fittings with a cement mortar lining and a seal coat in accordance with ANSI/AWWA C104/A21.4.

Use pipe and fittings with either mechanical joints or push-on joints conforming to ANSI/AWWA C111/A21.11. When required or necessary, use approved type joint restraint devices with a minimum working pressure rating of 200 psi and a factor of safety of 2.

SECTION 1036
WATER PIPE AND FITTINGS

1036-1 GENERAL

All materials when used to convey potable drinking water shall meet the National Sanitation Foundation Standard No. 61. All materials in contact with potable water shall be in conformance with Section 1417 of the Safe Drinking Water Act.

1036-2 COPPER PIPE

For indoor plumbing use copper pipe and sweated fittings conforming to ASTM B88 for the type and temper called for in the plans and Specifications. Cast fittings for copper pipe shall meet ASTM B61 or ASTM B62.

For buried service, use copper water pipe and tube conforming to ASTM B88 soft annealed Type K. Use flared or compression type fittings conforming to ANSI/AWWA C800 and local plumbing codes to connect pipe and tube.

1036-3 PLASTIC PIPE

(A) PVC Pipe

(1) Pressure Rated Pipe

Use PVC pipe conforming to ASTM D2241 or to ANSI/AWWA C905 with a minimum SDR of 21 and minimum pressure rating of 200 psi. Use pipe with push-on type joints having bells made as an integral part of the pipe conforming to ASTM D3139 or pipe with butt fused joints made from ASTM D1784 Class 12454B plastic formulated for fusing.

Use PVCO pipe conforming to ASTM F1483 or to ANSI/AWWA C909 for molecularly oriented pipe with a minimum pressure rating of 200 psi. Use pipe with push-on type joints having bells made as an integral part of the pipe conforming to ASTM D3139.

(2) Pressure Class Pipe

Use PVC pipe conforming to ANSI/AWWA C900 with a minimum DR of 18 and a minimum pressure class of 235 psi. Use pipe with push-on type joints having bells made as an integral part of the pipe conforming to ASTM D3139 or pipe with butt-fused joints made from ASTM D1784 Class 12454B plastic formulated for fusing.

(B) Polyethylene (PE) Pipe

Use PE water pipe and tubing that conforms to AWWA C901 or AWWA C906 with a minimum pressure class of 200 psi.

1036-4 STEEL PIPE

(A) Water Pipe

Use galvanized steel pipe meeting ASTM A53 for standard weight. Fittings for steel water pipe shall meet ASTM A126 for Class B iron or of ASTM A197. Galvanize all fittings in accordance with ASTM A153.

(B) Encasement Pipe

Use steel pipe meeting an ASTM specification with the minimum yield strength of 35,000 psi. Use pipe that is circular in shape and straight in length.

1036-5 DUCTILE IRON PIPE AND FITTINGS

Use ductile iron pipe that conforms to ANSI/AWWA C151/A21.51.

Use ductile iron pipe fittings and specials conforming to ANSI/AWWA C110/A21.10 for standard size fittings or ANSI/AWWA C153/A21.53 for compact fittings. Manufacture fittings with a cement mortar lining and a seal coat in accordance with ANSI/AWWA C104/A21.4.

Use either mechanical joints or push-on joints conforming to ANSI/AWWA C111/A21.11. When required or necessary, use approved type joint restraint devices with a minimum working pressure rating of 200 psi and a factor of safety of 2.

1036-6 FIRE HYDRANTS

Use dry barrel type fire hydrants conforming to ANSI/AWWA C502 with a minimum 4 1/2 inch diameter valve opening with a 6 inch mechanical joint inlet connection, with two 2 1/2 inch hose connections and with one 4 1/2 inch pumper connection. Outlets shall have national standard fire hose coupling threads. Use fire hydrants with a minimum bury length of 36 inches. Securely chain nipple caps to the barrel. Paint hydrants with one coat of primer paint and two coats of an approved paint of the owner's standard color. Apply the final coat after hydrant installation.

1036-7 WATER VALVES

(A) Gate Valves

Use iron body gate valves which conform to ANSI/AWWA C500 for bronze mounted, double disc, parallel seat type valves or to ANSI/AWWA C509 for resilient seat-type valves or to ANSI/AWWA C515 for reduced-wall, resilient seat gate valves. For buried service use gate valves with non-rising stems, 2 inch square operating nuts, O-ring seals and which open by turning counter clockwise. Gate valves shall have mechanical joint ends conforming to ANSI/AWWA C111/A21.11. Gate valves shall have a design working water pressure of 200 psi.

(B) Bronze Gate Valves

Use bronze gate valves conforming to ASTM B62 with tee head operating nuts and solid wedges. Use valves with a design working pressure of 200 psi.

(C) Tapping Valves

Use tapping valves conforming to Subarticle 1036-7(A) with appropriately sized openings, with flanged by mechanical joint ends and pressure rated at 200 psi.

1036-8 SLEEVES, COUPLINGS AND MISCELLANEOUS

(A) Tapping Sleeves

Use cast iron, ductile iron or Type 304 stainless steel tapping sleeves pressure rated at 200 psi. Use either the split sleeve type with mechanical joint ends or the full circle type with double seals. Manufacture the outlet flange to mate with the tapping valve flange.

(B) Transition Sleeves and Couplings

Use sleeve type couplings for transitioning between plain ends of different pipe types. Manufacture couplings in conformance with ANSI/AWWA C219 for a rated working

pressure of 200 psi. Coat the coupling at the factory with an epoxy in conformance with ANSI/AWWA C210 or ANSI/AWWA C213.

1036-9 SERVICE LINE VALVES AND FITTINGS

Use corporation stops and curb stops of all bronze material and high-pressure construction conforming to ANSI/AWWA C800.

Use tapping saddles of high-pressure construction, shaped to conform to the pipe and in conformance with ANSI/AWWA C800.

Use high-pressure fittings manufactured in conformance with ANSI/AWWA C800.

SECTION 1040
MASONRY

1040-1 BRICK

Use clay or shale brick that meets ASTM C62 for Grade SW, except as otherwise provided herein.

Use brick of uniform standard commercial size, with straight and parallel edges and square corners that are burned hard and entirely true, free from injurious cracks and flaws, tough, strong and have a clear ring when struck together. The sides, ends and faces of all brick shall be plane surfaces at right angles and parallel to each other.

Brick of the same manufacturer shall not vary more than ± 1/16 inch in thickness, ± 1/8 inch in width and ± 1/4 inch in length.

Concrete brick may be used instead of clay or shale brick when designated in the plans or in the specifications. Concrete brick shall meet ASTM C55 for Grade S-II except that the absorption of brick used in minor drainage structures shall not exceed 10 lbs/cf.

1040-2 CONCRETE BUILDING BLOCK

Use concrete building block from sources that participate in the Department's Solid Concrete Masonry Brick/Unit QC/QA Program. A list of these sources in North Carolina and adjoining states is available from the Materials and Tests Unit in Raleigh.

Use concrete building block that meets ASTM C90. Block shall be pink in color and substantially free from chips and cracks.

Use solid concrete block instead of clay brick for minor drainage structures that meet ASTM C139 except that the nominal dimensions shall be 4 inches x 8 inches x 16 inches.

Concrete block for block manholes shall meet ASTM C139.

1040-3 CONCRETE PAVING BLOCK

Use concrete paving block from sources that participate in the Department's Solid Concrete Masonry Brick/Unit QC/QA Program. A list of these sources in North Carolina and adjoining states is available from the Materials and Tests Unit in Raleigh.

Use concrete paving block that meet ASTM C139, except that the nominal dimensions shall be 4 inches x 8 inches x 16 inches. The block shall have a uniform surface color and texture.

1040-4 SEGMENTAL RETAINING WALL UNITS

Use segmental retaining wall (SRW) units from sources that participate in the Department's Solid Concrete Masonry Segmental Retaining Wall Units QC/QA Program. A list of these sources in North Carolina and adjoining states is available from the Materials and Tests Unit in Raleigh.

Use freeze-thaw durable SRW units when noted in the plans. Unless required otherwise in the contract, provide SRW units with a vertical straight face and a concrete gray color with no