



Designation: D1755 – 15

## Standard Specification for Poly(Vinyl Chloride) Resins<sup>1</sup>

This standard is issued under the fixed designation D1755; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope\*

1.1 This specification covers the establishment of requirements for homopolymers of vinyl chloride in original powder form intended for subsequent mixing and processing in thermoplastic compositions. These resins have a nominal specific gravity of 1.4 and a theoretical chlorine content of 56.8 %.

1.2 Two types of resin have been recognized: general purpose (suspension or mass) and dispersion. When mixed with plasticizer, general-purpose resins yield a dry or moist powder while dispersion resins yield a liquid slurry. Since many resins are polymerized to meet special requirements, a system of classification has been provided that permits a wide choice of grades.

1.3 The values stated in SI units are to be regarded as the standard.

1.4 *This standard does not purport to address all of the safety problems, 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—This standard and ISO 1264 – 1980 address the same subject matter, but differ in technical content.

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>2</sup>

- D495 Test Method for High-Voltage, Low-Current, Dry Arc Resistance of Solid Electrical Insulation
- D883 Terminology Relating to Plastics
- D1125 Test Methods for Electrical Conductivity and Resistivity of Water
- D1243 Test Method for Dilute Solution Viscosity of Vinyl Chloride Polymers

<sup>1</sup> 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- D1600 Terminology for Abbreviated Terms Relating to Plastics
- D1823 Test Method for Apparent Viscosity of Plastics and Organosols at High Shear Rates by Extrusion Viscometer
- D1824 Test Method for Apparent Viscosity of Plastics and Organosols at Low Shear Rates
- D1895 Test Methods for Apparent Density, Bulk Factor, and Pourability of Plastic Materials
- D1921 Test Methods for Particle Size (Sieve Analysis) of Plastic Materials
- D2132 Test Method for Dust-and-Fog Tracking and Erosion Resistance of Electrical Insulating Materials
- D2396 Test Methods for Powder-Mix Time of Poly(Vinyl Chloride) (PVC) Resins Using a Torque Rheometer
- D3030 Test Method for Volatile Matter (Including Water) of Vinyl Chloride Resins
- D3367 Test Method for Plasticizer Sorption of Poly(Vinyl Chloride) Resins Under Applied Centrifugal Force
- D3892 Practice for Packaging/Packing of Plastics
- E2251 Specification for Liquid-in-Glass ASTM Thermometers with Low-Hazard Precision Liquids

### 3. Terminology

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

### 4. Classification

4.1 *Types*—This specification covers two types of resin:

- 4.1.1 *Type GP*—General-purpose suspension or mass resins.
- 4.1.2 *Type D*—Dispersion resins primarily intended for use in organosols and plastisols.

4.2 *Grades*—This specification provides for as many grades of resin as it is feasible to be selected from the possible combinations of requirements in Table 1 and Table 2. A grade is designated by first indicating the type (GP or D), followed by cell numbers for each property in the order in which they are listed in Table 1 and Table 2. Where there is no interest in a property, a “0” is entered in place of a cell number. If it were desirable, it is acceptable to extend a cell limit by half the cell range into the next higher or lower cell, but not both. When this is done, it is indicated by a dash above the cell number ( $\bar{n}$ ) if the extension is into the higher cell, or a dash below ( $n$ ) if into the lower cell. Extension of cell limits applies only to cells

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

**TABLE 1 Type GP, General-Purpose Resin Requirements**

Designation Order No.	Property	Cell Limits									
		0	1	2	3	4	5	6	7	8	9
1	Dilute solution (inherent) viscosity	unspecified	>0.39	>0.70	>0.75	>0.87	>0.99	>1.09	>1.19	>1.29	>1.38
2	Sieve analysis, percent through No. 200 (75- $\mu$ m) sieve	unspecified	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 79	80 to 99	100
3	Apparent (bulk) density (min): g/1000 cm <sup>3</sup> lb/ft <sup>3</sup>	unspecified	<144	144	233	329	426	521	617	713	$\geq$ 809
		unspecified	<9.00	9.00	14.51	20.51	26.51	32.51	38.51	44.51	50.51
4	Plasticizer sorption, % DOP (min)	unspecified	<9.9	>10.0	>15.0	>20.0	>25.0	>30.0	>35.0	>40.0	...
5	Dry flow, method 'A', s/140 gms	unspecified	...	<9.9	>10.0	>12.0	>14.0	>16.0	>18.0	>20.0	...
6	Conductivity, max, $\mu$ S/cm-g	unspecified	...	...	<6	$\geq$ 6	...	...	...	...	...

**TABLE 2 Type D, Dispersion Resin Requirements**

Designation Order No.	Property	Cell Limits									
		0	1	2	3	4	5	6	7	8	9
1	Dilute solution (inherent) viscosity	unspecified	<0.90	0.90 to 0.99	1.00 to 1.09	1.10 to 1.19	1.20 to 1.29	1.30 to 1.39	1.40 to 1.49	1.50 to 1.59	$\geq$ 1.60
2	Brookfield viscosity (RVF), poise	unspecified	0 to 24	25 to 49	50 to 74	75 to 99	100 to 124	125 to 149	150 to 174	175 to 199	>199
3	Severs viscosity, poise	unspecified	0 to 49	50 to 99	100 to 149	150 to 199	200 to 299	300 to 499	500 to 999	1000 to 1499	>1499

where ranges of properties are allowed and not where maximum or minimum values are specified. The cell number of the first property (dilute solution viscosity) is separated from those that follow by a dash.

**4.3 Inherent Viscosity Cell Number**—When selecting the inherent viscosity cell number, the number shall cover the full inherent viscosity production range for the specific product. A resin with an inherent viscosity of 1.07 to 1.11 production range would have a 5 cell number. A resin with an inherent viscosity of 1.10 to 1.14 production range would have a 6 cell number

## 5. General Requirements

5.1 The resin shall be in powder form.

5.2 The resin shall conform to the requirements of **Table 1** or **Table 2**, as specified by the type and grade designation.

**NOTE 2**—It is possible that properties not covered, such as heat stability, color, and volatile loss, are also important for application performance in compounds.

## 6. Sampling

6.1 Adequate statistical sampling before packaging is an acceptable procedure. A batch or lot of material shall be considered as a unit of manufacture prepared for shipment and is permitted to consist of a blend of two or more production runs of material.

## 7. Number of Tests

7.1 One set of test specimens shall be considered sufficient for testing each batch.

## 8. Retest and Rejection

8.1 If any failure occurs, the materials shall be permitted to be retested to establish conformity.

## TEST METHODS

### 9. Dilute Solution Viscosity

9.1 Test Method **D1243**.

### 10. Apparent (Bulk) Density

10.1 Test Methods **D1895**, method A or method B.

**NOTE 3**—Finely divided powders such as vinyl resins may collect electrostatic charges, which if present at the time of measurement, may result in variable bulk density values. An anti-static material may be premixed with the sample at concentrations of 0.05 to 0.2 weight percent to reduce this variability (Magnesium Silicate, Alumina Hydroxide Hydrate, Calcium Stearate, Silicon Dioxide or Carbon Black are examples of anti-static agents).

### 11. Sieve Analysis

11.1 Test Method **D1921**.

**NOTE 4**—Specifications for sieve analysis (**Table 1**) are primarily intended to control fines.