubber, non-rising stem (NRS) and open to left.

- Exposed valves shall be hand wheel operated.

- Buried valves shall have 2" square operating nut.
- All valves shall have bronze stems.
- All valves shall be Mueller to match existing equipment and inventory.
- Valves shall meet AWWA C509-01 or C515-99 requirements. All Valves shall be Mueller to match existing equipment and inventory.

B. Butterfly valve *

Valves 12" and up shall be rubber-seated, cast iron body, cast iron or ductile iron disc, stainless steel shaft, factory epoxy lining inside disc and waterway and bearing requiring no lubrication Class 150 to conform to AWWA C504-00.

- All valves shall be Mueller to match existing equipment and inventory.

* **Note:** Wells, pumping stations and backflow devices may require hand wheel operated valves with outside screw and yoke (OS+Y) rising stem valves.

C. Angle Meter Stop, Corporation Stop, Curb Stop, and Meter Setter

Valves through 2" shall be ball valves with full port. Angle Meter Stops shall have locking wings.

- All valves shall be Mueller to match existing equipment and inventory.

D. Gate Valve, Exposed, under 2"

Valves 125 pounds, Wedge Disc Type, with non-rising stem, screwed connections, with hand wheel operators. Valves shall be bronze, and open left (NIBCO or CRANE).

E. Blow-Off Valve

Blow-Off valves shall be A. Y. McDonald Co. Mod. # 76109BF.

F. Combination Air Valve (CAV)

CAV shall be APCO 2-inch (min) CAV double orifice single CI body with bronze trim and SS float (or approved equal).

G. Backflow Prevention Assembly

The Centerville Community Services District requires all backflow prevention assemblies installed as point of connection protection for the District's water distribution system to have approval through the foundation for cross-connection control and hydraulic research of the University of Southern California (USC).

- All reduced pressure principle, double check, and pressure vacuum breaker backflow prevention assemblies in sizes 3/4" **through 2"** with the above approval are authorized for installation.
- The following backflow prevention assemblies in sizes 3" **through 10"** with the above approval are approved for installation: Ames, Febco, Watts, and Wilkins.

4. SADDLES

For DIP & PVC C900 pipe with taps 1" **through 4"** use:

- Romac 202NS with stainless steel straps and nylon coated ductile iron body.
- Saddles shall be by Romac to match existing equipment and inventories. All service saddles shall be installed with two anodes attached to the saddle body.

Note: For hot tap saddles 4" and larger, see Section 100.70.

5. FLEXIBLE COUPLING (FC) AND FLANGED COUPLING ADAPTORS (FCA)

Couplings shall be of the style and type recommended by the manufacturer and approved by the District or District Engineer. Couplings shall be sized to accommodate the type and size of pipes or fittings to be connected. Couplings shall be the manufacturer standard length, unless otherwise noted. All couplings made of DIP or steel shall be fusion bonded epoxy or nylon coated (Smith-Blair, Romac, or approved equal).

6. FIRE HYDRANTS

Hydrants shall meet the requirements of the latest edition of AWWA C502-05, "Standard for Dry Barrel Fire Hydrants". Hydrants shall be:

- Mueller Super Centurion A423 – 250 to match exiting equipment and inventory.

Notes:

- a. All parts and accessories purchased for fire hydrants shall be manufactured and warranted by the hydrant manufacturer.
- b. All fire hydrants shall have 5-1/4" main valve opening, two 2-1/2" hose nozzles and one 4-1/2" pumper nozzle.
- c. All fire hydrants shall have a 1-1/2" pentagon operating nut and shall open left. Fire hydrants shall be painted red. At right angles to fire hydrant and 1' off the centerline of street on the hydrant side, place a "blue" reflective marker attached to pavement with an approved adhesive.
- d. All fire hydrants shall be tested after installation for proper operation and drainage.

7. METER BOXES AND VAULTS

Meter Size	See Note Below	Box Size Minimum I.D.	Cook Concrete* Box/Vault #	Christy* Box/Vault #	BES Concrete* Box/Vault #
5/8" & 3/4"	a	10 1/4" x 17 1/4"	B0.75	B9	C9W
1"	a	12" x 20"	B1.0	B12	C12W
1.5"	a	13 1/4" x 24"	B1.5	B30	C30
2"	a	17" x 30"	B2.0	B36	C36
3"	b	30" x 48"	B4.0	B48	C48
4"	b	30" x 60"	B5.0	B52	C52
6"	b	48" x 78"	V4.0 6.5	R37P	-
8"	b	54" x 102"	V4.5 8.5	-	-
Larger than 8"	c				
Multiple	f				

* Or approved equal.

Notes: (On Meter Boxes and Vaults)

- a. Reinforced concrete cover with 5" x 8" cast iron hinged reading lid, or concrete insert as directed by the District.
- b. Steel checker plate lids 5"x 8" or 10" round reading lid centered over meter register for 3" & 4" meters, a two-piece lid is required. For 6" & 8" meters, a four-piece lid is required.
- c. Vault design for meters and associated equipment larger than 8" requires the approval of the District. Size and depth shall allow access for maintenance and/or meter removal and bypass line.
- d. Vault design for combination domestic/fire detector meters shall meet manufacturer's recommendations. Approval of the District shall be obtained prior to installation of the vault.

Approved By :


 District Manager:

e. H-20 Steel Traffic Lids shall be required in driveways or areas with rolled curb.

8. TRAFFIC VALVE BOXES AND EXTENSIONS (See Section 104.00)

Valve Box Size (Minimum)	See Notes:	Cook Concrete* Box #	Christy * Box #	BES Concrete * Box #
10" I.D. x 12" High	(a,b)	VB10T	G5	G5

* Or Approved Equal

9. BLOWOFF BOXES (See Section 150.00)

Valve Box Size (Minimum)	See Notes:	Cook Concrete* Box #	Christy * Box #	BES Concrete * Box #
10" I.D. x 12" High	(a,b)	VB10T	G5	G5

* Or Approved Equal

Notes: (On traffic valve & Blowoff Boxes)

- a. With cast iron box rim and lid.
- b. Extensions: continuous length, 8" PVC SDR 35 or 8" PVC C-900 pipe.

10. COMBINATION AIR VALVE (CAV) ENCLOSURES/BOXES

Case 1 above grade enclosure: Cook Concrete C-265 (with precast concrete slab) or approved equal. (See Section 151.00.)

Valve Size	See Notes	Box Size (Minimum I.D.)	Cook Concrete* Box #	Christy * Box #	BES Concrete * Box #
2", 3" & 4"	(a, c)	17" x 30"	B2.0	B36	C36
6" & 8"	(b, c)	30" x 48"	B3.0	G48	C48

* Or approved equal.

Notes:

- a. For 2", 3" & 4" Valve Box a one-piece lid shall be required.
- b. For 6" & 8" Valve Box a two-piece lid shall be required.
- c. Lids shall be solid reinforced concrete marked "WATER"; except when boxes are in driveway traffic areas or next to rolled curb and gutter, where H-10 Steel Traffic Lids are required.
- d. Above grade enclosure shall have reflective sheeting.

11. BACTERIOLOGICAL SAMPLING STATION ENCLOSURES

The sampling station enclosure shall be an Eclipse No. 88-WC model or approved equal.

Notes:

- a. This unit can be purchased from any water works product distributor.
- b. See Section 180.00 for enclosure installation.

12. BACKFLOW PREVENTION ASSEMBLY ENCLOSURES

Notes:

- a. For backflow prevention assemblies in sizes 3/4" through 2" see Above Grade Enclosure Standard Section 132.25.
- b. Insulation jacketing for 3/4" through 2" shall be REPCOR or approved equal.
- c. For Enclosure materials and installation, see Section 132.20, 132.25 or 132.30.
- d. Other alternative enclosure designs are available with prior approval of the District (i.e. Hot ROK).

13. LOCATING WIRE AND WARNING TAPE (See Section 208.00)

a. WIRE

Blue coated #10 AWG solid copper, soft drawn wire shall be installed (taped @ 10' minimum intervals) with all mains, services, air relief valves, blow-offs, fire services, and hydrants.

All locating wire shall be tested for continuity by qualified person(s) prior to acceptance.

b. TAPE

A detectable metallic 2-inch wide warning tape, blue color coded, imprinted with "caution-buried water line below" shall be installed 12" above all water mains installed in unpaved areas. Tape shall be Lineguard Detectable Marking Tape, Type III or approved equal.

14. PIPE AND FITTINGS WRAP

All pipe and fittings shall be protected with pipe wrap prior to installation within concrete pads or thrust blocks. Use Plasti-Sleeve (or approved equal) or Polyethylene Sheeting with adhesive tape per AWWA C105.

15. REFLECTIVE SHEETING

3M Scotchlite (high intensity) Reflective Sheeting No. 3820 4" (384L), or approved equal, to be installed on above grade air relief enclosures.

16. BEDDING MATERIAL

Bedding material shall be sand. Sand shall be free from clay or organic material, suitable for the purpose intended, and shall conform to the physical properties listed below. Either gradation is acceptable (District or PG&E).

Property	Test Method	Specification Requirement
Organic Impurities	ASTM C-40	Supernatant shall not be darker than Plate 3 when compared to Standard Gardinar Color Series.
Sand Equivalent	ASTM D-2419	Equal to or Greater than 30. Sand bedding to be used around copper pipe and copper/bronze/brass fittings shall be of non-limestone origin.
Compaction Characteristics	ASTM D-1557	Relative Compaction of 95% or greater.

Gradation	ASTM C-136 & ASTM C-117	SIEVE	PERCENT PASSING (By Weight)
-----------	-------------------------	-------	-----------------------------

District	No. 4 (4.75mm)	100
	No. 8 (2.36mm)	90 - 100
	No. 16 (1.18mm)	80 - 100
	No. 30 (600 um)	65 - 100
	No. 50 (300 um)	40 - 70
	No. 100 (150 um)	0 - 30
PG&E	½"	100
	No. 4	75 - 100
	No. 50	0 - 70
	No. 100	0 - 30
	No. 200	0 - 15

Alternate bedding material for Ductile Iron Pipe may be used with District Engineer's approval.

17. ABANDON WATER SERVICE

Any unused water service to a property that is to be developed or redeveloped shall be abandoned.

The District shall perform all notifications to existing customers that are affected by the shut-down of the existing water main during the disconnection of the service(s). The Contractor shall make any request for disconnection to the District a minimum of 2 working days prior to the date the work is to be performed.

The Contractor shall expose the service line(s) at the water main. The District will disconnect the service line(s) at the main at the District's expense. The Contractor shall backfill and resurface to previous (or better) condition.