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An American National Standard

Standard Specification for Crosslinked Polyethylene (PEX) Tubing[1]

This standard is issued under the fixed designation F 876; 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.

ε[1] NOTE—Tables 2 and 3 were editorially updated in February 2002.
ε[2] NOTE—Section 10.1 was editorially updated December 2002.

1. Scope

1.1 This specification covers crosslinked polyethylene (PEX) tubing that is outside diameter controlled, made in standard thermoplastic tubing dimension ratios, and pressure rated for water at three temperatures (see Appendix X1). Included are requirements and test methods for material, workmanship, dimensions, sustained pressure, burst pressure, environmental stress cracking, stabilizer migration resistance, and degree of crosslinking. Methods of marking are also given.

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.

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

1.4 The following safety hazards caveat pertains only to the test methods portion, Section 7, 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 Testing[2]

D 792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement[2]

D 1505 Test Method for Density of Plastics by the Density-Gradient Technique[2]

D 1598 Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure[3]

D 1599 Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings[3]

D 1600 Terminology for Abbreviated Terms Relating to Plastics[2]

D 1898 Practice for Sampling of Plastics[2]

D 2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings[3]

D 2765 Test Methods for Determination of Gel Content and Swell Ratio of Crosslinked Ethylene Plastics[4]

D 2837 Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials[3]

D 3045 Practice for Heat Aging of Plastics Without Load[4]

D 3350 Specification for Polyethylene Plastics Pipe and Fittings Materials[4]

D 3895 Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry[4]

F 412 Terminology Relating to Plastic Piping Systems[3]

2.2 *ANSI Standard:*

B36.10 Standards Dimensions of Steel Pipe (IPS)[5]

2.3 *Federal Standard:*

FED-STD-123 Marking for Shipment (Civil Agencies)[6]

2.4 *Military Standard:*

MIL-STD-129 Marking for Shipment and Storage[6]

2.5 *NSF Standard:*

NSF 14 for Plastic Piping Components and Related Materials[7]

2.6 *ISO Standard:*[5]

ISO R 161-1690 Pipes of Plastic Materials for the Transport of Fluids (Outside Diameters and Nominal Pressures) Part 1, Metric Series

3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology F 412, and abbreviations are in accordance with Terminology D 1600, unless otherwise specified. The abbreviation for crosslinked polyethylene is PEX. Plastic tubing denotes a

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

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

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

[5] Available from American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.

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

[7] Available from the National Sanitation Foundation, P.O. Box 1468, Ann Arbor, MI 48106.

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particular diameter schedule of plastic pipe in which outside diameter of the tubing is equal to the nominal size plus ⅛ in. Plastic pipe outside diameter schedule conforms to ANSI B36.10.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *crosslinked polyethylene plastics*—plastics prepared by crosslinking (curing) polyethylene compounds.

3.2.2 *hydrostatic design stress*—the estimated maximum tensile stress the material is capable of withstanding continuously with a high degree of certainty that failure of the tube will not occur. This stress is circumferential when internal hydrostatic water pressure is applied.

3.2.3 *pressure rating (PR)*—the estimated maximum water pressure the tube is capable of withstanding continuously with a high degree of certainty that failure of the tube will not occur.

3.2.4 *relation between dimensions, hydrostatic design stress, and pressure rating*—the following expression, commonly known as the ISO equation,[8] is used in this specification to relate dimensions, hydrostatic design stress, and pressure rating:

$$2S/P = (D_O/t) - 1 \quad (1)$$

or

$$2S/P = R - 1$$

where:

S = hydrostatic design stress, psi (or MPa),
P = pressure rating, psi (or MPa),
D_O = average outside diameter, in. (or mm),
t = minimum wall thickness, in. (or mm), and
R = standard dimension ratio, SDR.

3.2.5 *standard dimension ratio (SDR)*—the ratio of outside diameter to wall thickness. For PEX-tubing, it is calculated by dividing the average outside diameter of the tubing in inches or in millimetres by the minimum wall thickness in inches or millimetres. If the wall thickness calculated by this formula is less than 0.070 in. (1.78 mm) it shall be arbitrarily increased to 0.070 in. except for sizes ⅛ in. and smaller. The SDR values shall be rounded to the nearest 0.5.

3.2.6 *standard thermoplastic tubing materials designation code*—the tubing material designation code shall consist of the abbreviation PEX for the type of plastic.

4. Tubing Classification

4.1 *General*—This specification covers one PEX tubing material in one standard dimension ratio and having pressure ratings for water of three temperatures. The pressure ratings decrease as the temperature is increased.

4.2 *Standard Thermoplastic Pipe Dimension Ratio (SDR)*—This specification covers PEX tubing in one standard dimension ratio (SDR 9). The pressure ratings are uniform for all nominal tubing sizes.

5. Materials

5.1 *General*—Crosslinked polyethylene tubing, meeting the requirements of this specification, are primarily defined by means of three criteria, namely, (*1*) nominal density, (*2*) degree of crosslinking, and (*3*) long-term strength tests. There is a strong correlation between nominal density and results of short-term strength tests.

NOTE 1—PEX tubing intended for use in the transport of potable water should be evaluated and certified as safe for this purpose by a testing agency acceptable to the local health authority. The evaluation should be in accordance with requirements for chemical extraction, taste, and odor that are no less restrictive than those included in NSF 14. The seal or mark of the laboratory making the evaluation should be included on the tubing.

5.2 *Basic Materials*—PEX tubing shall be made from polyethylene compounds which have been crosslinked by peroxides, Azo compounds, or silane compounds in extrusion, or by electron beam after extrusion, or by other means such that the tubing meets the performance requirements of Section 6. For the use temperatures that the tubing will be marked for, the materials, procedure for mixing, and the process for crosslinking shall result in a product with long term hydrostatic stress ratings equal to or better than those shown in Table 1, when determined in accordance with procedures no less restrictive than those of PPI TR-3/92.[9] See Appendix X1 for additional information on PPI hydrostatic stress ratings.

TABLE 1 Hydrostatic Design Stresses and Pressure Ratings for PEX SDR 9 Plastic Tubing for Water at Different Temperatures

Rated Temperature		Hydrostatic Design Stress		Pressure Rating for Water	
°F	°C	psi	(MPa)	psi	(MPa)
73.4	23	630	(4.34)	160	(1.10)
180	82.2	400	(2.76)	100	(0.69)
200	93.3	315	(2.17)	80	(0.55)

NOTE 2—Tubing produced by crosslinking by peroxides, Azo compounds, or silane compounds in extrusion, or by electron beam after extrusion have met the requirements of Section 6. There are several other processes for producing crosslinked polyethylene tubing. However, each process must be established as meeting the requirements of this specification.

5.3 *Tubing Material Designation*—The tubing meeting the requirements of this specification shall be designated PEX.

6. Requirements

6.1 *Workmanship*—The tubing shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, or other defects. The pipe shall be as uniform as commercially practicable in color, opacity, density, and other physical properties.

6.2 *Dimensions and Tolerances*:

6.2.1 *Outside Diameters*—The outside diameters and tolerances shall be as shown in Table 2, when measured in accordance with 7.4 and 7.4.1.

6.2.2 *Wall Thickness*—The wall thickness and tolerances shall be as shown in Table 3, when measured in accordance with 7.4 and 7.4.2.

6.2.3 *Wall Thickness Range*—The wall thickness range shall be within 12 %, when measured in accordance with 7.4 and 7.4.2.

[8] ISO R161-1690.

[9] *PPI Technical Report TR-3/92*, Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials.

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TABLE 2 Outside Diameters and Tolerances for PEX Tubing

Nominal Tubing Size		Average Outside Diameter		Tolerances for Average Diameter		Out-of-Roundness[A]	
in.	mm	in.	mm	in.	mm	in.	mm
⅛	3	0.250	6.35	±0.003	±0.08	0.008	0.20
¼	7	0.375	9.52	±0.003	±0.08	0.008	0.20
5/16	8	0.430	10.92	±0.003	±0.08	0.008	0.20
⅜	10	0.500	12.70	±0.003	±0.08	0.012	0.32
½	13	0.625	15.88	±0.004	±0.10	0.016	0.40
⅝	16	0.750	19.05	±0.004	±0.10	0.016	0.40
¾	19	0.875	22.22	±0.004	±0.10	0.016	0.40
1	25	1.125	28.58	±0.005	±0.12	0.020	0.48
1¼	32	1.375	34.92	±0.005	±0.12	0.020	0.48
1½	38	1.625	41.28	±0.006	±0.16	0.024	0.60
2	51	2.125	53.98	±0.006	±0.16	0.030	0.76
2½	64	2.625	66.68	±0.007	±0.18	0.038	0.95
3	76	3.125	79.38	±0.008	±0.20	0.045	1.14
3½	89	3.625	92.08	±0.008	±0.20	0.046	1.16
4	102	4.125	104.78	±0.009	±0.23	0.052	1.32
4½	114	4.625	117.48	±0.009	±0.23	0.059	1.49
5	127	5.125	130.18	±0.010	±0.25	0.065	1.65
6	152	6.125	155.58	±0.011	±0.28	0.072	1.83

[A] The Out-of-Roundness specification applies only to tubing prior to coiling.

TABLE 3 Wall Thickness and Tolerances for PEX SDR 9 Plastic Tubing

Nominal Tubing		Minimum Wall Thickness		Tolerance	
in.	mm	in.	mm	in.	mm
⅛	3	0.047[A]	1.19[A]	+0.007	+0.18
¼	7	0.062[A]	1.57[A]	+0.010	+0.25
5/16	8	0.064	1.63	+0.010	+0.25
⅜	10	0.070[A]	1.78[A]	+0.010	+0.25
½	13	0.070[A]	1.78[A]	+0.010	+0.25
⅝	16	0.083	2.12	+0.010	+0.25
¾	19	0.097	2.47	+0.010	+0.25
1	25	0.125	3.18	+0.013	+0.33
1¼	32	0.153	3.88	+0.015	+0.38
1½	38	0.181	4.59	+0.019	+0.48
2	51	0.236	6.00	+0.024	+0.61
2½	64	0.292	7.41	+0.030	+0.76
3	76	0.347	8.82	+0.033	+0.84
3½	89	0.403	10.23	+0.035	+0.89
4	102	0.458	11.64	+0.040	+1.02
4½	114	0.514	13.05	+0.045	+1.14
5	127	0.569	14.46	+0.050	+1.27
6	152	0.681	17.29	+0.060	+1.52

[A] For tubing sizes of ½ in. and below, wall thickness minimums are not functions of SDR.

6.3 *Density*—When determined in accordance with 7.5, the crosslinked polyethylene tubing material shall have a minimum density of 0.926 Mg/m^3.

6.4 *Sustained Pressure*—The tubing shall not fail, balloon, burst, or weep as defined in Test Method D 1598, at the test pressures given in Table 4 when tested in accordance with 7.6.

6.5 *Burst Pressure*—The minimum burst pressure for PEX plastic tubing shall be as given in Table 5, when determined in accordance with 7.7.

6.6 *Environmental Stress Cracking*— There shall be no loss of pressure in the tubing, when tested in accordance with 7.8.

6.7 *Degree of Crosslinking*—When tested in accordance with 7.9, the degree of crosslinking for PEX tubing material shall be within the range from 65 to 89 % inclusive. Depending on the process used, the following minimum percentage crosslinking values shall be achieved: 70 % by peroxides, 65 % by Azo compounds, 65 % by electron beam, or 65 % by silane compounds.

NOTE 3—Techniques as found in Test Methods D 2765.

6.8 *Stabilizer Functionality*— Stabilizer Functionality shall be tested in accordance with 7.10.

7. Test Methods

7.1 *Conditioning*—Condition the specimens at 73.4 ± 3.6°F (23 ± 2°C) and 50 ± 5% relative humidity for not less than 40 h prior to test in accordance with Procedure A of Practice D 618, for those tests where conditioning is required. In cases of disagreement, the tolerances shall be ±1.8°F (±1°C) and ±2 % relative humidity.

TABLE 4 Sustained Water Pressure Test Condition for PEX SDR 9 Plastic Tubing

Nominal Tubing Size		Pressure Required for Test, psi[A] (MPa)					
in.	mm	73.4°F	(23°C)	180°F	(82.2°C)	200°F	(93.3°C)
⅛	3	595	(4.10)	355	(2.45)	300	(2.07)
¼	7	595	(4.10)	355	(2.45)	300	(2.07)
⅜	10	525	(3.62)	250	(1.72)	210	(1.45)
½	13	330	(2.28)	195	(1.34)	165	(1.14)
⅝ and larger	16 and larger	325	(2.24)	190	(1.31)	165	(1.14)

[A] The fiber stresses used to derive these test pressures are:
at 73.4°F (23.0°C) 1300 psi (8.96 MPa).
at 180°F (82.2°C) 770 psi (5.31 MPa).
at 200°F (93.3°C) 650 psi (4.48 MPa).

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TABLE 5 Burst Pressure Requirements for Water at Different Temperatures for PEX SDR 9 Plastic Tubing

Nominal Tubing Size		Minimum Burst Pressures at Different Temperatures, psi[A] (MPa)					
in.	mm	73.4°F	(23°C)	180°F	(82.2°C)	200°F	(93.3°C)
⅛	3	870	(6.00)	390	(2.69)	330	(2.28)
¼	7	870	(6.00)	390	(2.69)	330	(2.28)
⅜	10	620	(4.27)	275	(1.90)	235	(1.62)
½	13	480	(3.31)	215	(1.48)	185	(1.28)
⅝ and larger	16 and larger	475	(3.27)	210	(1.45)	180	(1.24)

[A] The fiber stresses used to derive these test pressures are:
at 73.4°F (23.0°C) 1900 psi (13.10 MPa).
at 180°F (82.2°C) 850 psi (5.86 MPa).
at 200°F (93.3°C) 720 psi (4.96 MPa).

7.2 *Test Conditions*—Conduct the test in the standard laboratory atmosphere of 73.4 ± 3.6°F (23 ± 2°C) and 50 ± 5 % relative humidity, unless otherwise specified in the test methods or in this specification. In cases of disagreement, the tolerances shall be ±1.8°F (±1°C) and ±2 % relative humidity.

7.3 *Sampling*—A sufficient quantity of tubing, as agreed upon by the purchaser and the seller, shall be selected and tested to determine conformance with this specification (see Practice D 1898). In the case of no prior agreement, random samples selected by the testing laboratory shall be deemed adequate.

7.3.1 *Test Specimens*—Not less than 50 % of the test specimens required for any pressure test shall have at least a part of the marking in their central sections. The central section is that portion of tubing that is at least one tubing diameter away from an end closure.

7.4 *Dimensions and Tolerances*—Use any length of tubing to determine the dimensions. Measure in accordance with Test Method D 2122.

7.4.1 *Outside Diameter*—Measure the outside diameter of the tubing in accordance with Test Method D 2122. The average outside diameter is the arithmetic average of the maximum and minimum diameter at any cross section. The tolerance for out-of-roundness shall apply only to tubing prior to shipment.

7.4.2 *Wall Thickness*—Make micrometer measurements of the wall thickness in accordance with Test Method D 2122 to determine the maximum and minimum values. Measure the wall thickness at both ends of the tubing to the nearest 0.001 in. (0.025 mm).

7.5 *Density*—Determine the density of the tubing compound in accordance with Test Method D 1505, or Test Methods D 792, using three specimens.

7.6 *Sustained Pressure Test*—Select the test specimens at random. Test individually with water at the three controlled temperatures and under the pressures given in Table 4, 18 specimens of tubing, each specimen at least ten times the nominal diameter in length, but not less than 10 in. (25.4 cm) or more than 3 ft (91.4 cm) between end closures and containing the permanent marking on the tubing. Test six specimens at each temperature. Condition the specimens for at least 2 h to within± 3.6°F (±2°C) of the specified test temperatures. Maintain the specimens at the pressures indicated for the appropriate temperatures for a period of 1000 h. Hold the pressure as closely as possible, but within± 10 psi (±0.070 MPa). Maintain the test temperatures within± 3.6°F (±2°C) of the specified temperature. Test in accordance with Test Method D 1598 except maintain the pressure at the values given in Table 4 for 1000 h. Failure of two of the six specimens tested at either temperature constitutes failure in the test. Failure of one of six specimens tested at either temperature is cause for retest of six additional specimens at that temperature. Failure of one of six specimens tested at either temperature in retest constitutes failure in the test. Failure of the tubing shall be defined in accordance with Test Method D 1598, namely:

7.6.1 *Failure*—Any continuous loss of pressure resulting from the transmission of the test liquid through the body of the specimen under test.

7.6.2 *Ballooning*—Any abnormal localized expansion of a tubing specimen while under internal hydraulic pressure.

7.6.3 *Bursting*—Failure by a break in the tubing with immediate loss of test liquid and continued loss at essentially no pressure.

7.6.4 *Seepage or Weeping*—Failure that occurs through essentially microscopic breaks in the tubing wall, frequently only at or near the test pressure.

NOTE 4—At lower pressures, the pipe may carry liquids without evidence of loss of liquids.

7.7 *Burst Pressure*—Determine the minimum burst pressure with at least five specimens in accordance with Test Method D 1599. The time of testing of each specimen shall be between 60 and 70 s. The pressure values are given in Table 5.

7.8 *Environmental Stress Cracking Test*— Use six randomly selected 10-in. (250-mm) long specimens for this test. Make a notch on the inside of the tubing wall in the axial direction. The notch depth shall be 10 % of measured minimum wall thickness and the notch length 1 in. (25 mm). Use a sharp blade mounted in a jig to make this imperfection. Use a depth micrometer or other means for setting the blade in the jig so that the notch depth is controlled as specified. The notch shall be placed, at its nearest point, at least 1.5 times the nominal diameter away from end closures. Fill the tubing with the test

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medium which is 5 % "Igepal CO-630"[10] mixed with 95 % of untreated water. The test is then made in accordance with 7.6, under the pressures given in Table 4, except maintain the pressure for 100 h.

7.9 *Degree of Crosslinking*—Place a tubing sample in a lathe with automatic feeding. Shave a strip that consists of the full wall thickness. The strip thickness shall be approximately 0.004 in. (0.1 mm) which is obtained by setting the lathe feeding accordingly. Test the specimens in accordance with Test Methods D 2765, Method B, with the only deviation: test specimen preparation. For the purpose of this specification, degree of crosslinking (*V*) is defined as 100 % minus extract percent equals *V*.

NOTE 5—This method provides a test method for measuring the average degree of crosslinking over the tube wall thickness. That, however, does not mean that the degree of crosslinking is allowed to vary outside the limits for the grade in question at any part of the tubing. In case of disagreement, strips of the same thickness, 0.004 in. (0.1 mm), can be taken in tangential, axial, or radial direction at any angle section or wall thickness depth, or both, etc. to measure the degree of crosslinking.

7.10 *Stabilizer Functionality*—The functionality of a stabilizer in a specific PEX compound shall be verified by hydrostatic testing of pipe made from the compound. Test six pipe samples continuously for 3000 h at a hoop stress of 0.70 MPa at 120° C, or for 8000 h at a hoop stress of 2.8 MPa at 110° C. This test is used to demonstrate the specific compound's ability to withstand long term temperature conditions set forth elsewhere in this standard.

7.10.1 *Procedure*—The test procedure shall be conducted in accordance with D 1598 or ISO 1167. Test six (6) samples at one of the temperature conditions in 7.10. The internal medium is water the external medium is air. Failure of any one of the specimens constitutes failure of the test.

7.10.2 *Significance*— The test need only be performed for the original validation of pipe made from a particular compound.

[10] This method is based on the use of "Igepal Co-630," a trademark for a nonylphenoxypoly (ethyeneoxy) ethanol, which may be obtained from GAF Corp., Dyestuff and Chemical Div., 140 W. 51st St., New York, NY 10020.

8. Retest and Rejection

8.1 If the results of any test(s) do not meet the requirements of this specification, the tests(s) shall be conducted again only by agreement between the purchaser and seller. Under such agreement, minimum requirements shall not be lowered, changed, or modified, nor shall specification limits be changed. If upon retest, failure occurs, the quantity of product represented by the test(s) does not meet the requirements of this specification.

9. Marking

9.1 Marking on the tubing shall include the following, spaced at intervals of not more than 5 ft:

9.1.1 Nominal tubing size (for example, 2 in.).

9.1.2 Type of plastic tubing material in accordance with the designation code given in 3.2.6.

9.1.3 Standard dimension ratio, SDR 9.

9.1.4 Pressure rating for water and temperature for which the pressure rating is valid.

9.1.5 ASTM designation, with which the tubing complies.

9.1.6 Manufacturer's name (or trademark) and production code.

9.1.7 Tubing intended for the transport of potable water shall also include the seal or mark of the laboratory making the evaluation for this purpose, spaced at intervals specified by the laboratory.

10. Quality Assurance

10.1 When the product is marked with this designation, F 876, the manufacturer affirms that the product was manufactured, inspected, sampled, and tested in accordance with this specification and has been found to meet the requirements of this specification.

11. Keywords

11.1 crosslinked polyethylene; hydrostatic stress; PEX; PPI; pipe; pressure; tubing

SUPPLEMENTARY REQUIREMENTS

GOVERNMENT/MILITARY PROCUREMENT

These requirements apply *only* to federal/military procurement, not domestic sales or transfers.

S1. *Responsibility for Inspection*—Unless otherwise specified in the contract or purchase order, the producer is responsible for the performance of all inspection and test requirements specified herein. The producer may use his own or any other suitable facilities for the performance of the inspection and test requirements specified herein, unless the purchaser disapproves. The purchaser shall have the right to perform any of the inspections and tests set forth in this specification where such inspections are deemed necessary to ensure that material conforms to prescribed requirements.

NOTE S1.1—In U.S. federal contracts, the contractor is responsible for inspection.

S2. *Packaging and Marking for U.S. Government Procurement:*

S2.1 *Packaging*—Unless otherwise specified in the contract, the materials shall be packaged in accordance with the supplier's standard practice in a manner ensuring arrival at destination in satisfactory condition and which will be acceptable to the carrier at lowest rates. Containers and packing shall comply with Uniform Freight Classification rules or National

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Motor Freight Classification rules.

S2.2 *Marking*—Marking for shipment shall be in accordance with Fed. Std. No. 123 for civil agencies and MIL-STD-129 for military agencies.

NOTE S2.1—The inclusion of U.S. Government procurement requirements should not be construed as an indication that the U.S. Government uses or endorses the products described in this specification.

APPENDIX

(Nonmandatory Information)

X1. SOURCE OF HYDROSTATIC DESIGN STRESSES

X1.1 The hydrostatic design stress recommended by the Plastic Pipe Institute is used to pressure rate PEX plastic tubing. These hydrostatic design stresses are: 630 psi (4.34 MPa) for water at 73.4°F (23°C), 400 psi (2.76 MPa) for water at 180°F (82.2°C), and 315 psi (2.17 MPa) for water at 200°F (93.3°C). These hydrostatic design stresses apply only to tubing meeting all the requirements of this specification.

X1.2 Refer also to Test Method D 2837. Additional information regarding the method of test and other criteria used in developing these hydrostatic design stresses may be obtained from the Plastic Pipe Institute, a division of The Society of the Plastics Industry, 355 Lexington Ave., New York, NY 10017. These hydrostatic design stresses may not be suitable for materials that show a wide departure from a straight-line plot of log stress versus log time to failure. All the data available to date on PEX-tubing materials made in the United States exhibit a straight-line plot under these plotting conditions.

X1.3 The hydrostatic design stresses and pressure ratings in Table 1 apply to PEX SDR 9 plastic tubing meeting the requirements of this specification.

X1.4 The hydrostatic design stresses recommended by the Plastic Pipe Institute are based on tests made on tubing ranging in size from ½ to 2 in.

X1.5 The stabilizer functionality test is not intended to determine the long term hydrostatic strength of the pipe but to serve as indicator of the individual PEX compound stabilization.

X1.6 Stabilizer Verification: The oxidation induction time (OIT) as described in Test Method D 3895 may be used to monitor stabilizer content of a PEX material or freshly extruded pipe. Once the initial OIT value has been established for a specific compound, subsequent OIT values can be used to validate the stabilizer level in the pipe or compound without the need to run additional temperature tests. It should be mentioned that OIT tests are not an indicator of life expectancy, nor should differences in OIT values between compounds be construed to indicate differences in the stabilizer effectiveness of respective formulations.

NOTE X1.1—As of this writing no precision and bias statement is available for the OIT tests and will have to be determined for each compound as data is developed.

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