



Designation: D 2683 – 98

An American National Standard

Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter- Controlled Polyethylene Pipe and Tubing¹

This standard is issued under the fixed designation D 2683; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers polyethylene socket-type fittings for use with outside diameter-controlled polyethylene pipe as specified by Specifications D 3035 and D 2513. Requirements for materials, workmanship, dimensions, and pressure performance are included. Where applicable in this specification, “pipe” shall mean “pipe and tubing.”

1.2 The values stated in inch-pound units are to be regarded as the standard. The values in parentheses are given for information only.

1.3 The following safety hazards caveat pertains only to the test method portion, Section 8, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing²
- D 1598 Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure³
- D 1599 Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings³
- D 1600 Terminology for Abbreviated Terms Relating to Plastics^{2,3}
- D 2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings³
- D 2513 Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings³
- D 2657 Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings³

¹ This specification is under the jurisdiction of ASTM Committee F-17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.10 on Fittings. Current edition approved April 10, 1998. Published August 1998. Originally published as D 2683 – 68 T. Last previous edition D 2683 – 95.

² *Annual Book of ASTM Standards*, Vol 08.01.

³ *Annual Book of ASTM Standards*, Vol 08.04.

D 3035 Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter³

D 3350 Specification for Polyethylene Plastics Pipe and Fitting Materials⁴

F 412 Terminology Relating to Plastic Piping Systems³

2.2 *Federal Standard:*

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)⁵

2.3 *Military Standard:*

MIL-STD-129 Marking for Shipment and Storage⁵

3. Terminology

3.1 Definitions are in accordance with Terminology F 412 and abbreviations are in accordance with Terminology D 1600, unless otherwise specified. The abbreviation of polyethylene plastic is PE.

3.2 *standard thermoplastic pipe dimension ratio (SDR)*—the ratio of pipe outside diameter to wall thickness. It is calculated by dividing the average outside diameter of the pipe by the minimum wall thickness.

4. Classification

4.1 This specification covers polyethylene fittings of the socket type made as specified in 5.1 and 5.2

4.1.1 Fittings covered by this specification are normally molded. In-line fittings such as couplings, unions, bushings, caps, nipples, etc., may be extruded or machined from extruded stock. Special fittings such as transition fittings and tapping teets shall be assembled and fabricated in accordance with procedures agreed upon between the manufacturer and the purchaser.

4.1.2 Fittings covered by this specification are intended to be joined by heat fusion to PE pipe; observe the cautions stressed in Note 2.

4.1.3 Fittings intended for use in the distribution of natural gas or petroleum fuels shall also meet the requirements of Specification D 2513.

⁴ *Annual Book of ASTM Standards*, Vol 08.02.

⁵ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

5. Materials

5.1 This specification covers polyethylene fittings made from polyethylene plastics compounds as defined in Specification D 3350.

NOTE 1—The Plastics Pipe Institute has recommended a hydrostatic design stress of 630 psi (4.34 MPa) for pipe compounds designated as PE 2406 800 psi (5.51 MPa) for pipe compounds designated as PE3408.

NOTE 2—Some polyethylene materials that meet the requirements of the PE24 or PE34 grades are not easily heat fusible to themselves or intermixed. Since the effects of intermixing pipe and fittings made of different polyethylene compounds have not been fully determined, the user shall assure himself of satisfactory long-term performance of such joints.

5.2 *Rework Material*—Clean rework material generated from the fitting manufacturer's own production may be used by the same manufacturer, as long as the fittings produced conform to the requirements of this specification.

6. Requirements

6.1 Dimensions and Tolerances:

6.1.1 Fittings, sockets, dimensions, and tolerances shall be as shown in Table 1, Table 2, and Table 3 when measured in accordance with 8.4. For reducing fittings, socket and inside diameter minimums for the appropriate size shall apply.

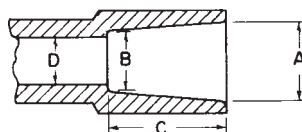
6.1.2 The maximum angular variation of any opening shall not be more than 2° off the true centerline axis.

6.1.3 The minimum wall thickness of fittings shall be 125 % of the minimum wall thickness of the pipe with which they are designed to be joined. For reducing fittings, the smallest size wall thickness shall be 125 % of the smallest pipe wall.

6.2 System Pressure Test Requirements:

6.2.1 *Short-Term Rupture Strength*—The minimum short-term rupture strength of the fitting and fused pipe shall not be less than the minimum short-term rupture strength of the pipe or tubing in the system when tested in accordance with 8.5.2.

TABLE 1 Fittings for Outside Diameter-Controlled Polyethylene Pipe^A



A Socket Entrance Diameter ^B				B Socket Bottom Diameter ^{C,D}			C	D	
Nominal Pipe Size, in.,	Average Diameter	Tolerance on Diameter	Maximum Out-of- Round	Average Diameter	Tolerance on Diameter	Maximum Out-of- Round	Socket Depth, min	Inside Diameter	
								min	max
								in. (mm)	
½	0.810 (20.57)	+0.005 (+0.127) −0.010 (−0.254)	±0.008 (±0.203)	0.804 (20.42)	+0.005 (+0.127) −0.026 (−0.660)	±0.008 (±0.203)	0.625 (15.88)	0.648 (16.46)	0.804 (20.42)
¾	1.020 (25.91)	±0.008 (±0.203)	±0.010 (±0.254)	1.012 (25.70)	+0.008 (+0.203) −0.012 (−0.305)	±0.010 (±0.254)	0.625 (15.88)	0.814 (20.68)	1.020 (25.91)
1	1.275 (32.38)	±0.008 (±0.203)	±0.010 (±0.254)	1.267 (32.18)	+0.008 (+0.203) −0.012 (−0.305)	±0.010 (±0.254)	0.687 (17.4)	1.020 (25.91)	1.275 (32.38)
1¼	1.620 (41.15)	±0.008 (±0.203)	±0.012 (±0.305)	1.612 (40.94)	+0.008 (+0.203) −0.016 (−0.406)	±0.012 (±0.305)	0.875 (22.22)	1.301 (33.04)	1.620 (41.15)
1½	1.860 (47.24)	±0.010 (±0.254)	±0.012 (±0.305)	1.849 (46.96)	+0.010 (+0.254) −0.020 (−0.508)	±0.012 (±0.305)	0.875 (22.22)	1.496 (38.0)	1.859 (47.22)
2	2.335 (59.31)	±0.010 (±0.254)	±0.012 (±0.305)	2.324 (59.03)	+0.010 (+0.254) −0.020 (−0.508)	±0.012 (±0.305)	0.875 (22.22)	1.885 (47.88)	2.334 (59.28)
3	3.455 (87.76)	±0.015 (±0.381)	±0.015 (±0.381)	3.439 (87.35)	+0.015 (+0.381) −0.025 (−0.635)	±0.015 (±0.381)	1.000 (25.4)	2.780 (70.61)	3.454 (87.73)
4	4.450 (113.03)	±0.015 (±0.381)	±0.015 (±0.381)	4.434 (112.62)	+0.015 (+0.381) −0.035 (−0.889)	±0.015 (±0.381)	1.125 (28.58)	3.575 (90.80)	4.449 (113.00)

^A Minimum dimensions have zero negative tolerance. The sketches and designs of fittings are illustrative only. Entrance chamfer or radius is optional.

^B Measured at top of socket wall taper, just below entrance radius.

^C Dimensions of tools should be checked for consistency with fittings used. Socket bottom diameter must be equal to or smaller than entrance diameter.

^D Measured at bottom of socket wall taper, just above bottom radius.