



Standard Specification for Poly (Vinyl Chloride) (PVC) Gaskets for Drain, Waste, and Vent (DWV), Sewer, Sanitary, and Storm Plumbing Systems¹

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1. Scope

1.1 This specification describes material and physical requirements for nonrigid poly (vinyl chloride) (PVC) preformed molded and spliced gaskets used in mechanical couplings. These couplings are used in gravity flow drain, waste, and vent (DWV), sewer, sanitary, and storm plumbing systems. They include couplings to join similar and dissimilar piping sizes and piping material.

1.2 Recycled materials may be used in this product in accordance with the requirements in Section 4.

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

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

1.4 The following safety hazards caveat pertains only to the test method portion, Section 7, 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.*

2. Referenced Documents

2.1 ASTM Standards:

- C 717 Terminology of Building Seals and Sealants²
- D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension³
- D 471 Test Method for Rubber Property—Effect of Liquids
- D 573 Test Method for Rubber—Deterioration in an Air Oven
- D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing⁴
- D 624 Test Method for Tear Strength of Conventional

- Vulcanized Rubber and Thermoplastic Elastomers³
- D 746 Test Method for Brittleness Temperature of Plastics and Elastomers by Impact⁴
- D 792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement⁴
- D 883 Terminology Relating to Plastics⁴
- D 1149 Test Method for Rubber Deterioration—Surface Ozone Cracking in a Chamber
- D 1203 Test Methods for Volatile Loss from Plastics Using Activated Carbon Method⁴
- D 1600 Terminology for Abbreviated Terms Relating to Plastics⁴
- D 1898 Practice for Sampling of Plastics⁴
- D 2240 Test Method for Rubber Property—Durometer Hardness³
- D 2287 Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds⁴
- D 3892 Practice for Packaging/Packing of Plastics⁵
- D 5033 Guide for the Development of Standards Relating to the Proper Use of Recycled Plastics⁶
- D 6147 Test Method for Vulcanized Rubber and Thermoplastic Elastomer—Determination of Force Decay (Stress Relaxation) in Compression

3. Terminology

3.1 *General*—Definitions are in accordance with Terminologies C 717, D 883 and D 1600, unless otherwise indicated.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *flash*—the excess material protruding from the surface of a molded article at the mold junction.

4. Materials and Manufacture

4.1 This specification covers preformed gaskets made principally from virgin nonrigid PVC molding compound conforming to the requirements of Specification D 2287 for general purpose, electrical requirements excluded class PVC 35267 or 34267. Refer to Table 1 in Specification D 2287.

4.1.1 This class compound has the following material property requirements:

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² *Annual Book of ASTM Standards*, Vol 04.07.

³ *Annual Book of ASTM Standards*, Vol 09.01.

⁴ *Annual Book of ASTM Standards*, Vol 08.01.

⁵ *Annual Book of ASTM Standards*, Vol 08.02.

⁶ *Annual Book of ASTM Standards*, Vol 08.03.

Properties Tested	ASTM Method	Requirement
Durometer hardness, A scale	Test Method D 2240	55 to 64
Specific gravity (nominal), 23°C/23°C	Test Method D 792	1.30 to 1.39
Tensile strength, min, psi (MPa)	Test Method D 412	1000 (8.9)
Volatile loss at 105°C, max, %	Test Method D 1203	6.0
Brittleness temperature, max	Test Method D 746	-40°C
Heat Aging :	Test Method D 573	
Hardness increase, max, pts. Shore A		10
Loss in tensile strength, max, %		25
Loss in elongation, max, %		35
Water Absorption, Weight increase,max, %	Test Method D 471	20
Ozone Resistance, No Cracks at 2 times Magnification	Test Method D 1149	No Cracks
Oil Immersion in IRM 903 Oil:	Test Method D 471	
Max volume increase, %		10
Max volume decrease, %		50
Stress Relaxation, Min. % Force Retention	Test Method D 6147	30

4.2 The molding compound shall have a minimum percent elongation by Test Method D 412 of 250 %.

4.3 The molding compound shall have a minimum tear strength by Test Method D 624 of 150 lb/in. (268.5 N/cm).

4.4 Recycled materials, as defined in Guide D 5033, may be used in this product if all the requirements in Sections 4 and 5 are met by the recycle material.

4.5 Qualification testing for material physical requirements shall be conducted by the material manufacturer on the specific compound supplied and not on the molded gaskets, since the physical properties do not change on molding.

NOTE 2—The material manufacturer shall reassess the need for requalification of the specific compound supplied any time the compound formulation is changed or the PVC resin or any compound ingredient is changed.

4.6 The compound manufacturer shall certify in writing to the gasket manufacturer that the compound supplied meets all the requirements of this specification.

5. Requirements

5.1 *Dimensions*—Gaskets shall conform to the dimensions and dimensional tolerances as agreed upon between the supplier and the purchaser. All dimensions shall be compatible with the dimensions and tolerances of the specific piping materials and sizes to which it is designed to join.

5.2 *Spliced Gaskets, Stretch Test*— The splice shall withstand the splice test in 7.1 with no visible separation or peeling.

5.2.1 The observance of any peeling or separation in a spliced seam shall be followed by immediate correction of the temperature/time functions in the heat welding operation.

5.3 Gaskets selected for sampling (6.1) shall meet all dimensional requirements (5.1) and workmanship requirements (5.4).

5.4 Workmanship:

5.4.1 The surface of preformed gaskets shall be smooth and free from pitting, cracks, blisters, air marks, or any other imperfections that may affect product performance in service.

5.4.2 Neither the flash thickness nor the flash extension shall exceed 1/32 in. (1 mm).

6. Sampling

6.1 Sampling shall be in accordance with Practice D 1898.

6.2 A shift of production on a molding line shall be considered as a unit of manufacture for sampling purposes.

6.3 Spliced gasket production shall be sampled at a level of 100 % of total spliced units produced during the trimming and inspection operation.

7. Test Methods

7.1 *Spliced Gasket Stretch Test*—Gasket specimens shall be stretched during the seam trimming operation by inverting the spliced section 180°, while carefully inspecting the seam for separation and peeling and the seam area for workmanship imperfections (5.4.1).

7.2 The physical properties enumerated herein shall be determined on the non-rigid PVC compound in accordance with the following methods:

7.2.1 *Test Specimens*—Unless otherwise specified, test specimens shall be prepared of sheets 0.075 ± 0.010 in. (1.9 ± 0.2 mm) thick. Specimens shall be of the shape and dimensions specified in the individual test methods.

7.2.2 *Conditioning*—Test specimens of non-rigid PVC plastics shall be conditioned in accordance with Procedure A of Practice D 618.

7.2.3 Unless otherwise specified, tests shall be conducted in the standard laboratory atmosphere of 23 ± 2°C (73.4 ± 3.6°F) and 50 ± 5 % relative humidity.

7.2.4 *Durometer Hardness*—Test Method D 2240 using a 15 s interval as described in 9.2 of that method.

7.2.5 *Specific Gravity*—Method A of Test Method D 792.

7.2.6 *Tensile Strength and Percent Elongation*—Test Methods D 412, using specimens prepared with Die C.

7.2.7 *Volatile Loss*—Test Method D 1203 using Method A, except that the test temperature shall be 105°C.

7.2.8 *Brittleness Temperature*—Test Method D 746, using Procedure A.

7.2.9 *Tear Strength*—Test Method D 624, using Die C.

7.2.10 *Heat Aging*—Test Method D 573 for 96 h at 70 ± 2°C (158 ± 4°F).

7.2.11 *Water Absorption*—Test Method D 471 for 7 days at 70 ± 2°C (158 ± 4°F).

7.2.12 *Ozone Resistance*—Test Method D 1149, using test specimen A for 100 h at 40 ± 2°C (104 ± 4°F) with ozone concentration of 1.5 ppm.

7.2.13 *Oil Immersion*—Test Method D 471 for 70 h at 100 ± 2°C (212 ± 4°F).

7.2.14 *Stress Relaxation*—Test Method D 6147, using Method B, and test specimen as defined in section 7.1.2 of D 6147. The test temperature and duration shall be 168 h at $23 \pm 2^\circ\text{C}$ ($73 \pm 4^\circ\text{F}$).

8. Certification

8.1 The gasket manufacturer shall keep appropriate production and testing records, including certification documentation from the PVC compound producer, required to certify, when requested by the purchaser, that the product meets all requirements of this specification.

9. Product Marking

9.1 Each gasket shall be marked with the manufacturers name or trademark, or both.

9.2 The type and size of pipe for which the gasket is intended or the manufacturer's product identification shall be marked on or attached to each gasket.

9.3 All gaskets shall be marked with the designation ASTM D 5926 showing compliance to this specification.

10. Packaging and Package Marking

10.1 *Packaging*—The gaskets shall be packaged in standard commercial containers so constructed as to ensure acceptance by common or other carriers for safe transportation at the lowest rate to the point of delivery, unless otherwise specified in the contract or order.

10.2 All packing, packaging, and marking provisions of Practice D 3892 shall apply to this specification.

11. Keywords

11.1 DWV piping gaskets; pipe couplings; plumbing gaskets; poly(vinyl chloride) (PVC); recycle usage; sanitary piping gaskets; sewer piping gaskets; storm piping gaskets

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