

ASTM D 1056 explained

American Society for Testing Materials D1056 (ASTM D1056)



- Standard Specification For Flexible Cellular Materials – Sponge or Expanded Rubber
- Sponges (Open Cell) and Expanded (Closed Cell) Foams
- Reviewed and revised periodically
- ASTM D 1056-68 – The last two digits refer to the year of the test method issued (1968)
- If there is no year mentioned that means the most recent version of ASTM D 1056 is being referred to.
- Sponge products are identified by a three-character Grade Number (example: 2A2).
- The three characters represent Type, Class and Grade.

Types

Types – *These specifications cover two types of cellular rubber designated by the prefix numbers 1 and 2*

Type 1 = Open Cell Rubber

Type 2 = Closed Cell Rubber

Classes

Classes – *Both types are divided into four classes designated by the letters A, B, C, and D added to the number prefix*

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.

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.

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.

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): but specific resistance to the action of petroleum-base oils is not required.

Grades

Each type and class has been divided into a number of different grades.

Each grade is based on specific range of firmness as expressed by compression-deflection. Grades are designated by digit, the softer grades being identified with lower numbers and the higher grades being identified with the higher numbers.

Grade 0 – For Types 1 and 2 cellular rubber, a compression deflection range from 0 to 2 psi (0 to 13.8 kPa)

Grade 1 = For Types 1 and 2 cellular rubber, a compression deflection range from 2 to 5 psi (13.8 to 34.5 kPa)

Grade 2 = For Types 1 and 2 cellular rubber, a compression deflection range from 5 to 9 psi (34.5 to 62.1 kPa)

Grade 3 = For Types 1 and 2 cellular rubber, a compression deflection range from 9 to 13 psi (62.1 to 89.6 kPa)

Grade 4 = For Types 1 and 2 cellular rubber, a compression deflection range from 13 to 17 psi (89.6 to 117.2 kPa)

Grade 5 = For Types 1 and 2 cellular rubber, a compression deflection range from 17 to 25 psi (117.2 to 172.4 kPa)

3

Suffix Letter Test Required

- A, Heat resistance
 - B, Compression set (B1 for 1A, 1B, and 1C only) (B2 & B3 for 2A, 2B, 2C, 2D only)
 - C, Ozone or weather resistance^B
 - D, Load deflection^C
 - E, Fluid resistance^C
 - F, Low-temperature resistance
 - G, Tear resistance^B
 - J, Abrasion resistance^C
 - K, Adhesion capability^C
 - L, Water absorption^C
 - M, Combustion characteristics^D
 - N, Impact resistance^C
 - P, Staining resistance^C
 - R, Resilience^B
 - T, Tensile/Elongation^B
 - W, Density^B
 - Z, Special requirements
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Suffix numbers that follow the suffix letter denote different testing parameters or conditions for that suffix.

For e.g. B1 stands for C. Set at 70oC (158oF) and B2 stands for C. Set at 23oC (74.3oF) or Room Temp.

^B Ratings to be arranged between the purchaser and the supplier

^C Test method and values to be arranged between the purchaser and the supplier

Caution:

Test Temperatures for Open Cell are higher than for Closed Cell and should NOT be used for Closed Cell.

Example Line Call Out for Sponge ASTM D-1056 2C2 A1 B2 E1 Z (Z = material passes FMVSS 302)

2 – Closed Cell,

C – Medium Oil Swell or Medium Oil Resistance

2 – Compression Deflection (25% Compression) 5 to 9psi,

A1 – Change in Compression Deflection after aging for 22h at 100°C to be +/-30% from Original C.D.,

B2 – Compression Set at 23°C for 22h (50% compression) and after 24h recovery to be max. of 25%,

E1 – Test method and values to be arranged by the Purchaser and the Supplier

Z = States special requirement as detailed.

Caution:

Test Temperatures for Open Cell are higher than for Closed Cell and should NOT be used for Closed Cell.

ASTM D1056 -68	ASTM D1056 -73	ASTM D1056 -77	ASTM D1056 -85	ASTM D1056 -14
RE41 BF1	RE 41 BF1	RE 41 B2F1	2A1 B2F1	2A1 B2F1
SBE 43 BCF2	RE 43 BCE2F2	RE 43 B2C1E2F2	2B3 B2C1F2	2B3 B2C1F2
SCE 42	RE 42 E1	RE 42 E1	2C2	2C2
Types: R (No Oil Resistance) and S (Medium to Low Oil Resistance)	No SBE and SCE. Everything is RE	No SBE or SCE. Everything is RE	A-No Oil resistance B-Excellent Oil Resistance C-Medium Oil Resistance	A-No Oil resistance B-Excellent Oil Resistance C-Medium Oil Resistance
		Suffix B1 – C. Set at 70°C; Suffix B2 – C. Set at 23oC		B1 – Only for Open Cell B2 & B3 – For Closed Cell
Type S Class SB - Low Fuel Swell (50% Max.) or Excellent Oil Resistance Class SC –Medium Swell, (150% Max)	Suffix E1 – Medium Oil Swell(150%) Suffix E2 –Low Oil Swell (50%)			Suffix E1 – Oil Resistance is an add on to basic requirements – values and test methods determined between purchaser and supplier
No allowance for Densities under 10 pcf	Density Less Than 10 pcf given greater allowance for Oil Swell. E1-250% and E2 -100%			Allowances for under 10 PCF – see Specification details.
Grades: 40, 41,42,43,44 and 45	Grades: 40, 41, 42, 43, 44 and 4	Grades: 40, 41, 42, 43, 44 and 45	Grades: 0, 1, 2, 3, 4 and 5	Grades: 0, 1, 2, 3, 4 and 5

MIL-C -3133;

→ The same as D 1056 and was discontinued in 1986.

SAE J18;

→ The same as D 1056, discontinued.

ASTM D1667;

→ Very similar to 1056. Specifically for PVC containing closed cell foams.

ASTM D3575;

→ Similar to 1056 for polyolefin foams. Plastics like polyethylene and ethylene vinyl acetate.