



Simriz® Perfluoroelastomer

simrit®

Simrit Industrial Products

In keeping with the ever-changing needs of the industries we serve, the Simrit Division of Freudenberg-NOK is introducing the Simriz® brand name for our perfluoroelastomer compounds.



Simrit is the industrial products division of Freudenberg-NOK and is dedicated to serving the needs of industrial distributors and OEMs. Simrit products are manufactured within the Freudenberg & NOK Group Companies, known for their world-class quality and reliability. Simrit's manufacturing

and design expertise, coupled with exceptional customer service and field engineering support, enables timely delivery to our customers, superior sealing components and total system sealing solutions.

Simrit provides a full range of standard and custom blended sealing elastomers. Established and accredited quality systems include ISO-9000, AS-9000, and QS-9000 certifications to ensure parts of the highest quality.

Perfluoroelastomers (FFKM)—have an ideal combination of characteristics, including:

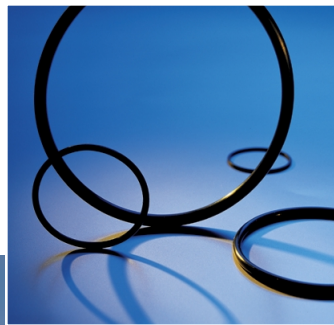
- Excellent chemical resistance
- High temperature resistance, and
- High levels of elasticity

Under the name Simriz, Simrit offers you globally recognized perfluoroelastomers for o-rings and custom molded shapes. Simriz closes the material gap between elastomers, which have poor temperature and chemical resistance, and inelastic PTFE. With a fluorination level of 72%, FFKM elastomers have a level of resistance close to that of pure PTFE at 76%. At the same time, FFKM materials exhibit resilience that makes them an excellent choice for applications where resistance to aggressive chemicals and tight sealing is needed.

What Is Simriz®?

Simriz is a family of perfluoro-elastomer compounds designed to provide superior chemical resistance and thermal stability. It possesses the resilience of an elastomer with chemical resistance approaching that of PTFE.

The appeal of Simriz is in its universal chemical resistance. Each Simriz compound has additional properties to meet specific application requirements.



Patented cross-linking system

By selecting the right cross-linking system we have optimized the beneficial properties of Simriz. Simriz materials are cross-linked using peroxide or a patented cross-linking system. This provides Simriz seals with excellent chemical resistance, including resistance to organic amines and steam.

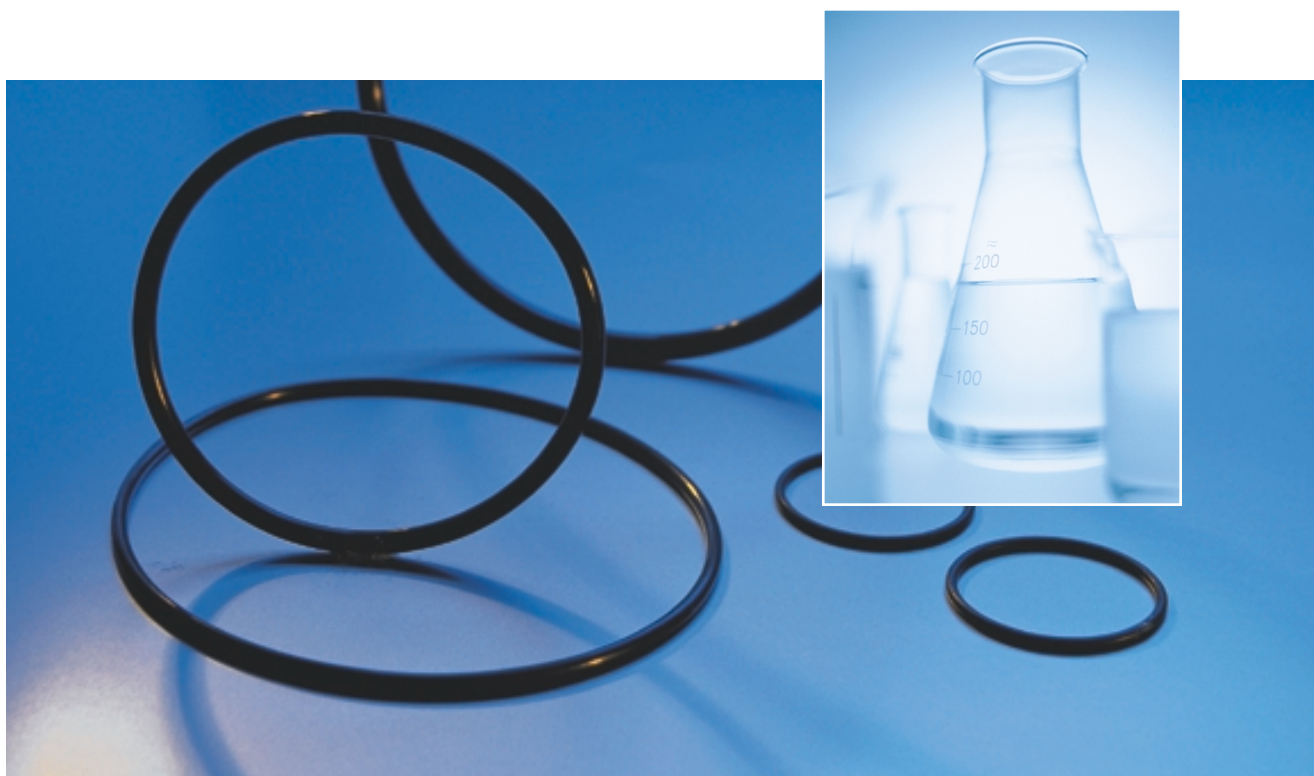
Simriz o-rings and molded shapes are available in nine different Simriz compounds. Each compound is specifically designed to optimize the following criteria and to meet market specific application needs:

- Broad chemical resistance
- Mechanical properties (hardness, tensile strength, elongation, etc.)
- Compression set resistance
- High temperature capability
- Low temperature flexibility



Simriz Compounds and their Unique Characteristics

Simriz Compound	Aerospace	Industrial			Oil & Gas	Food & Drug	Semiconductor		
	Z7257	Simriz 481	Simriz 485	Simriz 487	Simriz 134	Simriz 484	Simriz 486	Simriz 488	Simriz 489
Color	black	black	black	black	black	black	white	white	transparent
Hardness Shore A	75	70	75	75	90	75	75	70	65
Temperature Range °C	-6°C 320°C	-20°C 230°C	-7°C 230°C	-6°C 300°C	-4°C 230°C	-7°C 230°C	-7°C 230°C	-6°C 300°C	-6°C 280°C
Temperature Range °F	21°F 610°F	-4°F 450°F	19°F 450°F	21°F 570°F	25°F 450°F	19°F 450°F	19°F 450°F	21°F 570°F	21°F 540°F
Tensile Strength MPa (psi)	16.9 (2450)	17.1 (2480)	18.5 (2690)	18.7 (2720)	21.5 (3120)	22.1 (3210)	18.0 (2620)	20.1 (2920)	13.5 (1960)
Elongation (%)	175	260	195	170	160	165	190	190	235
Compression Set (%) 70 hrs.@200°C	–	27	25	–	29	34	25	–	–
Compression Set (%) 70 hrs.@250°C	23	–	–	–	–	–	–	–	20
Compression Set (%) 70 hrs.@275°C	–	–	–	26	–	–	–	28	–
Volume Swell (%) In water, 70 hrs.@200°C	1.9	6.3	5.1	1.9	–	6.5	5.9	3.2	–



Chemical Resistance

Fully-fluorinated monomers in Simriz compounds provide superior protection against chemical attack. The following table provides general chemical resistance comparison between Simriz, standard fluorocarbon (Viton*), and EPDM.



Chemicals	Simriz	FKM	EPDM
ACIDS			
Acetic Acid, Glacial	1	4	2
Hydrochloric Acid	1	1	3
Hydrofluoric Acid	1	4	3
Nitric Acid	1	1	3
Trichloroacetic Acid	1	3	2
INORGANIC BASES			
Potassium Hydroxide	1	4	1
Sodium Hydroxide	1	2	1
ALCOHOLS/ETHERS			
Isopropyl Alcohol	1	1	1
Methyl Alcohol	1	4	1
Tetrahydrofuran	1	4	3
AROMATIC HYDROCARBONS			
Benzene	1	2	4
Toluene	1	2	4
ALIPHATIC HYDROCARBONS			
ASTM Oil #3	1	1	4
ESTERS			
Dimethylphthalate	1	2	2
ALDEHYDES/KETONES			
Acetone	1	4	1
Methyl Ethyl Ketone (MEK)	1	4	1
N-Hexaldehyde	1	4	1
AMINES			
Aniline	1	2	2
Ethylenediamine	2	4	1
CHLOROCARBON SOLVENTS			
Carbon Tetrachloride	1	1	4
Methylene Chloride	1	2	4
Trichloroethane	1	1	4
WATER			
Water	1	1	1
STEAM			
Steam (<149°C/300°F)	1	2	1
Steam (>149°C/300°F)	2	4	4

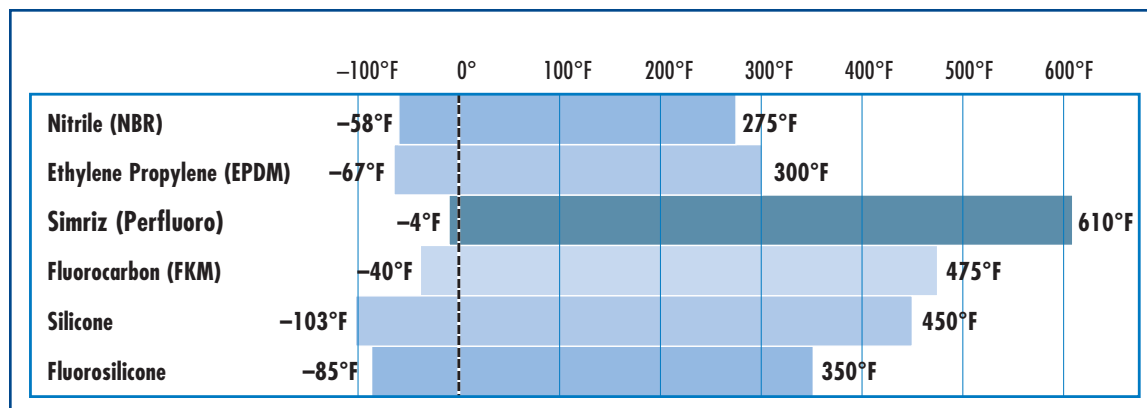
Rating	Description	Volume Change	Comments
1	Little or no effect	<10%	Elastomer may exhibit swelling and/or loss of physical properties under severe conditions.
2	Possible loss	10–20%	Elastomer may exhibit swelling physical properties in addition to a change in physical properties. May be suitable for static applications.
3	Noticeable change	20–40%	Elastomer exhibits a noticeable change in swelling and physical properties. Questionable performance in most applications.
4	Excessive change	>40%	Elastomer not suitable for service.

Methanol, Formic Acid, Methyl Ethyl Ketone, Trichloroacetic Acid or Ethylenediamine are among the most aggressive chemicals presently used. Simriz products provide optimum seal stability when used under these extremely adverse conditions.

The information given in this chemical compatibility table is believed to be reliable, but no representation, guarantees or warranties of any kind are made to its accuracy or suitability for any purpose.

*Viton is the registered trademark of DuPont Dow Elastomers.

Thermal Stability Comparison



Low temperature flexibility

Typical perfluoroelastomers available today have excellent chemical resistance, but they lack flexibility at temperatures below 0°C. To ensure low temperature sealability, Simrit has developed Simriz 481 compound for low temperature applications to -20°C.

Contamination—not an issue with Simriz

A specially formulated Simriz 489 material provides:

- Low outgassing and permeation
- Low particle generation in plasma
- Sealing capability to 280°C/540°F
- Very low extractable ions and molecular contaminants

This means that Simriz 489 compound prevents contamination, making it ideal for use in the semiconductor industry.

Simriz Sizes and Availability

O-rings and molded shapes manufactured from Simriz are specifically produced to match our customer requirements. Standard AS568 sizes can be delivered within very short lead times. Most standard sizes are available at no tooling charge.

O-Ring Part Number Structure

Simriz parts come in a full range of AS568 and metric sizes. Custom size o-rings and molded shapes are also available. AS568 size table is available upon request.

Simriz Compound	Material Code	Simriz Compound	Material Code
Simriz 134	SZ134	Simriz 487	SZ487
Simriz 481	SZ481	Simriz 488	SZ488
Simriz 484	SZ484	Simriz 489	SZ489
Simriz 485	SZ485	Z7257	Z7257
Simriz 486	SZ486		

Simriz P/N Structure:

A S 5 6 8 - x x x x x x x

AS568 Dash Size

Material Code
(see above table)

Example: AS568-214 SZ485

(i.e., -214 = ID 0.984" x W 0.139" in Simriz 485 compound)

Typical Applications

Simriz provides reliable sealing solutions in the following application areas:

Characteristic	Industry	Sealing Examples
Chemical Resistance	Chemical Processing	Mechanical Seals, Filters, Flanges, Valves
	Petroleum Refining	Mechanical Seals, Flanges, Valves
	Instrumentation	Sensors, Collectors, Sample Vials
	Semiconductor	Wet Stations, Filters, Valves
	Automotive	Fuel & Oil Systems, Disconnects, Couplings
	Paint & Coatings	Canisters, Spray Guns
Plasma Resistance	Semiconductor	Chamber Lid, Slit Valve, Quartz Tube Joints
Thermal Stability	Aerospace	Engines, APUs
	Chemical Processing	Mechanical Seals, Flanges
	Petroleum Refining	Mechanical Seals, Flanges
	Semiconductor	Furnace Doors, Quartz Tubes
	Automotive	Sensors
Low Contamination	Semiconductor/Medical/Pharmaceutical	Valves, Reactor Seals, Vacuum Components
	Instrumentation	Vacuum Components, Sensors
Contact with Food/Drug	Food & Drug/Pharmaceutical	Mechanical Seals, In-process Seals, Tube Joints, Plate Seals



Simriz for pharmaceutical applications

75 Simriz 484 was specially developed to meet the exacting requirements of the pharmaceutical industry and meet FDA specifications. This material can be used in system components and equipment parts designed for the pharmaceutical, food industry and biotechnology markets.



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