

## Engineered Seals Division

### Manufacturing Capabilities/Technologies

In-house mixing; homogeneous molding and over-molding expertise; injection, compression, transfer and liquid injection; specialty machining operations; system, sub-system and assembly; cleanroom manufacturing area; functional testing.



### Division Products

#### Composite Seals

- Fluid transfer seals
- Pipe seals
- Cluster seals
- Bearing seals
- Custom seals and isolators
- Hay rake tines and other agricultural equipment components

#### Custom Molded Seals

- Turbine shaft seals
- Machined lip seals
- Isolation mounts
- Grommets
- Connector seals
- Diaphragms
- Bellows
- Poultry picking fingers
- Filter seals
- Fuel management seals
- Wire connector boots
- Aerosol valve seals
- D-rings
- Packer elements
- Press-in-place diamond seal and H-seal
- Dovetail retrofit EZ-Lok™ and WEAR-Lok™

## Composite Sealing Systems Division

### Manufacturing Capabilities/Technologies

Machining, stamping, compression, transfer and injection molding, rubber-to-metal and composite bonding, vacuum heat-treatment, electroplating, roll-forming, welding and lapping, class 10,000 cleanroom, mechanical, chemical and functional testing.



### Division Products

#### Composite Seals

- Gask-O-Seal® volume/void seals
- Integral Seal™ edge molded seals
- Stat-O-Seal fastener and fitting seals
- ThredSeal™ fastener and fitting seals
- Lock-O-Seal fastener and fitting seals

#### Metal Seals

- EnerRing resilient metal seals (O, C, E, U AND V cross-sections)
- Metal jacketed gaskets
- Corrugated gaskets
- Flat metal gaskets

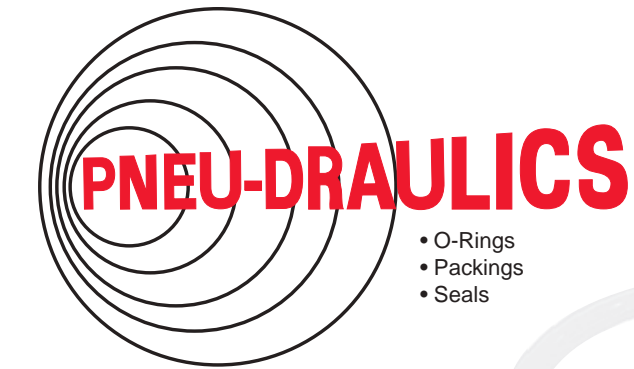
#### Sealing Systems

- Composite sealing systems including seal, sealing interface and system design and manufacture

For all of your sealing needs call Alabama Seal and Packing at (205) 879-7225

### Common Base Polymer Families

Chemical Name	Abbreviation	Temperature Range	Characteristics
Acrylonitrile-Butadiene (Nitrile, Buna-N)	NBR	-70°F TO 275°F (-57°C TO 135°C)	Most widely used polymer in the seal industry. Excellent resistance to petroleum-based fluids, good balance of physical properties and wide temperature range.
Isobutylene-Isoprene (Butyl)	IIR	-75°F to 250°F (-59°C to 121°C)	Low permeability rate and good electrical properties. Often used to seal low temperature vacuum system applications.
Chloroprene Rubber (Neoprene)	CR	-60°F to 250°F (-51°C to 121°C)	Good general purpose polymer. Exhibits good ozone, aging and chemical resistance—primarily used in refrigerants.
Ethylene Acrylate (Vamac®)	AEM	-40°F to 350°F (-40°C to 177°C)	Similar to polyacrylate with improved low temperature performance, swells more in oil than polyacrylate.
Ethylene Propylene Rubber	EPDM, EPM EP, EPR	-65°F to 300°F (-54°C to 149°C)	Widely specified seal material—excellent resistance to alcohols, ketones, steam, brake fluid, Skydrol® and other phosphate ester based hydraulic fluids.
Fluorocarbon	FKM, FPM	-55°F to 400°F (-48°C to 204°C)	Second most popular seal material after nitrile. Wide-spectrum chemical resistance and broad temperature range. Some specialty FKM compounds have low temperature static sealing to -40°F (-40°C). Commonly used in fluids.
Fluorosilicone	FVMQ	-100°F to 350°F (-73°C to 177°C)	Combines temperature range of silicone with good resistance to petroleum-based fuels and lubricants. Applications with high heat that are combined with potential exposure to petroleum oils and/or hydrocarbon fuels.
Hifluor™	FKM	-15°F to 400°F (-26°C to 204°C)	Parker's trade name for a group of intermediate technology materials that bridge the gap between fluorocarbon and perfluoroelastomer.
Hydrogenated Nitrile	HNBR, HSN	-40°F to 300°F (-40°C to 149°C)	Similar to nitrile with improved high temperature capabilities and ozone resistance. Excellent resistance to petroleum-based fluids.
Liquid Silicone Rubber	LSR, LIM	-175°F to 450° (-115°C to 232°C)	LSR is mixed as a two-part liquid and is pumped into an injection tool. The material's low viscosity prior to vulcanization requires a lower mold pressure and shorter vulcanization times compared to conventional injection molding.
Polyamide (Nylon 6, Nylon6, 6)	PA 6	-65°F to 250°F (-54°C to 121°C)	Well known family of plastics used as anti-extrusion devices and retainers. Resistant to a variety of petroleum and phosphate ester hydraulic fluids.
Perfluoroelastomer	FFKM, FFKM	5°F to 608°F (-15°C to 320°C)	Parker's Parofluor™ and Parofluor ULTRA™ materials combine the chemical resistance of PTFE with the elastic properties of fluorocarbon.
Polyacrylate	ACM	-5°F to 350°F (-21°C to 177°C)	Outstanding resistance to petroleum-based fuels and oils. Good resistance to oxidation, ozone and sunlight—resists flex cracking.
Polyetheretherketone	PEEK	-80°F to 450°F (-62°C to 232°C)	High-temperature-resistant plastic used where extrusion resistance, high-temperature capability and a broad resistance to chemical environments is needed. Available in unmodified or glass-filled formulations.
Polytetrafluoroethylene	PTFE	-450°F to 550°F (-268°C to 288°C)	Stable polymer with extremely good resistance to almost all known chemicals. Parker's proprietary polytetrafluoroethylene material is called Polon®.
Polyurethane	AU, EU	-40°F to 200°F (-40°C to 93°C)	Tough, abrasion and wear-resistant material, well suited for hydraulic and pneumatic rod or piston applications. Parker's proprietary materials, Moythane®, Resilon® and Ultrathan® deliver the best overall sealing performance of all commercial polyurethane formulations. Ultra clean medical and optical grades are also available.
Silicone	VMQ, PVMQ, PMQ	-175°F to 450°F (-115°C to 232°C)	Exceptional heat and compression set resistance, good insulating properties, tends to be physiologically neutral and is useful in wide temperature extremes. Relatively poor tensile strength, tear and abrasion resistance.
Tetrafluoroethylene-Propylene (Aflas®)	TFE/P	15°F to 450°F (-9°C to 232°C)	High-temperature stability, resistance to broad range of chemicals, including bases, amines, sour gas, hydrocarbon blends and brake fluid. Its poor low temperature flexibility and compression set resistance has limited a more widespread use of the materials.



- O-Rings
- Packings
- Seals



We are strategically focused on providing engineered solutions to the following key markets:



#### Aerospace

Vehicles moving through air and space.



#### Automotive

Vehicles and components associated with propelling and stopping vehicles.



#### Chemical Industry

Chemical processing producing a wide variety of solid, liquid and gaseous materials.



#### Consumer

Appliances, consumer electronics, water systems and food & beverage equipment.



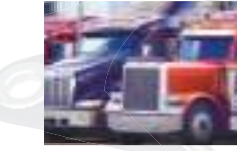
#### Fluid Power

Hydraulic and pneumatic systems or components.



#### General Industrial

Manufacturing or processing of products or components.



#### Heavy Duty Mobile

Construction, agriculture and heavy trucks.



#### Information Technology

Computer systems, peripherals and components.



#### Life Sciences

Medical devices, diagnostic & lab equipment and pharmaceutical manufacturing.



#### Military

Government weapons, vehicles, surveillance and security.



#### Oil & Gas

Oil and natural gas exploration, drilling, extraction and conveyance.



#### Other Transportation

Railways, subways and marine.



#### Power Generation

Electrical power generation facilities.



#### Renewable Energy

Naturally replenished energy from sunlight wind, rain, tides and geothermal services.



#### Semiconductor

Design and fabrication of semiconductor devices.



#### Telecommunications

Transmission of signals over a distance for the purpose of communications.

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### Pneu-Draulics

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### Alabama Seal and Packing

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The Sealing Specialists





## Parker Seal Group Divisions

### Engineered Polymer Systems

#### Manufacturing Capabilities/Technologies

Plastics injection molding, urethane reactive extrusion, plastics compounding; rubber compression, transfer, and injection-compression molding; in-house elastomeric mixing, rubber to metal bonding; PTFE blending, molding and sintering; CNC precision machining and milling, in-house prototyping and tooling; in-house material and validation labs; class 1,000 and class 100,000 cleanrooms.

#### Division Products

##### Packings

- PolyPak® rod and piston seals
- Resilon® polyurethane seals
- WearGard, MolyGard® & PTFE wear rings and bearings
- Wipers and scrapers
- U-Cup packings
- T-Seals
- V-Packing
- Integrated Pistons

##### Rotary Shaft Seals

- Clipper® and Parker oil seals
- FlexiLip PTFE rotary seals
- FlexiCase canned PTFE seals
- ProTech™ & MILLENNIUM® bearing isolators

##### PTFE Seals

- FlexiSeal® spring energized lip seals
- Custom PTFE seals

##### Oilfield Products

- Gimbal bearings
- Riser clamps
- End protectors
- Crown bumpers
- Large metal/elastomer elements
- Flex elements

##### Custom Products

- RM® Dynex expansion joints
- Thermoplastic tubing for medical applications



#### Packing Division Europe Products

- Rod and piston seals
- Rotary seals
- Flange seals
- Cushioning seals for pneumatic cylinders
- Polon® PTFE seals
- FlexiSeal® spring energized lip seals
- Ultrathane® polyurethane seals
- Sealing systems for high-pressure water pumps
- Guiding elements
- Wiper rings
- Diaphragms
- Special profiles, precision molded shapes
- Anti-vibration elements
- Bonded rubber-metal seals
- Bearings
- Plastic/rubber composite seals
- Bonded piston seals
- Stat-O-Seal® fastener and fitting seals
- EnerRing® resilient metal seals and shapes
- Isolation mounts and grommets

## Integrated Sealing Systems Division

#### Manufacturing Capabilities/Technologies

Compression, injection and transfer molding; integrated assembly, over-molding rubber-to-plastic and rubber-to-metal bonding, in-house functional test lab.

#### Division Products

##### Composite Seals

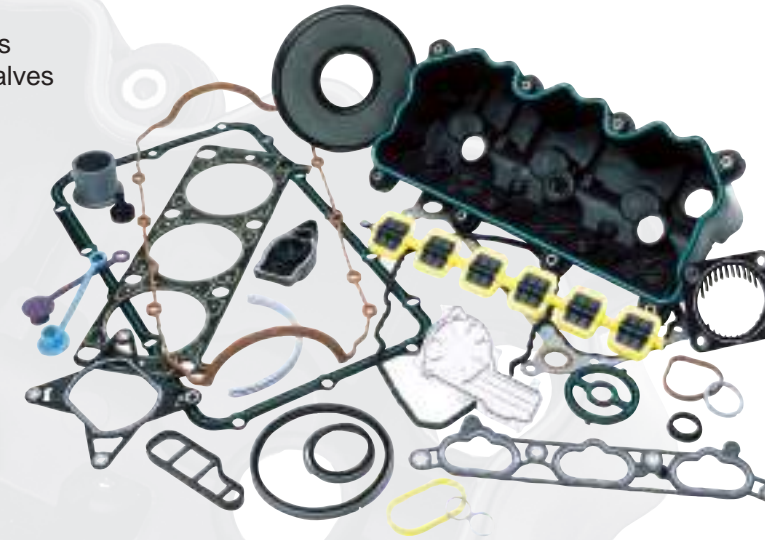
- Over-molded rubber-to-plastic composite carrier seals
- Short Runner Valve (SRV), Charge Motion Control Valves (CMCV) blades/assemblies for air intake control
- Over-molded rubber-to-plastic filter seals
- Bonded piston seals for dynamic biaxial applications
- Bonded rubber molded servo valve seals
- Hygienic sanitary gasket

##### Custom Molded Seals

- Press-in-place seals
- Isolator mounts and grommets
- Integrated sealing systems for cam cover, oil pan, water outlet connector and breather application
- Lip seals

##### Packings

- ChemCast piston seals and wear rings



## TechSeal Division

#### Manufacturing Capabilities/Technologies

Compression and liquid injection molding, precision cutting, splicing and fabricating, close tolerance custom extruded profiles, USP Class VI and FDA white-listed, UL and NSF 61 certified materials.

#### Division Products

##### Extruded Products

- Small-diameter precision cut seals
- Large-diameter lathe cut seals
- ParFab™ extruded profiles
- ParFab spliced/fabricated gaskets (hollow and solid rings/gaskets, 4-corner "picture frame" gaskets compression limited gaskets)
- TetraSeal® circular lathe cut seals
- Spin-on oil filter seals
- Industrial drive belts
- Special lathe cut profiles (D-rings, V-seals, L-seals, double chamfers, short lip seals, etc.)
- Long-length extruded seals
- Anti-drain back seals
- Sweeper belts
- Oilfield packer elements



## O-Ring Division

#### Manufacturing Capabilities/Technologies

In-house elastomeric mixing and tooling, computer-controlled compression and injection molding, liquid injection molding (LIM), automated vision inspection, co-injection molding.

#### O-Ring Division Products

##### O-Rings

- O-ring seals in fluorocarbon, fluorosilicone, silicone, ethylene propylene, nitrile, HNBR, neoprene, butyl, polyacrylate, polyurethane and many other formulations
- O-ring seals in specialty perfluorinated elastomer formulations, such as Hifluor™ and Parker ULTRA™
- UL, NSF, FDA, USDA, USP, AMS, NAS and MIL-spec approved O-ring materials
- Large-diameter continuous molded O-rings
- Parbak® Back-up rings
- Drive belts

##### O-Ring Accessories

- Standard and custom O-ring kits
- O-ring installation lubricants and tools

##### Adhesives and Sealants

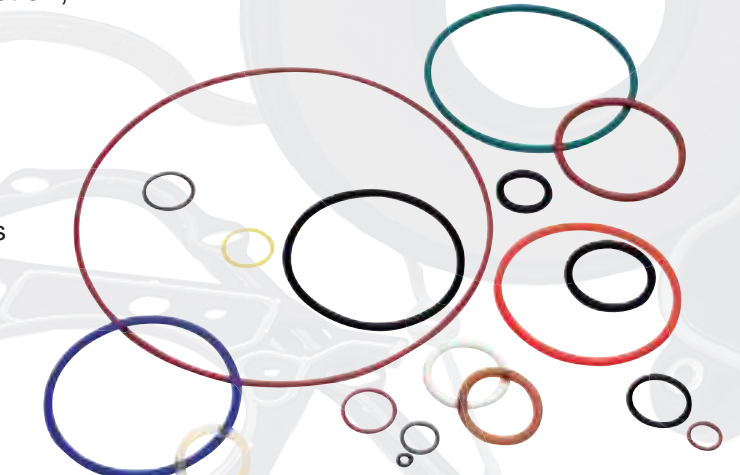
- Instant adhesives, retaining compounds, thread lockers, thread sealants, instant gaskets and activators

#### O-Ring Division Europe Products

- O-ring seals in fluorocarbon, fluorosilicone, silicone, ethylene propylene, nitrile, HNBR, neoprene, butyl, polyacrylate, polyurethane and many other formulations
- O-ring seals in Hifluor™ and specialty perfluorinated elastomer formulations, such as Parofluor™ and Parofluor ULTRA™
- Large diameter continuous molded O-rings
- Parbak® back-up rings
- Standard and custom O-ring kits
- O-ring installation lubricants and tools

In addition to O-rings, the following products are available from the O-Ring Division Europe:

- Custom molded shapes
- Extruded profiles
- Filter seals
- Special lathe cut profiles
- Plastic/rubber composite seals for static automotive powertrain applications
- Aerosol valve seals
- Custom seals for HVAC systems
- Adhesives and sealants



#### Parker

#### O-Ring Smartphone Apps

Parker O-Ring Division offers 3 new mobile apps!

Parker O-Ring Division is bringing our unique combination of experience, innovation, and support directly to your smartphone with 3 new mobile apps.

These interactive mobile apps give you numerous engineering tools at your fingertips, with an advanced material and size selector, leak troubleshooting, and fluid compatibility solutions. Try them out today!

Scan these QR code with your smartphone to access Parker's Material Selection App.

No smartphone? Visit us at the url's listed in each corresponding mobile app box listed below.



#### O-Ring Selector

- Search by compound
- Search by certifications
- Search by material properties
- Search by size
- Search by material and much more!

<http://divapps.parker.com/divapps/seal/mobile/MaterialSelection/>



#### Leak Troubleshooting

- Diagnose by seal appearance
- Diagnose by leakage occurrence
- Diagnose by time of leakage

<http://divapps.parker.com/divapps/seal/mobile/mobilefailureanalysis/>



#### Fluid Compatibility

- Search by product category
- Search by desired fluids
- Select from compatible materials
- View/send test reports

<http://divapps.parker.com/divapps/seal/mobile/FluidCompatibility/Desktop/>



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