Designation: ~~F1483 – 12~~ F1483 – 15

Standard Specification for Oriented Poly(Vinyl Chloride), PVCO, Pressure Pipe[1]

This standard is issued under the fixed designation F1483; 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.

1. ~~Scope~~ Scope*

1.1 This specification covers requirements for materials, dimensions, sustained pressure, accelerated regression testing, burst pressure, flattening, impact resistance, workmanship, and methods of marking for oriented poly(vinyl chloride) (PVCO) pipe for pressure applications.

1.2 The PVCO pipe shall be joined using elastomeric seals (gaskets). The joint shall meet the requirements of Specification D3139 and the elastomeric seal shall meet the requirements of Specification F477. The PVCO shall not be joined by solvent cementing.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are ~~given for information only.~~ 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 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:*[2]

D618 Practice for Conditioning Plastics for Testing
D883 Terminology Relating to Plastics
D1598 Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure
D1599 Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings
D1600 Terminology for Abbreviated Terms Relating to Plastics
D1784 Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
D2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
D2152 Test Method for Adequacy of Fusion of Extruded Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion
D2444 Test Method for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
D2837 Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products
D3139 Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
F412 Terminology Relating to Plastic Piping Systems
F477 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

2.2 *Federal Standard:*[3]

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

2.3 *Military Standard:*[3]

MIL-STD-129 Marking for Shipment and Storage

[1] This specification is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.25 on Vinyl Based Pipe.

Current edition approved ~~Sept. 1, 2012~~Nov. 1, 2015. Published ~~November 2012~~December 2015. Originally approved in 1993. Last previous edition approved in ~~2005~~2012 as F1483~~–05.~~ –12. DOI: ~~10.1520/F1483-12.~~10.1520/F1483-15.

[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* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from DLA Document Services Building 4/D 700 Robbins Avenue Philadelphia, PA 19111-5094 http://quicksearch.dla.mil/

***A Summary of Changes section appears at the end of this standard**

2.4 *Other Standards:*
NSF Standard No. 14 for Plastic Piping Components and Related Materials[4]
ANSI/NSF Standard No. 61 for Drinking Water System Components—Health Effects[4]
PPI-TR 3 Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe[5]

3. Terminology

3.1 *General*—Definitions are in accordance with Terminologies D883 and F412 and abbreviations are in accordance with Terminology D1600, unless otherwise indicated. The abbreviation for poly(vinyl chloride) plastics is PVC.

3.2 *Definitions:*

~~3.1.1 *General*—Definitions are in accordance with Terminologies D883 and F412 and abbreviations are in accordance with Terminology D1600, unless otherwise indicated. The abbreviation for poly(vinyl chloride) plastics is PVC.~~

3.2.1 *PVCO pipe*—abbreviation for oriented poly(vinyl chloride) plastics. PVCO pipe is PVC pressure pipe which attains a relatively high strength by reorienting the molecules. Conventionally extruded PVC pipe is expanded circumferentially (for example, 2-in. diameter is expanded to 4-in. diameter) through the application of pressure and temperature. The expansion reorients the PVC molecular structure in the hoop direction, thereby increasing the material strength.

3.3 *Definitions of Terms Specific to This Standard:*

3.3.1 *expansion ratio (ER)*—the ratio of the finished PVCO pipe outside diameter to the outside diameter of the original starting stock.

3.3.2 *standard thermoplastic pipe material designation code*—the molecularly oriented poly(vinyl chloride) materials designation code shall consist of the abbreviation PVCO for the type of plastics, followed by the ASTM type and grade in arabic numerals and the hydrostatic design stress in units of 100 psi (0.69 MPa) with any decimal figures dropped. The ASTM type and grade shall be that of the starting stock material. The hydrostatic design stress shall be that of the finished PVCO pipe.

[4] Available from ~~the National Sanitation Foundation, P.O. Box 1468,~~ NSF International, P.O. Box 130140, 789 N. Dixboro Rd., Ann Arbor, MI ~~48106.~~48105, http://www.nsf.org.

[5] Available from Plastics Pipe ~~Institute, 1275 K St. N.W., Suite 400, Washington, DC 20005.~~Institute (PPI), 105 Decker Court, Suite 825, Irving, TX 75062, http://www.plasticpipe.org.

3.3.2.1 *Discussion*—

A complete material designation code shall consist of four letters and four figures (for example; a PVCO pipe manufactured from 12454 (Type 1, Grade 1) material starting stock and having an HDB of 7100 psi (48.92 MPa) [HDS of 3550 psi) (24.46 MPa)] will have a material designation code of PVCO 1135).

~~3.2.3 DISCUSSION—A complete material designation code shall consist of four letters and four figures (for example; a PVCO pipe manufactured from 12454 (Type 1, Grade 1) material starting stock and having an HDB of 7100 psi (48.92 MPa) [HDS of 3550 psi) (24.46 MPa)] will have a material designation code of PVCO 1135).~~

3.3.3 *starting stock*—the conventionally extruded PVC pipe of uniform wall thickness which will be expanded to a larger diameter, molecularly oriented pipe.

3.3.4 *wall-thickness-ratio (WTR)*—the ratio of the finished product wall thickness to the wall thickness of the starting stock.

4. Classification

4.1 *General*—This specification covers PVCO made from PVC plastic pipe, starting stock, having a hydrostatic design stress of 2000 psi (13.78 MPa) determined in accordance with Test Method D2837. Finished PVCO pipe shall have a hydrostatic design stress of 3550 psi (24.46 MPa) determined by testing in accordance with Test Methods D1598, with data evaluated in accordance with Test Methods D2837, as in 6.3.2.

5. Materials

5.1 *General*—Poly(vinyl chloride) plastics used to make PVCO pipe meeting the requirements of this specification are categorized by means of two criteria, namely (*1*) short-term strength tests; and (*2*) long-term strength tests.

5.1.1 *Supplementary Requirement*—This applies whenever a regulatory authority or user calls for the product to be used to convey or to be in contact with potable water. Potable water applications products intended for contact with potable water shall be evaluated, tested, and certified for conformance with ANSI/NSF Standard 61 or the health effects portion of NSF Standard No. 14 by an acceptable certifying organization when required by the regulatory authority having jurisdiction.

5.2 *Basic Materials*—This specification covers PVCO pipe made from PVC compounds having certain physical and chemical properties as described in Specification D1784.