Shore Durometer & Compression Deflection

Shore Durometer — Measuring Surface Hardness

Shore Durometer is a standardized measure of a material's resistance to permanent indentation. It is determined by pressing a spring-loaded indenter into the surface of a material and measuring the depth of penetration under a defined load. The result is a dimensionless number on a scale from 0 (no resistance) to 100 (no penetration).

Different Shore scales are used depending on the hardness range of the material:

Shore 00 — Used for very soft, compliant materials such as closed-cell and open-cell foam products, sponge rubber, and gel-like compounds. The Shore 00 indenter applies a lighter load than Shore A, making it suitable for materials too soft to register meaningfully on the Shore A scale.

Shore A (ASTM D2240) — The standard scale for solid and semi-solid elastomers, including natural rubber, neoprene, EPDM, silicone, nitrile, and similar compounds. Shore A is the most widely referenced durometer scale in the rubber and sealing industry.

Shore D — Used for hard rubber compounds, rigid plastics, and engineering polymers where Shore A readings would be at or near 100.

Important: Shore Durometer measures surface hardness only. For sponge and foam materials, the reading can be significantly influenced by the skin layer formed during manufacturing and by individual cell size and structure — not just the bulk material properties. Two foam products with identical compression deflection values may have noticeably different Shore 00 readings depending on surface characteristics.

Compression Deflection — Measuring Bulk Stiffness

Compression Deflection is a direct measurement of the force required to compress a sponge or foam material by a defined percentage of its original thickness. For ASTM D1056 and ASTM D6576, the standard measurement is the force in psi (pounds per square inch) required to deflect the specimen 25% of its original height.

The test is performed using a presser foot that is larger in area than the test specimen. This is a critical distinction: because the entire top surface is loaded uniformly, the result is independent of specimen thickness. This is unlike the ILD (Indentation Load Deflection) method commonly used for open-cell polyurethane foam, where specimen thickness affects the result.

For sponge rubber applications — seals, gaskets, weatherstripping, cushioning, vibration isolation — Compression Deflection is the more meaningful and reliable specification value. It directly describes how the material will perform under a sealing load or compressive force in service.

Hanna Rubber Company's sponge and foam products are manufactured to compression deflection hardness ranges as defined by ASTM D1056 and ASTM D6576. Durometer values shown in the comparison table below are approximate correlations — not manufacturing specifications.

ASTM D1056 vs. ASTM D6576 — What's the Difference?

Both standards cover flexible cellular rubber and both classify materials by cell structure — Type 1 (open cell / sponge) and Type 2 (closed cell / expanded) — as well as by oil resistance class and compression deflection grade. The key distinction is manufacturing process:

ASTM D1056 — The broad, long-standing standard for flexible cellular rubber products (sponge and expanded rubber), regardless of how they are manufactured. It is the primary industry reference for cellular rubber in sealing, gasketing, cushioning, and vibration isolation applications.

ASTM D6576 — Applies specifically to cellular rubber produced by the chemical blowing process. It covers both open cell (Type I) and closed cell (Type II) chemically blown materials. D6576 was derived from D1056 and replaced Military Specification Mil-R-6130C when the DoD cancelled that spec in 2001. The compression deflection firmness ranges in D6576 are narrower than those in D1056, which can present manufacturing challenges — particularly for closed-cell silicone sponge producers.

When specifying cellular rubber, confirm which standard applies to your product. Many materials — particularly neoprene and EPDM closed-cell sponges — are certified to both D1056 and D6576. If D6576 is called out on a drawing or purchase order, verify whether the tighter compression deflection ranges are a firm requirement or whether an exception is acceptable.

Shore 00 to Shore A Approximate Correlation

The table below provides a general reference correlation between Shore 00 and Shore A Durometer readings. This data is approximate; the relationship is non-linear and can vary with material type, skin thickness, cell structure, and test conditions. Do not use this table as an exact conversion for specification or design purposes.

Shore Durometer 00	Shore Durometer A
45	5
55	10
62	15
70	20
76	25
80	30
83	35
86	40
88	45
90	50
91	55
93	60

94	65
95	70
97	75

ASTM D1056 Grade Reference — Compression Deflection & Durometer

ASTM D1056 classifies flexible cellular rubber (both open and closed cell) by compression deflection range. The table below correlates ASTM D1056 hardness grades with approximate Shore 00 Durometer ranges and their corresponding compression deflection values (25% deflection, psi). Grade designations shown include the '68 series (refers to the 1968 edition of the standard) and '98 series (refers to the 1998 edition).

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Shore 00 Durometer (approx.)	20–55	35–65	60–80	65–85	70–90
Compression Deflection @ 25% (psi)	2–5	5–9	9–13	13–17	17–25
ASTM D1056 Grade '68	41	42	43	44	45
ASTM D1056 Grade '98	1	2	3	4	5

Which Measurement to Specify?

When ordering or specifying sponge rubber products, always reference Compression Deflection grades (ASTM D1056 or ASTM D6576) rather than Durometer. Compression deflection values are reproducible, independent of surface condition, and directly related to how the material will function in a sealing or cushioning application.

Durometer is useful as a quick field check or incoming inspection method, and for communicating approximate hardness in conversational or non-technical contexts. It is not appropriate as a sole acceptance criterion for sponge and foam materials.