

Part 642 – Specifications

Chapter 3 – National Standard Material Specifications

Material Specification 547—Plastic Pipe

A. Scope

This specification covers the quality of Poly Vinyl Chloride (PVC), Polyethylene (PE), High Density Polyethylene (HDPE), and Acrylonitrile-Butadiene-Styrene (ABS) plastic pipe, fittings, and joint materials.

B. Material

- (1) Pipe—The pipe must be as uniform as commercially practicable in color, opaqueness, density, and other specified physical properties. It must be free from visible cracks, holes, foreign inclusions, or other defects. The dimensions of the pipe must be measured as prescribed in ASTM D2122. Unless otherwise specified, the pipe must conform to the requirements listed in this specification and the applicable reference specifications in Figure 547–2, the requirements specified in Construction Specification 45, Plastic Pipe, and the requirements shown on the drawings.
- (2) Fittings and joints—Fittings and joints must be of a schedule, SDR or DR, pressure class, external load carrying capacity, or pipe stiffness that equals or exceeds that of the plastic pipe. The dimensions of fittings and joints must be compatible with the pipe and measured in accordance with ASTM D2122. Joint and fitting material must be compatible with the pipe material. The joints and fittings must be as uniform as commercially practicable in color, opaqueness, density, and other specified physical properties. It must be free from visible cracks, holes, foreign inclusions, or other defects. Fittings and joints must conform to the requirements listed in this specification, the requirements of the applicable specification referenced in the ASTM or AWWA specification for the pipe, the requirements specified in Construction Specification 45, and the requirements shown on the drawings.
- (3) Solvents—Solvents for solvent-welded pipe joints must be compatible with the plastic pipe used and must conform to the requirements of the applicable specification referenced in the ASTM or AWWA specification for the pipe, fitting, or joint.
- (4) Gaskets—Rubber gaskets for pipe joints must conform to the requirements of ASTM F477, Elastomeric Seals (Gaskets) for Jointing Plastic Pipe.

C. Perforations

When perforated pipe is specified, perforations must conform to the following requirements unless otherwise specified in Construction Specification 45 or shown on the drawings:

- (1) Perforations must be either circular or slots.
- (2) Circular perforations must be $1/4 \pm 1/16$ -inch diameter holes arranged in rows parallel to the axis of the pipe.
- (3) Perforations must be evenly spaced along each row such that the center-to-center distance between perforations is not less than eight times the perforation diameter. Perforations may appear at the ends of short and random lengths. The minimum perforation opening per foot of pipe must be as shown in Figure 547–1.

Figure 547-1 Perforations

Nominal pipe size	Minimum number of rows		Minimum opening/foot (in ²)
	circular	slot	
4	2	2	0.22
6	4	2	0.44
8	4	2	0.44
10	4	2	0.44
12	6	2	0.66

- (4) Rows must be arranged in two equal groups at equal distance from the bottom on each side of the vertical centerline of the pipe. The lower-most rows of perforations must be separated by an arc of not less than 60 degrees or more than 125 degrees. The uppermost rows of perforations must be separated by an arc not to exceed 166 degrees. The spacing of rows between these limits must be uniform. The minimum number of rows must be as shown in Figure 547–1.
- (5) Slot perforations must be symmetrically located in two rows, one on each side of the pipe centerline. Slot perforations must be located within the lower quadrants of the pipe with slots no wider than 1/8 inch and spaced not to exceed 11 times the perforation width. Minimum perforation opening per lineal foot of pipe must be as shown in Figure 547–1.
- (6) On both the inside and outside of the pipe, perforations must be free of cuttings or frayed edges and of any material that would reduce the effective opening.

Figure 547-2 Pipe Specifications

Pipe	Specification
Poly vinyl chloride (PVC) pipe	
Plastic pipe - Schedules 40, 80, 120	ASTM D1785 ASTM D2466
Pressure rated pipe - SDR Series	AWWA C900 ASTM D2241
Plastic drain, waste, and vent pipe and fittings	ASTM D2665
Joints for IPS PVC pipe using solvent weld cement	ASTM D2672
Composite sewer pipe	ASTM D2680
Type PSM PVC sewer pipe and fittings	ASTM D3034
Large-diameter gravity sewer pipe and fittings	ASTM F679
Smooth-Wall Underdrain Systems for Highway, Airport, and Similar Drainage	ASTM F758
Profile gravity sewer pipe and fittings based on controlled inside diameter	ASTM F794
Corrugated sewer pipe with a smooth	ASTM F949

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Pipe	Specification
interior and fittings	
Pressure pipe, 4-inch through 60-inch for water distribution	AWWA C900
Polyethylene (PE) plastic pipe	
12- to 60-inch annular corrugated profile-wall polyethylene (PE) pipe and fittings	ASTM F2306
SIDR-PR based on controlled inside diameter	ASTM D2239
SDR-PR based on controlled outside diameter	ASTM D3035
High density polyethylene (HDPE) plastic pipe	
Plastic pipe and fittings	ASTM D3350
SDR-PR based on controlled outside diameter	ASTM F714
Heat joining polyolefin pipe and fittings	ASTM D2657
Acrylonitrile-butadiene-styrene (ABS) pipe	
Composite sewer pipe	ASTM D2680