



Engineered Sealing Solutions for the Energy, Oil & Gas Industries

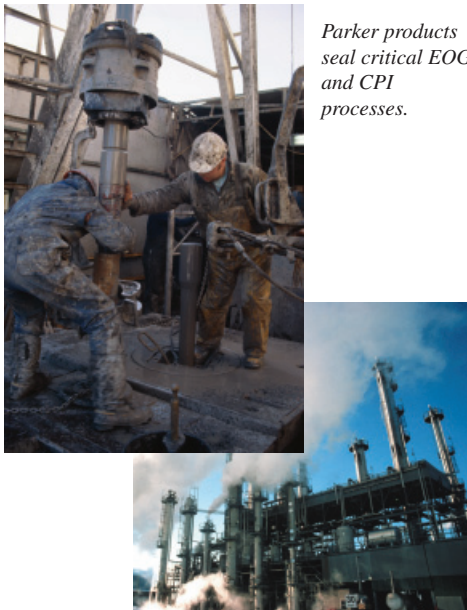
ISO 9001 / QS 9000 Registered

Catalog PSG-5003/USA



Engineered sealing solutions for every application.

Parker Hannifin's Seal Group is a leader in the compounding, design and manufacture of precision-engineered sealing products for the energy, oil and gas (EOG) and chemical processing (CPI) industries. From exploration to refining, land to subsea, we offer thousands of standard and custom products in materials ranging from nitriles, fluorocarbons and perfluoroelastomers to advanced polyurethanes, PTFE and thermoplastics. These 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.



Parker products seal critical EOG and CPI processes.

For Drilling Operations

Parker Engineered Polymer Systems (EPS) and O-Ring (ORD) divisions specialize in innovative seal designs and compounds for shock tools, drilling jars, and other applications associated with drilling operations. These products include:

- Parker *PolyPaks*TM
- Parker O-Rings
- Parker *LC Profile* seals

Seal profiles are available in carboxylated nitrile, highly saturated nitriles, and fluorocarbon compounds. O-rings are ideal for use in a variety of static and low-pressure sealing applications.

For Blow-Out Preventers (BOPs)

- *Type B PolyPaks*TM are designed to handle the high pressures and rigorous duties associated with this aspect of the drilling process.
- Polyurethane and *PolyMyte*TM compounds are proven performers in BOP applications. In high pressure applications, Parker back-up ring systems provide the extrusion resistance required to protect the critical sealing element.
- *UltraCOMP*TM products, when used as back-up devices, provide exceptional extrusion resistance at wide temperature ranges and high pressures. (See Bulletin 5211B-USA).
- Compound V1238-95 exhibits more than twice the extrusion resistance of standard 90 durometer O-ring materials with a unique combination of superior physical and chemical properties.

For Subsea Applications

Polyurethanes with increased water resistance and high abrasion resistance can maximize the life of risers, casing hangers and mud pumps. The right combination of Parker polyurethane, nitrile, fluorocarbon, or thermoplastic will meet most underwater sealing challenges.

For Land and Subsea Service

- Parker *Type B PolyPak* seals and patented "Pressure Inverting Pedestal" (*PIP*) rings handle the rigorous service requirements of subsea connectors and actuators. The seal materials of choice for this tough environment are Parker *PolyMyte*, *UltraCOMP*TM and thermoplastic rubber.
- Where high pressures are expected, the use of a Parker *UltraCOMP*TM back-up system is recommended to protect the seal elements from possible damage. If high pressure gas is involved, Parker explosive decompression resistant (*ED*) compounds will typically maintain sealability where other elastomers fail.
- Compound V1238-95 exhibits unequalled explosive decompression resistance and has excellent sour gas resistance per NACE standard TMO 187-98.

For Production

Parker engineered rod and piston seals serve EOG production seal needs in "Christmas" trees, gas lift valves, injection systems, flowlines, connectors, actuators and compressors. Additional products include:

- Packer elements
- Swabs for cleaning drilling lines
- Mud motor rotary seals
- Molded custom seals and machined shapes



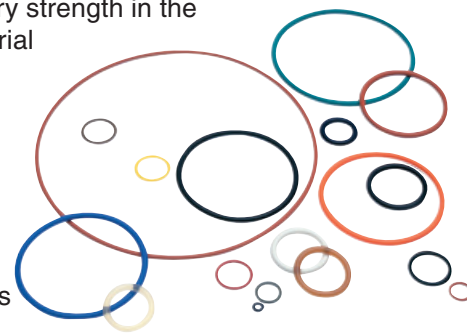
Drill line swabs



Packer elements & custom shapes

For Static Sealing Applications

For static and light-duty dynamic applications, the most popular sealing solution is still the O-ring. The reliable geometry, proven performance and low cost of O-ring seals make them the preferred seal around the world. Parker's primary strength in the O-ring market is material technology. No seal manufacturer offers a broader range of materials—from basic nitriles for petroleum service and explosive decompression resistant fluorocarbons to our newest, high-performance *Parofluor ULTRA*TM perfluorinated elastomers—for sealing in the most demanding chemical and thermal environments.



Parker O-Rings for static sealing



Parker Sealing Product Types

Parker PolyPak™ Seals

PolyPaks are multi-purpose seals that provide effective sealing at both high and low pressure. *PolyPaks* are ideal for use in Energy, Oil and Gas applications due to their unique physical and mechanical properties. *PolyPak Seals* offer these advantages:

- High conformability
- Excellent sealability
- Extrusion resistance
- Long service life
- High stability
- Wide choice of profiles
- Wide choice of materials
- Easy retrofit



Parker PolyPaks

(See Catalog EPS 3800 for more information)

Parofluor™ Advanced Perfluoroelastomers

Parofluor™ and *Parofluor ULTRA™* perfluorinated compounds are specially formulated for oil and gas industry service. Parker offers both standard and non-standard O-rings in the *Parofluor ULTRA* family of materials. Parker offers both standard and non-standard O-rings, U-cups, *PolyPaks*, *LC Profile*, custom engineered seals, such as packer elements, and other shapes in *Parofluor* and *Parofluor ULTRA* materials. These materials:

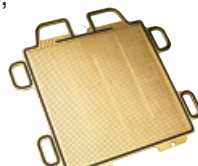
- Perform in the most aggressive chemical media, including H₂S, hydrocarbon and polar solvents
- Have excellent thermal stability up to 320°C (608°F)
- Exhibit chemical and heat resistance, yet maintain the essential properties of resilience and rebound, making them ideal for use as high-performance elastomer seals
- Resist extrusion and the detrimental effects of explosive decompression



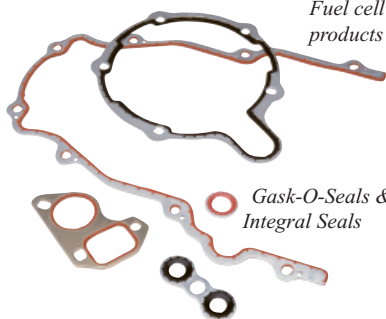
Parofluor ULTRA™
O-Rings and molded shapes

Custom Gask-O-Seals and Integral Seals

Parker's Composite Sealing Systems Division (CSS) manufactures a wide range of metal/rubber combinations, including the *Gask-O-Seal™* volume/void seal and the *Integral Seal™* edge molded seal. These products, along with a broad selection of standard resilient metal seals and 460 and 630 pipe flange seals, expand our line of engineered solutions for EOG applications. In order to meet the evolving demands of advanced energy technologies, such as the fuel cell, we continuously develop new designs and material formulations for our composite seal products.



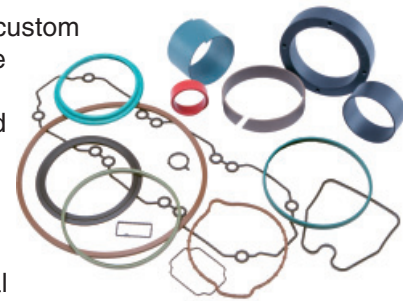
Fuel cell products



Gask-O-Seals & Integral Seals

Custom Molded & Machined Seals and Components

EPS and ESD divisions offer custom molded rubber, including large cross section, large diameter and thermoplastic molded and machined products ranging in sizes from 0.030" to 100" for even the most demanding applications. These products include large diameter, special size O-rings and molded shapes.



Custom Shapes

UltraCOMP™ Molded & Machined Components

Parker's *UltraCOMP™* engineered thermoplastic polymers are formulated for unparalleled performance in applications requiring very high working temperature range, exceptional chemical resistance, excellent water resistance and high tensile and compressive strength. EPS Division offers a range of *UltraCOMP* tube stock, along with custom machined parts for high pressure, high temperature and load bearing systems. Typical products include:

- Back-up rings
- Bearings
- Male/female vee adapters
- PIP rings
- Anti-extrusion devices

(See Technical Bulletin EPS 5264B1-USA for more information)



UltraCOMP™ tubes

Grafoil®, Rubber/Metal & Fabric/Rubber Coil Vee Ring

EPS Division's Houston EOG Operations is strategically positioned to serve the needs of the Energy, Oil & Gas industries. Manufacturing capabilities at the Houston site include rubber-to-metal bonding, Grafoil® compression molding, fabric and rubber molding.



Grafoil® die-formed rings

Parker Polon® PTFE FlexiSeals™

The *FlexiSeal™* is a spring-energized U-cup utilizing a variety of jacket profiles, spring types and materials to meet the EOG industry's most demanding engineered sealing requirements. Jacket profile bodies are made from Polon® PTFE, PTFE composites or other high performance polymer plastics. Three different spring types are available in several corrosion-resistant metal alloys, including stainless steel, Elgiloy® and Hastelloy® (See Catalog PPD 5315 for more information).



Polon® PTFE FlexiSeals™

CNC Machining

Parker's EPS Division can machine seals up to 17" in diameter for quick prototype turnaround, short-run testing and production parts. Our skilled machining specialists work with such diverse seal materials as *UltraCOMP™*, Nylon, PTFE, *Resilon™ HT* urethane (P4300), P4700 urethane and PPS.

Large Diameter Molding

Parker EPS and ORD Divisions have large diameter molding capabilities, including:

- Thermoplastic molding up to 100" diameter
- Rubber molding to 72" diameter
- Large diameter PTFE machining to 60"
- Unlimited inside diameter O-ring sizes

Isostatic Molding

The EPS Division also has isostatic molding capability, and can provide thin-wall molding of Polon® PTFE for manufacturing valve and stem packing products used extensively in the Energy, Oil & Gas industries. Isostatic molding makes Polon PTFE products, such as *FlexiSeals™*, very competitive for high-volume, long-run applications. EPS also has specialized equipment to support long-length molding requirements.



Custom Polon® PTFE seals and shapes

Materials Expertise

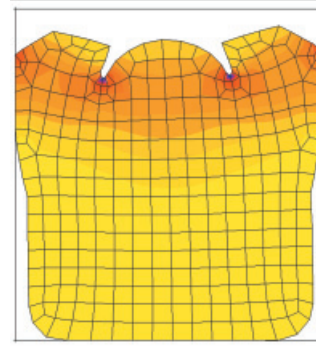
Our polymer chemists and material development staff can create or modify existing compounds to meet specific customer needs, such as:

- Improved fluid resistance
- Reduced wear or friction
- Improved mechanical properties
- Enhanced thermal stability

Finite Element Analysis & Seal Design Optimization

Using sophisticated Finite Element Analysis (FEA) software, Parker engineers can analyze critical design information, such as stress concentration, heat transfer, fluid flow and electro-magnetic properties of new and existing seal geometry. This streamlines tooling and production processes, and helps ensure the selection of the right material and geometry for your application. Using FEA technology, our engineers can determine:

- Deformation (deformed shape)
- Volume/void ratios, gland fill %
- Stress distribution
- Load - Deflection
- Stability analysis
- Friction force
- Thermal effects
- Material evaluation
- Seal life prediction



FEA plot of Parker LC Profile seal geometry under compression

Technical Support

Parker product engineers are available to address temperature, pressure, gland design, surface finish and all other seal design considerations, and can often optimize an existing design or propose cost-effective alternatives. Our in-house hydraulic and pneumatic test and R&D laboratories enable us to quickly develop and perform appropriate test protocols for our customers.

Worldwide Availability

Around the corner or around the globe, Parker's Seal Group is there with solutions to tough sealing problems. This worldwide sealing network, which consists of 46 manufacturing locations and more than 200 distributor and service center locations in nine countries, means that you can always get quality products when and where you need them. It also means that sound advice from Parker sealing experts is never far away.

Parker Materials for Energy, Oil & Gas Sealing Service

Division		Material	Temp Range (°F)	Hardness (Shore A)	Comments / Applications
ORD	EPS				
NITRILES (Buna-N, NBR)					
◆		N0674-70	-30° +250°	70	General purpose. Petroleum lubricants, seawater, diesel fuel.
◆	◆	N4180-80	-40° +250°	80	General purpose. Petroleum lubricants, seawater, diesel fuel.
◆		N1210-90	-30° +275°	90	Low compression set, extrusion resistant. Petroleum lubricants.
HYDROGENATED NITRILES (HSN, HNBR)					
◆		N1173-70	-25° +300°	70	General purpose HNBR, abrasion and high temperature resistance
◆		N1231-80	-25° +300°	80	Explosive decompression resistant. Good abrasion and high temp resistance.
◆	◆	N4288-85	-20° +300°	85	High tensile. Excellent abrasion resistance. Good compression set resistance. High wearing applications.
◆		KB163-90	-25° +300°	90	Extrusion resistant, good abrasion and high temp resistance, low swell characteristics
◆	◆	N4007-95	-20° +300°	95	High tensile. Excellent abrasion resistance. Good compression set resistance. High wearing applications.
CARBOXYLATED NITRILES (NITROXILE™)					
◆		N0750-80	-20° +275°	80	Excellent abrasion resistance. Petroleum lubricants, seawater, diesel fuel.
◆	◆	N4263-90	-20° +275°	90	Excellent abrasion resistance. Petroleum lubricants, seawater, diesel fuel.
◆	◆	N4006-95	-20° +275°	95	Internally lubricated. Lower friction, excellent abrasion resistance. Petroleum lubricants, seawater, diesel fuel.
◆	◆	N4021-95 XHNBR	-20° +300°	95	Internally lubricated. Lower friction, excellent abrasion resistance. Petroleum lubricants, seawater, diesel fuel.
ETHYLENE PROPYLENE (EPDM, EPR)					
◆		E0962-90	-65° +500°	90	Steam service. Geothermal, high temp, resistant to CO ₂ , H ₂ S, methanol and glycols, explosive decompression resistant.
	◆	E4270-90	-65° +500°	90	Steam service. Geothermal, high temp, resistant to CO ₂ , H ₂ S, methanol and glycols, explosive decompression resistant.
FLUOROCARBON (FKM, FPM)					
◆	◆	V0747-75	-15° +400°	75	General purpose. Excellent compression set resistance. High temp, high pressure, petroleum oils & fuels.
◆		V1260-75	-15° +400°	75	F type fluorocarbon. Methanol and H ₂ S resistant. Extremely low compression set. Moderate to good amine resistance.
◆	◆	V4205-75	-15° +400°	75	General purpose. Excellent compression set resistance. High temp, high pressure, petroleum oils & fuels.
◆	◆	V0965-80	-15° +400°	80	General purpose G.F. type fluorocarbon. Methanol resistant. High temp, high pressure, petroleum oils.
	◆	V4285-85	-15° +400°	85	General purpose G.F. type fluorocarbon. Methanol resistant. High temp, high pressure, petroleum oils.
◆		V1264-90	-15° +400°	90	F type fluorocarbon. Similar to V1263-75 but higher durometer for increased extrusion and wear resistance.
◆		V0709-90	-15° +400°	90	Excellent compression set resistance. High temp, petroleum oils & fuels.
◆	◆	V4208-90	-15° +400°	90	Excellent compression set resistance. High temp, high-pressure petroleum oils & fuels.
◆	◆	V1238-95	-15° +400°	95	Extrusion resistant, explosive decompression resistant, good compression set resistance, high temp, high pressure, H ₂ S
◆	◆	V4266-95	-10° +450°	95	Similar to V4208-90 with greater wear resistance and extrusion resistance.
PERFLUORINATED ELASTOMERS					
◆	◆	V8545-75 Parofluor™	5° +572°	75	Broad chemical resistance, for use with downhole (sour gas), drilling mud, amine-based fluids, steam, and other aggressive fluids.
◆		FF102-75 Parofluor ULTRA™	5° +525°	75	Broad chemical resistance with outstanding long term acid resistance, suitable for use in sub surface safety valves, severe service.
◆		FF500-75 Parofluor ULTRA™	5° +525°	75	Broader chemical resistance than FF200-75, suitable for downhole (sour gas), drilling mud, amine-based fluids, steam, and other aggressive chemicals.
◆		FF200-75 Parofluor ULTRA™	5° +608°	75	High temperature, high modulus, low compression set, broad chemical resistance, for use with downhole (sour gas), drilling mud, amine-based fluids, steam, and other aggressive chemicals. Low leachables.
◆		FF202-90 Parofluor ULTRA™	5° +608°	90	Improved extrusion and wear resistant material, good compression set resistance, extreme temps, similar chemical inertness as FF200-75.
◆	◆	V8588-90 Parofluor™	5° +536°	90	Extrusion and explosive decompression resistant, good compression set resistance, extreme chemical resistance, high temp, CO ₂ , H ₂ S, amines, steam
HIGHLY FLUORINATED ELASTOMERS					
◆	◆	V3819-75 Hifluor™	-15° +400°	75	Cost-effective alternative to perfluorinated materials. Abrasion resistance, resistance to aggressive chemicals, ketones, amines, acids and bases.
◆	◆	V8534-90 Hifluor™	-15° +400°	90	Extrusion resistant version of V3819-75. High pressure, resistant to aggressive chemicals.
AFLAS™					
◆		V1041-85	15° +450°	85	Improved compression set resistance. Amines, H ₂ S, steam, high temp.
◆	◆	V4276-85	15° +400°	85	Improved compression set resistance. Amines, H ₂ S, steam, high temp.
◆		V1213-90	15° +400°	90	Extrusion resistant, explosive decompression resistant. Amines, H ₂ S, steam.
ELASTO-PLASTIC MATERIALS					
	◆	P4300 Resilon™ HT	-65° +275°	90	Highest performing TPU, high temperature, low compression set, excellent rebound.
	◆	P4301 Resilon™ WR	-65° +275°	90	TPU-based, hydrolysis resistant (e.g., hot water, 195°).
	◆	P4700	-50° +225°	90	Superior polyurethane designed for enhanced physical properties. Improved compression set and rebound.
	◆	P4615 Molythane™	-65° +200°	90	General purpose polyurethane compounded for high extrusion resistance. Excellent wear and abrasion resistance.
PLASTIC ALLOY MATERIALS					
	◆	PolyMyte™	-65° +275°	60 D	High tear strength, abrasion and extrusion resistance. Excellent resistance to petroleum fluids, many phosphate esters, some chlorinated hydraulic fluids, up to 180° in water.
	◆	Molygard™	-65° +250°	120 R	Proprietary compound of filled nylon. Load bearing and anti-extrusion.
Polon® PTFE					
	◆	Polon® 110	-450° +425°	60 D	Virgin Polon PTFE. Best for static applications. Good in vacuum with low gas permeability, Excellent in cryogenics. Can be used in slow, infrequent dynamics.
	◆	Polon® 257	-200° +575°	62 D	Glass/Moly filled PTFE. High wear-resistance in high speed reciprocating service and on hardened shafts in well-lubricated rotary applications.
	◆	Polon® 134	-200° +575°	62 D	Glass-filled PTFE. High wear resistance, excellent performance in seat and stem packing.
	◆	Polon® 08	-360° +550°	67 D	Carbon fiber filled PTFE. Dynamic applications. High wear material with low abrasion.
	◆	Polon® 114	-320° +180°	62 D	UHMWPE. High-wearing plastic for use in abrasive media. Excellent in H ₂ O-based media, but restricted chemical and heat resistance. Reciprocating applications or very slow rotary service.
	◆	Polon® 117	-320° +550°	65 D	Carbon / PPS / Filled PTFE: Abrasion resistant, high wearing material for use on very hard surfaces. Intended for severe service dynamic applications involving high PV values and/or high temperature. Not recommended for use in oxidizing agents or ethers above 200°F.
UltraCOMP™ SERIES OF ENGINEERED THERMOPLASTIC COMPOUNDS					
		High performance thermoplastic materials. High temp, high pressure, chemical resistant compound. Good extrusion resistance and compressive strength. Back-up devices, valve seats, PIP rings, anti-extrusion and special sealing elements.			
	◆	UltraCOMP™ HTP	-65° +500°	89 D	UltraCOMP™
	◆	UltraCOMP™ CGT	-65° +500°	85 D	Carbon/Graphite/PTFE filled. Enhanced mechanical properties. Bearings, thrust washers

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For fast, easy and accurate seal design assistance, ask for *Parker's Total inPHorm™ seal design and material selection software*. Total inPHorm includes five separate programs for the specification of:

- **O-Rings**
- **Static Seals**
- **Composite Sealing Products**
- **Hydraulic & Pneumatic Seals**
- **EMI Shielding & Thermal Management Products**

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