



HIGH-PERFORMANCE SEALING

**evolast<sup>®</sup>**

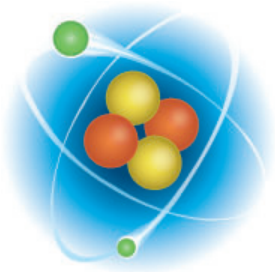
**High Performance Elastomer**

- Outstanding mechanical properties
- Almost universal chemical resistance
- Widest temperature range
- High temperature stability up to 340°C
- For critical purity
- Pharmaceutical and food approvals
- Highest quality parts
- Oil & Gas approvals
- For semiconductor applications

# evolast®

## Perfluorinated rubber – FFKM

FFKM materials are elastomers offering the highest chemical and heat resistance. Some FFKM types can be exposed to temperatures over 300°C. The resistance to chemicals is nearly universal and comparable to that of PTFE.



**evolast® parts**, the ultimate generation of perfluoroelastomers (FFKM according to ASTM D1418), are designed to combine the needs for chemical and thermal resistance provided by PTFE with the sealing properties (compression set) typical of elastomers.

**evolast® seals** are used in heavy duty equipment in critical processes where mechanical seals, valves, pumps, require the maximum of performance in particularly harsh environments.

**evolast® items** are available in the usual shapes such as O-rings and gaskets both in standard and customized dimension.

**evolast® parts** are recommended for extremely severe applications where difficult and costly maintenance strongly requires reduced process downtimes.

Thanks to a wide range of specific FFKM grades and compounding recipes, **evolast® components** have outstanding properties well above any other elastomers including FKM and FEPM.

**Outstanding resistance** in aggressive chemicals, acids, organic and inorganic media, ketones, esters, solvents, amines, hot steam and water.

**Wide temperature range** from -25°C to 270°C for standard grades and up to 340°C for premium grades. Special grades from -40°C up to 260°C are also available.





**Gasket used in reaction vessels,** bulk containers, valves and pumps must be able to resist against a range of aggressive media, pharmaceutical ingredients and aggressive sterilizing and cleaning processes.

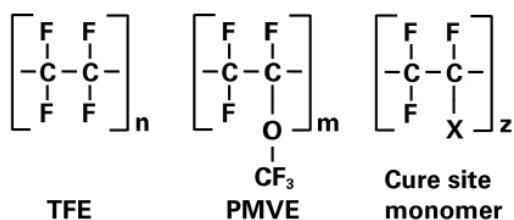


**evolast® grades** offer a full range of sealing solutions compliant with the requirements of FDA, USP and 3A-Sanitary.

Some **evolast®** have been specifically designed to meet high purity requirements of the industry, avoiding the use of mineral fillers and particle formation in chambers with aggressive plasma conditions. The introduction of PTFE particles smaller than 40nm ensures excellent particle dispersion, resulting in mechanical properties equivalent to mineral filled perfluoroelastomers and better than others organic filled materials available in the marketplace.

## **evolast® for Pharmaceutical, Bioscience, Food and Drugs applications, High Purity.**

Pharmaceutical and food equipment present some of the most demanding sealing requests.



evolast® perfluoroelastomer compounds are based on terpolymers of tetrafluoroethylene (TFE), perfluoromethylvinyl ether (PMVE), and a cure site monomer (CSM). Thanks to the fully fluorinated monomers contained in perfluoroelastomers, they show superior chemical resistance.

Perfluoroelastomers (FFKM) have a fully fluorinated polymer backbone resulting in fluorine content over 71%.

## High Temperature Resistant **evolast**<sup>®</sup> grades

**evolast**<sup>®</sup> perfluoroelastomers are ideal for demanding sealing applications where stability at high temperature is required.



**Outstanding thermal stability and excellent chemical resistance** of perfluoroelastomer parts are due to the strength of the carbon-fluorine bond in the perfluorinated chain. The unique properties of this material help to maintain its seal integrity which can reduce maintenance, operating costs and improve safety.



## **evolast**<sup>®</sup> Chemical Compatibility

**evolast**<sup>®</sup> grades were specially developed for the chemical process and offer the highest chemical resistance of all the elastomers.

**Specifically they outperform FKMs** when in contact with polar fluids (such as ketones, esters, ethers and aldehydes) and bases (alkalis and amines).

**evolast**<sup>®</sup> parts are available in a wide range of compounds formulated to optimize properties and to give the best performance in various chemicals.

# Perfluoroelastomers evolast® FFKM for semiconductor applications.

Thanks to the high level of experience, care and flexibility in the field of FFKM compounds, quality and attention to detail in moulding, **MCM High-Performance Sealing** offers specific products, O-rings and technical articles, in ultrapure processing for the semiconductor industry.



## **Plasma processes evolast® PS3 family**

To withstand aggressive plasma conditions, seals need to have high purity, low particle generation and low outgassing to guarantee reliability and long-life.

Temperatura Range: 300-315 °C

Color: miscellaneous  
(translucent, brown,...)

Hardness: from 70 to 80 ShA



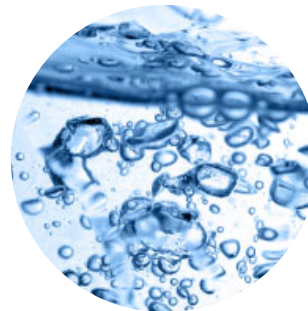
## **Thermal processes evolast® PS2 family**

Thermal based applications require high performance materials to give long term sealing resistance at high temperatures, together with specific chemical resistance.

Temperatura Range: 275-300°C

Color: miscellaneous (black, white,...)

Hardness: from 65 to 80 ShA



## **Wet chemical processes evolast® PS1 family**

Wet chemistry is widely used in the processing of wafers, requiring high resistance to specific chemicals, without contributing to organic or metallic contamination of the stripping or cleaning fluids

Temperatura Range: 250°C

Color: black

Hardness: 75 ShA

Our perfluoroelastomers have been developed to offer superior sealing solutions with improved performance and functionality. Above you find the evolast® we recommend for semiconductor processes. Our engineers are always on hand to identify and develop fluoroelastomers that work perfectly in any working environment.

## evolast<sup>®</sup> for Oil & Gas

Safety and reliability are of supreme importance in the petrochemical industry.

**Oil drilling is one of the most complex fields that a seal has to face, because of the peculiar environmental conditions.**

evolast<sup>®</sup> grades have been specially developed to offer outstanding explosive decompression (ED) resistance and industry-leading low and high temperature performance. evolast<sup>®</sup> O&G grades are Norsok M-710 approved.

Explosive Decompression (ED), also referred to as Rapid Gas Decompression (RGD), is a failure mechanism of elastomer seals caused by the rapid decompression of gaseous media.

When elastomer seals are exposed to high-pressure gas for a prolonged period the gas permeates into the seal material. When the external pressure is reduced, the gas which is dissolved within the seal material comes out of solution to form micro bubbles.

As the gas expands, it may permeate out of the seal material. However, if the rate of decompression (and hence expansion) is high, gas which is trapped within the seal can cause fissuring and result in seal failure.



## Low Temperature Resistant evolast<sup>®</sup>

evolast<sup>®</sup> "LT" family has been specially developed to match the latest and most stringent requirements where low temperatures are required.



**All evolast® compounds offer an outstanding chemical resistance performance.**

In the "Remarks" column you can find directions / suggestions to the specific application and any approvals / certificates.

Name	Material	Hardness Shore A	Colour	Temperature °C		Remarks *approvals available
				from	to	
evolast® B694	FFKM	60	white	-20	+270	according to FDA, USP Class VI- 3A-Sanitary Standard
evolast® B794	FFKM	70	white	-20	+270	<b>*FDA 21CFR177.2400, *USP Class VI, *3A-Sanitary Standard, *Reg. EC 1935/2004, *DM 21/03/1973, *BfR XXI</b>
evolast® B795	FFKM	70	white	-15	+300	high temperature, according to FDA, USP Class VI- 3A-Sanitary Standard
evolast® B7LT	FFKM	70	white	-40	+250	ultra low temperature, acc. to FDA, USP Class VI- 3A-Sanitary Standard
evolast® B7SC	FFKM	75	white	-20	+300	high temperature, high purity, plasma applications
evolast® B894	FFKM	80	white	-20	+270	according to FDA, USP Class VI- 3A-Sanitary Standard
evolast® B895	FFKM	80	white	-15	+300	high temperature, according to FDA, USP Class VI- 3A-Sanitary Standard
evolast® N694	FFKM	60	black	-25	+270	standard applications
evolast® N697	FFKM	60	black	-40	+260	<b>*FDA CFR 177.2400, *FDA CFR 177.2600</b> , ultra low temperature
evolast® N775	FFKM	75	black	-15	+340	outstanding thermal stability, not suitable for steam/amine
evolast® N794	FFKM	70	black	-25	+270	standard applications, <b>*FDA 21 CFR 177.2400, *FDA 21 CFR 177.2600, *3A-Sanitary Standard, *USP Class VI</b> , high temperature
evolast® N7HC	FFKM	70	black	-20	+260	steam, hot water, amine
evolast® N7LT	FFKM	75	black	-46	+250	ultra low temperature
evolast® N894	FFKM	75	black	-25	+275	standard applications, preferably stored
evolast® N896	FFKM	75	black	-15	+330	high temperature
evolast® N897	FFKM	80	black	-30	+260	low temperature
evolast® N8FD	FFKM	75	black	-15	+315	high temperature, according to FDA, USP Class VI- 3A-Sanitary Standard
evolast® N8LT	FFKM	75	black	-46	+260	ultra low temperature
evolast® N8SR	FFKM	75	black	-15	+330	steam, hot water resistance
evolast® N993	FFKM	90	black	-20	+270	standard applications
evolast® N994	FFKM	90	black	-30	+260	low temperature
evolast® N995	FFKM	90	black	-15	+330	high temperature
evolast® N9ED	FFKM	90	black	-15	+260	<b>*AED Norsok M710 – 5.33 mm, API6A (sour gas environment) – 10% H2S *NACE TM0187 (sour gas environment) – 5% H2S and – 20% H2S *Sour fluid test Arrhenius ISO 23936-2/NORSOK M710-3</b>
evolast® N9EX	FFKM	90	black	-15	+320	<b>*AED Norsok M710</b> , high temperature
evolast® N9LT	FFKM	90	black	-46	+250	<b>*AED Norsok M710, *BS EN ISO 23936-2</b> , low temperature
evolast® V7FD	FFKM	70	green	-15	+270	standard applications, acc. to FDA, USP Class VI- 3A-Sanitary Standard
evolast® V895	FFKM	80	green	-15	+310	high temperature

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