Designation: ~~D1056 – 07~~ D1056 – 14

Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber[1,2]

This standard is issued under the fixed designation D1056; 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.

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

1. Scope*

1.1 This specification covers flexible cellular rubber products known as sponge rubber and expanded rubber, but does not apply to latex foam rubber or ebonite cellular rubber. The base material for an open/closed cellular product may be made of synthetic, natural, or reclaimed rubber, or a mixture, and may contain other polymers or chemicals, or both, which may be modified by organic or inorganic additives. These elastomeric materials have properties similar to those of vulcanized rubber, namely (1) the ability to be converted from a thermoplastic to a thermosetting state by crosslinking (vulcanization) or (2) the substantial recovery of their original shapes when strained or elongated, or both.

1.2 Extruded or molded shapes of sizes too small for cutting standard test specimens are difficult to classify or test by these methods and will usually require special testing procedures.

1.3 In case of conflict between the provisions of this general specification and those of detailed specifications or test methods for a particular product, the latter shall take precedence. Reference to the test methods in this specification should specifically state the particular test or tests desired.

1.4 The values stated in ~~SI~~inch-pound units are to be regarded as ~~the~~ standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 The following safety hazards caveat pertains only to the test methods portions 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.*

NOTE 1—ISO 6916-1 is similar to this specification.

2. Referenced Documents

2.1 *ASTM Standards:*[3]

D395 Test Methods for Rubber Property—Compression Set
D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
D471 Test Method for Rubber Property—Effect of Liquids
D573 Test Method for Rubber—Deterioration in an Air Oven
D575 Test Methods for Rubber Properties in Compression
D624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
D832 Practice for Rubber Conditioning For Low Temperature Testing
D883 Terminology Relating to Plastics
D1171 Test Method for Rubber Deterioration—Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens)
D2632 Test Method for Rubber Property—Resilience by Vertical Rebound

[1] This specification is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.22 on Cellular Materials - Plastics and Elastomers.

This standard has been approved for use by agencies of the Department of Defense to replace Methods 12001, 12005, 12011, 12021, 12031, 12041, 12151, and 12411 of Federal Test Method Standard No. 601.

This standard has been approved for use by agencies of the Department of Defense to replace MIL-STD-670 and MIL-STD-C 3133, which were discontinued in 1986.

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[2] This version supersedes all prior versions of this specification.

[3] 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.

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

D3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets
D3183 Practice for Rubber—Preparation of Pieces for Test Purposes from Products
D5132 Test Method for Horizontal Burning Rate of Polymeric Materials Used in Occupant Compartments of Motor Vehicles
2.2 *ISO Standard:*[4]
ISO 6916-1 Flexible Cellular Polymeric Materials: Sponge and Expanded Cellular Rubber Products—Specification Part 1 Sheet

3. Terminology

3.1 *Definitions*—See Terminology D883.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *cellular material*—a generic term for materials containing many cells (either open or closed, or both) dispersed throughout the mass.

3.2.2 *closed cell*—a product whose cells are totally enclosed by its walls and hence not interconnecting with other cells.

3.2.3 *expanded rubber*—cellular rubber having closed cells made from a solid rubber compound.

3.2.4 *flexible cellular material*—a flexible cellular organic polymeric material that will not rupture within 60 s when a specimen ~~200~~8 by ~~25 by 25 mm (8 by 1 by 1 in.)~~1 by 1 in. (200 by 25 by 25 mm) is bent around a ~~25-mm (1-in.)~~1-in. (25-mm) diameter mandrel at a uniform rate of 1 lap/5 s in the form of a helix at a temperature between ~~18~~65 and ~~29°C (65~~85°F (18 and ~~85°F).~~29°C).

3.2.5 *open cell*—a product whose cells are not totally enclosed by its walls and open to the surface, either directly or by interconnecting with other cells.

3.2.6 *rubber*—a material that is capable of recovering from large deformations quickly and forcibly, and can be, or already is, modified to a state in which it is essentially insoluble (but can swell) in boiling solvent (such as benzene, methyl ethyl ketone, and ethanol-toluene azeotrope).

[4] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

3.2.6.1 *Discussion*—

A rubber in its modified state, free of diluents, retracts within 1 min to less than 1.5 times its original length after being stretched at room temperature ~~(20~~68 to ~~27°C)~~80.6°F to twice its length and held for 1 min before release.

3.2.7 *skin*—the textured outer surface on the material formed during manufacture by contact with molds, cover plate, air, or other curing medium.

3.2.7.1 *Discussion*—

Normally, this skin is formed by contact with the mold or cover plates during manufacture. Molded open-cell (sponge) parts usually have a skin on all surfaces, except when cut to length from longer strips. Parts made by cutting from open-cell (sponge) sheets usually have skin on two faces and open cells at the cut edges. Closed-cell (expanded) rubber sheets are frequently split from thicker pieces and consequently do not have the skin faces. On some products it is desirable to add a solid rubber skin coating. The use to which the cellular rubber product is to be put determines the thickness of added skin required. Products subject to abrasion or open-cell (sponge) rubber that must withstand absorption of water or transmission of gases will ordinarily require an applied skin coating. Closed-cell (expanded) rubber does not usually require an added skin for these reasons.

3.2.8 *sponge rubber*—cellular rubber consisting predominantly of open cells made from a solid rubber compound.

4. Classification (Types, Classes, Grades, and Suffix Letters)

4.1 *Types*—These specifications cover two types of cellular rubber designated by the prefix numbers 1 and 2.
4.1.1 *Type 1*—Open-cell rubber.
4.1.2 *Type 2*—Closed-cell rubber.
4.1.3 See Section 3 for definitions of open and closed cell.

4.2 *Classes*—Both types are divided into four classes designated by the letters A, B, C, and D added to the number prefix. Basic requirements for classes are found in Tables 1 and 2.
4.2.1 *Class A*—Cellular rubber made from synthetic rubber, natural rubber, reclaimed rubber, or rubber-like materials, alone or in combination, where specific resistance to the action of petroleum base oils is not required.
4.2.2 *Class B*—Cellular rubber made from synthetic rubber or rubber-like materials alone or in combination, having specific requirements for oil resistance with low mass change.

4.2.3 *Class C*—Cellular rubber made from synthetic rubber or rubber-like materials alone or in combination, having specific requirements for oil resistance with medium mass change.

4.2.4 *Class D*—Cellular rubber made from synthetic rubber or rubber-like materials alone or in combination having specific requirements for extreme temperature resistance −103 to 347°F (−75 to ~~175°C) (−103 to 347°F);~~175°C); but specific resistance to the action of petroleum-base oils is not required.

4.3 *Grades*—Each type and class has been divided into a number of different grades. Each grade is based on a specific range of firmness as expressed by compression-deflection (see Sections 19 to ~~22~~23). Grades are designated by digit, the softer grades being identified with the lower numbers and the higher grades being identified with the higher numbers.

4.3.1 *Grade 0*—For Types 1 and 2 cellular rubber, a compression-deflection range from 0 to ~~15 kPa~~2 psi (0 to ~~2 psi).~~13.8 kPa).

4.3.2 *Grade 1*—For Types 1 and 2 cellular rubber, a compression-deflection range from ~~15 to 35 kPa (2 to 5 psi).~~2 to 5 psi (13.8 to 34.5 kPa).

4.3.3 *Grade 2*—For Types 1 and 2 cellular rubber, a compression-deflection range from ~~35 to 65 kPa (5 to 9 psi).~~5 to 9 psi (34.5 to 62.1 kPa).

4.3.4 *Grade 3*—For Types 1 and 2 cellular rubber, a compression-deflection range from ~~65 to 90 kPa (9 to 13 psi).~~9 to 13 psi (62.1 to 89.6 kPa).

4.3.5 *Grade 4*—For Types 1 and 2 cellular rubber, a compression-deflection range from ~~90 to 120 kPa (13 to 17 psi).~~ 13 to 17 psi (89.6 to 117.2 kPa).

4.3.6 *Grade 5*—For Types 1 and 2 cellular rubber, a compression-deflection range from ~~120 to 170 kPa (17 to 25 psi).~~ 17 to 25 psi (117.2 to 172.4 kPa).

NOTE 2—For conversion of types, classes, and grades to previous versions of Specification D1056, see Appendix X1.

5. Materials and Manufacture

5.1 *Sponge Rubber*—Sponge rubber is made by incorporating into the compound a blowing agent, such as sodium bicarbonate, that gives off a gas which expands the mass during the vulcanization process. Sponge rubber is manufactured in sheet, strip, molded, or special shapes. Unless otherwise specified, sheet and strip sponge rubber shall have a natural skin on both the top and bottom surfaces. Fabric surface impressions are ordinarily not objectionable. The coarseness of the impressions shall be agreed upon between the parties concerned.

5.2 *Expanded Rubber*—Closed-cell rubber is made by incorporating gas-forming ingredients in the rubber compound, or by subjecting the compound to high-pressure gas, such as nitrogen. Expanded rubber is manufactured in sheet, strip, molded, tube, cord, and profile shapes by molding or extruding. Unless otherwise specified, the presence of skin on the top or bottom surfaces of sheet and strip expanded rubber shall be optional. Extruded shapes have skin on all surfaces except cut ends.

TABLE 1 Physical Requirements of Cellular Rubbers, Type 1, Open-Cell Sponge

		Basic Requirements					
~~Grade Number~~ Grade Number	~~Compression Deflection, 25 % Deflection (Limits), kPa (psi)~~	~~Compression Deflection after Oven Aging, Change from Original~~ Compression Deflection after Oven Aging, Change from Original ~~(158°F)~~	Compression Deflection, 25 % Deflection (Limits), psi (kPa)	~~Oil-Aged 22 h at 70°C (158°F), Change in Volume in ASTM Oil No. 3 (IRM 903) (Limits),%~~ Oil-Aged 22 h at 158°F (70°C), Change in Volume in ASTM Oil No. 3 (IRM 903) (Limits),%	~~Compression Set, 50 % Deflection, max,%~~ Compression Set, 50 % Deflection, max,% ~~22 h at 150°C (302°F)~~ ~~22 h at 70°C (158°F)~~	~~22 h at 100°C (212°F)~~	~~Low-Temperature Flex, 5 h at 55°C (−67°F)~~ Low-Temperature Flex, 5 h at −67°F (−55°C)
		168 h at 158°F (70°C)	22 h at 302°F (150°C)		22 h at 158°F (70°C)	22 h at 212°F (100°C)	
		Class A, Non-oil-Resistant					
~~1A0~~	~~less than 15 (2)~~	~~±20~~[A]	~~...~~	~~...~~	~~15~~	~~...~~	~~...~~
1A0	less than 2 (13.8)	±20[A]	...	...	15	...	...
~~1A1~~	~~15 to 35 (2 to 5)~~	~~±20~~	~~...~~	~~...~~	~~15~~	~~...~~	~~...~~
1A1	2 to 5 (13.8 to 34.5)	±20	...	...	15	...	...
~~1A2~~	~~35 to 65 (5 to 9)~~	~~±20~~	~~...~~	~~...~~	~~15~~	~~...~~	~~...~~
1A2	5 to 9 (34.5 to 62.1)	±20	...	...	15	...	...
~~1A3~~	~~65 to 90 (9 to 13)~~	~~±20~~	~~...~~	~~...~~	~~15~~	~~...~~	~~...~~
1A3	9 to 13 (62.1 to 89.6)	±20	...	...	15	...	...
~~1A4~~	~~90 to 120 (13 to 17)~~	~~±20~~	~~...~~	~~...~~	~~15~~	~~...~~	~~...~~
1A4	13 to 17 (89.6 to 117.2)	±20	...	...	15	...	...
~~1A5~~	~~120 to 170 (17 to 25)~~	~~±20~~	~~...~~	~~...~~	~~15~~	~~...~~	~~...~~
1A5	17 to 25 (117.2 to 172.4)	±20	...	...	15	...	...
		Class B, Oil-Resistant, Low Mass Change[B]					
~~1B0~~	~~less than 15 (2)~~	~~±20~~[A]	~~...~~	~~−25 to + 10~~	~~40~~	~~...~~	~~...~~
1B0	less than 2 (13.8)	±20[A]	...	−25 to + 10	40	...	...
~~1B1~~	~~15 to 35 (2 to 5)~~	~~±20~~	~~...~~	~~−25 to + 10~~	~~40~~	~~...~~	~~...~~
1B1	2 to 5 (13.8 to 34.5)	±20	...	−25 to + 10	40	...	...
~~1B2~~	~~35 to 65 (5 to 9)~~	~~±20~~	~~...~~	~~−25 to + 10~~	~~40~~	~~...~~	~~...~~
1B2	5 to 9 (34.5 to 62.1)	±20	...	−25 to + 10	40	...	...
~~1B3~~	~~65 to 90 (9 to 13)~~	~~±20~~	~~...~~	~~−25 to + 10~~	~~40~~	~~...~~	~~...~~

1B3	9 to 13 (62.1 to 89.6)	±20	...	−25 to + 10	40	...	...
~~1B4~~	~~90 to 120 (13 to 17)~~	~~±20~~	~~...~~	~~−25 to + 10~~	~~40~~	~~...~~	~~...~~
1B4	13 to 17 (89.6 to 117.2)	±20	...	−25 to + 10	40	...	...
~~1B5~~	~~120 to 170 (17 to 25)~~	~~±20~~	~~...~~	~~−25 to + 10~~	~~40~~	~~...~~	~~...~~
1B5	17 to 25 (117.2 to 172.4)	±20	...	−25 to + 10	40	...	...
	Class C, Oil-Resistant, Medium Mass Change[B]						
~~1C0~~	~~less than 15 (2)~~	~~±20[A]~~	~~...~~	~~+ 10 to + 60~~	~~50~~	~~...~~	~~...~~
1C0	less than 2 (13.8)	±20[A]	...	+ 10 to + 60	50	...	...
~~1C1~~	~~15 to 35 (2 to 5)~~	~~±20~~	~~...~~	~~+ 10 to + 60~~	~~50~~	~~...~~	~~...~~
1C1	2 to 5 (13.8 to 34.5)	±20	...	+ 10 to + 60	50	...	...
~~1C2~~	~~35 to 65 (5 to 9)~~	~~±20~~	~~...~~	~~+ 10 to + 60~~	~~50~~	~~...~~	~~...~~
1C2	5 to 9 (34.5 to 62.1)	±20	...	+ 10 to + 60	50	...	...
~~1C3~~	~~65 to 90 (9 to 13)~~	~~±20~~	~~...~~	~~+ 10 to + 60~~	~~50~~	~~...~~	~~...~~
1C3	9 to 13 (62.1 to 89.6)	±20	...	+ 10 to + 60	50	...	...
~~1C4~~	~~90 to 120 (13 to 17)~~	~~±20~~	~~...~~	~~+ 10 to + 60~~	~~50~~	~~...~~	~~...~~
1C4	13 to 17 (89.6 to 117.2)	±20	...	+ 10 to + 60	50	...	...
~~1C5~~	~~120 to 170 (17 to 25)~~	~~±20~~	~~...~~	~~+ 10 to + 60~~	~~50~~	~~...~~	~~...~~
1C5	17 to 25 (117.2 to 172.4)	±20	...	+ 10 to + 60	50	...	...
	Class D, High-Temperature-Resistant						
~~1D0~~	~~less than 15 (2)~~	~~...~~	~~±5~~	~~...~~	~~...~~	~~50~~	~~pass~~
1D0	less than 2 (13.8)	...	±5	...	...	50	pass
~~1D1~~	~~15 to 35 (2 to 5)~~	~~...~~	~~±5~~	~~...~~	~~...~~	~~50~~	~~pass~~
1D1	2 to 5 (13.8 to 34.5)	...	±5	...	...	50	pass
~~1D2~~	~~35 to 65 (5 to 9)~~	~~...~~	~~±5~~	~~...~~	~~...~~	~~30~~	~~pass~~
1D2	5 to 9 (34.5 to 62.1)	...	±5	...	...	30	pass
~~1D3~~	~~65 to 90 (9 to 13)~~	~~...~~	~~±5~~	~~...~~	~~...~~	~~30~~	~~pass~~
1D3	9 to 13 (62.1 to 89.6)	...	±5	...	...	30	pass
~~1D4~~	~~90 to 120 (13 to 17)~~	~~...~~	~~±5~~	~~...~~	~~...~~	~~30~~	~~pass~~
1D4	13 to 17 (89.6 to 117.2)	...	±5	...	...	30	pass
~~1D5~~	~~120 to 170 (17 to 25)~~	~~...~~	~~±5~~	~~...~~	~~...~~	~~30~~	~~pass~~
1D5	17 to 25 (117.2 to 172.4)	...	±5	...	...	30	pass

Requirements Added by Suffix Letters

~~Grade Number~~	~~Compression Deflection, 25 % Deflection (Limits), kPa (psi)~~	~~A4~~	~~B1~~	~~F~~	~~M~~
Grade Number	Compression Deflection, 25 % Deflection (Limits), psi (kPa)	A4	B1	F	M

		~~Compression Deflection after Oven Aging, Change from Original, 22 h, at 175°C (347°F), Limits, %~~	~~Compression Set, 50 % Deflection, 22 h at 70°C (158°F), max %~~	~~Low-Temperature Flex~~			~~Combustion Characteristics, max, 100 mm/min, (4 in./min)~~
		Compression Deflection after Oven Aging, Change from Original, 22 h, at 347°F (175°C), Limits, %	Compression Set, 50 % Deflection, 22 h at 158°F (70°C), max %	Low-Temperature Flex			Combustion Characteristics, max, 4 in./min (100 mm/min)
				F1	F2	F3	
				~~5 h at −40°C (−40°F)~~	~~5 h at −55°C (−67°F)~~	~~5 h at −75°C (−103°F)~~	
				5 h at −40°F (−40°C)	5 h at −67°F (−55°C)	5 h at −103°F (−75°C)	
			~~Class A, Non-oil-Resistant[A]~~				
			Class A, Non-oil-Resistant				
~~1A0~~	~~less than 15 (2)~~	~~...~~	~~...~~	~~pass~~	~~pass~~	~~...~~	~~pass~~
1A0	less than 2 (13.8)	...	...	pass	pass	...	pass
~~1A1~~	~~15 to 35 (2 to 5)~~	~~...~~	~~...~~	~~pass~~	~~pass~~	~~...~~	~~pass~~
1A1	2 to 5 (13.8 to 34.5)	...	...	pass	pass	...	pass
~~1A2~~	~~35 to 65 (5 to 9)~~	~~...~~	~~...~~	~~pass~~	~~pass~~	~~...~~	~~pass~~
1A2	5 to 9 (34.5 to 62.1)	...	...	pass	pass	...	pass
~~1A3~~	~~65 to 90 (9 to 13)~~	~~...~~	~~...~~	~~pass~~	~~pass~~	~~...~~	~~pass~~
1A3	9 to 13 (62.1 to 89.6)	...	...	pass	pass	...	pass
~~1A4~~	~~90 to 120 (13 to 17)~~	~~...~~	~~...~~	~~pass~~	~~pass~~	~~...~~	~~[pass~~
1A4	13 to 17 (89.6 to 117.2)	...	...	pass	pass	...	[pass
~~1A5~~	~~120 to 170 (17 to 25)~~	~~...~~	~~...~~	~~pass~~	~~pass~~	~~...~~	~~pass~~
1A5	17 to 25 (117.2 to 172.4)	...	...	pass	pass	...	pass
	Class B, Oil-Resistant, Low Mass Change[B]						
~~1B0~~	~~less than 15 (2)~~	~~...~~	~~...~~	~~pass~~	~~...~~	~~...~~	~~pass~~
1B0	less than 2 (13.8)	...	...	pass	...	...	pass
~~1B1~~	~~15 to 35 (2 to 5)~~	~~...~~	~~...~~	~~pass~~	~~...~~	~~...~~	~~pass~~
1B1	2 to 5 (13.8 to 34.5)	...	...	pass	...	...	pass
~~1B2~~	~~35 to 65 (5 to 9)~~	~~...~~	~~...~~	~~pass~~	~~...~~	~~...~~	~~pass~~
1B2	5 to 9 (34.5 to 62.1)	...	...	pass	...	...	pass

~~1B3~~	~~65 to 90 (9 to 13)~~	~~. . .~~	~~. . .~~	~~pass~~	~~. . .~~	~~. . .~~	~~pass~~
1B3	9 to 13 (62.1 to 89.6)	. . .	. . .	pass	. . .	. . .	pass
~~1B4~~	~~90 to 120 (13 to 17)~~	~~. . .~~	~~. . .~~	~~pass~~	~~. . .~~	~~. . .~~	~~pass~~
1B4	13 to 17 (89.6 to 117.2)	. . .	. . .	pass	. . .	. . .	pass
~~1B5~~	~~120 to 170 (17 to 25)~~	~~. . .~~	~~. . .~~	~~pass~~	~~. . .~~	~~. . .~~	~~pass~~
1B5	17 to 25 (117.2 to 172.4)	. . .	. . .	pass	. . .	. . .	pass
	Class C, Oil-Resistant, Medium Mass Change[B]						
~~1C0~~	~~less than 15 (2)~~	~~. . .~~	~~25~~	~~pass~~	~~. . .~~	~~. . .~~	~~pass~~
1C0	less than 2 (13.8)	. . .	25	pass	. . .	. . .	pass
~~1C1~~	~~15 to 35 (2 to 5)~~	~~. . .~~	~~25~~	~~pass~~	~~. . .~~	~~. . .~~	~~pass~~
1C1	2 to 5 (13.8 to 34.5)	. . .	25	pass	. . .	. . .	pass
~~1C2~~	~~35 to 65 (5 to 9)~~	~~. . .~~	~~25~~	~~pass~~	~~. . .~~	~~. . .~~	~~pass~~
1C2	5 to 9 (34.5 to 62.1)	. . .	25	pass	. . .	. . .	pass
~~1C3~~	~~65 to 90 (9 to 13)~~	~~. . .~~	~~25~~	~~pass~~	~~. . .~~	~~. . .~~	~~pass~~
1C3	9 to 13 (62.1 to 89.6)	. . .	25	pass	. . .	. . .	pass
~~1C4~~	~~90 to 120 (13 to 17)~~	~~. . .~~	~~25~~	~~pass~~	~~. . .~~	~~. . .~~	~~pass~~
1C4	13 to 17 (89.6 to 117.2)	. . .	25	pass	. . .	. . .	pass
~~1C5~~	~~120 to 170 (17 to 25)~~	~~. . .~~	~~25~~	~~pass~~	~~. . .~~	~~. . .~~	~~pass~~

1C5	17 to 25 (117.2 to 172.4)	. . .	25	pass	. . .	. . .	pass

Class D, High-Temperature-Resistant							
~~1D0~~	~~less than 15 (2)~~	~~±25~~	~~...~~	~~pass~~	~~...~~	~~pass~~	~~pass~~
1D0	less than 2 (13.8)	±25[A]	...	pass	...	pass	pass
~~1D1~~	~~15 to 35 (2 to 5)~~	~~±25~~	~~...~~	~~pass~~	~~...~~	~~pass~~	~~pass~~
1D1	2 to 5 (13.8 to 34.5)	±25	...	pass	...	pass	pass
~~1D2~~	~~35 to 65 (5 to 9)~~	~~±25~~	~~...~~	~~pass~~	~~...~~	~~pass~~	~~pass~~
1D2	5 to 9 (34.5 to 62.1)	±25	...	pass	...	pass	pass
~~1D3~~	~~65 to 90 (9 to 13)~~	~~±25~~	~~...~~	~~pass~~	~~...~~	~~pass~~	~~pass~~
1D3	9 to 13 (62.1 to 89.6)	±25	...	pass	...	pass	pass
~~1D4~~	~~90 to 120 (13 to 17)~~	~~±25~~	~~...~~	~~pass~~	~~...~~	~~pass~~	~~pass~~
1D4	13 to 17 (89.6 to 117.2)	±25	...	pass	...	pass	pass
~~1D5~~	~~120 to 170 (17 to 25)~~	~~±25~~	~~...~~	~~pass~~	~~...~~	~~pass~~	~~pass~~
1D5	17 to 25 (117.2 to 172.4)	±25	...	pass	...	pass	pass

[A] If this grade after aging still falls within the compression-deflection requirement of ~~<15 kPa (2 psi),~~<2 psi (13.8 kPa), it shall be considered acceptable even though the change from the original is greater than ±20 %.

[B] ~~Terminology~~Terminology was changed in 1997 from low swell to low mass change to better reflect the data obtained.

TABLE 2 Physical Requirements of Cellular Rubbers, Type 2, Closed-Cell Expanded

Grade Number	Compression Deflection, 25 % Deflection (Limits), kPa (psi)	Oven-Aged, Change from Original Compression Deflection Values (Limits), %		Water Absorption, max, Change in Weight, %		Fluid Immersion, 7 Days at 23°C (73.4°F), max %[A]		Density of 160 kg/m³ (10 lb/ft³) or less	Compression Set, 50 % Constant Deflection, 22 h at 100°C (212°F), max
		Oven-Aged Change from Original Compression Deflection Values (Limits), %	Compression Deflection, 25 % Deflection (Limits), psi (kPa)	Water Absorption, max, Change in Weight, %		Fluid Immersion, 7 Days at 73.4°F (23°C), max %[B]			Low- Temperat
		168 h at 158°F (70°C)	22 h at 302°F (150°C)	22 h at 150°C (302°F)	Density over 160 kg/m³ (10 lb/ft³)	Density of 160 kg/m³ (10 lb/ft³) or less	Density over 160 kg/m³ (10 lb/ft³)		Compression Set, 50 % Constant Deflection, 22 h at 212°F (100°C), max %
				Density over 10 lb/ft³ (160 kg/m³)	Density of 10 lb/ft³ (160 kg/m³) or less	Density over 10 lb/ft³ (160 kg/m³)	Density of 10 lb/ft³ (160 kg/m³) or less		
Class A, Nonfuel-Resistant									
~~2A0~~	~~less than 15 (2)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~...~~	~~...~~	~~...~~	~~...~~
2A0	less than 2 (13.8)	±30[A]	...	5	10	...	...	...	...
~~2A1~~	~~15 to 35 (2 to 5)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~...~~	~~...~~	~~...~~	~~...~~
2A1	2 to 5 (13.8 to 34.5)	±30	...	5	10	...	...	...	...
~~2A2~~	~~35 to 65 (5 to 9)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~...~~	~~...~~	~~...~~	~~...~~
2A2	5 to 9 (34.5 to 62.1)	±30	...	5	10	...	...	...	...
~~2A3~~	~~65 to 90 (9 to 13)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~...~~	~~...~~	~~...~~	~~...~~
2A3	9 to 13 (62.1 to 89.6)	±30	...	5	10	...	...	...	...
~~2A4~~	~~90 to 120 (13 to 17)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~...~~	~~...~~	~~...~~	~~...~~
2A4	13 to 17 (89.6 to 117.2)	±30	...	5	10	...	...	...	...
~~2A5~~	~~120 to 170 (17 to 25)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~...~~	~~...~~	~~...~~	~~...~~
2A5	17 to 25 (117.2 to 172.4)	±30	...	5	10	...	...	...	...
~~Class B, Fuel-Resistant, Low Mass Change[B]~~									
Class B, Fuel-Resistant, Low Mass Change[C]									
~~2B0~~	~~less than 15 (2)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~50~~	~~100~~	~~...~~	~~...~~
2B0	less than 2 (13.8)	±30[A]	...	5	10	50	100	...	...
~~2B1~~	~~15 to 35 (2 to 5)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~50~~	~~100~~	~~...~~	~~...~~
2B1	2 to 5 (13.8 to 34.5)	±30	...	5	10	50	100	...	...
~~2B2~~	~~35 to 65 (5 to 9)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~50~~	~~100~~	~~...~~	~~...~~
2B2	5 to 9 (34.5 to 62.1)	±30	...	5	10	50	100	...	...
~~2B3~~	~~65 to 90 (9 to 13)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~50~~	~~100~~	~~...~~	~~...~~
2B3	9 to 13 (62.1 to 89.6)	±30	...	5	10	50	100	...	...
~~2B4~~	~~90 to 120 (13 to 17)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~50~~	~~100~~	~~...~~	~~...~~
2B4	13 to 17 (89.6 to 117.2)	±30	...	5	10	50	100	...	...
~~2B5~~	~~120 to 170 (17 to 25)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~50~~	~~100~~	~~...~~	~~...~~
2B5	17 to 25 (117.2 to 172.4)	±30	...	5	10	50	100	...	...
~~Class C, Fuel-Resistant, Medium Mass Change[B]~~									
Class C, Fuel-Resistant, Medium Mass Change[C]									
~~2C0~~	~~less than 15 (2)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~150~~	~~250~~	~~...~~	~~...~~
2C0	less than 2 (13.8)	±30[A]	...	5	10	150	250	...	...
~~2C1~~	~~15 to 35 (2 to 5)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~150~~	~~250~~	~~...~~	~~...~~
2C1	2 to 5 (13.8 to 34.5)	±30	...	5	10	150	250	...	...
~~2C2~~	~~35 to 65 (5 to 9)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~150~~	~~250~~	~~...~~	~~...~~
2C2	5 to 9 (34.5 to 62.1)	±30	...	5	10	150	250	...	...

~~2C3~~	~~65 to 90 (9 to 13)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~150~~	~~250~~	~~...~~	~~...~~
2C3	9 to 13 (62.1 to 89.6)	±30	...	5	10	150	250	...	...
~~2C4~~	~~90 to 120 (13 to 17)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~150~~	~~250~~	~~...~~	~~...~~
2C4	13 to 17 (89.6 to 117.2)	±30	...	5	10	150	250	...	...
~~2C5~~	~~120 to 170 (17 to 25)~~	~~±30~~	~~...~~	~~5~~	~~10~~	~~150~~	~~250~~	~~...~~	~~...~~
2C5	17 to 25 (117.2 to 172.4)	±30	...	5	10	150	250	...	...
Class D, High-Temperature-Resistant									
~~2D0~~	~~less than 15 (2)~~	~~...~~	~~±5~~	~~5~~	~~10~~	~~...~~	~~...~~	~~80~~	~~pass~~
2D0	less than 2 (13.8)	...	±5	5	10	...	...	80	pass
~~2D1~~	~~15 to 35 (2 to 5)~~	~~...~~	~~±5~~	~~5~~	~~10~~	~~...~~	~~...~~	~~80~~	~~pass~~
2D1	2 to 5 (13.8 to 34.5)	...	±5	5	10	...	...	80	pass
~~2D2~~	~~35 to 65 (5 to 9)~~	~~...~~	~~±5~~	~~5~~	~~10~~	~~...~~	~~...~~	~~60~~	~~pass~~
2D2	5 to 9 (34.5 to 62.1)	...	±5	5	10	...	...	60	pass
~~2D3~~	~~65 to 90 (9 to 13)~~	~~...~~	~~±5~~	~~5~~	~~10~~	~~...~~	~~...~~	~~60~~	~~pass~~
2D3	9 to 13 (62.1 to 89.6)	...	±5	5	10	...	...	60	pass
~~2D4~~	~~90 to 120 (13 to 17)~~	~~...~~	~~±5~~	~~5~~	~~10~~	~~...~~	~~...~~	~~60~~	~~pass~~
2D4	13 to 17 (89.6 to 117.2)	...	±5	5	10	...	...	60	pass
~~2D5~~	~~120 to 170 (17 to 25)~~	~~...~~	~~±5~~	~~5~~	~~10~~	~~...~~	~~...~~	~~60~~	~~pass~~
2D5	17 to 25 (117.2 to 172.4)	...	±5	5	10	...	...	60	pass

Requirements Added By Suffix Letters

		~~A~~				~~B~~		~~F~~			~~M~~
		A				B		F			M
~~Grade Number~~	~~Compression Deflection 25 % Deflection (Limits), kPa (psi)~~	~~Compression Deflection After Oven Aging, Change from Original Limits, %~~				~~Compression Set, 50 % Deflection, max %~~		~~Low Temperature Flex, 5 h at Temperature~~			~~Combustion Characteristics, 100 mm/min, max, (4 in./min)~~
Grade Number	Compression 25 % Deflection (Limits), psi (kPa)	Compression Deflection After Oven Aging, Change from Original Limits, %				Compression Set, 50 % Deflection, max %		Low Temperature Flex, 5 h at Temperature			Combustion Characteristics, 4 in./min max (100 mm/min max)
		~~22 h at 100°C (212°F)~~		~~22 h at 125°C (257°F)~~	~~22 h at 150°C (302°F)~~	~~22 h at 175°C (350°F)~~	~~22 h at 23°C (73.4°F)~~	~~22 h at 23°C (73.4°F)~~	~~−40°C (−40°F)~~	~~−55°C (−67°F)~~	~~−75°C (−103°F)~~
		22 h at 212°F (100°C)	22 h at 257°F (125°C)	22 h at 302°F (150°C)	22 h at 350°F (175°C)	22 h at 73.4°F (23°C)	22 h at 73.4°F (23°C)	−40°F (−40°C)	−67°F (−55°C)	−103°F (−75°C)	
		A1	A2	A3	A4	B2	B3	F1	F2	F3	
~~2A0~~	~~less than 15 (2)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2A0	less than 2 (13.8)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2A1~~	~~15 TO 35 (2 TO 5)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2A1	2 to 5 (13.8 to 34.5)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2A2~~	~~35 TO 65 (5 TO 9)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2A2	5 to 9 (34.5 to 62.1)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2A3~~	~~65 TO 90 (9 TO 13)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2A3	9 to 13 (62.1 to 89.6)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2A4~~	~~90 TO 120 (13 TO 17)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2A4	13 to 17 (89.6 to 117.2)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2A5~~	~~120 TO 170 (17 TO 25)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2A5	17 to 25 (117.2 to 172.4)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2B0~~	~~less than 15 (2)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2B0	less than 2 (13.8)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2B1~~	~~15 TO 35 (2 TO 5)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2B1	2 to 5 (13.8 to 34.5)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2B2~~	~~35 TO 65 (5 TO 9)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2B2	5 to 9 (34.5 to 62.1)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2B3~~	~~65 TO 90 (9 TO 13)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2B3	9 to 13 (62.1 to 89.6)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2B4~~	~~90 TO 120 (13 TO 17)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2B4	13 to 17 (89.6 to 117.2)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2B5~~	~~120 TO 170 (17 TO 25)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2B5	17 to 25 (117.2 to 172.4)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2C0~~	~~less than 15 (2)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2C0	less than 2 (13.8)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2C1~~	~~15 TO 35 (2 TO 5)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2C1	2 to 5 (13.8 to 34.5)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2C2~~	~~35 TO 65 (5 TO 9)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2C2	5 to 9 (34.5 to 62.1)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2C3~~	~~65 TO 90 (9 TO 13)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2C3	9 to 13 (62.1 to 89.6)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2C4~~	~~90 TO 120 (13 TO 17)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2C4	13 to 17 (89.6 to 117.2)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2C5~~	~~120 TO 170 (17 TO 25)~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~pass~~	~~pass~~	~~pass~~	~~pass~~
2C5	17 to 25 (117.2 to 172.4)	±30 %	±30 %	±30 %	±30 %	25 %	35 %	pass	pass	pass	pass
~~2D0~~	~~less than 15 (2)~~	~~NA[C]~~	~~NA[C]~~	~~NA[C]~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~NA[C]~~	~~NA[C]~~	~~pass~~	~~pass~~

2D0	less than 2 (13.8)	NA[D]	NA[D]	NA[D]	±30 %	25 %	35 %	NA[D]	NA[D]	pass	pass
~~2D1~~	~~15 TO 35 (2 TO 5)~~	~~NA[C]~~	~~NA[C]~~	~~NA[C]~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~NA[C]~~	~~NA[C]~~	~~pass~~	~~pass~~
2D1	2 to 5 (13.8 to 34.5)	NA[D]	NA[D]	NA[D]	±30 %	25 %	35 %	NA[D]	NA[D]	pass	pass
~~2D2~~	~~35 TO 65 (5 TO 9)~~	~~NA[C]~~	~~NA[C]~~	~~NA[C]~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~NA[C]~~	~~NA[C]~~	~~pass~~	~~pass~~
2D2	5 to 9 (34.5 to 62.1)	NA[D]	NA[D]	NA[D]	±30 %	25 %	35 %	NA[D]	NA[D]	pass	pass
~~2D3~~	~~65 TO 90 (9 TO 13)~~	~~NA[C]~~	~~NA[C]~~	~~NA[C]~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~NA[C]~~	~~NA[C]~~	~~pass~~	~~pass~~
2D3	9 to 13 (62.1 to 89.6)	NA[D]	NA[D]	NA[D]	±30 %	25 %	35 %	NA[D]	NA[D]	pass	pass
~~2D4~~	~~90 TO 120 (13 TO 17)~~	~~NA[C]~~	~~NA[C]~~	~~NA[C]~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~NA[C]~~	~~NA[C]~~	~~pass~~	~~pass~~
2D4	13 to 17 (89.6 to 117.2)	NA[D]	NA[D]	NA[D]	±30 %	25 %	35 %	NA[D]	NA[D]	pass	pass
~~2D5~~	~~120 TO 170 (17 TO 25)~~	~~NA[C]~~	~~NA[C]~~	~~NA[C]~~	~~±30 %~~	~~25 %~~	~~35 %~~	~~NA[C]~~	~~NA[C]~~	~~pass~~	~~pass~~
2D5	17 to 25 (117.2 to 172.4)	NA[D]	NA[D]	NA[D]	±30 %	25 %	35 %	NA[D]	NA[D]	pass	pass

[A] If this grade after aging still falls within the compression-deflection requirement of <2 psi (13.8 kPa), it shall be considered acceptable even though the change from the original is greater than ±30 %.

[B] This test (see Sections ~~26~~27 – ~~33~~34) of weight change in Reference Fuel B is used in place of the usual oil-resistance test of volume change of No. 3 oil for the following reason: Oil or solvent immersion of flexible closed cellular materials usually causes loss of gas, by diffusion through the softened cell walls, that results in some shrinkage of the test sample. This shrinkage counteracts the swell that would normally occur, therefore invalidating test data based on volume change. Reference Fuel B is used because it produces a wider and more consistent differentiation among the A, B, and C classes than does the No. 3 oil.

[C] Standard oil resistance test methods give inconsistent results on closed cellular materials. This test gives a general indication of oil resistance but more reliable information should be obtained by testing in actual or simulated service conditions.

The values of 150 % maximum Class C and 50 % maximum Class B apply to cellular materials having densities of more than ~~160 kg/m~~10 lb/ft^3 ~~(10 lb/ft~~(160 kg/m^3). For cellular materials with densities of ~~160 kg/m~~10 lb/ft^3 or less, the values of maximum mass change allowed are 250 % for Class C and 100 % for Class B.

Terminology was changed in 1997 from low swell to low mass change to better reflect the data obtained.

[D] NA = Not applicable. Already covered as a basic requirement in Table 2.

6. Physical Properties

6.1 The various grades of cellular rubber shall conform to the requirements as to physical properties in Table 1 and Table 2 together with any additional requirements indicated by suffix letters in the grade designations as described in Section 4 and Table 3.

TABLE 3 ASTM Test Methods

NOTE 1—See Table 1 or Table 2 for established requirements for open or closed cell forms respectively.

NOTE 2—Test Methods D412 was intended for testing dense rubber samples. It requires a sample thickness of between ~~1.5 and 3 mm (0.060 and 0.120 in.)~~0.060 and 0.120 in. (1.5 and 3 mm). This thickness is difficult to achieve on some foam products. In addition, foam samples, particularly low-compression deflection products can be difficult to measure ~~gage.~~gauge. There is also no mention of allowance for skin or no skin samples. For these reasons, tensile samples tested in accordance with Specification D1056 are allowed to be up to ~~6.5 mm (.250 in.)~~0.250 in. (6.35 mm) thick and should be tested with or without skin as used in the application.

Basic Requirements and Suffix Number Requirement or Suffix Letter	Basic Requirements	Suffix Number 1	Suffix Number 2	Suffix Number 3	Suffix Number 4
~~Compression deflection~~	~~Specification D1056, Sections 17 – 22~~				
Compression deflection	Specification D1056, Sections 17 – 23				
~~Heat resistance~~	~~Specification D1056, Sections 16 – 22, change in compression deflection after aging 7 days at 70°C (158°F)~~				
Heat resistance	Specification D1056, Sections 16 – 23, change in compression deflection after aging 7 days at 158°F (70°C)				
~~Fluid resistance (1B and 1C rubber only)~~	~~Specification D1056, Sections 23 – 33,~~				
Fluid resistance (1B and 1C rubber only)	Specification D1056, Sections 24 – 34, 22 h ~~at 70°C (158°F)~~ at 158°F (70°C)				
~~Fluid resistance[A] (2B and 2C)~~	~~Specification D1056 Sections 26 – 33, 7 days at 23°C (73.4°F)~~				
Fluid resistance[A] (2B and 2C)	Specification D1056 Sections 27 – 34, 7 days at 73.4°F (23°C)				
~~Compression set (1A, 1B, and 1C)~~	~~Specification D1056, Sections 49 – 55, 22 h at 70°C (158°F), 50 % deflection, 30-min recovery at 23°C (73.4°F)~~				

TABLE 3 *Continued*

Basic Requirements and Suffix Number Requirement or Suffix Letter	Basic Requirements	Suffix Number 1	Suffix Number 2	Suffix Number 3	Suffix Number 4
Compression set (1A, 1B, and 1C)	Specification D1056, Sections 50 – 56, 22 h at 158°F (70°C), 50 % deflection, 30-min recovery at 73.4°F (23°C)				
~~Compression set (1D and 2D rubber only)~~	~~Specification D1056, Sections 49 – 55, 22 h at 100°C (212°F), 50 % deflection, 30-min recovery at 23°C (73.4°F)~~				
Compression set (1D and 2D rubber only)	Specification D1056, Sections 50 – 56, 22 h at 212°F (100°C), 50 % deflection, 30-min recovery at 73.4°F (23°C)				
~~Water absorption (2A, 2B, 2C, and 2D)~~	~~Specification D1056, Sections 42 – 48~~				
Water absorption (2A, 2B, 2C, and 2D)	Specification D1056, Sections 43 – 49				
~~Suffix A, heat resistance~~		~~Specification D1056, Sections 16 – 22, change in compression deflection after aging 22 h at 100°C (212°F)~~	~~Specification D1056, Sections 16 – 22, change in compression deflection after aging 22 h at 125°C (257°F)~~	~~Specification D1056, Sections 16 – 22, change in compression deflection after aging 22 h at 150°C (302°F)~~	~~Specification D1056, Sections 16 – 22, change in compression deflection after aging 22 h at 175°C (350°F)~~
Suffix A, heat resistance		Specification D1056, Sections 16 – 23, change in compression deflection after aging 22 h at 212°F (100°C)	Specification D1056, Sections 16 – 23, change in compression deflection after aging 22 h at 257°F (125°C)	Specification D1056, Sections 16 – 23, change in compression deflection after aging 22 h at 302°F (150°C)	Specification D1056, Sections 16 – 23, change in compression deflection after aging 22 h at 350°F (175°C)
~~Suffix B, compression set (B1 for 1A, 1B, and 1C only) (B2 & B3 for 2A, 2B, 2C, 2D only)~~		~~Specification D1056, Sections 49 – 67, 22 h at 70°C (158°F), 50 % deflection, 30-min recovery at 23°C (73.4°F), 25 % max~~	~~Specification D1056, Sections 49 – 67, 22 h at 23°C (73.4°F), 50 % deflection, 24-h recovery at 23°C (73.4°F), 25 % max~~	~~Specification D1056, Sections 49 – 67, 22 h at 23°C (73.4°F), 50 % deflection, 24-h recovery at 23°C (73.4°F) 35 %, max~~	
Suffix B, compression set (B1 for 1A, 1B, and 1C only) (B2 & B3 for 2A, 2B, 2C, 2D only)		Specification D1056, Sections 50 – 68, 22 h at 158°F (70°C), 50 % deflection, 30-min recovery at 73.4°F (23°C), 25 % max	Specification D1056, Sections 50 – 68, 22 h at 73.4°F (23°C), 50 % deflection, 24-h recovery at 73.4°F (23°C), 25 % max	Specification D1056, Sections 50 – 68, 22 h at 73.4°F (23°C), 50 % deflection, 24-h recovery at 73.4°F (23°C) 35 %, max	
Suffix C, ozone or weather resistance[B]		Test Method D1171, ozone chamber exposure, Method A. Exposure rating (Exposure Method A or B)	Test Method D1171, outdoor exposure, Method A: Exposure Rating	Test Method D1171, ozone exposure (ozone chamber or outdoor), Test Method B: Quality Retention Rating	
Suffix D, load deflection[C]					
Suffix E, fluid resistance[C]					
~~Suffix F, Low-temperature resistance~~		~~Specification D1056, Sections 56 – 60, 5 h at –40°C (–40°F)~~	~~Specification D1056, Sections 56 – 60, 5 h at –55°C (–67°F)~~	~~Specification D1056, Sections 56 – 60, 5 h at –75°C (–103°F)~~	
Suffix F, Low-temperature resistance		Specification D1056, Sections 57 – 61, 5 h at –40°F (–40°C)	Specification D1056, Sections 57 – 61, 5 h at –67°F (–55°C)	Specification D1056, Sections 57 – 61, 5 h at –103°F (–75°C)	
Suffix G, tear resistance[B]		Test Method D624 Die C			
Suffix J, abrasion resistance[C]					
Suffix K, adhesion capability[C]		Rubber compound must be suitable for, and able to accept adhesive bonding.			
Suffix L, water absorption[C]					
~~Suffix M, combustion characteristics[D]~~		~~Test Method D5132 100 mm/min, max (4 in./min, max)~~			
Suffix M, combustion characteristics[D]		Test Method D5132 4 in./min, max (100 mm/min, max)			
Suffix N, impact resistance[C]					
Suffix P, staining resistance[C]					
Suffix R, resilience[B]		Test Method D2632 (Shore Rebound)			