



Designation: D 1784 – 06

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

This standard is issued under the fixed designation D 1784; 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 piping applications involving special chemical and acid resistance or heat resistance, 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 may 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 be by mutual agreement between the purchaser and the seller.

1.2 Rigid PVC compounds intended for pipe, fittings, and other piping appurtenances are covered in Specifications **D 3915** and **D 4396**.

1.3 Rigid PVC compounds for exterior building product applications are covered in Specification **D 4216**.

1.4 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.

1.5 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.

1.6 The values stated in SI units are to be regarded as standard. The values given in brackets 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.

NOTE 2—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

- D 256** Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
- D 618** Practice for Conditioning Plastics for Testing
- D 635** Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
- 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 883** Terminology Relating to Plastics
- D 1600** Terminology for Abbreviated Terms Relating to Plastics
- D 1898** Practice for Sampling of Plastics³
- D 3892** Practice for Packaging/Packing of Plastics
- D 3915** Specification for Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds for Plastic Pipe and Fittings Used in Pressure Applications
- D 4216** Specification for Rigid Poly(Vinyl Chloride) (PVC) and Related PVC and Chlorinated Poly(Vinyl Chloride) (CPVC) Building Products Compounds
- D 4396** Specification for Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds for Plastic Pipe and Fittings Used in Nonpressure Applications

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 Oct. 1, 2006. Published October 2006. Originally approved in 1960. Last previous edition approved in 2003 as D 1784 – 03.

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 Withdrawn.

D 4703 Practice for Compression Molding Thermoplastic Materials into Test Specimens, Plaques, or Sheets

D 5260 Classification for Chemical Resistance of Poly(Vinyl Chloride) (PVC) Homopolymer and Copolymer Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

2.2 *ISO Standards:*⁴

ISO 1163-1:1985

ISO 1163-2:1980

3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology **D 883** and abbreviations with Terminology **D 1600** 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.

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

NOTE 3—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:

Class Identification:	1	2	4	5	4
Poly(vinyl chloride) homopolymer					
Property and Minimum Value:					
Impact strength (Izod) (34.7 J/m (0.65 ft · lbf/in.))					
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 4—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.

4.3 Product application chemical resistance when specified shall be classified in accordance with the classification section of Classification **D 5260**.

5. Ordering Information

5.1 The purchase order, or inquiry, for these materials shall state the specification number and identify the class selected, for example, D 1784, Class 12454.

5.2 Further definition, as may be required for the following, shall be on the basis of agreement between the purchaser and the seller:

5.2.1 Physical form and particle size (see **6.1**),

5.2.2 Contamination level (see **6.2**),

5.2.3 Color (see **6.3**),

5.2.4 Other supplementary definition if necessary, and

5.2.5 Inspection (see **12.1**).

6. Materials and Manufacture

6.1 Materials supplied under this specification shall be PVC and CPVC compounds in the form of cubes, granules, free-flowing powder blends, or compacted powder blends.

6.2 Materials shall be of uniform composition and size and shall be free of foreign matter to such level of contamination as may be agreed upon between the purchaser and the seller.

6.3 Color and transparency or opacity of molded or extruded articles formed under the conditions recommended by the seller shall be comparable within commercial match tolerances to the color and transparency or opacity of standard molded or extruded samples of the same thickness supplied in advance by the seller of the material.

7. Physical Requirements Physical Requirements

7.1 Test values for specimens of the material prepared as specified in Section 9 and tested in accordance with Section 10 shall conform to the requirements given in **Table 1** for the class selected.

8. Sampling

8.1 A batch or lot shall be considered as a unit of manufacture and may consist of a blend of two or more production runs of material.

8.2 Unless otherwise agreed upon between the seller and the purchaser, the material shall be sampled in accordance with the procedure described in the General and Specific Sampling Procedures, as applicable, of Practice **D 1898**. Adequate statistical sampling prior to packaging shall be considered an acceptable alternative.

9. Conformance Testing

9.1 The minimum properties identified by the class designations in **Table 1** specified in the purchase order (see **5.1**) shall be verified by the tests described in Section 11.

9.2 Conformance with this specification shall be determined with one set of test results. If there are multiple test results, the average value for all test samples shall be used to determine conformance.

9.3 If the average test value produces values below the minimum property values of the Class designation in **Table 1**, the material does not conform to this specification.

10. Specimen Preparation

10.1 Compliance with the designated requirements chosen from **Table 1** shall be determined with compression-molded, extruded, or injection-molded test specimens for Izod impact resistance, tensile strength, tensile modulus of elasticity, deflection temperature under load, and flammability. Specimens cut from laminates of compression-molded or extruded sections (see Practice **D 4703**) shall not be used unless it can be shown by test that complete fusion is obtained. It is understood that a material shall not be tested without also specifying the

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.