



Designation: D 4099 – 89^{ε1}

AMERICAN SOCIETY FOR TESTING AND MATERIALS

1916 Race St., Philadelphia, Pa. 19103

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Standard Specification for Poly(Vinyl Chloride) (PVC) Prime Windows/Sliding Glass Doors¹

This standard is issued under the fixed designation D 4099; 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.

^{ε1} NOTE—Editorial changes were made throughout in July 1990.

1. Scope

1.1 This specification establishes the requirements for material properties and performance characteristics for prime windows and sliding glass doors manufactured of rigid poly(vinyl chloride) (PVC). Windows and doors included in this specification shall be complete assemblies (systems) containing all necessary hardware, anchors, and miscellaneous equipment as specified herein.

1.2 This specification includes common types of PVC window and door types presently in production. No inference is to be drawn as to the acceptability of other window and door types not listed.

1.3 Although this specification establishes performance criteria, there is no intent to imply acceptable use of PVC windows and doors in a particular building. The specifying agency shall establish all requirements for a particular application and determine suitability of the product for its anticipated use.

1.4 This specification is limited to prime windows and doors and does not include secondary windows, storm windows or storm doors.

1.5 The values stated in inch-pound units are to be regarded as the standard.

1.6 The following precautionary caveat pertains only to the test method portion, Section 11, of this specification: *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems 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.*

2. Referenced Documents

2.1 ASTM Standards:

A 165 Specification for Electrodeposited Coatings of Cadmium on Steel²

B 456 Specification for Electrodeposited Coatings of Copper Plus Chromium and Nickel Plus Chromium³

B 633 Specification for Electrodeposited Coatings of Zinc on Iron and Steel³

C 1036 Specification for Flat Glass⁴

C 1048 Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass⁴

D 883 Definitions of Terms Relating to Plastics⁵

D 1600 Abbreviations of Terms Relating to Plastics⁵

D 1898 Practice for Sampling of Plastics⁶

D 3656 Specification for Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Fiber Yarn⁷

D 3892 Practice for Packaging/Packing of Plastics⁸

D 4028 Specification for Solar Screening Woven from Vinyl-Coated Fiber Glass Yarn⁷

D 4726 Specification for White Rigid Poly(Vinyl Chloride) (PVC) Exterior Profile Extrusions Used for Assembled Windows and Doors⁹

E 283 Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors¹⁰

E 330 Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference¹⁰

E 331 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference¹⁰

E 380 Metric Practice¹¹

E 547 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential¹²

E 621 Practice for Use of Metric (SI) Units in Building Design and Construction¹⁰

E 631 Terminology of Building Construction¹⁰

E 737 Practice for Installation of Storm Windows, Replacement Windows, Multi-Glazing, Storm Doors, and Replacement Doors¹⁰

E 774 Specification for Sealed Insulating Glass Units¹⁰

E 987 Test Methods for Deglazing Force of Fenestration Products¹⁰

¹ This specification is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.24 on Plastic Building Products.

Current edition approved July 28, 1989. Published September 1989. Originally published as D 4099 – 82. Last previous edition D 4099 – 88.

² Discontinued; see 1987 Annual Book of ASTM Standards, Vol 02.05.

³ Annual Book of ASTM Standards, Vol 02.05.

⁴ Annual Book of ASTM Standards, Vol 15.02.

⁵ Annual Book of ASTM Standards, Vols 08.01 and 08.04.

⁶ Annual Book of ASTM Standards, Vol 08.02.

⁷ Annual Book of ASTM Standards, Vol 07.02.

⁸ Annual Book of ASTM Standards, Vol 08.03.

⁹ Annual Book of ASTM Standards, Vol 08.04.

¹⁰ Annual Book of ASTM Standards, Vol 04.07.

¹¹ Annual Book of ASTM Standards, Vol 14.02.

¹² Annual Book of ASTM Standards, Vol 04.08.

2.2 *Consumer Product Safety Commission Standard:*¹³
CPSC 16 CRF 1201—Safety Standard for Architectural Glazing Materials

2.3 *Federal Specifications:*¹⁴

MIL-STD-105D Sampling Procedure and Tables for Inspection by Attributes

FS-RR-W-365 Federal Specification—Wire Fabric (Insect Screening)¹⁴

2.4 *Other Standards:*

SMA-SMT-31 Testing Procedures and Equipment Bulletin for Attachment of Screening to Frame¹⁵

ANSI Z97.1 Safety Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings¹⁶

ANSI/SMA 1004 Specification for Aluminum Roll-Formed Tubular Shaped Screens¹⁶

3. Terminology

3.1 *General*—Definitions are in accordance with Definitions D 883 and E 631 and abbreviations with Abbreviations D 1600 unless otherwise indicated.

3.2 *Descriptions of Terms Specific to This Standard:*

3.2.1 *bite*—the distance which the surrounding member overlaps the vision area in the window or door to be tested, as submitted for test.

3.2.2 *compatible with rigid poly(vinyl chloride) (PVC)*—a high degree of certainty that in service sustained physical contact will not result in discoloration, degradation, softening, cracking, or brittleness of the rigid poly(vinyl chloride) (PVC) matrix.

3.2.3 *degazing*—the disengagement of a window vision area from its surrounding member. As tested herein, it is denoted as the percentage of the as-produced window “bite.”

3.2.4 *prime window (door)*—the original window (door) to which a storm window (door) or multi-glazing is added to provide greater thermal resistance.

4. Metrication

4.1 Metrication (SI) is in accordance with Method E 380, as specified for building design and construction in Practice E 621.

NOTE 1—Due to traditional construction industry use of special sizes and modules, inch-pound units cannot be translated directly into SI units. Practice E 621 provides preferred modules and sizes in SI units for use when metric building design and construction is required.

5. Classification

5.1 The window units will be subdivided by grades based on design pressure:

5.1.1 *Grade 15*—15 lbf/ft² (0.72 kPa) design pressure.

5.1.2 *Grade 20*—20 lbf/ft² (0.96 kPa) design pressure.

5.1.3 *Grade 25*—25 lbf/ft² (1.20 kPa) design pressure.

5.1.4 *Grade 30*—30 lbf/ft² (1.44 kPa) design pressure.

5.1.5 *Grade 35*—35 lbf/ft² (1.68 kPa) design pressure.

5.1.6 *Grade 40*—40 lbf/ft² (1.92 kPa) design pressure.

5.1.7 *Grade 45*—45 lbf/ft² (2.15 kPa) design pressure.

5.1.8 *Grade 50*—50 lbf/ft² (2.39 kPa) design pressure.

5.1.9 *Grade 55*—55 lbf/ft² (2.63 kPa) design pressure.

5.1.10 *Grade 60*—60 lbf/ft² (2.87 kPa) design pressure.

5.1.11 *Grade 65*—65 lbf/ft² (3.11 kPa) design pressure.

6. Materials and Manufacture Requirements

6.1 All rigid poly(vinyl chloride) (PVC) extrusions or moldings used in construction of the window or door (system assembly) shall conform to the requirements of Specification D 4726.

6.2 Wall thickness of functional segments of rigid poly(vinyl chloride) (PVC) extrusions used in construction of the window or door assembly shall be as agreed upon between the purchaser and seller with a wall thickness tolerance of ± 0.008 in. (0.2 mm) for wall thicknesses less than 0.080 in. (2.0 mm), and $\pm 10\%$ for wall thicknesses over 0.080 in. (2.0 mm).

6.3 Secondary members, such as friction shoes, filler tracks, weather-stripping, guides, etc., shall be made of a suitable material compatible with rigid PVC.

6.4 *Fasteners*—Screws, nuts, washers, bolts, rivets, and other miscellaneous devices incorporated in the product shall be of stainless steel, aluminum, or other corrosion-resistant materials compatible with rigid poly(vinyl chloride) (PVC) and of sufficient quality to perform the specific functions for which they are used. Steel may be used provided it is cadmium plated in accordance with Specification A 165, type OS, zinc plated in accordance with Specification B 633, SC-2, or nickel and chrome plated in accordance with Specification B 456, type SC-2.

6.5 *Hardware*—Component parts that are visible shall be of stainless steel, aluminum, or other corrosion-resistant materials compatible with rigid poly(vinyl chloride) (PVC) and of sufficient quality to perform the specific functions for which they are used. Steel may be used provided it is cadmium plated in accordance with Specification A 165, type OS, zinc plated in accordance with Specification B 633, SC-2, or nickel and chrome plated in accordance with Specification B 456, type SC-2.

6.6 *Weatherstrip*—Weatherstrip, if used, shall be made of any suitable material compatible with rigid PVC. The weatherstrip may be installed in the window or door frame, window or door sash, or both, to effectively enable the window or door unit to meet performance requirements stated herein. Weatherstrip should resist air and water leakage, withstand atmospheric conditions, and be mechanically functional under use.

6.7 *Anchoring Devices*—Anchoring devices used in erection of the window or door unit shall be aluminum, stainless steel, or other noncorrosive materials compatible with rigid PVC. Steel may be used provided it is cadmium plated in accordance with Specification A 165, type OS, zinc plated in accordance with Specification B 633, SC-2, or nickel and chrome plated in accordance with Specification B 456, type SC-2.

6.8 *Structural Members:*

6.8.1 Where mullion units are constructed, whether they are joined by integral mullions, independent mullions, or by

¹³ Available from Consumer Product Safety Commission, Washington, DC 20207.

¹⁴ Available from Naval Publications and Forms Center, 5801 Tabor Ave, Philadelphia, PA 19120.

¹⁵ Available from Screen Manufacturers Assn., 410 N. Michigan Ave., Chicago, IL 60611.

¹⁶ Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.