



Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers¹

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1. Scope

1.1 This specification covers preformed dense elastomeric compression gaskets and accessories for use in sealing and glazing applications. These materials are generally used to seal or serve as components of compression sealing systems between mechanically restrained surfaces in building constructions.

1.2 *Test Method C 1166, as referenced in this specification, should be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use.*

1.3 The following precautionary statement pertains only to the test method portion, Section 9, 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
- C 1166 Test Method for Flame Propagation of Dense and Cellular Elastomeric Gaskets and Accessories²
- D 395 Test Methods for Rubber Property—Compression Set³
- D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension³
- D 573 Test Method for Rubber—Deterioration in an Air Oven³

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

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

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 925 Test Methods for Rubber Property—Staining of Surfaces (Contact, Migration, and Diffusion)³

D 1149 Test Method for Rubber Deterioration—Surface Ozone Cracking in a Chamber³

D 1566 Terminology Relating to Rubber³

D 2240 Test Method for Rubber Property—Durometer Hardness³

D 3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets³

3. Terminology

3.1 Definitions:

3.1.1 For the definition of elastomer, and other definitions of terms used in this specification, see Terminology C 717.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *compression seal*—a type of joint seal in which weathertightness is maintained by the exertion of compressive pressure on the gasket or sealing material.

3.2.2 *gasket*—a resilient preformed and precured shape intended for use in providing a compression seal.

3.2.3 *spacer*—a material used to maintain space between a glass or panel and its surrounding frame.

3.2.4 *setting block*—a block of resilient material used to support a pane of glass or a panel within a frame.

4. Materials and Manufacture

4.1 The elastomeric materials shall be manufactured from a high-quality ozone-resistant compound that, when properly cured, will comply with this specification.

4.2 The cured compound shall be suitable for use where resistance to sunlight, weathering, oxidation, and permanent deformation under load are of prime importance.

4.3 The preformed gaskets or shapes shall be free of porosity, surface defects, and dimensional irregularities that may affect serviceability.

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

4.4 Unless otherwise specified, the material shall be black.

5. Physical Properties

5.1 The physical properties of the material shall conform to the requirements specified in Table 1.

6. Dimensional Tolerances

6.1 Permissible variations in all cross-sectional dimensions shall be as specified in Table 2 unless otherwise agreed upon between the purchaser and the supplier.

7. Significance and Use

7.1 Flame Propagation:

7.1.1 This specification has two options:

7.1.1.1 *Option I*—Flame propagation test is required.

7.1.1.2 *Option II*—Flame propagation test is not required.

7.1.2 In case no option is specified, Option I will apply.

8. Sampling

8.1 Samples for testing shall be taken from the finished product whenever possible.

8.2 When the thickness or shape of the finished product makes it impossible to obtain the type of samples specified in the various methods, the manufacturer shall, upon request of the purchaser at the time of ordering, furnish a sufficient number of test slabs, strips or blocks, prepared in accordance with Practice D 3182, for the proper performance of the required tests. The slabs or blocks shall be prepared from the same production lot of compound and the same state of cure as is used for the gasket.

9. Test Methods

9.1 *Hardness*—Test Method D 2240. Measure hardness on either a finished surface, a squarely cut end, or a flat sliced or

buffed surface, depending on the size and shape of the specimen (Note 1). Determine the change in hardness after oven aging for 70 h at $100 \pm 1^\circ\text{C}$ ($212 \pm 2^\circ\text{F}$).

NOTE 1—Hardness readings for the purpose of approximate determinations may be taken from the dumbbell specimens, recognizing that these may vary slightly from those taken from the finished material.

9.2 *Compression Set*—Test Methods D 395, Method B. Oven age specimens 22 h at $100 \pm 1^\circ\text{C}$ ($212 \pm 2^\circ\text{F}$). Where plied specimens are necessary, the results shall comply with the requirements of Table 1.

9.3 *Ozone Resistance*—Test Method D 1149 (Specimen A), using an ozone concentration of 100 mPa, an exposure time of 100 h at $40 \pm 2^\circ\text{C}$ ($104 \pm 3.6^\circ\text{F}$), and a specimen elongation of 20 %.

9.4 *Tensile Strength and Elongation*—Test Methods D 412. Where possible, prepare the dumbbells from sections of the finished material. Determine the percentage change in tensile strength and elongation after oven aging for 70 h at $100 \pm 1^\circ\text{C}$ ($212 \pm 2^\circ\text{F}$).

9.5 *Heat Aging*—Test Method D 573.

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

9.7 *Brittleness Temperature*—Test Method D 746.

9.8 *Non-Staining*—Test Methods D 925, Method B.

9.9 *Flame Propagation*—Test Method C 1166 determines whether or not the gasket will propagate flame, with no significance being attached to such matters as fuel contribution, rate of flame spread, smoke generation, or the nature and temperature of products of combustion.

10. Keywords

10.1 compression; dense; elastomer; elastomeric; gasket; glazing; preformed; seal; setting block; spacers

TABLE 1 Elastomeric Compression Seal Gaskets and Accessories Physical Requirements

Properties	Requirements						ASTM Test Method
Hardness, nominal Shore A durometer ± 5 , as specified by the purchaser	40	50	60	70	80	90	D 2240
Compression set, 22 h @ 100°C (212°F), max, %	35	30	30	30	35	40	D 395
Ozone resistance, 100 mPa, 100 h @ 40°C (104°F), 20 % elongation			$\leftarrow$ no cracks $\rightarrow$				D 1149 (Specimen A)
			at $7\times$ magnification				
Tensile strength, min, MPa (psi)	10.3 (1500)	10.3 (1500)	11.0 (1600)	12.4 (1800)	12.4 (1800)	12.4 (1800)	D 412, Die C
Elongation at rupture, min, %	400	300	250	200	175	125	D 412, Die C
Heat aging, 70 h, 100°C (212°F):							
Hardness increase, max durometer points	10	10	10	10	10	10	D 573
Change in tensile strength, max, %	15	15	15	15	15	15	
Change in elongation, max, %	40	40	40	40	40	40	
Tear strength, min, kN/m (lbf/in.)	26.3 (150)	26.3 (150)	26.3 (150)	17.5 (100)	17.5 (100)	13.1 (75)	D 624, Die C
Brittleness temperature, max, $^\circ\text{C}$	-40	-40	-40	-40	-40	-40	D 746
Nonstaining			$\leftarrow$ no migratory stain $\rightarrow$				D 925
Flame propagation							C 1166
Option I			$\leftarrow$ 100 mm (4 in.) max. $\rightarrow$				
Option II			$\leftarrow$ no limit $\rightarrow$				

TABLE 2 Standards for Cross-Sectional Tolerance

NOTE 1—Dimensional tolerances for outside diameters, inside diameters, wall thickness, width, height, and general cross-sectional dimensions of extrusion.

Rubber Manufacturers Association ^A					
RMA Class		2 Precision	RMA Class		2 Precision
Drawing Designation		E2	Drawing Designation		E2
Dimensions (in inches)			Dimensions (in Millimeters)		
Above	Up to		Above	Up to	
0	0.06	±0.010	0	1.5	±0.25
0.06	0.10	0.014	1.5	2.5	0.35
0.10	0.16	0.016	2.5	4.0	0.40
0.16	0.25	0.020	4.0	6.3	0.50
0.25	0.39	0.027	6.3	10	0.70
0.39	0.63	0.031	10	16	0.80
0.63	0.98	0.039	16	25	1.00
0.98	1.57	0.051	25	40	1.30
1.57	2.48	0.063	40	63	1.60
2.48	3.94	0.079	63	100	2.00

^AAdapted from Rubber Manufacturers Association Handbook, Table 13, Fifth Ed., 1992.

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