



Specify Viton® fluoroelastomers for

superior sealing performance

in a wide variety of aggressive applications



Viton®

From DuPont Performance Elastomers



Seals and parts last longer with Viton® fluoroelastomers

Proven over decades of service

Viton® has delivered a combination of high-temperature performance and exceptional chemical resistance for almost 50 years. Its dynamic characteristics give critical seals and parts exceptional performance and longer life in aggressive environments.

Viton® made with Advanced Polymer Architecture

When an application demands even higher levels of performance, you can choose specialty types of Viton® made with Advanced Polymer Architecture (APA). APA polymers deliver improved resistance to bases as well as processing and performance benefits across a broad range of chemicals and fluids.

Reduce lifetime costs and cut unscheduled downtime

Viton® far outlasts nitrile rubber and other general-purpose elastomers. It allows you to extend service intervals and stretch maintenance budgets because the increased reliability of Viton® reduces unscheduled downtime.

Increase temperature capability

In many applications, rubber parts are stressed by accidental temperature excursions as well as increases in operating temperatures designed to increase production. In some situations, Viton® can serve continuously at 204°C, even after excursions to 315°C. Certain types of Viton® can perform equally well at temperatures as low as -40°C.

Stand up to aggressive fluids

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

Help maintain process purity and integrity

When FDA compliance is necessary, certain types of Viton® meet FDA requirements for food and pharmaceutical applications. Appropriately formulated vulcanizates based on the latest types of Viton® made with Advanced Polymer Architecture (APA) demonstrate outstanding cleanliness. They exhibit dramatically lower levels of extractibles (total organic carbon and metals) compared to compounds based on EPDM, only slightly higher levels than PTFE, and provide excellent resistance to steam and caustic cleaning chemicals.

Comply with tougher regulations

Environmental regulations have raised the stakes for leaks, spills and emissions. The reliable sealing performance of 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
- Food and Pharmaceuticals
- Off-Highway and Heavy Duty Equipment
- Oil and Gas Exploration and Production
- 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

Viton® fluoroelastomers are compatible with many important chemical media (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 that seals and components resist damage during installation and use. Basic mechanical property data listed below demonstrate how 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 long periods of compression in severe environments. After 100 hours in air at 150°C, Viton® retains more than 90% of its original sealing force, while seals of fluorosilicone, polyacrylate and nitrile retain only 70%, 58% and 40%, respectively.

Viton® has excellent resistance to corrosive 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.

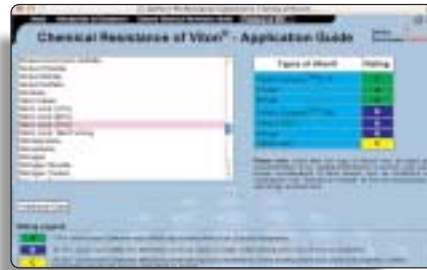
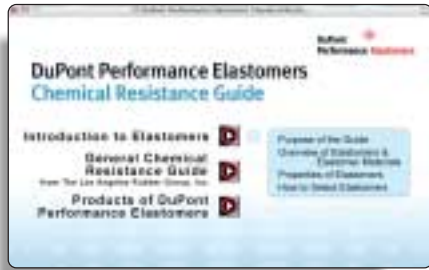
Table 1 – Comparison of elastomer properties¹

Common Name	Neoprene	Ethylene Propylene	Nitrile	Silicone	Fluoro-silicone	Viton®	Viton® ETP-S	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, animals 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	1,2	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	327
Low temperature (Tg), °C	-50	-54	-25 to -30	-85 to -125	-65	-8 to -30 ³	-10	-8
Tensile strength, MPa	25	17	27	10	10	20	15	15
Hardness, Durometer, Shore A(D)	30-95	40-90	30-90	40-80	55-95	65-95	65-95	65-95

¹ Data has been drawn from tests at DuPont Performance Elastomers 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.



Visit the Chemical Resistance Guide at: www.dupontelastomers.com

Superior thermal stability

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

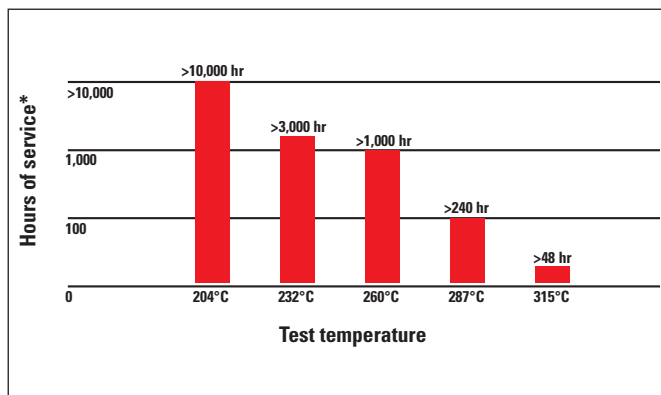
Viton® also delivers at low temperatures. Dynamic seal applications for Viton® have been successful at -40°C, and in some cases, appropriately designed parts of Viton® can offer static sealing capabilities down to -60°C.

More importantly, Viton® exhibits good resistance to 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

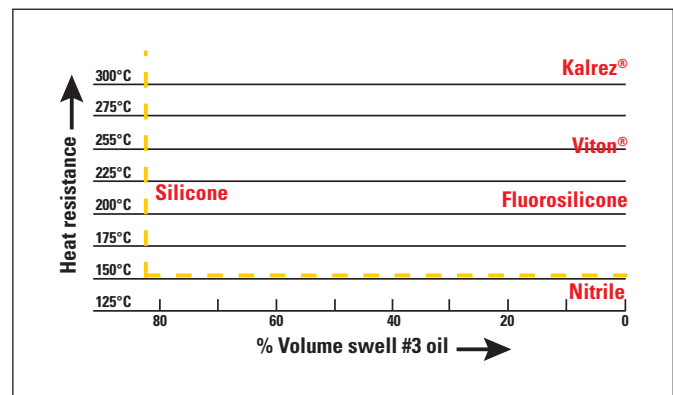
Because Viton® is compatible with an exceptional range of chemicals, fuels and solvents, it can reduce costs through extended service life and reduce unscheduled downtime for seals and components. Broad compatibility also increases product versatility to extend applications. More information about the performance of Viton® with chemicals and fluids is available in the Chemical Resistance Guide on our website at www.dupontelastomers.com

Figure 1 – Heat resistance



Viton® maintains good sealing performance for over 10,000 hours in air at temperatures up to 204°C.
*Approximate number of hours at which typical vulcanizate of Viton® will retain 50% of its original elongation at break.

Figure 2 – Heat and oil resistance of specialty elastomers (ASTM D2000/SAE J200)



Viton® retains good sealing performance and low volume swell in hot oil at elevated temperatures.



Permeation resistance to reduce emissions

In addition to its characteristic resistance to aggressive fluids and high temperature, Viton® is often specified for its excellent 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

Through ongoing innovation, we continue to expand the Viton® family of products to meet specific end-use and processing needs. Table 3 shows how different Viton® product types compare in chemical resistance and mechanical properties.

Identifying the product type that best meets your needs is critical in order to achieve the desired performance. 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 types that are tailored for superior fluid resistance, low-temperature performance, or combinations of these properties. Types with an "S" suffix are specialty types made with Advanced Polymer Architecture. The type recommended for use in a specific application is selected for processibility as well as overall performance.

Table 2 – Permeation rates¹ for selected elastomers, and Nylon 12²

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	1118	–
HNBR (44% CAN)	230	553	828	–
Fluorosilicone	455	584	635	–
Nylon 12	5.5	24	83	–
Viton® GLT-S	2.6	14	60	–
Viton® AL	0.8	6.7	32	–
Viton® A	0.8	7.5	36	49
Viton® GFLT-S	1.8	6.5	14	–
Viton® B	0.7	4.1	12	–
Viton® GF-S	0.7	1.1	3.0	7

¹ Average permeation rate for ASTM Standard (g x mm) (m² x days)

² Mathematically normalized to 1 mm thickness using data from tests described in ASTM E96-53T.

Table 3 – Relative chemical compatibility and mechanical properties for Viton® fluoroelastomers

Chemical environment	Viton® general use types					Viton® specialty types		
	A	B	F	GBL-S	GF-S	GLT-S	GFLT-S	ETP-S
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	2	2	2	2	1
Low molecular weight carbonyls 100% concentration (MTBB, MBK, MIBK, etc.)	4	4	4	4	4	4	4	1
Compression set and low-temperature performance								
Resistance to compression set	1	2	2	2	2	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



Make sure you get what you specify

To make sure you're receiving the quality and performance benefits of Viton®, insist your parts are made with genuine Viton® from DuPont Performance Elastomers. The Genuine Viton® mark is your verification that the polymer contents are 100% Viton®, and not imitations or blends. We have a network of licensees who provide documentation certifying that the parts they supply are made from Viton®. When you order Viton® products, check the label for the Genuine Viton® mark, or ask for the relevant documentation to be certain you're getting the real thing.

Putting Viton® to work for you

When you purchase Viton® you get more than assured quality from a leading manufacturer of elastomers. You get performance that's supported and constantly enhanced by innovations, such as Viton® made with APA. No other manufacturer offers as broad a selection of suppliers and fluoroelastomer types to meet your specific application needs, backed with a depth of expertise and industry knowledge. Since 1957, DuPont and now DuPont Performance Elastomers have continuously supported the development of new fluoroelastomer technology and products.

For more information, contact your nearest DuPont Performance Elastomers office listed on the back cover. 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.





Viton®

From DuPont Performance Elastomers

For further information please contact one of the offices below, or visit our website at www.dupontelastomers.com

Global Headquarters – Wilmington, DE USA

Tel. +1 800 853 5515
+1 302 792 4000
Fax +1 302 792 4450

European Headquarters – Geneva

Tel. +41 22 717 4000
Fax +41 22 717 4001

South & Central America Headquarters – Brazil

Tel. +55 11 4166 8978
Fax +55 11 4166 8989

Asia Pacific Headquarters – Singapore

Tel. +65 6275 9383
Fax +65 6275 9395

Japan Headquarters – Tokyo

Tel. +81-3-5521-2990
Fax +81-3-5521-2991

The information set forth herein is furnished free of charge and is based on technical data that DuPont Performance Elastomers believes to be reliable. It is intended for use by persons having technical skill, at their own discretion and risk. Handling precaution information is given with the understanding that those using it will satisfy themselves that their particular conditions of use present no health or safety hazards. Since conditions of product use and disposal are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. As with any material, evaluation of any compound under end-use conditions prior to specification is essential. Nothing herein is to be taken as a license to operate or a recommendation to infringe on patents. While the information presented here is accurate at the time of publication, specifications can change. Check www.dupontelastomers.com for the most up-to-date information.

Caution: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, discuss with your DuPont Performance Elastomers customer service representative and read Medical Caution Statement H-69237.

*DuPont™ is a trademark of DuPont and its affiliates.
Viton®, Viton® Extreme™ and Kalrez® are trademarks
or registered trademarks of DuPont Performance Elastomers.*

*Copyright © 2005 DuPont Performance Elastomers.
All rights reserved.*

*(10/05) Printed in USA.
Reorder no: VTS-H73468-00-D1005*

DuPont 
Performance Elastomers