

SECTION 1

MATERIALS OF CONSTRUCTION

1. GENERAL - Materials used in construction shall be as herein specified. Material not listed specifically herein or on the drawings shall require the approval of the District Engineer. The District Engineer shall be the sole judge as to the acceptability of manufacturers' specifications, methods and products.

The following list of approved materials for water system construction has been established for the purpose of standardizing all materials so as to minimize the supply of spare parts and repair materials to be stocked by the District. Substitution of types of materials will not be permitted, although similar and equal products of manufacturers not named will be given consideration for items not requiring stocking of spare parts by the District.

The materials described herein are suitable for use under normally encountered conditions. Use of special materials will be required for special circumstances.

References herein to standard specifications of various organizations shall pertain to the current revisions of those specifications.

Ductile iron pipe shall be used for all water distribution mains installed in the District. Mains designated as transmission mains by the District shall be of material determined by the District Engineer.

All fire hydrant runs shall be ductile iron.

2. PIPE

- 2.1 Ductile Iron - Ductile iron pipe shall conform to the requirements of ANSI A21.51 and shall be cement mortar lines in accordance with ANSI A21.4. Minimum wall thickness shall be Class 52. To be of U.S. manufacture only.
- 2.2 Standard Steel - Standard steel pipe installed in vaults, pits, or where exposed shall conform to ASTM A120, Schedule 40 except where otherwise noted. Pipe shall be hot dip galvanized, unless otherwise specified. A double coating of "Polyken 932" or approved equal shall be placed on all buried steel pipe, fittings and other ferrous metal including nuts and bolts. To be of U.S. manufacture only.
- 2.3 Copper Tubing - Copper tubing shall be Type K, soft copper manufactured by Mueller and shall conform to ASTM B88. To be of U.S. manufacture only.
- 2.4 Red Brass Pipe - The pipe will be supplied in conformance to ASTM B-43. To be of U.S. manufacture only.

3. FITTINGS

- 3.1 Ductile Iron - Fittings for ductile iron shall conform to the requirements of ANSI A21.10, except for laying length dimensions, which may be waived. Fittings to be rated for 350 psi working pressure. (Flanged fittings shall be rated for 250

psi working pressure.) All fittings shall be cement mortar lined and have a lining thickness of not less than 1/16 inch. To be of U.S. manufacture only.

- 3.2 Standard Steel Pipe - Screwed fittings for standard steel pipe shall be malleable iron ASA 150 pound standard and galvanized unless otherwise specified. Flanges for steel pipe shall conform to the requirements of AWWA C-207 and shall be hub-typed unless otherwise specified. To be of U.S. manufacture only.
- 3.3 Couplings - Flexible couplings shall be compression type, such as Smith-Blair, Dresser or equal, when so indicated on the drawings. Couplings shall have wedge shaped, chloramine-resistant gaskets and stainless steel nuts and bolts. Couplings for ductile iron shall be ductile iron and fully restrained Romac. Mechanical joint solid sleeves shall be used for all buried installations. All bolts must be tightened to the manufacturer's specifications. All bolts, nuts, washers shall be Type 316 stainless steel coated with anti-seize. To be of U.S. manufacture only.
- 3.4 Tapping Tees - Ductile iron pipe tapping tees shall be JCM Model No. 452 Stainless Steel Mechanical Joint Tapping Tee . All bolts must be tightened to the manufacturer's specifications. All bolts, nuts, washers shall be Type 316 stainless steel coated with anti-seize. To be of U.S. manufacture only. Contractor shall present District with all tapping coupons upon completion of tap. Coupons are to be tagged or marked as to location, date of tap and pipe size.

4. JOINTS

- 4.1 Mechanical – Only EBBA or Romac Restrained 316 mechanical joints shall be used and shall conform to the requirements of ANSI A21.11. Chloramine-resistant gaskets for these joints shall conform to ANSI A21.11 (AWWA C111). All bolts shall be tightened to the manufacturer's specifications. All bolts, nuts and washers shall be Type 304 stainless steel unless otherwise specified by the District. ASTM A588 (CorTen) may be approved by the District depending on application, location, soil corrosivity, etc. All stainless threaded fasteners shall be coated with anti-seize during installation NOTE: All mechanical joint connections shall require the use of EBBA Megalug fully restrained glands. To be of U.S. manufacture only.
- 4.2 Flanged - Flanged joints shall conform to ANSI A21.15 (AWWA C115). Chloramine-resistant gaskets for flanged joints shall be ring type. The gasket thickness shall be 1/16 inch for pipe ten inches (10") and less, and 1/8 inch for larger pipe. Flange assembly bolts shall be standard square head machine bolts with heavy, hot pressed hexagonal nuts except where otherwise noted. Bolt length shall be such that after the joints are made up, the bolt shall protrude through the nut not more than 1/2 inch. Stainless steel bolts and nuts shall be used on all flange joints. All bolts shall be tightened to the manufacturer's specifications. All bolts, nuts, washers shall be Type 316 stainless steel and coated with anti-seize. To be of U.S. manufacture only.

- 4.3 Push-on - Push-on joints shall conform to the requirements of AWWA C111. Chloramine-resistant gaskets for these joints shall be field loc gaskets and shall conform to ANSI A21.11 (AWWA C111). To be of U.S. manufacture only.

5. VALVES

- 5.1 Gate Valves (Bronze Square Nut) - Valve ends shall be as required. All valves shall open left (counter-clock wise). All bolts shall be tightened to the manufacturer's specifications. All bolts, nuts and washers shall be Type 316 stainless steel and coated with anti-seize. To simplify maintenance and replacement procedures only the following valves shall be used:
- 5.1.1 Size over 3 Inches - For working pressures of 250 psi or less, gate valves larger than 3 inches in size shall be Mueller Series A-2360, D.I. bodies, non-rising stem with stainless steel trim, resilient seated wedge type with epoxy coating and bronze square nut top. All valves shall meet or exceed the requirements of AWWA C509. For working or static pressures above 250 psi, valves shall be as approved by the District.
- 5.1.2 Size 3 Inches or Less - Gate valves 3 inches or less in size shall be Mueller Series H-10914 with bronze body and solid wedge disc.
- 5.2 Tapping Valves - Tapping valves shall be equivalent to Mueller No. A-2360 with non-rising stem. A torque wrench must be used to tighten bolts to the manufacturer's specifications. All bolts, nuts, washers shall be Type 316 stainless steel coated with anti-seize.
- 5.3 Stops
- 5.3.1 Corporation Stops (1-1/2" & 2") - Corporation stops shall be Mueller B-xxxxx ball valve type with 300 psi rating (unless lower working pressure corporation stops are approved by the District). No flare fittings permitted.
- 5.3.2 Meter Stops - Meter stops shall be equivalent to Mueller Series 110 with lock wing. No flare fittings permitted.

6. POLYETHYLENE WRAP

- 6.1 Wrap all ductile iron and cast iron pipe, fittings and valves with 1 (one) layer of 8 mil polyethylene as per AWWA C105. Polyethylene material must display AWWA approved materials on its outside or exposed face.

7. FIRE HYDRANTS

- 7.1 Fire hydrants shall Clow 2050, 2060 all bronze, no paint and shall be as shown in Standard Detail No. NC-15A and shall be installed in accordance to AWWA M31 Manual (as located by Fire Department). Fire hydrants shall be wet barrel type with two 2-1/2" hose nozzle outlets and with one 4-1/2" steamer nozzle in areas zoned industrial, commercial or public (school). Hydrant in other zone areas such as residential shall be wet barrel type with one 2-1/2" nose nozzle and one 4-1/2" steamer nozzle or as approved by District Engineer. All bolts

shall be tightened to the manufacturer's specifications. All bolts, nuts, washers shall be Type 316 stainless steel and coated with anti-seize.

8. BOXES

8.1 Valve Boxes: See Standard Detail No. NC – 18.

8.2 Meter Boxes: See Standard Detail No. NC – 02.

9. PRESSURE REDUCING STATION

9.1 Valve Vaults: Vaults shall be the size and configuration shown on Standard Detail No. NC-07 with formed openings for pipe penetrations. Wall, floor, and roof thickness and joint location shall be determined by the fabricator. Vault shall be designed in accordance with the applicable provisions of ASTM C858. Design load shall be AASHTO HS-20. Vault shall be determined by District Engineer.

9.2 New Vault Lid Personnel Accessway Cover and Frame: Cover and frame shall be designed for HS-20 loading (unless otherwise approved by the District) and shall be made by Syracuse Casting. Cover shall be "non-slip" aluminum diamond-plate with lift assisted, open a full 180°, be watertight, have lifting handles in cover and hex locking bolts. Minimum opening shall be 42" x 72". District may require larger openings. Meet all Cal OSHA requirements for safety protection such as safety chains and / or rods to prevent falls.

10. THREADED PARTS

- All stainless steel bolts for flanged fittings shall be anti-siezed with an anti-sieze compound sprayed or brushed on.
- All threaded parts shall be taped with thread seal tape then brushed with a pipe threaded sealant – Rectorseal #5 (soft set).