



Designation: D3915 – 06

Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds for Plastic Pipe and Fittings Used in Pressure Applications¹

This standard is issued under the fixed designation D3915; 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 plastic compounds composed of poly(vinyl chloride), chlorinated poly(vinyl chloride), or vinyl chloride copolymers, and the necessary compounding ingredients intended for use in making pipe, fittings, and other piping appurtenances. The compounding ingredients may consist of lubricants, stabilizers, non-poly(vinyl chloride) resin modifiers, pigments, and inorganic fillers.

1.2 This specification is designed to cover compounds for pressure piping applications. Refer to Specification [D4396](#) for compounds designed for non-pressure applications.

1.3 Rigid PVC-type compounds for building applications other than piping are covered in Specification [D4216](#).

1.4 Rigid PVC-type compounds for general purpose extrusion and molding use are covered in Specification [D1784](#). Specification [D1784](#) is applicable to piping applications involving special chemical and acid resistance.

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

1.6 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, chemical resistance, weather resistance, bending forces, etc.

1.7 The following safety hazards caveat pertains only to the test methods section, 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.

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

1.9 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered standard.

1.10 Recycled plastics shall not be used in pipe and fittings for pressure applications.

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](#)
- [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](#)
- [D1243 Test Method for Dilute Solution Viscosity of Vinyl Chloride Polymers](#)
- [D1600 Terminology for Abbreviated Terms Relating to Plastics](#)
- [D1784 Specification for Rigid Poly\(Vinyl Chloride\) \(PVC\) Compounds and Chlorinated Poly\(Vinyl Chloride\) \(CPVC\) Compounds](#)
- [D1898 Practice for Sampling of Plastics \(Withdrawn 1998\)³](#)

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 Dec. 1, 2006. Published January 2007. Originally approved in 1980. Last previous edition approved in 2004 as D3915 - 04. DOI: 10.1520/D3915-06.

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

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

D2837 Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products

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

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:

3.1.1 *General*—Definitions used in this specification shall be in accordance with Terminologies **D883**, **D1600**, and **F412**, unless otherwise noted.

4. Classification

4.1 Means for classifying and identifying PVC and CPVC pipe and fittings compounds are provided in **Table 1**. The properties enumerated in this table 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, and so forth.

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 Class 134544 PVC pipe compound having the following requirements (see **Table 1**):

Class	1	3	4	5	4	4
Identification:						
Poly(vinyl chloride)						
Property and Minimum Value:						
Impact strength (1.50 to 5.00 ft·lbf/in.)						
Tensile strength (7000 to 8000 psi)						
Modulus of elasticity in tension (400 000 to 480 000 psi)						
Deflection temperature under load (100 to 110°C)						
Hydrostatic design basis (4000 psi)						

NOTE 3—The cell-type format provides the means for classification 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

TABLE 1 Class Requirements for Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

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	unspecified	poly(vinyl chloride) (PVC)	chlorinated poly(vinyl chloride) (CPVC)	vinyl chloride copolymer (CVC)					
2	Impact resistance, min: J/m of notch (ft·lbf/in. of notch)	unspecified	< 40.0 (<0.65)	40.0 (0.65)	80.1 (1.50)	266.9 (5.00)				
3	Tensile strength, min: MPa (psi)	unspecified	<34.0 (<5000)	34.0 (5000)	41.0 (6000)	48.0 (7000)	55.0 (8000)			
4	Modulus of elasticity in tension, min: MPa (psi)	unspecified	<1930 (<280 000)	1930 (280 000)	2210 (320 000)	2480 (360 000)	2760 (400 000)	3310 (480 000)	3860 (560 000)	
5	Deflection temperature under load, 1.82 MPa (264 psi), min: °C (°F)	unspecified	60 (140)	70 (158)	80 (176)	100 (212)	110 (230)	120 (248)	130 (266)	140 (284)
6	Hydrostatic design basis: MPa (psi)	unspecified	13.80 (13.25 to 16.50) (2000) (1920 to 2390)	17.25 (16.55 to 20.75) (2500) (2400 to 3010)	21.70 (20.80 to 26.35) (3150) (3020 to 3820)	27.60 (20.40 to 33.05) (4000) (3830 to 4790)	34.50 (33.10 to 41.60) (5000) (4800 to 6030)			