



*Standard Specification
for*

Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based On Controlled Inside Diameter

AASHTO DESIGNATION: M 304M-94 (1997)

1. SCOPE

1.1 This specification covers Poly (Vinyl Chloride) (PVC) profile wall perforated and nonperforated pipe and fittings, 100 to 1200 mm nominal inside diameter, for use in non-pressure storm drains, culverts, underdrains, and other subsurface drainage systems providing either soiltight or watertight joints.

1.2 Industrial waste disposal lines should be installed only with the specific approval of the governing code authority since chemicals not commonly found in drains and temperatures in excess of 60°C may be encountered.

1.3 Pipe and fittings produced to this specification should be installed in accordance with ASTM D 2321 and the manufacturer's recommendation.

1.4 The following precautionary caveat pertains only to the test method portion, Section 8, of this specification. *This standard does not purport to address the safety problems associated with its use. It is the responsibility of whoever uses this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. REFERENCED DOCUMENTS

2.1 AASHTO Standard:

2.1.1 *Standard Specifications for Highway Bridges*

2.2 ASTM Standards:

- D 618 Method of Conditioning Plastics and Electrical Insulating Materials for Testing
- D 883 Terminology Relating to Plastics
- D 1600 Abbreviations of

Terms Relating to
Plastic

- D 1784 Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
- D 2122 Method of Determining Dimensions of Thermoplastic Pipe and Fittings
- D 2152 Test Method for Degree of Fusion of Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion
- D 2321 Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe
- D 2412 Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel Plate Loading
- D 2444 Test Method for Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
- D 3212 Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- F 412 Terminology Relating to Plastic Piping Systems
- F 477 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

3. TERMINOLOGY

3.1 General—Definitions used in this specification are in accordance with definitions given in ASTM D 883 and ASTM F 412 unless otherwise indicated.

3.2 Profile Wall Pipe—A pipe product consisting of an essentially smooth wall waterway braced with annular or helical projections or ribs on the outside of the pipe, or with annular or helical bracing between essentially smooth outer and inner walls. (See Figure 1.)

3.3 Soiltight Joints—Joints that do not allow soil migration through the joint into the pipe are deemed soiltight. Both the size of any opening or flow channel into the joint and the soil particle size determine soil tightness.

4. ORDERING INFORMATION

4.1 Orders—Orders for materials to this specification shall include the following information as necessary to adequately describe the desired product.

4.1.1 Name of material (PVC ribbed drain pipe),

4.1.2 AASHTO designation including year,

4.1.3 Perforations, when perforations are required,

4.1.4 Diameter of pipe,

4.1.5 Length, either total length or length of each piece and number of pieces, and

4.1.6 Special Requirements.

5. MATERIALS

5.1 Basic Materials—The pipe, in-

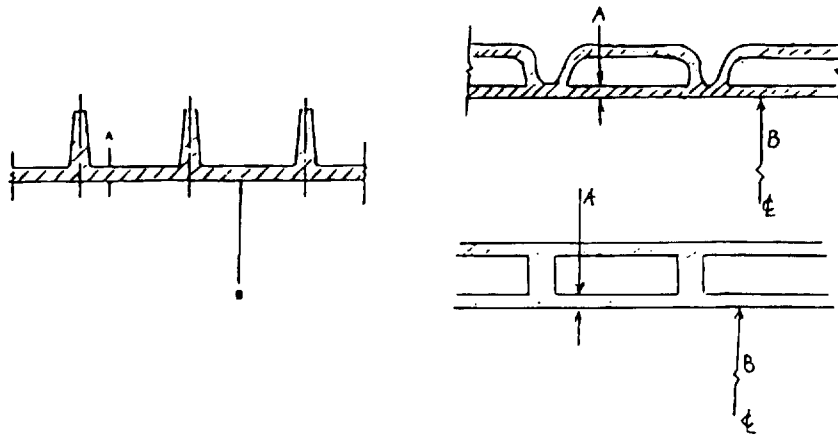


FIGURE 1 Typical Profiles (Cross Section)
A Waterway Minimum Wall
B Average Inside Diameter
 (Other Configurations of Ribs and Spacing Are Permissible)

ternal sleeves and fittings shall be made of PVC plastic having a minimum cell classification of 12454C or 12364C as defined in ASTM D 1784. Homopolymer PVC compounds must meet or exceed the requirements of the above listed minimum cell classification number.

5.2 Reworked Material—Clean reworked material generated from the manufacturer's own production, when used by the manufacturer, shall meet the requirements for minimum cell classification as described in Section 5.1.

5.3 Gaskets—Elastomeric gaskets shall comply with low head-application requirements described in ASTM F 477.

5.4 Lubricant—The lubricant used for assembly shall have no detrimental effect on the gasket or on the pipe. Only lubricant recommended by the manufacturer shall be used.

6. JOINT SYSTEMS

6.1 Joint Types—Joints may consist of bells, external sleeves, internal sleeves or band couplers.

6.2 Joint Classifications—Joints shall be classified as soiltight or watertight. Soiltight joints must meet the requirements of Section 7.6. Watertight joints must meet the requirements of Section 7.7.

NOTE 1—The outside diameters of products of different manufacturers are not specified and therefore compatibility should be reviewed.

7. REQUIREMENTS

7.1 Workmanship—The pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions, or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density, and other physical properties.

7.2 Pipe Dimensions:

7.2.1 Diameter—The inside diameter of the pipe shall meet the requirements given in Table 1 when measured in accordance with Section 8.3.1.

7.2.2 Wall Thickness—The minimum wall thickness of the waterway of

ribbed pipe and fitting shall meet the requirement given in Table 1 when measured in accordance with Section 8.3.2.

7.2.3 Bell Wall Thickness—In the case of belled pipe and fittings fabricated from pipe sections, the thickness of the wall in the bell shall be considered satisfactory if it was formed from pipe meeting the above requirements. For reducing fittings or those with smaller inlets, the minimum wall thickness for each inlet shall be no less than the minimum wall thickness for that size pipe.

NOTE 2—Due to the present state of technology in the industry, some fittings are fabricated fittings. Fabricated fittings made from pipe meeting the requirements of the pipe specification should be acceptable providing that the joints are adequately lapped or reinforced. Unreinforced mitered joints should not be used. Laying lengths of fittings should be in accordance with manufacturer's requirements.

7.3 Pipe Flattening—There shall be no evidence of splitting, cracking, breaking, or separation of ribs or seams, when pipe is tested in accordance with Section 8.4.

7.4 Pipe Impact Strength—The impact strength shall not be less than values shown in Table 1 when tested in accordance with Section 8.5.

NOTE 3—This requirement is intended only for use as a quality control test, not as a simulated service test.

TABLE 1 Pipe

Nominal Pipe Size mm	Minimum Average Inside Diameter ^A mm	Minimum Waterway Wall mm	Minimum Pipe Impact Strength J	Minimum Pipe Stiffness kPa
100	100.0	0.56	108	318
150	149.7	0.64	108	318
200	199.7	0.89	136	318
250	249.6	1.14	136	318
300	296.8	1.52	136	318
375	363.3	1.90	136	262
450	444.8	2.16	136	221
525	524.7	2.54	136	193
600	594.7	2.92	136	165
675	669.8	3.18	136	152
750	746.4	3.43	163	131
900	898.4	3.94	163	110
1050	1050.9	4.32	163	97
1200	1202.9	4.83	163	83

^A Tolerance on inside diameter shall be +2 percent of nominal pipe size, but not to exceed 13 mm.