

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 |