

VCU SPECIFICATIONS AND ENGINEERING REQUIREMENTS FOR THE INSTALLATION
OF WATER MAINS AND APPURTENANCES

ADDENDUM
PVC PIPE FOR WATER MAINS AND SERVICES

PART 1 - PRODUCTS

1.1 PIPE AND FITTINGS

A. General:

1. No foreign-manufactured pipe shall be allowed. All pipe restraints shall be produced solely in the United States.
2. All materials shall be certified for conformance with ANSI/NSF Standard 61.

B. Pipe:

1. Polyvinyl Chloride Pipe (PVC):
 - a. All PVC pipe shall be PVC 1120 pressure pipe made from clean, virgin class 12454 PVC compound conforming to resin specification ASTM D1784 with outside dimensions of cast iron pipe and shall conform to all applicable requirements of ASTM D1784 and D2241. The PVC compounds shall be treated or certified suitable for potable water products by the National Sanitation Foundation (NSF) Testing Laboratory (NSF Standard No. 61). All PVC pipe shall be blue in color.
 - b. In accordance with the latest edition of AWWA C900.
 - c. All PVC pipe shall have a dimension ration (DR) of 14 (305 psi pressure class per C900). In no case shall PVC pipe with a wall thickness less than DR 14 be permitted. PVC pipe pressure classes were increased in the lates revision of AWWA C900; however, VCU does not allow pipe in its system to be fully subject to the revised Pressure Class pressures in AWWA C900 latest revision. DR 14 shall not be subjected to working pressures exceeding 200 psi.
 - d. Minimum pipe stiffness (F/dY) at 5% deflection shall be as follows when tested in accordance with D2241:
 - i. DR 14 pipe: 914 psi for all sizes
 - e. The pipe shall be designed to pass a quick burst test pressure of 985 psi (DR 14 pipe) applied in 60 to 70 seconds when tested in accordance with ASTM D1599, as referenced in ASTM 2241.
 - f. Standard laying lengths shall be 20-feet. Random lengths of not more than 15% of the total footage of each size may be shipped in lieu of the standard lengths. Reruns of reclaimed material shall not be accepted.
 - g. Acceptable manufacturers shall be JM Eagle, Inc., North American Pipe Corporation, Diamond Plastics Corporation, Northern Pipe Products, Sanderson Pipe, and Vulcan Plastics, a Division of Consolidated Pipe & Supply Company, Inc., or approved equal.
2. Copper Service Pipe
 - a. See VCU Specification Section 02270 "Service Pipes"
3. PVC Service Pipe
 - a. HDPE – PEX DR 9, 200 PSI. Shall be copper tube size and blue in color.
 - b. Stiffener shall be used at every compression joint.

C. Joints:

1. PVC Pipe:

- a. The pipe shall have bell and spigot ends with push-on, O-ring rubber gasket, compression type joints conforming to the requirements of ASTM 2672 and AWWA C111 standards for rubber joints.

D. Fittings:

1. General
 - a. All fittings shall be ductile iron pipe regardless of mainline pipe.
2. PVC Pipe
 - a. Fittings shall be coated on the outside with either asphaltic coating in accordance with AWWA C110 and the fittings shall be lined inside with either cement-mortar and asphaltic seal coating in accordance with AWWA C105.
 - b. All fittings shall have mechanical joint bell ends conforming to AWWA C111 unless otherwise noted on the drawings.
 - c. Restrained joints shall be used for all connections to valves and fittings and all connections shall be restrained mechanical joint type using retainer glands.
 - d. Restraining gaskets with integral stainless steel locking segments (including MJ Field-Lok gaskets) are not permitted on valves or fittings.
 - e. Non-restrained mechanical and push-on joints are not allowed for connections to valves, hydrants, or fittings.
 - f. All fittings shall have polyethylene encasement conforming to ANSI/AWWA C105/A21.5 Standards.
3. Connections to Existing Pipes
 - a. Restrained joint solid sleeves shall be used when connecting plain end to plain end pipe in accordance with ductile iron pipe specifications.

PART 3 - EXECUTION

3.1 HANDLING

- A. Handle pipe accessories so as to ensure delivery to the trench in sound, undamaged condition:
 1. Carry pipe into position; do not drag.
 2. Use pinch bars or tongs for aligning or turning the pipe only on the bare end of the pipe.
 3. Sections of pipe having been discovered with cuts or gouges in excess of 10% of the pipe wall thickness shall not be used.
 4. Any section of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture is visible, shall be marked as rejected and removed at once from the work.
- B. Thoroughly clean interior of pipe and accessories before lowering pipe into trench. Keep clean during laying operations by plugging or other method approved by the Engineer.
- C. Before installation, inspect each piece of pipe and each fitting for defects:
 1. Material found to be defective before or after laying: Replace with sound material meeting the specified requirements and without additional cost to the Owner.
- D. Rubber gaskets: Store in a cool, dark place until just prior to time of installation.

3.2 PIPE CUTTING

- A. Cut pipe neatly and without damage to pipe.
- B. Unless otherwise recommended by the pipe manufacturer, and authorized by the Engineer, cut pipe with mechanical cutter only.

1. Use wheel cutters when practical.
2. Cut plastic pipe square and remove all burrs.

3.3 JOINT DEFLECTION

- A. Plastic pipe: unless a lesser amount is recommended by the pipe manufacturer, maximum allowable deflections from a straight line or grade, or offsets, will be five (5) degrees.

3.4 PLACING AND LAYING

A. Plastic Pipe:

1. Position pipe and fittings in trench in a manner that identifying marks will be readily visible for inspection.
2. Cutting and jointing:
 - a. Protect against abrasions from serrated holding devices.
 - b. Remove burrs and glosses from surfaces to be jointed, use abrasive paper, file or steel wool.
 - c. Remove dirt, dust and moisture by wiping clean with chemical cleaner or dry cloth.
3. Align pipe system components without strain.
4. Support piping at intervals of not more than four (4) feet, at end, branch fittings, and in change of direction or elevation.
5. Support plastic pipe in trenches with a three (3) inch layer of sand. Allow no rocks, debris or potentially damaging substances within six (6) inches of plastic pipe or trenches.
6. Protect pipe from damage when assembling ("pushing home") pipe joints. Wood or other suitable (non-metallic) material consistent with the pipe manufacturer's recommendations shall be used as a cushion while pushing home the pipe. Avoid metal to plastic contact. Neither deflection of PVC pipe joints nor bending of PVC pipe are permitted. All angles shall be made with proper fittings.
7. Provide an electrically continuous type TW insulated number ten (10) tracer wire in the trench along the pipe, fastened to the pipe at twenty (20) foot intervals and terminating above ground with a twelve (12) inch lead taped around each riser.

- B. Tapping: A tapping sleeve or tapping saddle shall be used for all taps on PVC pipe. Tapping sleeves and tapping saddles shall be approved by the VCU Collections and Distribution Manager prior to construction.

- C. Connections: Use specials and fittings to suit the actual conditions where connections are made between new work and existing mains. Use only those specials and fittings approved by the VCU.

D. Sleeves:

1. Where pipe passes through walls of valve pits or structures, provide cast iron wall sleeves.
2. Fill annular space between walls and sleeves with rich cement mortar.
3. Fill annular space between pipe and sleeves with mastic.

3.5 TRACING WIRE

- A. All PVC water main and services shall be installed with tracing wire.

1. Tracing wire shall be Copperhead #10 solid copper wire.
2. Tracing wire shall be laid/drilled with the pipe and shall be brought to ground level at each hydrant and valve box. Provide two tracing wires for HDD installation.
 - a. The wire(s) shall be connected to the loop below the steamer cap at hydrants and be attached to the barrel at regular intervals not to exceed two (2) feet.

- b. The wire(s) shall be drawn through a ½ inch diameter hole to be cut in the valve box riser and knotted to keep at ground level. The wire(s) shall be attached to the riser at regular intervals not to exceed two (2) feet.
3. Tracing wire shall be installed for all PVC water services.
4. All tracing wire shall be tested to confirm it conducts prior to acceptance.

3.14 TESTING AND INSPECTING

A. Pressure Testing:

- a. All pressure and leakage tests shall conform with AWWA Standards (latest edition) and VCU Specification Section 02250 "Hydrostatic Testing Procedure".

G. Disinfection:

1. Before acceptance of the potable water system, disinfect each unit of completed water supply, distribution and service line in accordance with AWWA C651, latest edition.
2. Perform all tests and disinfection required by VCU Specification Section 02255 "Disinfection".
3. Furnish two copies of a Certificate of Disinfection to the VCU.
4. The method of chlorination shall be in accordance with AWWA C651, Section 4.4, (continuous feed method), unless approved otherwise in advance by the Engineer

END OF SECTION