



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

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This standard has been approved for use by agencies of the U.S. Department of Defense.

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 C1166, 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.*

1.4 The committee with jurisdiction over this standard is not aware of any comparable standards published by other organizations.

2. Referenced Documents

2.1 *ASTM Standards:*²

C717 Terminology of Building Seals and Sealants

¹ This specification is under the jurisdiction of ASTM Committee C24 on Building Seals and Sealants and is the direct responsibility of Subcommittee C24.73 on Compression Seal and Lock Strip Gaskets.

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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.

C1166 Test Method for Flame Propagation of Dense and Cellular Elastomeric Gaskets and Accessories

D395 Test Methods for Rubber Property—Compression Set

D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

D573 Test Method for Rubber—Deterioration in an Air Oven

D624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

D746 Test Method for Brittleness Temperature of Plastics and Elastomers by Impact

D925 Test Methods for Rubber Property—Staining of Surfaces (Contact, Migration, and Diffusion)

D1149 Test Methods for Rubber Deterioration—Cracking in an Ozone Controlled Environment

D1566 Terminology Relating to Rubber

D2240 Test Method for Rubber Property—Durometer Hardness

D3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets

3. Terminology

3.1 Definitions:

3.1.1 For the definition of elastomer, and other definitions of terms used in this specification, see Terminology **C717**.

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.

4.4 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 **D3182**, 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 **D2240**. 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 **D395**, 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 **D1149** (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 **D412**. 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 **D573**.

9.6 *Tear Strength*—Test Method **D624**, using Die C.

9.7 *Brittleness Temperature*—Test Method **D746**.

9.8 *Non-Staining*—Test Methods **D925**, Method B.

9.9 *Flame Propagation*—Test Method **C1166** 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 $\pm$ 5, as specified by the purchaser	40	50	60	70	80	90	D2240
Compression set, 22 h @ 100°C (212°F), max, %	35	30	30	30	35	40	D395
Ozone resistance, 100 mPa, 100 h @ 40°C (104°F), 20 % elongation			← no cracks →				D1149 (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)	D412 , Die C
Elongation at rupture, min, %	400	300	250	200	175	125	D412 , Die C
Heat aging, 70 h, 100°C (212°F):							
Hardness increase, max durometer points	10	10	10	10	10	10	D573
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)	D624 , Die C
Brittleness temperature, max, $^\circ\text{C}$	-40	-40	-40	-40	-40	-40	D746
Nonstaining			← no migratory stain →				D925
Flame propagation							C1166
Option I			← 100 mm (4 in.) max. →				
Option II			← no limit				

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	RMA Class		2
		Precision			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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