



For performance you can count on...

specify genuine **Viton[®] fluoroelastomers**

for reliable sealing components



Viton[®] fluoroelastomer

A Product of DuPont Dow Elastomers

Seals, rubber parts last longer with

Viton® fluoroelastomers

Viton® can help you reduce costs by preventing seal failures, extending maintenance intervals, handling more aggressive fluids and higher temperatures, increasing safety and meeting stringent environmental regulations.

With Viton®, you can meet these needs with performance proven by decades of service in harsh environments.

REDUCE LIFETIME COSTS

Viton® far outlasts nitriles and other general-purpose elastomers. It allows you to extend service intervals and stretch maintenance budgets.

CUT UNSCHEDULED DOWNTIME

Viton® protects against unscheduled downtime because it provides increased reliability. You can extend warranty periods with greater confidence.

INCREASE TEMPERATURE CAPABILITY

In many applications, rubber parts are stressed by accidental temperature excursions as well as by increases in operating temperatures designed to increase production. In some situations, Viton® can serve continuously at 204°C with excursions to 315°C.

STAND UP TO AGGRESSIVE FLUIDS

Viton® performs well in a wide range of aggressive fluid environments. Systems can tolerate changes in fluids and have more versatility for broader application.

COMPLY WITH TOUGHER REGULATIONS

Environmental regulations have raised the stakes for leaks, spills, and emissions. Viton® helps guard against these problems to improve plant and automotive operations.

PROVEN PERFORMANCE

Since its introduction in 1957, Viton® has solved sealing and other problems in major industries:

- Aircraft and Aerospace
- Automotive
- Chemical Processing and Transportation
- Off-Highway and Heavy-Duty Equipment
- Petroleum Refining and Transportation

Major uses include bonded seals, radial lip seals, caulks, coatings, vibration dampeners, expansion joints, gaskets, O-rings, piston seals, custom shapes, and stock rod and sheets.





A TOUGH CONTENDER

The compatibility of Viton® fluoroelastomers with some important chemical media is shown in Table 1. The capabilities of other elastomers shown for comparison can be helpful when you're considering changing materials to increase reliability or accommodate more severe operating conditions.

Viton® also offers mechanical ruggedness so seals and components resist damage during

installation and use. Basic mechanical property data listed show that Viton® compares favorably with other elastomers in tensile strength, range of hardness and resistance to compression set.

Viton® retains sealing force to prevent leaks even after compression for long periods in severe environments. After 100 hours in air at 150°C, Viton® retains more than 90% of its original sealing force, while seals of fluo-

rosilicone, polyacrylate and nitrile retain only 70, 58 and 40% respectively.

Viton® has excellent resistance to atmospheric oxidation, sunlight and ozone. After 20 years of exposure to direct sunlight, seals of Viton® showed no traces of cracking. In addition, Viton® did not crack after one year in an atmosphere containing 100 ppm ozone.

Table 1. Comparison of Elastomer Properties¹

Common Name	Neoprene	Ethylene Propylene	Nitrile	Silicone	Fluoro-silicone	Viton®	Viton® ETP	Kalrez®
Chemical Compatibility²								
Lubricating and Fuel Oils	2	4	1	4	1	1	1	1
Hydraulic Oils	2	4	1	2,3	1	1	1	1
Fireproof Hydraulic Fluids	2	1	3	3	4	4	2	1
Vegetable Oils, Animal Fats	2,3	2,3	1	1,3	1	1	1	1
Gasoline (high octane)	3,4	4	1,2	4	1	1	1	1
Kerosene	2	4	1	4	1	1	1	1
Aromatic Hydrocarbons	4	4	2,4	4	2,3	1	1	1
Aliphatic Hydrocarbons	2	4	1	4	2	1	1	1
Alcohols	1	2	1	2	1,2	1	1	1
Ketones	3,4	1	4	4	4	4	2	1
Halogenated Solvents	4	4	4	4	1,2	2	1,2	2
Water (>80°C)	3	1	1	1	1	1	1	1
Concentrated Acids	4	4	4	4	3	1-2 ³	2	1
Diluted Acids	2,3	2	3,4	4	3	1	1	1
Alkalis	1,2	1	2	1,2	2	4	1	1
Properties								
Max. Continuous Service Temperature, °C	105	150	121	204	175	204	204	316
Low Temperature (Tg), °C	-50	-54	-25 to -30	-85 to -125	-65	-8 to -30 ³	-11	-8
Tensile Strength, MPa	25	17	27	10	10	20	15	15
Hardness, Durometer, Shore A(D)	30-95	40-90	40-95	30-90	40-80	55-95	65-95	65-95

¹ Data has been drawn from tests at DuPont Dow facilities and industry sources. Data is presented for use only as a general guide and should not be the basis for design decisions. See the back of this brochure for additional information about the data.

² Key: 1 = Excellent 2 = Good 3 = Fair 4 = Not Recommended

³ Rating is type dependant.



SUPERIOR THERMAL STABILITY

Resisting damage from thermal upsets is important insurance against failure for seals and other components. Viton® fluoro-elastomers resist hardening and embrittlement >10,000 hours in air up to 204°C, and they endure thermal excursions to 315°C (Figure 1). And with the high-temperature capability of Viton®, some users can increase operating temperatures to improve productivity or gain other advantages.

Viton® delivers at low temperatures, too. Dynamic seal applications for Viton® have been successful at -40°C, and in some cases, appropriately designed parts of Viton® can still offer static sealing capabilities down to -60°C.

What's more important, Viton® retains good performance in fluids at elevated temperatures. Figure 2 compares the performance of Viton® and other elastomers in a standard SAE/ASTM test that measures volume swell in hot oil. A swell of more than 30% is usually unacceptable.

BROAD CHEMICAL COMPATIBILITY

Because Viton® is compatible with a very wide range of chemicals, fuels and solvents, it can reduce costs through extended service life and reduce unscheduled downtime for seals and components. Broad compatibility also increases product versatility to extend applications. Much more information is available about the performance of Viton® with chemicals and fluids. The DuPont Dow Elastomers publication, "Viton® Fluid Resistance Guide," can be obtained from any DuPont Dow Elastomers office listed on the back cover, or refer to our chemical compatibility guide at www.dupont-dow.com/crg.

Figure 1. Heat Resistance of Viton®

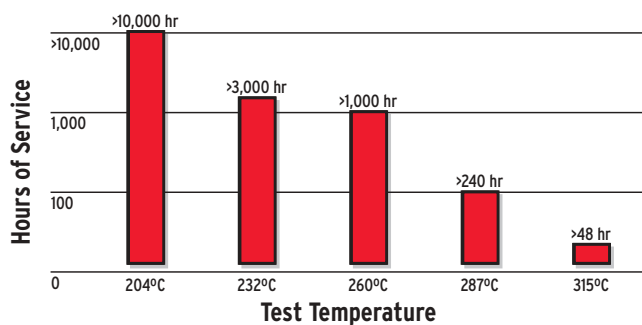
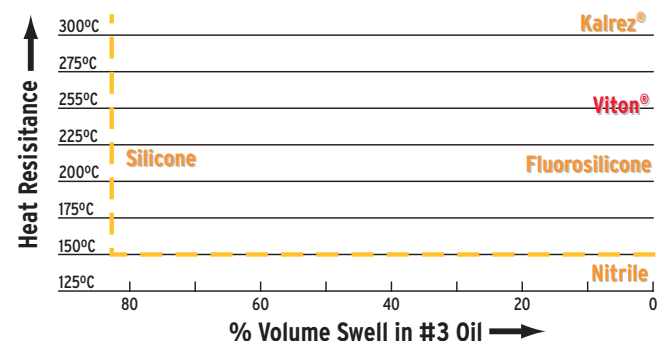


Figure 2. Heat and Oil Resistance of Specialty Elastomers (ASTM D2000/SAE J200)





PERMEATION RESISTANCE TO REDUCE EMISSIONS

Even if high temperatures or aggressive fluids aren't involved, Viton® may be specified because it has good resistance to permeation. In automotive, chemical processing, and other industries, Viton® helps minimize fugitive emissions to meet Clean Air Act requirements (Table 2).

SELECTING THE TYPE OF VITON® THAT'S BEST FOR YOU

We've developed many types of Viton® to meet specific end-use and processing needs. Table 3 shows how different types of Viton® compare in chemical resistance and mechanical properties.

Selecting the type that best meets your needs is important, but isn't complicated, and help is available from DuPont Dow Elastomers. The general purpose types

differ from the specialty types primarily in chemical resistance and low temperature flexibility. In the specialty family, the choice is among four types that are tailored for superior fluid resistance, low-temperature performance or combinations of these properties.

Each family of Viton® is available in a number of types. The type to be used for a specific application is selected for manufacturability as well as performance.

Table 2. Permeation Rates³ for Selected Elastomers, and Nylon 12⁴

Material	Fuel C at 23°C	90% Fuel C, 10% Ethanol	85% Fuel C, 15% Methanol	Toluene at 40°C
NBR (33% ACN)	669	1028	1188	—
HNBR (44% CAN)	230	553	828	—
Fluorosilicone	455	584	635	—
Nylon 12	5.5	24	83	—
Viton® GLT	2.6	14	60	—
Viton® AL	0.8	6.7	32	—
Viton® A	0.8	7.5	36	49
Viton® GFLT	1.8	6.5	14	—
Viton® B	0.7	4.1	12	—
Viton® GF	0.7	1.1	3.0	7
Viton® ETP				14

³ Average Permeation Rate for ASTM Standard ($g \times mm$) ($m^2 \times days$)

⁴ Mathematically normalized to 1 mm thicknesses using data from tests described in ASTM E96-53T.

Table 3. Relative Chemical Compatibility and Mechanical Properties of Viton® Fluoroelastomers

Chemical Environment	Viton®—General Use Family Types			Viton®—Specialty Family Types				
	A	B	F	GBL	GF	GLT	GFLT	ETP
Automotive and aviation fuels	1	1	1	1	1	1	1	1
Automotive fuels oxygenated with MEOH, ETOH, MTBE, etc.	4	2	1	2	1	4	1	1
Engine lubricating oil, SE and SF	2	1	1	1	1	1	1	1
Engine lubricating oil, SG and SH	3	2	2	1	1	2	1	1
Aliphatic hydrocarbon process fluids, chemicals	1	1	1	1	1	1	1	1
Aromatic hydrocarbon process fluids, chemicals	2	2	1	1	1	2	1	1
Aqueous fluids, steam mineral acids	3	2	2	1	1	1	1	1
Strong base, high pH, caustic, amines	4	4	4	4	4	4	4	1–2
Low molecular weight carbonyls –100% concentration (MTBB, MBK, MIBK, etc.)	4	4	4	4	4	4	4	1–2
Compression Set and Low-Temperature Performance								
Resistance to compression set	1	2	2	2	3	2	2	2
Low-temperature flexibility	2	2	3	2	3	1	1	2

Key: 1 = Excellent 2 = Fair to Good 3 = Poor 4 = Not Recommended



ASSURE PERFORMANCE BENEFITS BY SPECIFYING VITON® FLUOROELASTOMERS

Viton® gives you advantages over other fluoroelastomers because its performance is supported by innovation, quality and long experience.

No other manufacturer offers as broad a selection of fluoroelastomer types to meet your specific application needs. Our technical innovation has been focused on meeting user needs for improved performance and product types for cost-effective processing.

Since 1957, DuPont and now DuPont Dow Elastomers have continuously supported the development of new fluoroelastomer technology and products.

MAKE SURE YOU GET WHAT YOU SPECIFY

You can make sure that you're receiving the quality and performance benefits of Viton® by insisting that your parts are made with Viton®. DuPont Dow has a network of licensees who provide documentation that the parts they supply are made from genuine Viton®. Make sure to look for the genuine Viton® label—your verification that the polymer contents are 100% virgin Viton®.

Fluoroelastomers move through compounders to parts manufacturers, and finished parts are often sold to distributors or component manufacturers or OEMs before they reach end users. Because this supply chain is so long, communications can break down. Users may not be sure they've received parts made with the

material they've selected. If you select Viton®, insist on our "label" or other documentation to be sure that you are getting Viton®, not imitations or blends.

PUT VITON® TO WORK FOR YOU

Contact any of the DuPont Dow Elastomers' offices on the back cover for more information. We're ready to work with you and your parts supplier to recommend the correct type of Viton® and the best formulation to meet your needs.



The “Made with genuine Viton®” label is your assurance of quality that only Viton® fluoroelastomers can provide.



Visit www.dupont-dow.com/viton

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