



aerospace  
climate control  
electromechanical  
filtration  
fluid & gas handling  
hydraulics  
pneumatics  
process control  
sealing & shielding



## Sealing Solutions for Oil and Gas



ENGINEERING YOUR SUCCESS.

# Oil and Gas Seal Compounds

O-Rings	Molded Shapes	Extruded Seals	PolyPak	S-Seals	Flexi Lip/ FlexSeals	Backup Rings	Composite Seals	Metal Seals	Material	Temperature Range (°F)	Hardness (Shore A)	Comments
<b>Acrylonitrile - Butadiene (Nitrile, Buna-N) – NBR</b>												
X	X	X	X	X			X		N0674-70	-30 to +250	70	General purpose
X	X	X	X	X			X		N0304-75	-60 to +225/250	75	Excellent low temperature
				X					N4400A75	-35 to +275	75	Peroxide-cured nitrile, excellent compression set resistance
	X		X	X					N4180A80	-30 to +275	80	General purpose, good compression set
X									N1490-90	-30 to +250	90	General purpose
X									NB194-90	-30 to +255	90	Low compression set, extrusion resistant
<b>Hydrogenated Nitriles – HSN, HNBR</b>												
X		X					X		N1173-70	-25 to +300/325	70	General purpose
X	X		X	X					KA453-80	-25 to +300	80	Chemically resistant
X									N1231-80	-25 to +300/325	80	Explosive decompression resistant
X	X		X	X					KA183-85/N4031A85	-50 to +300	85	Excellent low temperature capability, extrusion resistant, ED resistance, passes NACE TMO 187-98 standard
	X		X	X					N4288A85	-25 to +300	85	Excellent abrasion resistance, good compression set
	X	X							KB255-90	-25 to +300	90	General purpose
X			X	X					KB163-90	-30 to +300	90	General purpose, explosive decompression resistant, certified to NORSOK M710
X	X		X	X					KB164-90	-30 to +300	90	Extrusion resistant
X			X	X					N4007-90/N4007A90	-25 to +300	90	Explosive decompression resistant, certified to NORSOK M710 & passes NACE TMO187-98 standard
<b>Ethylene Propylene Rubber – EPDM, EPM, EP, EPR</b>												
X		X					X		E0740-75	-70 to +250	75	Low compression set
X	X	X	X	X					E0962-90/E4270A80	-60 to +250	90	Excellent steam to 500°F, explosive decompression resistant, resistant to CO <sub>2</sub> , H <sub>2</sub> S, methanol & glycols
<b>Carboxylated Nitriles (Nitroxile™) - XNBR</b>												
X									NX507-70	-20 to +275	70	General purpose
	X		X	X					N4274A85	-20 to +275	85	Extreme low friction, internal lubricant for lower friction & excellent abrasion resistance
	X		X	X					N4263A90	-20 to +275	90	Excellent abrasion resistance
<b>Fluorocarbon – FKM, FPM</b>												
X	X						X		V1164-75	-15 to +400	75	General purpose, good compression set
X		X		X					V0747-75	-15 to +400	75	General purpose
X	X								V1260-75	-15 to +400	75	Very chemically resistant
X	X		X	X					V1289-75	-55 to +400	75	Excellent low temperature performance
	X		X	X					V4205A75	-15 to +400	75	General purpose, excellent compression set resistance
X				X					VP104-85	-15 to +400	85	Extrusion resistant, explosive decompression resistant
X							X		V0709-90	-15 to +400	90	General purpose
			X	X					V4208A90	-15 to +400	90	General purpose, excellent compression set resistance
X	X	X	X	X					V1238-95	-15 to +400	95	Extrusion resistant, good compression set, explosive decompression resistant, certified to NORSOK M710
			X	X					V4266A95	-15 to +400	95	General purpose
	X	X							VA275-95	-15 to +400	95	Extrusion resistant, good compression set, explosive decompression resistant
<b>Perfluoroelastomer (ULTRA™) – FFKM, FFKM</b>												
X	X		X	X			X		V8545A75	-15 to +550	75	Good compression set resistance, extreme chemical resistance & low leachables
X			X	X					V8588-90	-5 to +572	90	High temperature resistance, broad chemical compatibility & explosive decompression resistance
<b>Highly Fluorinated Elastomers (Hifluor™) – FKM</b>												
X	X		X	X					V3819-75	-15 to +400	75	Chemically resistant, low compression set
X			X	X					V8534-90	-15 to +400	90	Chemically resistant, extrusion resistant
<b>Tetrafluoroethylene - Propylene – TFE/P</b>												
X		X							VP102-80	15 to +450	80	Low compression set
X	X		X						V1041-85	15 to +450	85	ED resistant, good in H <sub>2</sub> S, certified to NORSOK M710 & passes NACE TMO187-98 standard
	X		X						V4276A85	-15 to +450	85	Improved compression set resistance, certified to NORSOK M710 & passes NACE TMO187-98 standard
X									VP103-90	25 to +450	90	Extrusion resistant
	X		X						V4461A90	-15 to +450	90	Improved compression set resistance
<b>Polyurethane (Elasto-Plastic Materials) – PU</b>												
X	X		X						P4300 Resilon™ HT	-65 to +275	90	Highest performing TPU, high temperature, low compression set, excellent rebound
X	X		X						P4301 Resilon WR	-65 to +275	90	TPU-based, hydrolysis resistant (e.g., hot water, 195°F)
	X		X						P4306 Resilon LF	-65 to +275	90	High performance, similar to P4300 with lower friction
	X		X						P4700	-50 to +225	90	Superior polyurethane, enhanced physical properties, improved compression set & rebound
	X		X						P4615 Molythane™	-65 to +200	90	General purpose polyurethane used in petroleum based fluids, high extrusion & wear resistance
<b>Plastic Alloy Materials (PolyMyte™)</b>												
X		X			X				Z4651, Z4652	-65 to +275	60/65 D <sup>1</sup>	High pressures, temperatures up to 275°F in petroleum based fluids, 180°F in water based fluids
<b>Polytetrafluoroethylene – PTFE</b>												
				X	X				0301	-200 to +550	60 D <sup>1</sup>	Graphite filled PTFE
				X	X				0603	-200 to +550	62 D <sup>1</sup>	Aromatic polyester filled PTFE
				X	X				0502	-200 to +550	62 D <sup>1</sup>	Carbon fiber filled PTFE
				X	X				0204	-250 to +575	67 D <sup>1</sup>	Fiberglass & MoS <sub>2</sub> filled PTFE
				X	X				0307	-200 to +575	62 D <sup>1</sup>	Carbon-graphite filled PTFE
				X	X				0602	-200 to +575	65 D <sup>1</sup>	Carbon & PPS filled PTFE
<b>Polyetheretherketone (UltraCOMP™ Series of Engineered Thermoplastic Compounds) – PEEK</b>												
						X			UltraCOMP CGT	-65 to +500	85 <sup>2</sup>	Carbon/Graphite/PTFE filled
						X			UltraCOMP HTP	-65 to +480	100 <sup>2</sup>	High temperature, pressure & chemical environments, excellent fatigue resistance & ED resistant
<b>Metal</b>												
							X		304 Stainless Steel	+800 max	N/A	Specification shown is for material in "strip" form
							X		Alloy 718	+1,200 max	N/A	Specification shown is for material in "strip", "bar/forge" form
							X		Alloy X-750	+1,200 max	N/A	Specification shown is for material in "strip" form
							X		Hastelloy C-276	+1,400 max	N/A	Specification shown is for material in "strip", "bar/forge" form
							X		Waspaloy	+1,600 max	N/A	Specification shown is for material in "strip" form
							X		Haynes 25	+2,000 max	N/A	Specification shown is for material in "strip" form
						X			316L Stainless Steel	-	N/A	Specification shown is in plate form

<sup>1</sup>Hardness Shore D per ASTM D2240  
<sup>2</sup>Hardness Rockwell M per ASTM D785

Note: Composite seals include Gask-O-Seals, Integral Seals, Fastener and Fitting Seals





# Sealing Solutions for Oil and Gas

The equipment that moves today's industry is more reliable and highly-engineered than ever before. That's why Parker develops and manufactures engineered sealing solutions – technologically advanced sealing devices and materials that can keep pace with aggressive chemicals, high temperatures and high and low pressures.

Our sealing products have our unique combination of experience and innovation built right in, and we're able to supply them quickly and cost effectively to fit virtually any application you can think of.

## Sealing Environment

- **Aggressive chemicals, including H<sub>2</sub>S (sour gas and sour oil), hydrocarbon concentrated bases, amines, formates and polar solvents**
- **High pressures to 50,000 psi**
- **Elastomer temperatures to 608°F**
- **Metal seal temperatures to 2,000°F**
- **Tolerances to +/- .001 in.**
- **Continuous exposure to sea water, steam, steam/oil mixes, petroleum oils, drilling mud, waves, wind, shock, vibration, abrasion, rapid decompression and rotary cycling**
- **Production and drilling risers and valves, blowout preventers, wellhead equipment, mud pumps, tricone drilling bit seals, compressors and controls, just to name a few**

## Market Environment

- **World energy demand will increase due to growth in China, India and Asian countries**
- **Rise of technologies to locate, transport and deliver liquefied natural gas (LNG) will herald a move from oil to gas as a major world energy source**
- **Increased globalization will grow demand for global logistics, spurring vendor partnerships and single order point systems**

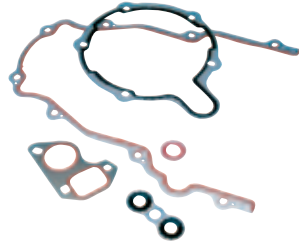
Around the corner or around the globe, Parker is there with engineered solutions to tough sealing problems.

# Oil and Gas Product Overview



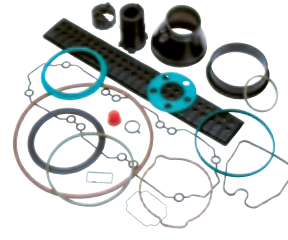
## Gask-O-Seals

Gask-O-Seals are very reliable elastomer bonded-to-metal or plastic sealing devices intended for applications requiring extreme reliability, longevity and durability. The elastomer is molded directly in place within the groove or grooves of a metal or plastic retainer.



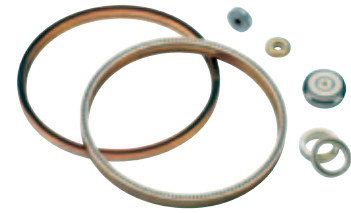
## Integral Seals

The integral seal design bonds the elastomer sealing element to thin metal or engineered plastic retainer plates, allowing for a very complex sealing geometry, ease of assembly and reliable service in a single seal element.



## Custom Molded or Machined Shapes

Custom molded or machined seals are available in a virtually infinite range of shapes and cross sections. Parker designs and manufactures engineered elastomeric shapes, both homogeneous and inserted, for sealing systems and isolation applications.



## Dynamic Metal Seals and Sealing Systems

Parker's dynamic metal seals offer a new design option for critical low duty-cycle, all metal sealing in mission critical applications. Frequently selected for high pressure/high-temperature (HPHT) service, these seals excel under extreme environments.



## Ultra-High-Temperature Metallic Seals

In the never-ending search for higher efficiency and reduced emissions, jet engines and gas turbines are now running hotter than ever. Parker's resilient turbine seals offer robust ultra-high-temperature sealing solutions for compressor, combustion chamber and power turbine stages.



## Metal Seals and Gaskets

Parker provides metal seals in a wide range of base metals and plating finishes, available as metal jacketed gaskets, corrugated gaskets and flat gaskets, in a wide range of sizes and shapes. Metal seals are ideal for high-temperature, high-vacuum, broad chemical resistance and low extractable applications.



## O-Rings

O-rings are available in all AS568 inch sizes and a wide range of metric sizes (DIN 3771, ISO 3601 and JIS B2401) as well as custom sizes. O-rings can be molded in a wide range of elastomer compounds ranging from basic nitrile to perfluorinated materials called ULTRA.



## PTFE FlexiSeals

Our full line of spring energized PTFE lip seals are used on rod, piston, face and rotary sealing applications. FlexiSeals are typically used in areas where elastomeric seals cannot meet the frictional, temperature or chemical resistance requirements of the application.



## PTFE FlexiLip and FlexiCase Rotary Seals

FlexiLip high-speed PTFE lip seals are designed for rotary applications. The filled PTFE sealing element, available in single, dual and triple sealing lip designs, provides chemical compatibility, a wide temperature range and high speed capability.



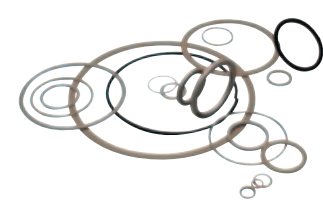
## Rod and Piston Seals

U-Cups and the PolyPak line of fluid power rod and piston seals have been the industry standard for over 40 years. PolyPak and U-Cup seals are available in a variety of profiles, energizers and seal materials, providing seal solutions for light, medium and heavy duty hydraulic applications.



## Oilfield Rubber Products

Our drilling and well-servicing products span a broad range – including blowout preventers, packer elements, diaphragms, drill pipe/casing protectors, hammer union seals, packer cups, cement plugs, liner wipers, flex plugs, oil saver rubbers, pipe wipers, rod strippers, swap cups, pulsation dampeners, test cups and water saver rubbers.



## Backup Rings

Parker backup rings offer simple solutions to safely increase system pressure or solve an existing seal extrusion problem. Standard profiles are available in a variety of materials to complement virtually any Parker rod or piston profile.





## Value Added Services

Parker's product offering includes more than manufacturing and delivery. Custom seal kits, part marking and special packaging simplify inventory control of expendable components for oil and gas equipment and tools.

## Product Innovation

Today's sealing challenges demand innovative solutions, and nobody knows innovation better than Parker. Voice of the customer programs, market knowledge and six decades of engineering, material formulation and manufacturing experience all combine to develop new products to meet your evolving sealing needs. And our manufacturing facilities are keeping pace with innovation with their custom machining and quick turnaround PTFE manufacturing.

## Application Engineering

Our team of application engineers can help you find the most reliable, cost-effective sealing solution for your application. These engineers are experts, combining decades of experience in real-world sealing with a full complement of technology-driven design tools.

## Advanced Computer Simulation

Utilizing advanced, non-linear Finite Element Analysis (FEA) software, our engineers can perform extremely

accurate virtual simulations of performance based on actual physical test data. These simulations eliminate the need for multiple iterations of costly prototype tooling, and dramatically reduce development lead times. They also ensure first-time selection of the best material and geometry for your application.

## Quality Initiatives

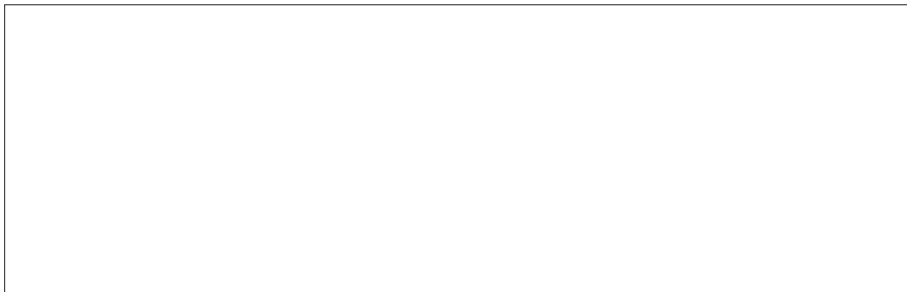
Quality isn't just a buzzword at Parker; it's a culture based on employee empowerment and continuous improvement. Our manufacturing facilities are registered to ISO 9001, AS 7115, ISO 14001, and we're constantly striving to improve customer satisfaction and product quality through the implementation of:

- **Six Sigma methodology**
- **Lean manufacturing**
- **TQM methodology**
- **Feasibility studies**
- **Kaizen events**

## Worldwide — Where You Need Us

Around the corner or around the globe, Parker is there with engineered solutions to tough sealing problems. Your local Parker oil and gas market specialist provides a single point of contact for local sealing support. And our worldwide headquarters is the hub of an established worldwide network of over 300 distributor and service center locations. This network – and the global sales and engineering support it provides – means you can always get quality products when and where you need them. It also means that sound advice from a Parker sealing expert is never far away.





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