

# Specialty Elastomers for Energy, Oil and Gas Industries

Parker Hannifin's O-Ring Division, a leading developer of engineered sealing solutions, offers a large selection of elastomeric materials that are specifically formulated to meet the demands of the Energy, Oil and Gas (EOG) and chemical processing industries. These materials are available in a wide range of configurations, including standard and custom-sized O-rings, molded shapes and ParBak™ anti-extrusion devices.

## Parofluor ULTRA™ Materials

The newest materials developed for oilfield and chemical processing environments are Parofluor ULTRA



perfluoroelastomers. These compounds exhibit chemical and heat resistance similar to PTFE, yet maintain the essential properties of resilience and rebound, making them ideal for use as high-performance elastomer seals. Parofluor ULTRA materials perform in the most aggressive chemical media, including H<sub>2</sub>S, hydrocarbon and polar solvents. They also have excellent thermal stability.

## TYPICAL OILFIELD SEALING CHALLENGES

### High Pressure:

Extrusion resistance is of primary importance in the high pressures typical of oilfield applications. When space or assembly limitations prohibit the use of back-up rings, extrusion resistant O-rings can provide a good alternative sealing solution. Typically, 90 or 95 durometer materials are selected for this type of service. Parker offers specific Nitrile, Fluorocarbon, Ethylene Propylene and Perfluorinated elastomers that meet these requirements.

### High Temperature:

Temperatures in energy and oilfield applications frequently exceed 325°F, and can reach as high as 450°F. This environment puts tremendous stress on any elastomeric material. Independent testing has demonstrated that Parker materials, such as Parofluor™ V8588-90, Parofluor ULTRA FF200-75 and V1238-95 continue to perform at these temperatures while resisting reversion, compression set and embrittlement.

### Explosive Decompression:

A common challenge in oilfield sealing applications is explosion decompression or "ED." This phenomenon occurs when system pressure decays rapidly and the gases that have permeated or dissolved into the elastomer expand. This rapid decompression causes the O-ring to rupture. Parker's V1238-95 and Parofluor V8588-90 compounds exhibit superior explosive decompression resistance, and are ideal for use in applications where the potential for ED exists.

### Widely Varied Media:

To provide exceptional sealing performance in energy and oilfield applications, a material must be resistant to a broad range of media. Parker's Parofluor V8588-90 and HiFluor™ V8534-90 compounds have been evaluated using NACE standard TMO 187-98 criteria. Parker materials retain their physical properties and sealability under these tough test conditions.

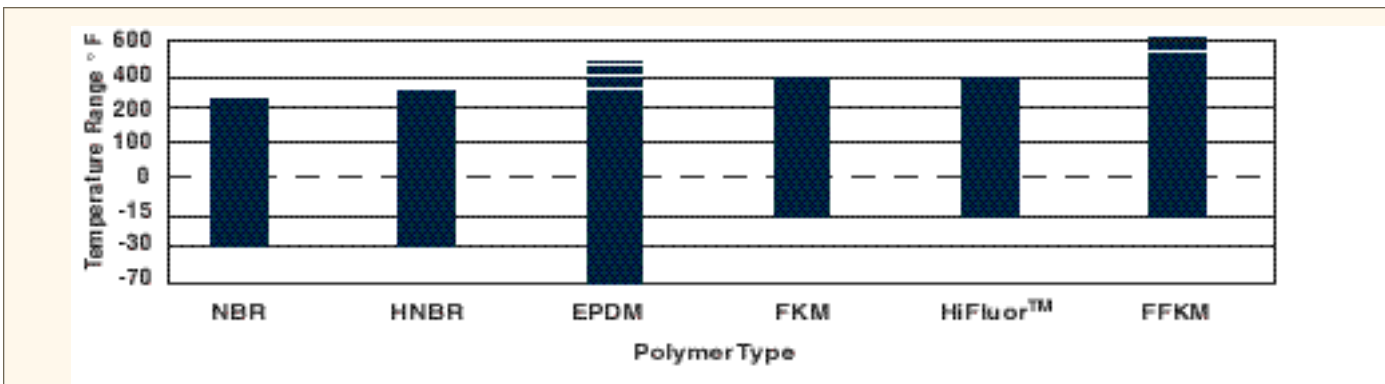
### Key Features of Parker's Specialty EOG Elastomers

- **E0962-90:** Geothermal EPDM
- **N1210-90:** Low compression set, extrusion resistance
- **V1238-95:** Superior extrusion and explosive decompression resistance
- **V8588-90: Parofluor:** High temperature, broad chemical compatibility and explosive decompression resistance
- **FF102-75: Parofluor ULTRA:** Steam, extremely strong acids and other corrosive environments
- **FF200-75: Parofluor ULTRA:** High performance low compression set, chemically inert with high temperature capability (608°F)
- **FF202-90: Parofluor ULTRA:** Similar characteristics to FF200-75 with improved extrusion and wear resistance
- **FF500-75: Parofluor ULTRA:** Widest chemical compatibility of all Parker ULTRA compounds with high temperature capability (525°F)

# fact sheet

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# Thermal Stability of Oilfield Elastomers



The temperature limits assigned to compounds in the above table are offered as guidelines only, and are dependent upon the application and the specified Parker compound. This temperature range may be reduced or extended in certain oilfield applications.

Typical Oilfield Elastomers	HARDNESS (SHORE A)	COMMENTS/APPLICATIONS
<b>NITRILES (Buna-N, NBR)</b>		
N0674-70	70	General purpose, petroleum lubricants, seawater, diesel fuel, for cap seal energizer, valves, and actuators
N1210-90	90	Low compression set, extrusion resistant, similar compatibility to N0674-70, preferred for well data logging
<b>HYDROGENATED NITRILES (HSN,HNBR)</b>		
N1173-70	70	Well service, improved methanol and sour gas resistance over Nitrile, suitable for service where the concentration of sour gas is low
N1231-80	80	Explosive decompression resistant, good abrasion and high temperature resistance
KB163-90	90	Excellent extrusion resistance, good abrasion and high temperature resistance, low swell characteristics
<b>ETHYLENE PROPYLENE (EPDM, EPR)</b>		
E0962-90	90	Geothermal, steam service, high temperature, explosive decompression resistant, extrusion resistant, suitable for service in steam/oil mixtures of less than 10% petroleum fluid, moderate H <sub>2</sub> S resistance
<b>FLUOROCARBON (FKM, FPM)</b>		
V0747-75		General purpose, compression set resistance, high resiliency FKM, good high temperature, used on ball and gate valve seats and mechanical seals
V1164-75	75	High performance fluoroelastomer, good in aqueous media, dilute base and acid resistant material
V1260-75	75	Low compression set similar to an A type FKM, fluid compatibility like GFLT type FKM
V1264-90	90	General purpose, more extrusion resistant, similar resiliency and high temperature properties as 75 durometer FKM, used in valve seats and mechanical seals
V0709-90	90	Excellent extrusion and explosive decompression resistance, downhole, excellent sour gas resistance per NACE standard TMO 187-98, wider chemical resistance including hot water and methanol, superior mechanical properties over V0858-95
V1238-95	95	
<b>AFLAS™</b>		
V1041-85	85	Improved compression set resistance, high temperature, amine, H <sub>2</sub> S, and steam resistant material
V1213-90	90	Extrusion resistant, explosive decompression resistant, amine, H <sub>2</sub> S, and steam resistant material
<b>HIGHLY FLUORINATED ELASTOMERS</b>		
V3819-75	75	General purpose, high performance fluoroelastomer, resistance to aggressive chemicals, ketones, amines, acids, and bases
HiFluor™		
V8534-90	90	Improved extrusion and abrasion resistant material, high performance fluoroelastomer, suitable for use in high pressure, aggressive chemicals
HiFluor™		
<b>PERFLUORINATED ELASTOMERS</b>		
V8545-75	75	Broad chemical resistance, for use in downhole (sour gas), drilling mud, amine-based fluids, steam, and other aggressive chemicals
Parofluor™		
V8588-90	90	Explosive decompression resistant material as demonstrated by M.E.R.L. testing, excellent sour gas resistance per NACE standard TMO 187-98 and API 6A appendix F, broad chemical compatibility
Parofluor™		
FF102-75	75	Broad chemical resistance with outstanding long-term acid resistance, suitable for use in sub surface safety valves, severe service
Parofluor ULTRA™		
FF200-75	75	High temperature, low compression set, broad chemical resistance, for use with downhole (sour gas), drilling mud, amine-based fluids, steam and other aggressive chemicals
Parofluor ULTRA™		
FF202-90	90	Improved extrusion and wear resistant material, high temperature, low compression set, similar chemical inertness as FF200-75
Parofluor ULTRA™		
FF500-75	75	Broader chemical resistance than FF200-75, suitable for use in downhole (sour gas), drilling mud, amine-based fluids, steam and other aggressive chemicals
Parofluor ULTRA™		

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