Designation: D4396 – 06

StandardSpecification for Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds for Plastic Pipe and Fittings Used in Nonpressure Applications[1]

This standard is issued under the fixed designation D4396; 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*

1.1 This specification covers rigid plastic compounds intended for use in making nonpressure piping products composed of *(1)* poly(vinyl chloride) polymer, *(2)* chlorinated poly(vinyl chloride) polymer, or *(3)* vinyl chloride copolymers, and the necessary compound ingredients. The compounding ingredients may consist of lubricants; stabilizers; nonpoly(vinyl chloride) resin modifiers; colorants or pigments, or both; fibrous or nonfibrous reinforcements; or fillers.

1.2 The requirements in this specification are intended for the quality control of compounds used to manufacture pipe or fittings intended for nonpressure use. They are not applicable to finished pipe and finished fittings. See the applicable ASTM standards or requirements for finished products.

1.3 It may be necessary, in special cases, to select specific compounds for unusual piping applications that require consideration of other properties not covered in this specification, such as service temperature, sag resistance, special chemical resistance, weather resistance, bending forces, and electrical properties.

1.4 Rigid PVC compounds for pressure applications are covered in Specification D3915.

1.5 Rigid PVC-type compounds for building applications other than piping are covered in Specification D4216.

1.6 Rigid PVC compounds for general purpose extrusion and molding use are covered in Specification D1784.

1.7 The rate of burning test, Test Method D635, is used in this specification as a test for identification of certain properties of the compound.

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

1.9 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.

1.10 Rigid PVC and CPVC recycle plastics meeting the requirements of this specification may be used in some applications. Refer to the specific requirements in the Material and Manufacture Section of the applicable product standard.

1.11 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 1—There are no ISO standards covering the primary subject matter of this specification.

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
D1784 Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

[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.

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[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.

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

D1898 Practice for Sampling of Plastics (Withdrawn 1998)[3]
D3010 Practice for Preparing Compression-Molded Test Sample Plaques of Rigid Poly(Vinyl Chloride) Compounds (Withdrawn 1992)[3]
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
D5260 Classification for Chemical Resistance of Poly(Vinyl Chloride) (PVC) Homopolymer and Copolymer Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
F412 Terminology Relating to Plastic Piping Systems

3. Terminology

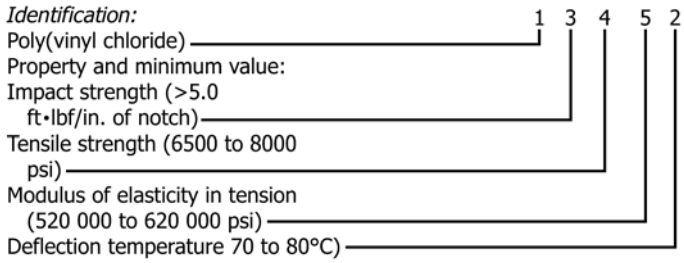
3.1 *Definitions*—General definitions are in accordance with Terminologies D883, F412, and D1600, unless otherwise noted.

4. Classification

4.1 The means for classifying and identifying PVC pipe compounds are provided in Table 1. The properties enumerated in this table and the tests defined provide identification of the compounds selected. They are not necessarily suitable for direct application in design because of differences in shape or part, size, loading, environmental conditions, method of processing, 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 2—The manner in which selected materials are identified by this classification system is illustrated by a cell Class 13452 PVC nonpressure pipe compound having the following requirements (see Table 1):



NOTE 3—The cell-type format provides the means for classification and close characterization and specification of compound properties, alone or in combination, for a broad range of compounds. 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 compounds. The manufacturer should be consulted.

4.3 Product application chemical resistance when specified shall be classified in accordance with the Classification Section of Classification D5260.

5. Ordering Information

5.1 The purchase order, or inquiry for these compounds, shall state this specification number and identify the cell class selected, for example: D4396, Cell Class _____.

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, bulk density, and particle size (see 6.2 and 6.3).
5.2.2 Contamination level (see 6.5).
5.2.2.1 Residual vinyl chloride or other monomers.
5.2.3 Color (see 6.4).
5.2.4 Other supplementary information, if necessary.
5.2.5 Inspection (see 12.1).
5.2.6 Any special chemical resistance, special heat resistance, or electrical properties.

6. Materials and Manufacture

6.1 *Resin (Polymer) Requirements:*

[3] The last approved version of this historical standard is referenced on www.astm.org.

TABLE 1 Class Requirements for Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC) Pipe Compounds for Nonpressure Piping Products

NOTE 1—The minimum property value will determine the cell number, although the maximum expected value may fall within the next higher cell.

Designation Order No.	Property and Unit	Cell Limits								
		0	1	2	3	4	5	6	7	8
1	Kind of resin in compound	...	poly(vinyl chloride) (PVC)	chlorinated poly (vinyl chloride) (CPVC)	vinyl chloride copolymer					
2	Impact resistance, min, ft·lbf/in. (J/m) of notch	unspecified	0.65 (40.0)	1.5 (80.1)	5.0 (266.9)					
3	Tensile strength, min, psi (MPa)	unspecified	3000 (21)	4000 (27.5)	5000 (34.4)	6500 (44.7)	8000 (55.0)			
4	Modulus of elasticity in tension, min, psi (MPa)	unspecified	280 000 (1930)	340 000 (2344)	380 000 (2620)	460 000 (3171)	520 000 (3585)	620 000 (4275)		
5	Deflection temperature under load, 264 psi (1.82 MPa), min, °F (°C)	unspecified	140 (60)	158 (70)	176 (80)	212 (100)	230 (110)	248 (120)	266 (130)	284 (140)