



Stockwell Elastomerics, Inc.

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High Performance Elastomeric Components and Materials



Glossary of Rubber Industry Terms

All ASTM Material Designations are from Spec. D1418. For some physicals, reference ASTM Tests are noted. Contact us for information on synthetic rubber compounds not listed.

Abrasion Resistance

The resistance to surface loss of a rubber material due to frictional forces. (ASTM D-2228)

Aging

Accelerated aging tests are run on various rubbers to find out in as short a time period as possible the destructive influence of light, oxygen, heat, and ozone. Natural or shelf aging requires many years for proper evaluation, so accelerated aging tests will give comparative values in short periods of time; however, there is no absolute correlation between natural aging and accelerated aging.

Buna-N

See **Nitrile**

Buna-S

See **SBR**

Butyl

Isobutylene - Isoprene Rubber, Low Rebound, Motor Mounts, Low Gas Permeability, Limited Heat and Oil Resistance. ASTM Designation IIR

Chloroprene Rubber

Neoprene, Physicals, Oil & Chemical Resistance, Outdoor Reliability are all very good. Heat Resistance to 300° F. ASTM Designation CR.

Compression Molding

"Chunks" of uncured, premixed rubber are placed in each part cavity of a two plate mold. Compressed between two platens in a press under heat and pressure.

Compression Set

The ability of rubber to return to its original thickness after prolonged compressive stresses at a given temperature and deflection. (ASTM D-395)

Dielectric Properties

The ability of material to resist the puncture due to electrical stress. This property is expressed in terms of volts per Mil thickness. (Volts per .001" thickness.)

Durometer (Hardness)

Hardness as a property of rubber is difficult to define except according to the methods used to determine it. These methods measure the resistance of the stock to indentation by the blunt point of a metal rod, ball, or needle. Thus the hardness of rubber can best be described as resistance to indentation.

Various instruments measure indentation. The most common instrument used on rubber is the Durometer. Several scales are used depending on the hardness range (00, 0, A, B, C, D) but the A scale is used for most compounds. Readings on each scale are from 0 to 100. Durometer hardness is a convenient nondestructive method of testing which can also be correlated to other properties such as tensile strength, tensile modulus and resilience. Since indentation hardness is dependent upon elastic modulus and viscoelastic behavior of the compound, rubber compounds which are not completely elastic will "creep" during the test. This creep should be posted as the difference between the initial hardness reading after fifteen seconds of contact with the specimen. A properly noted reading: Durometer A61 points; creep minus 4 points at 15 Seconds, 73°F. (ASTM D-2240)

Elastomer

A term used to describe elastic polymers with rubber-like behavior. The base "gum" of a rubber material design.

Elongation

The term "elongation" is used to describe the ability of a rubber compound to stretch without breaking. To describe this property as measured it is more accurate to speak of "ultimate elongation" or "elongation at break" since its value, expressed as percent of original length, is taken at the moment of rupture. (ASTM D-412)

EPDM, (EPR, EPT - Similar)

Ethylene-Propylene-Diene Rubber, Excellent Ozone Resistance, Good Physicals, Limited Oil Resistance. Heat Resistance to 350°F.

Flame Resistance

Rubber that will not support combustion under ordinary conditions. UL Standards describe testing details, E. G. UL94V-0, UL94HF1 and UL94HB.

Flex Cracking

Rubber articles subjected to repeated flexing have been found to develop small cracks on the surface. (ASTM D-813)

Fluorocarbons, Viton® Fluorel™

The first all purpose rubber. Physicals, resistances to oils, chemicals, outdoors are all excellent, heat resistance to 450°F. ASTM Designation FKM.

Fluorosilicone

The specialty silicone rubber that has excellent physicals, oil & chemical resistance, resists aging and outdoors. Heat resistance to 500°F. ASTM Designation FVMQ

Hydrocarbon Solvents - Aromatic

Having basic benzene structure, usually coal tar types such as benzene, toluene and xylene. Most rubbers will swell or dissolve in these liquids.

Low Temperature Flexibility

The temperature at which the rubber becomes too stiff to function in its intended manner. Allowing the rubber to warm up will restore its original properties. (ASTM D-2137)

Natural Rubber, Natural Polyisoprene, "Gum Rubber"

Excellent Abrasion and Tear Resistance, limited oil and outdoors resistance, heat resistance to 200°F. ASTM Designation NR

Nitrile Rubber, Buna-N, Hycar, Acrylonitrile-Butadiene

Oil Resistance, "O" Rings up to 350°F. Limited outdoor resistance. ASTM Designation NBR.

Permanent Set

When a piece of rubber is stretched and released it does not return to its exact original length but comes to rest somewhat longer than it was before stretching. The increase in length of the rubber strip, expressed as percent of its original length, is termed "permanent set."

Polymer

See **Elastomer**
Often used interchangeably.

Pressure Sensitive Adhesive, PSA

Adhesive that comes in a ready to apply film that is placed on treated release paper. The adhesive is generally rubber based, acrylic, or silicone. Unsupported PSA is entirely elastomer. Supported PSA is reinforced with a plastic film that gives the adhesive film dimensional stability.

Resilience

Capability of a material to return to its original size and shape after deformation. It is generally expressed in percentage of ratio of energy returned by rubber to the energy used in compressing rubber. (ASTM D-1054, D-2632)

SBR, BUNA-S, GR-S

Styrene-Butadiene Rubber, the basic automotive tire rubber. Limited heat and oil resistance. Heat resistance to 200°F. ASTM Designation SBR.

Silicone Rubber

Inert and heat resistant to 500°F. Resists aging, outdoors. Limited oil resistance. ASTM Designation VMQ.

Specific Gravity

The ratio of the weight to the given bulk to that of the same bulk of water (solids and liquids.)

Synthetic Natural

Synthetic Polyisoprene Rubber, man made natural rubber from petroleum byproducts. Same properties as natural but with closer control in consistency. ASTM Designation IR.

Tear Resistance

The resistance to growth of a nick or cut when is applied to a test specimen. (ASTM D-624.) Expressed as pounds per lineal inch.

Tensile Modulus

The term "modulus" is used to denote resistance to being stretched. It is defined as the force in pounds necessary to stretch a piece of rubber, one square inch in cross section, a specified amount. The amount of stretch is normally expressed as a percentage of original length and the "stress" as pounds per inch at the fixed elongation.

Tensile Strength

The tensile strength of a rubber compound is in its resistance to rupture under tension. It is measured as strength at break and expressed in pounds per square inch of cross section. This property has an absolute value in some applications where the product is actually subjected to tension in service but, like the other tensile properties, it is most frequently used in evaluating compounding materials on a cooperative basis. (ASTM D-412)

Transfer Molding

A variation of compression molding. Rectangular sheets of uncured, premixed rubber are placed in a milled out pot or chamber in an extra plate or plates. Gates for each cavity are drilled in the bottom of the pot to allow the rubber to flow accurately into each cavity.



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