

The values published in Soremag charts and data sheets — hardness, tensile strength, tear strength, rebound, abrasion — rest on **standardized test methods (ASTM)**. This document explains, property by property, what each test measures, how it is run, and how to read the value when choosing a material.

WHY STANDARDIZED METHODS?

- › **Comparing like with like:** two materials tested to the same standard, under the same conditions, can be set side by side — that is the principle behind our comparative charts.
- › **Repeatability:** specimens, speeds, temperatures and instruments are set by the standard; the result does not depend on the operator.
- › **A common language:** “Die C tear” or “D5963 abrasion” means the same thing to your engineering group, your buyer and our shop.
- › **One caution:** these values are measured in the laboratory on **standardized specimens** — not on your finished part. Real performance also depends on geometry, temperature and service conditions: the final selection is validated against your application.

THE TESTS, PROPERTY BY PROPERTY

ASTM D2240 Shore A / Shore D hardness

A standardized indenter is pressed against the material; its resistance to indentation gives the Shore value. The **A** scale covers soft to firm materials, the **D** scale rigid ones. It is a starting point, never a single criterion. **See the Soremag guide “Measuring Shore A hardness”.**

ASTM D624 Tear resistance (Die C)

Measures the force needed to **start and propagate a nick** in a notched specimen. A critical property for scraper edges, grooves, roller ends and any part exposed to cuts: a nick that does not spread is a part that survives.

ASTM D2632 Rebound / resilience

A plunger is dropped vertically onto the specimen; **% rebound** measures the energy returned. High rebound = the part runs cool and gives energy back; low rebound = it absorbs (hysteresis) — wanted for bumpers and isolators, worth watching on wheels loaded at high speed.

ASTM D575 Compression-deflection

Measures the **stress needed to compress** the material by a given percentage. This is the real stiffness of a bumper or a pad under load — two materials of the same Shore hardness can have very different compression curves.

ASTM D471 Fluid resistance

The specimen is immersed in **reference oils and fluids** for a defined time and at a defined temperature; changes in volume, mass and hardness are measured. This guides the ether/ester choice and the choice of rubber in the presence of oils, solvents or hot water.

ASTM D412 Tensile strength, elongation & moduli

A dumbbell specimen is pulled to failure: **tensile strength, elongation at break (%)** and the **moduli at 100 % and 300 %** elongation are recorded. This tells you how the material holds up when the part works in tension or deforms heavily.

ASTM D5963 Abrasion resistance

The specimen is rubbed against a standardized **rotating abrasive drum**; **volume loss (mm³)** is measured. The **lower** the value, the better the material resists wear by rubbing — the governing property for wear plates, liners and sliding parts.

ASTM D395 Compression set

The specimen is held compressed, often hot, then released: the **% of unrecovered deformation** is measured. A low value means a bumper, a seal or a bushing comes back to shape cycle after cycle instead of taking a permanent set.

ASTM D1894 Coefficient of friction

A standardized sled slides on the material; the **static and dynamic** coefficients are recorded. Useful when choosing between a surface that has to **drive** (high friction) and a surface that has to **let things slide** (guides, chute liners).

ASTM D790 Flexural modulus

The specimen rests on two supports and is loaded at the center: this measures **stiffness in bending**. Relevant to hard polyurethanes (Shore D scale) used as near-rigid parts — gears, guides, structural components.

Worth remembering: a data sheet reads as a **whole**. Two materials of the same hardness can behave in opposite ways in service — compare tensile strength, tear, rebound, abrasion and compression set as well. The values come from standardized tests on specimens: final validation is always done against your application, with our team.

QUICK QUESTIONS

Are the values in Soremag charts and data sheets guarantees?

They are typical values measured to the standards cited, on laboratory specimens. They serve to compare and select materials; they are not contractual minimums, unless specifically agreed on a given project.

Why do two materials of the same Shore hardness behave differently?

Because hardness only measures resistance to indentation. The formulation (polymer, cure system, additives) changes rebound, tear, abrasion and fluid resistance — which is why the whole data sheet matters.

Can the hardness measured on a finished part differ from the data sheet?

Yes, slightly: D2240 applies to flat specimens of a defined thickness. On a roller or a finished part (curved surface, thin covering), the reading can vary by a few points — this is normal and accounted for in our measurement method.