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Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds¹

This standard is issued under the fixed designation D1784; 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 rigid PVC and CPVC compounds intended for general purpose use in extruded or molded form; ~~including pressure piping applications involving special chemical and acid resistance or heat resistance, composed nonpressure piping applications—composed~~ of poly(vinyl chloride), chlorinated poly(vinyl chloride), or vinyl chloride copolymers containing at least 80 % vinyl chloride, and the necessary compounding ingredients. The compounding ingredients shall be permitted to consist of lubricants, stabilizers, non-poly(vinyl chloride) resin modifiers, pigments, and inorganic fillers.

NOTE 1—Selection of specific compounds for particular end uses or applications requires consideration of other characteristics such as thermal properties, optical properties, weather resistance, etc. Specific requirements and test methods for these properties ~~shall~~should be by mutual agreement between the purchaser and the seller.

NOTE 2—~~The list of compounding ingredients in 2—~~Selection of compounds for pressure piping applications requires consideration of material stress ratings that are required for determining pressure ratings, but are not addressed in this specification. Requirements for long-term material stress ratings in accordance with recognized stress rating standards, such as HDB in accordance with Test Method D2837 for pressure piping, should be included in specifications for pressure piping products or systems.

NOTE 3—The list of compounding ingredients in 1.1 is not meant to be an exhaustive list of allowable compound ingredients. In addition to the compounding ingredients listed, others may also be used. The list of compounding ingredients in 1.1 does not imply that every ingredient listed is a required ingredient. Some compounds may not contain all the ingredients listed in 1.1.

1.2 ~~The requirements in this specification are intended for the quality control of compounds used to manufacture finished products. These properties are based on data obtained using standard test specimens tested under specified conditions. They are not directly applicable to finished products. See the applicable ASTM standards for requirements for finished products.~~

1.3 ~~Rigid PVC compounds intended for pipe, fittings, and other piping appurtenances are covered in Specifications D3915 and D4396~~

1.2 For applications involving special chemical resistance see Classification D5260.

1.4 Rigid PVC compounds for exterior building product applications are covered in Specification D4216.

1.5 ~~The text of this specification references notes and footnotes that provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of this specification.~~

1.6 ~~Rigid PVC recycle plastics meeting the requirements of this specification may be used in some applications. Refer to the specific requirements in the materials and manufacture section of the applicable product standard.~~

1.7 ~~The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.~~

1.8

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1.6 ~~The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.~~

1.7 ~~The following safety hazards caveat pertains only to the test methods portion, Section 11, 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.*~~

¹ This specification is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials. Current edition approved Nov. May 1, 2008:2011. Published November 2008:May 2011. Originally approved in 1960. Last previous edition approved in 2007:2008 as D1784 – 078. DOI: 10.1520/D1784-08.10.1520/D1784-11.

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

~~NOTE 3—This 4—~~This specification is similar in content (but not technically equivalent) to ISO 1163-1:1985 and ISO 1163-2:1980.

2. Referenced Documents

2.1 *ASTM Standards:*²

- D256 Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
- D618 Practice for Conditioning Plastics for Testing
- D635 Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
- D638 Test Method for Tensile Properties of Plastics
- D648 Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position
- D883 Terminology Relating to Plastics
- D1600 Terminology for Abbreviated Terms Relating to Plastics
- D3892 Practice for Packaging/Packing of Plastics
- ~~D3915 Specification for Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds for Plastic Pipe and Fittings Used in Pressure Applications~~
- ~~D4216 Specification for Rigid Poly(Vinyl Chloride) (PVC) and Related PVC and Chlorinated Poly(Vinyl Chloride) (CPVC) Building Products Compounds~~
- ~~D4396 Specification for Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds for Plastic Pipe and Fittings Used in Nonpressure Applications~~ 2837 Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products
- D4703 Practice for Compression Molding Thermoplastic Materials into Test Specimens, Plaques, or Sheets
- D5260 Classification for Chemical Resistance of Poly(Vinyl Chloride) (PVC) Homopolymer and Copolymer Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

2.2 *ISO Standards:*³ ~~02~~

- ISO 1163-1:1985
- ISO 1163-2:1980

3. Terminology

~~3.1—~~*Definitions*

3.1 Definitions—Definitions are in accordance with Terminology D883 and abbreviations with Terminology D1600 unless otherwise indicated.

4. Classification

4.1 Means for selecting and identifying rigid PVC and CPVC compounds are provided in Table 1. The properties enumerated in Table 1 and the tests defined are expected to provide identification of the compounds selected. They are not necessarily suitable for direct application in design because of differences in shape of part, size, loading, environmental conditions, etc. ~~784-11~~

4.2 Classes are designated by the cell number for each property in the order in which they are listed in Table 1.

~~NOTE 4—The 5—~~The manner in which selected materials are identified by this classification system is illustrated by a Class 12454 rigid PVC compound having the following requirements (see Table 1). The two-digit cell limits 10 and 11 are rarely used, only for special high-temperature grades of CPVC compound:

	1	2	4	5	4
Class <i>Identification:</i> Poly(vinyl chloride) homopolymer					
<i>Property and Minimum Value:</i> Izod (34.7 J/m (0.65 ft-lbf/in.)) under notch					
Tensile strength (48.3 MPa (7000 psi))					
Modulus of elasticity in tension (2758 MPa (400 000 psi))					
Deflection temperature under load (70°C (158°F))					

~~NOTE 5—The 6—~~The cell-type format provides the means for identification and close characterization and specification of material properties, alone or in combination, for a broad range of materials. This type format, however, is subject to possible misapplication since unobtainable property combinations can be selected if the user is not familiar with commercially available materials. The manufacturer should be consulted.

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 American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.