



What Is Tensile Strength in Rubber?

By Cody David and Richard Ramirez

Tensile strength is the maximum stress a cured rubber product can handle before it breaks.

High tensile strength rubber gets used anywhere a part is repeatedly stretched, flexed, or pulled under direct tension. Examples include seals, gaskets, vibration mounts, straps, diaphragms, and expansion joints.

Tensile Strength by Rubber Type

Values below reflect typical measures. Actual tensile strength for any given compound depends on formulation, filler loading, and cure systems as designated by the material specification.

Rubber Type	Tensile Range (PSI)	Tensile Range (MPa)
Natural Rubber (NR)	500 – 4,000 psi	3.45 – 27.58 MPa
HNBR	1,500 – 3,500 psi	10.34 – 24.13 MPa
Nitrile (NBR)	450 – 3,200 psi	3.10 – 22.06 MPa
Neoprene (CR)	450 – 3,200 psi	3.10 – 22.06 MPa
Butyl (IIR)	500 – 3,000 psi	3.45 – 20.68 MPa
EPDM	800 – 2,600 psi	5.52 – 17.93 MPa
Fluorosilicone (FVMQ)	200 – 1,500 psi	1.38 – 10.34 MPa
FKM / Viton™	700 – 1,600 psi	4.83 – 11.03 MPa
Silicone (VMQ)	450 – 1,200 psi	3.10 – 8.27 MPa

With high elasticity, good compression, abrasion, and flex-cracking resistance, Natural Rubber is

the first choice for many dynamic applications. HNBR is also worth consideration as it exhibits strong physical properties while adding the heat and chemical resistances that Natural Rubber doesn't typically match.

On the lower end, materials such as FKM / Viton™, silicone and fluorosilicone are desired more for their extreme resistances across corrosive chemicals and wide temperature ranges rather than inherent dynamic properties including tensile strength.

How Tensile Strength Is Tested

An industry standard test method for testing tensile is ASTM D412. This specification establishes the methodology for testing both tensile strength and elongation in industrial rubber products.

The test procedure requires a dumbbell-shaped sample (also known as a dog-bone sample) that is stretched on a tensometer until it breaks. The force required to break the sample defines the rubber compound's tensile strength and the percentage of original length to how far it stretched at break defines its elongation.



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Our in-house lab covers a wide range of testing to help you select the right material for your application. Questions about tensile strength and elongation for your specific use case? Reach our technical sales team at sales@warco.com or [714-532-3355](tel:714-532-3355).

Frequently Asked Questions

1. What psi is considered high tensile strength in rubber?

Typically, a measurement of 2,000 to 3,000 psi (~13.79 MPa to 20.68 MPa) of stress or more is considered to be high tensile strength in rubber.

2. What psi is considered low tensile strength in rubber?

Generally, materials with less than 1,000 psi would be considered to have low tensile strength.

3. How is tensile strength different from tear strength?

Tensile strength is the force required to break a clean sample (free to nicks or cuts) under strain of stretching and tear strength is resistance to an established nick or cut propagating

under strain of stretching. Materials can be strong in one and weak in the other, which is why they're tested separately (ASTM D412 for tensile and elongation vs. ASTM D624 for tear resistance).

4. Why do PSI and MPa both show up for tensile strength?

For applications within the USA, tensile strength is measured in imperial units of pounds per square inch (psi). Globally, the related metric unit is mega pascal (MPa).

5. Do harder (higher durometer) rubber materials have higher tensile strength?

There's a general correlation. Harder compounds are often stronger in tension, as both properties increase with crosslink density and filler loading. Note this correlation has limits and durometer alone isn't a reliable predictor of tensile performance.

6. Does temperature affect tensile strength?

Tensile strength is affected by both hot and cold temperatures. Hot temperatures can soften the material, which decreases the tensile strength as well. Colder temperatures can make the material more susceptible to cracking, which also decreases the tensile strength.