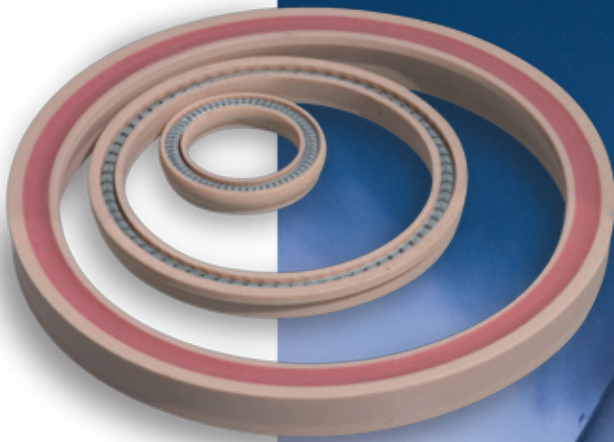




***FlexiSeals***<sup>®</sup>



# PTFE Sealing Solutions

Parker Seal's Packing Division Europe manufactures a broad range of PTFE and high-performance plastic seals at its state-of-the-art manufacturing facilities for the following industries:

- Aerospace
- Chemical Processing
- Consumer
- Energy, Oil & Gas
- Fluid Power
- General Industrial
- Medical
- Military
- Semiconductor
- Transportation

The Parker Packing Division Europe produces a wide range of standard and custom seals for static and dynamic applications. Our engineering staff provides sealing solutions for the most demanding or unusual applications.

## The FlexiSeals® System

FlexiSeals® are used where conventional seal materials (like elastomers, PUR, fabric materials, etc.) fail to meet the required temperature range, chemical resistance or friction requirements of the respective application.

The FlexiSeal® consists of a polymer jacket which is energized by a metallic spring. FlexiSeal® is available in a wide variety of profiles, spring types and materials in rod, piston and face seal configurations.

The use of a resilient spring element ensures positive sealing even at low pressure and compensates for jacket wall reduction from cold flow, wear and thermal contraction.

The shape of the jacket allows the hydrostatic pressure to energize the seal and supplements the spring force which increases contact pressure and eliminates potential leakage. Jacket profiles are made from PTFE-based and other high-performance polymer plastics. Spring types are available in corrosion-resistant metal alloys including stainless steel, Elgiloy®, Inconel® and Hastelloy®.



## Product benefits

- Low friction
- No stick-slip
- Outstandingly high chemical resistance
- Temperatures from  $-270$  to  $+315$  °C
- Pressures from vacuum up to 6,000 bar
- Speeds up to 30 m/s
- No explosive decompression
- No shelf-life limitations
- Jacket profile is precision machined and can be tailored to existing groove geometry
- Standard FlexiSeals® are precision-machined to fit fractional, metric, MIL, AS and JIS O-ring glands in existing equipment

## Engineering Capabilities

Packing Division Europe has a dedicated product engineering and design staff for PTFE seals. Specialized material and mechanical test labs are available to aid in the development and validation of PTFE seals.

Our capabilities include

- Design and application engineering.
- CAD/CAM technology
- Materials test lab
- State of the art Finite Elements Analysis (FEA).
- Fast prototype service
- Functional test lab

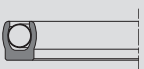
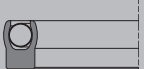
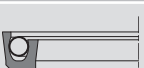
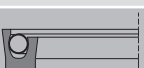
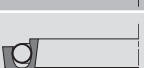
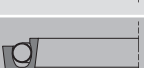



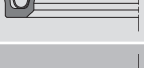
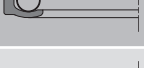




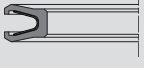
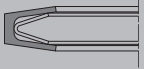
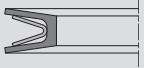
## Manufacturing Capabilities

Packing Division Europe has strategically located PTFE manufacturing locations in Boom (Belgium), Helsingør (Denmark), Sadská (Czech Republic) and Shanghai (China). Parker provides a wide range of manufacturing capabilities in these plants, including

- PTFE material blending
- Compression and isostatic molding
- PTFE extrusion
- Screw machining
- Precision lathe-turning operations
- CNC machining
- Spring fabrication
- Fast prototyping service
- Low volume, complex geometry production
- High volume, long run production capabilities



## FlexiSeal® Profiles

Cross-section	Profile	Application	Pressure max. (bar)*
	NAA	Static and intermittent dynamic applications. Reciprocating or rotating on either inside or outside diameter.	210
	NHA	High pressure, static and intermittent dynamic applications providing better extrusion resistance at elevated pressures and temperatures.	550
	BAI	Reciprocating actuator rods. Short, scraper-type dynamic lip reduces frictional forces due to hydrostatic pressure.	210
	BHI	High pressure, reciprocating actuator rods. Short, scraper-type dynamic lip reduces frictional forces due to hydrostatic pressure.	550
	BAO	Piston sealing. Short, scraper-type dynamic lip reduces frictional forces due to hydrostatic pressure.	210
	BHO	High pressure piston sealing. Short, scraper-type dynamic lip reduces frictional forces due to hydrostatic pressure.	550
	FLO	Rotating shafts. Axially clamped outside flange stabilizes seal, prevents seal rotation and resists thermally induced movement. Requires two-piece gland. Scraper version also available (FLS).	210
	NLI	Rotating shafts without the possibility of a flange cavity. Also low pressure, reciprocating applications. Scraper version also available (SLI).	210
	NLO	Outside rotating housings and low pressure, reciprocating applications. Scraper version also available (SLO).	210
	NAI	Static and intermittent dynamic applications requiring sealing between two faces with internal pressure.	550
	NHI	Static and intermittent dynamic applications requiring sealing between two faces with elevated internal pressure.	1400
	NAE	Static and intermittent dynamic applications requiring sealing between two faces with external pressure.	550
	NHE	Static and intermittent dynamic applications requiring sealing between two faces with elevated external pressure.	1400
	NLF	Sealing of two internally pressurized faces where bolt load and friction are limited, both static and dynamic.	550
	NLG	Sealing of two externally pressurized faces where bolt load and friction are limited, both static and dynamic.	550
	NRI	Static sealing of two internally pressurized faces in cryogenic conditions. Also used in intermittent dynamic applications. Rigid spring acts as a control band to resist low temperature shrinkage.	550
	NRE	Static sealing of two externally pressurized faces in cryogenic conditions. Also used in intermittent dynamic applications.	550
	AAI	Secures seal in groove when exposed to high velocities in case of opening of a butterfly valve disk or passing over a port. Requires specific groove arrangement. AAO for outside dynamic.	550

\* under normal operating conditions

## Top 10 materials

Compound Code	Description	Application	Temperature Range (°C)		Wear Resistance 1 = low 10 = high	Pressure Resistance 1 = low 10 = high	Chemical Compatibility A = excellent B = fair C = limited
			min.	max.*			
001	Virgin PTFE	Best for static applications requiring positive sealing. Good in vacuum with low gas permeability. Can be used in slow, infrequent dynamics. FDA compliant.	-260	260	1	1	A
009	Modified PTFE	Similar to virgin PTFE but lower porosity, higher extrusion resistance and smoother surface on machined parts.	-260	260	2	2	A
002	Graphite / PTFE	Much better temperature resistance than virgin PTFE. Better resistance to extrusion and more wear resistant. Excellent for corrosive service, steam and hot water applications. Good in unlubricated service.	-260	300	4	6	A
007	Carbon / Graphite filled PTFE	Particularly suited for highly corrosive service. Widely used in dynamic steam and water applications. Excellent general purpose material and often used in rotary applications.	-260	300	6	8	A
005	Polymer / PTFE	A dynamic material for softer surfaces and a static material for high temperatures. Excellent wear resistance without abrasion.	-260	315	6	4	A
004	Bronze / PTFE	Excellent wear, temperature and pressure resistance. Excellent for high speeds. Limited use because of electrical conductivity and chemical incompatibility. Typical bearing/wear strip material.	-260	300	7	8	B
063	Proprietary carbon fiber / PTFE	Excellent all purpose material. Best for dynamic applications running on moderate to hard surfaces. High wear material with low abrasion. Often selected as bearing/wear strip material.	-260	300	8	7	A
003	Glass fiber / MoS <sub>2</sub> filled PTFE	Excellent wear resistance, internally lubricated with MoS <sub>2</sub> . Often used for high pressure extrusion resistance or high speed, high pressure rotary. Only use on very hard metals because of its abrasiveness.	-240	300	7	8	A
031	Glass fiber / Modified PTFE	Excellent pressure resistance. Only use on very hard metals. Do not use with strong alkalis or HF.	-260	300	6	10	A
0V6	Proprietary filled PTFE	Best wear resistance among filled PTFEs. Gentle to soft surfaces.	-260	300	10	6	A
006	UHMW-PE	Contains ultra-high molecular weight polyethylene. Among the toughest, most wear-resistant materials with limitations however for temperature and chemical resistance. Intended for reciprocating applications, or very slow rotary. Higher friction coefficient than PTFE. FDA compliant.	-260	80	10	10	B

\* under normal operating conditions



## **Seal Group Europe Packing Division**

---



### **Parker Hannifin GmbH & Co. KG** Prädifa - Packing Division

P.O. Box 1641  
74306 Bietigheim-Bissingen · Germany  
Tel. +49 (0) 7142 351-0  
Fax +49 (0) 7142 351-293  
[www.parker.com/euro\\_packing](http://www.parker.com/euro_packing)  
e-mail: [packing-europe@parker.com](mailto:packing-europe@parker.com)

### **Advanced Products N.V.**

Industrieterrein Krekelenberg  
Rupelweg 9  
2850 Boom · Belgium  
Tel. +32 3 880 8150  
Fax +32 3 888 4862

### **Polar Seals A.p.S.**

Bjergvangen 2  
3060 Espergaerde · Denmark  
Tel. +45 49 12 17 00  
Fax +45 49 12 17 01