

O-RING ELASTOMER DESCRIPTIONS AND PROPERTIES

SDSI uses varying rubber types. Selecting the right polymer base is important to each project. Our experienced staff works with you to determine what type of rubber works best for your application.



NITRILE (BUNA)

Much better oil and solvent resistance compared to either natural rubber or Neoprene
Recommended for most oil field applications. Can be formulated for use at low temperatures
Good compression set and abrasion resistance, but poor weathering resistance Can be used with concentrated acids and alkalis but there are better alternatives Maximum continuous operating temperature is about -40° to 250°F

HNBR (HYDROGENATED NITRILE)

Similar to Nitrile but with improvements in heat and ozone resistance Can be formulated for low temperature applications Excellent for oil field service Usually not recommended in applications with concentrated acids or alkalis Very high cost Maximum continuous operating temperature is about -40° to 325°F

EPDM

Exceptional resistance to weathering and ozone Excellent resistance to water, most gases, steam, and heat aging Good for exposure to concentrated acids and alkalis, but not recommended for exposure to oils and solvents Maximum continuous operating temperature is about -65° to 325°F

FKM (VITON®)

High cost, but high performance material Outstanding resistance to most chemicals, oils and solvents Good oxidation and ozone resistance Maximum continuous operating temperature is about -15° to 400°F. "Viton" is a trademark of DuPont and signifies material produced by DuPont

NEOPRENE (CHLOROPRENE)

Good general purpose rubber with properties close to natural rubber, but is synthetically produced Better resistance to oils and solvents compared to natural rubber but similar low compression set Can be compounded for flame resistance Good weathering resistance Poorer low temperature performance compared to natural rubber Not good in applications with concentrated acids or alkalis Maximum continuous operating temperature is about -40° to 250°F

PTFE

White thermoplastic fluoroethylene resin offers a combination of qualities not found in any other material-chemical inertness, heat resistance, low friction, dielectric strength, weatherability, zero water absorption, toughness, and flexibility. Temperature range: -65° to +500°F.

SILICONE

Recommended for applications requiring a wide temperature range and good dry heat resistance. Good weather and ozone resistance. Limited oil resistance. Not normally recommended for dynamic sealing applications due to relatively poor tensile and tear strength and relatively low abrasion resistance. Temperature range: -80° to + 450°F.

FLUOROSILICONE

Good low/high temperature resistance. Excellent resistance to petroleum oils and fuels. Used in aerospace applications for fuel systems and systems requiring resistance to diester base lubricants to 350°F. Due to limited strength and abrasion resistance, this material is generally recommended for static applications only. Temperature range: -80° to +350/400°F.

AFLAS®

Similar to FKM, but with improved steam aging resistance Lower overall temperature resistance Very costly and seldom used except in very specific oil field applications Maximum continuous operating temperature is about -20° to 450°F.

URETHANE (POLYURETHANE)

Resistant to petroleum oils, hydrocarbon fuels, oxygen, ozone, and weathering. Particularly recommended for hydraulic systems where high pressures, shock loads, wide metal tolerances, or abrasive contamination is anticipated. Not recommended for acids, ketones, and chlorinated hydrocarbons. Some urethanes are also sensitive to water and humidity. Temperature range: -65° to +200°F.

PTFE ENCAPSULATED

Seamless and uniform PTFE FEP encapsulation which completely encloses a core material of either silicone or Viton® elastomer. Matches the chemical and temperature resistance of solid PTFE O-Rings and possesses the elasticity and recovery properties which are crucial in many sealing applications. Temperature operating range -75°F to +400°F.



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Kalrez® Industrial O-Ring Compounds

Kalrez® 7075

A new compound with enhanced physical performance properties including very low compression set (15% O-rings per ASTM D 395B) and improved seal force retention. It is a carbon black filled compound utilizing new and proprietary cure chemistry technology with mechanical properties designed for improving sealing performance in both high temperature environments and temperature cycling situations. 7075 joins the family of Kalrez® Spectrum™ products designed for the chemical processing industry. To provide even greater sealing performance in dynamic applications where low friction is required, 7075 O-rings have a glossier finish than other Kalrez® parts. 7075 was specifically developed to be used as an O-ring or custom-sealing component in the chemical and hydrocarbon industries, with an improved thermal resistance that extends maximum service temperature to 327°C (620°F). Kalrez® Spectrum™ 7075 offers the enhanced elastomeric properties outlined above while providing a chemical resistance better than the industry standard set by Kalrez® 4079.

Kalrez® 4079

A low compression set compound for general-purpose use in O-rings, diaphragms, seals, and other parts used in the process and aircraft industries. It is a carbon black-filled compound with excellent chemical resistance, good mechanical properties, and outstanding hot air aging properties. It exhibits low swell in organic and inorganic acids and aldehydes and has good response to temperature cycling effects. A maximum operating temperature of 316°C (600°F) is recommended, with short excursions to higher temperatures possible. This compound is not recommended for use in hot water/steam applications or in contact with certain hot aliphatic amines, ethylene oxide and propylene oxide.

Kalrez® 6375

A carbon black-filled compound for general use in O-rings, seals, diaphragms and other specialty parts specifically for the chemical process industry. This compound has excellent, broad chemical resistance, good mechanical properties, and outstanding hot-air aging properties. 6375 is well suited for mixed process streams because of its excellent resistance to acids, bases, and amines. In addition, it is the suggested compound for use in hot water steam, ethylene oxide and propylene oxide. A maximum service temperature of 275°C (525°F) is recommended.

Kalrez® 1050LF

A general-purpose compound for O-rings, seals, and other parts used in chemical process industries. It has good hot water/steam, excellent amine resistance, and enhanced compression set properties. Maximum recommended service temperature of 288°C (550°F). Not recommended for use in organic or inorganic acids at high temperatures.



Kalrez® 1058

A carbon black-filled compound that has been plasticized with a perfluorinated oil. It is the softest, lowest modulus compound available. Generally, it is similar in chemical resistance to Compound 1050LF; it has an upper service temperature of 260°C (500°F). Typically used in applications that require low sealing force or high extensibility including liquid chromatography septa, seals/seats for relief valves and tubing. Its shrinkage is greater than other Kalrez compounds; therefore, finished parts may differ from standard specifications.

Kalrez® 3018

A carbon black-filled compound similar to Compound 1050LF, except for higher hardness/modulus. This compound offers the best hot water/steam resistance and the best high pressure extrusion resistance. Generally used in oil field and process industry applications where these properties coupled with good amine and general chemical resistance are required. A maximum service temperature of 220°C (428°F) is recommended.

Kalrez® 2035

A carbon black-filled compound that is well suited for selected applications in the finishing equipment, pharmaceutical, semiconductor, and chemical transportation markets. Compound 2035 has excellent chemical resistance exhibiting low swell in organic acids, inorganic acids, esters, ketones, and aldehydes. This compound is suggested for use in the ethylene oxide and propylene oxide applications. It also offers good mechanical properties. A maximum service temperature of 220°C (428°F) is recommended.

Kalrez® 2037

A non-black-filled compound that is well suited for selected applications in the pharmaceutical, semiconductor, and other markets that demand high purity elastomers. Compound 2037 has excellent chemical resistance exhibiting low swell in organic acids, inorganic acids, esters, ketones, and aldehydes. It also offers good mechanical properties. A maximum service temperature of 218°C (425°F) is recommended.

Miscellaneous Kalrez® Properties

Many miscellaneous properties are of interest for specific applications. Some of these are unaffected by compound choice, while others vary with hardness or extensibility. As an example, coefficient of friction typically increases as hardness decreases. In general, miscellaneous physical properties are similar to those of Viton® fluoroelastomer.



Note: Other specialty or custom compounds may be available or developed to applications that require different properties than the above compounds offer: 8375, 8385, 8101, 4001.....

Typical Physical Properties*

Kalrez® Compound	7075	4079	6375	1050LF	1058	3018	2035	2037
Durometer Hardness, Shore A, points ±5 (ASTM D2240)	75	75	75	82	65	91	85	79
100% Modulus, psi/MPa (ASTM D412, 500 mm/mm (20in/mm))	1100/7.6	1050/7.2	1050 / 7.2	1800/12.4	675/4.7	2450/16.9	1250/8.6	900/6.2
Tensile Strength at Break, psi/MPa (ASTM D412, 500 mm/mm (20in/mm))	2600/17.9	2450/16.9	2200/15.1	2700/18.6	1300/9.0	3150/21.7	2500/17.2	2450/16.9
Elongation at Break, % (ASTM D412, 500 mm/mm (20in/mm))	160	150	160	125	180	125	150	200
Compression Set, % at 70 hrs at 204°C (400°F) (ASTM D395B, pellets)	12	25	30	35	40	35	25	27
Brittle Point, °C / °F (ASTM D746)		-50 / -58		-41/ -42	-40 / -40	-37 / -35	-54 / -65	-54 / -65