~~Designation:D 2609–02~~ Designation: D 2609 – 02 (Reapproved 2008)

An American National Standard

Standard Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe[1]

This standard is issued under the fixed designation D 2609; 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 plastic insert fittings for polyethylene (PE) plastic pipe. Included are requirements for materials, workmanship, dimensions, and burst pressure.

1.2 The text of this specification references notes, footnotes, and appendixes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the specification.

~~1.3The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are provided for information only.~~

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 The following safety hazards caveat pertains only to the test methods 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:*[2]

D 256 Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics

D 618 Practice for Conditioning Plastics for Testing

D 638 Test Method for Tensile Properties of Plastics

D 648 Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position

D 789 ~~Test Methods for Determination of Relative Viscosity and Moisture Content of Polyamide (PA)~~[2] Test Methods for Determination of Solution Viscosities of Polyamide (PA)

D 1599 Test Method for Resistance to Short-Time Hydraulic ~~Failure~~ Pressure of Plastic Pipe, Tubing, and Fittings

D 1600 Terminology for Abbreviated Terms Relating to Plastics

D 1784 Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

D 2104 Specification for Polyethylene (PE) Plastic Pipe, Schedule 40

D 2239 Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter

F 412 Terminology Relating to Plastic Piping Systems

F 1498 Specification for Taper Pipe Threads ~~60°~~60 for Thermoplastic Pipe and Fittings

2.2 *NSF Standards:*

Standard No. 14 for Plastic Piping Components and Related Materials[3]

Standard No. 61 for Drinking Water System Components—Health Effects[3]

3. Terminology

3.1 Definitions are in accordance with Terminology F 412 and abbreviations are in accordance with Terminology D 1600, unless otherwise specified.

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[1] This specification is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.10 on Fittings.
~~Current edition approved September 10, 2002. Published September 2002. Originally published as D2609–67. Last previous edition D2609–00.~~
Current edition approved Nov. 1, 2008. Published February 2009. Originally approved 1967. Last previous edition approved in 2002 as D 2609 – 02.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* ~~, Vol 08.01.~~volume information, refer to the standard's Document Summary page on the ASTM website.

[3] ~~Annual Book of ASTM Standards, Vol 08.04.~~

[3] Available from NSF International, P.O. Box 130140, 789 N. Dixboro Rd., Ann Arbor, MI 48113-0140, http://www.nsf.org.

4. Classification

4.1 This specification covers one class of fittings suitable for use with PE plastic pipe that meet the requirements of applicable ASTM specifications. At present, these are Specifications D 2104 and D 2239.

5. Materials

5.1 *Types of Plastics*—The fittings shall be made from one of the following plastics:

5.1.1 Nylon plastics (NP) meeting the requirements of either Type I or Type II (except Grade 2A) in Test Methods D 789.

5.1.2 Propylene plastic (PP) with a minimum tensile strength at yield of 24.0 MPa (3410 psi) when tested in accordance with Test Method D 638 at a speed of 51 mm/min (2.0 in./min), an Izod impact resistance at 23°C of at least 30 J/m (0.6 ft–lbf/in.) when tested in accordance with Method A of Test Methods D 256, and a minimum deflection temperature of 64°C at 455 KPa stress when tested in accordance with Test Method D 648.

5.1.3 Poly(vinyl chloride) plastics (PVC) meeting the requirements of 12454-B, 12454-C, 11443-B, or 14333-D, in Specification D 1784.

5.2 *Rework Material*—The manufacturers shall use only their own clean rework fitting material and the fittings produced shall meet all the requirements of this specification. The types of materials specified in 5.1 shall not be mixed with one another.

6. *Requirements* Requirements

6.1 *Dimensions and Tolerances*—The dimensions and tolerances shall be as shown in Tables 1-3 when measured in accordance with 8.4. The negative tolerance on all minimum dimensions is zero.

6.1.1 *Alignment*—The alignment of all openings of fittings shall be within ¼ in./ft.

6.1.2 *Fittings Not Illustrated*—All fittings, whether illustrated in Tables 1-3 or not, shall have insert ends in accordance with Table 1 or threaded ends in accordance with Table 3. For insert ends, which have more than four barbs, the first four barbs, starting from the open end of the fitting connection, shall meet all requirements of Table 1. The remaining barbs shall also meet Table 1, with the exception that mold marks left as a result of the manufacturing process, such as ejector pin marks, are exempt from the "V" dimension requirement, and the minimum requirement for "Z." D, Zmax, and F apply in all cases. For designs where the entire fitting end is barbed, such as "F" cannot be readily measured, "F" shall be calculated as [(Z – 2V) – D] / 2.

6.1.3 *Threads*—For all fittings having taper pipe threads, threads shall conform to Specification F 1498 and be gaged in accordance with 8.6.

6.2 *Burst Pressure*—The minimum burst pressure for the fittings shall be as shown in Table 4, when determined in accordance with 8.5.

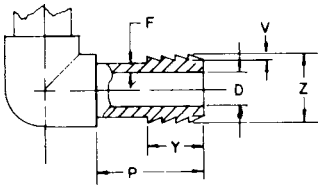
7. Workmanship, Finish, and Appearance

7.1 The fittings shall be homogeneous throughout and free of cracks, holes, foreign inclusions, or other defects. The fittings shall be as uniform as commercially practicable in color, opacity, density, and other physical properties.

8. Test Methods

8.1 *Conditioning*—Condition the specimens at 73.4 ± 3.6°F (23 ± 2°C) and 50 ± 5 % relative humidity for not less than 40

TABLE 1 Dimensions of Insert End,[A] in. (mm)



Nominal Pipe Size	Insert Length, *P*	Barbs				Depth, *V*	Wall Thickness, *F*	Inside Diameter of Fitting, *D*
		Length, *Y*	Outside Diameter, *Z*[B]		Number			
	min	min	max	min	min	min	min	min
½	1¼ (31.8)	¾ (19.0)	0.665 (16.9)	0.635 (16.1)	4	0.015 (0.4)	0.080 (2.0)	0.406 (10.3)
¾	1¼ (31.8)	¾ (19.0)	0.865 (22.0)	0.835 (21.2)	4	0.015 (0.4)	0.085 (2.2)	0.562 (14.3)
1	1¼ (31.8)	¾ (19.0)	1.095 (27.8)	1.065 (27.0)	4	0.020 (0.5)	0.100 (2.5)	0.750 (19.0)
1¼	1¼ (31.8)	¾ (19.0)	1.425 (36.2)	1.395 (35.4)	4	0.025 (0.6)	0.110 (2.8)	0.995 (25.3)
1½	1½ (38.1)	¾ (19.0)	1.665 (42.3)	1.630 (41.4)	4	0.030 (0.8)	0.110 (2.8)	1.125 (28.6)
2	1½ (38.1)	¾ (19.0)	2.125 (54.0)	2.085 (53.0)	4	0.030 (0.8)	0.110 (2.8)	1.656 (42.1)
2½	2 (50.8)	1 (25.4)	2.520 (64.0)	2.487 (63.2)	4	0.030 (0.8)	0.120 (3.0)	2.062 (52.4)
3	2⅛ (54.0)	1⅛ (28.6)	3.125 (79.4)	3.086 (78.4)	4	0.030 (0.8)	0.125 (3.2)	2.600 (66.0)
4	3 (76.2)	1¼ (31.8)	4.090 (103.9)	4.044 (102.7)	4	0.030 (0.8)	0.130 (3.3)	3.525 (89.5)

[A] The sketches and designs of fittings shown are illustrative only. The dimensions specified shall govern in all cases.
[B] Outside diameter maximum and minimum apply to each individual measurement, not the average of the four (see 8.4).