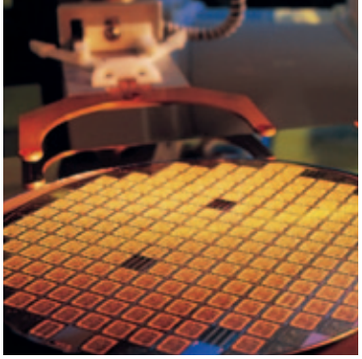
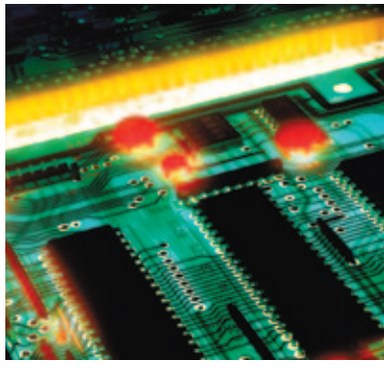


aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Sealing Solutions for Microelectronics



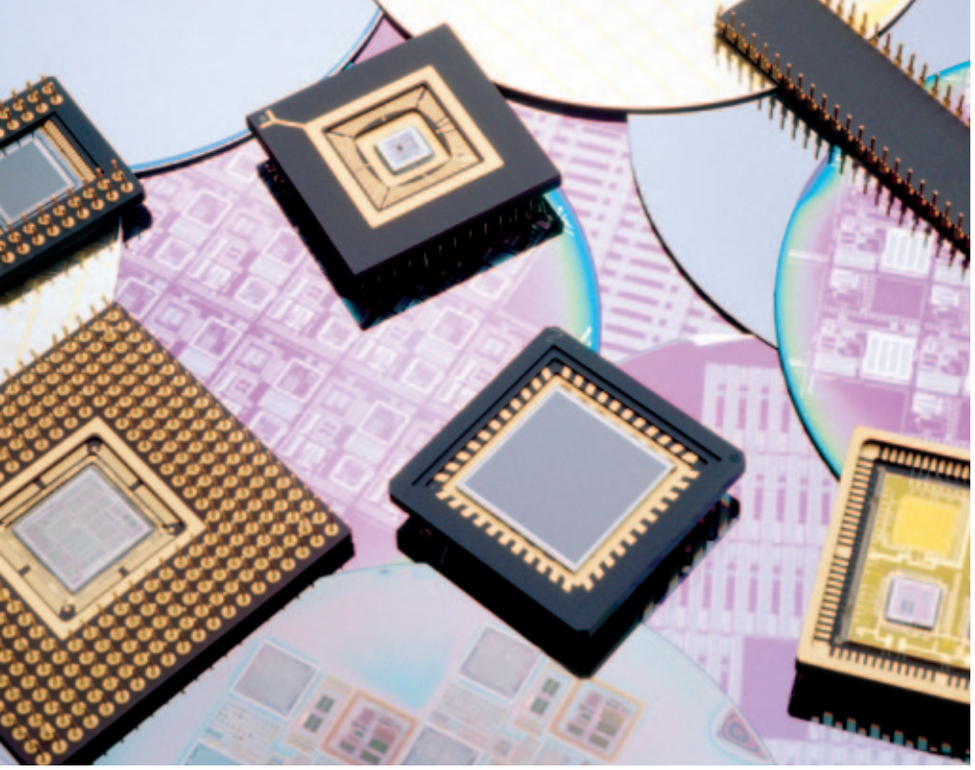
Parker

ENGINEERING YOUR SUCCESS.

Microelectronics Seal Compounds

O-Rings	Extruded Seals	Molded Shapes	Machined Shapes	Composite Seals	Material	Temperature Range	Color	Hardness (Shore A)	Comments	Recommend Process / Applications
ULTRA™ Perfluoroelastomer – FFKM										
X	X			X	FF102-75	-15 to 275°C	Black	75	acid resistance, low cost	surface prep cleaning, rinse, wet etch, copper plating, photolithography
X		X			FF200-75	-15 to 320°C	Black	75	high temperature, low compression set, chemical resistance	
X		X			FF350-75	-15 to 316°C	White	75	high purity, high temperature, low compression set	
X		X			FF352-75	-15 to 316°C	White	75	clean, improved O2 plasma resistance, high temperature, low compression set	
X		X			FF354-65	-15 to 316°C	White	65	high purity, high temperature, low closure force	
				X	FF356-75	-15 to 316°C	White	75	high purity, high temperature, low compression set, used for bonded products	chamber doors, contact rings
X		X		X	FF370-75	-15 to 316°C	Opaque-Black	75	non-filled high purity, low extractable, minimum particles, high temperature, low compression set	
X	X			X	FF374-60	-15 to 320°C	Deep Purple	60	low closure force, high temperature, low extractable, low particle generation	photolithography, HPCVD, CVD, metal CVD, SaCVD, wet etch, surface prep cleaning, wet strip, etch / O-rings, doors, shapes
X	X			X	FF376-80	-15 to 320°C	Deep Purple	80	low particle generation, low extractables, high temperature	photolithography, HPCVD, CVD, metal CVD, SACVC, wet etch, surface prep cleaning, wet strip, etch / O-rings, doors, shapes
X		X			FF500-75	-15 to 275°C	Black	75	broad chemical resistance	
X	X			X	FF580-75	-15 to 275°C	Black	75	chemical resistance, good compression set	surface prep cleaning, rinse, wet etch, copper plating, photolithography
Perfluoroelastomer – FFKM										
X		X		X	V8545-75	-15 to 300°C	Black	75	good chemical and heat resistance	
X		X		X	V8581-90	-15 to 300°C	White	90	dynamic application, low out gassing	
HiFluor™ Highly Fluorinated – FKM, FPM										
X	X			X	HF355-65	-26 to 204°C	Translucent	65	low particle generation, low extractables, low metallic ash content	HDPCVD, PECVD, CVD, PVD / O-rings, doors
X	X			X	HF359-80	-26 to 204°C	Tan	80	nano-filled HiFluor compound, low metallic ash content	O2 plasma resistance, etch process / O-rings, doors
X		X		X	V3819-75	-26 to 204°C	Black	75	chemical resistant	
Fluorocarbon – FKM, FPM										
X				X	V0986-50	-26 to 204°C	Brown	50	general purpose	
X	X			X	VA170-75	-26 to 204°C	Black	75	general purpose FKM	low cost, global FKM for microelectronics market / O-rings, doors, molded shapes
		X			VA272-60	-26 to 204°C	Black	60	general purpose	
X				X	V1033-70	-26 to 204°C	White	70	general purpose	
X		X		X	V0747-75	-26 to 204°C	Black	75	general purpose	
X		X		X	V0884-75	-26 to 204°C	Brown	75	general purpose	
X		X		X	V1164-75	-26 to 204°C	Black	75	general purpose	
X		X		X	V1274-75	-26 to 204°C	Black	75	clean, low extractables	
X		X		X	V0709-90	-26 to 204°C	Black	90	general purpose	
X				X	V0894-90	-26 to 204°C	Brown	90	general purpose	
X		X		X	V1260-75	-26 to 204°C	Black	75	the most chemically resistant FKM, it has similar chemical resistance to a highly fluorinated compound with significant cost savings	
	X				VA600-75	-26 to 204°C	Black	75	general purpose, can be provided in long continuous lengths	
	X				VA7895-75	-26 to 204°C	Black	75	general purpose, can be provided in long continuous lengths	
Ethylene Propylene – EPR, EPM, EPDM										
	X				E7740-65	-55 to 121°C	Black	65	general purpose, can be provided in long continuous lengths	
X				X	E0803-70	-57 to 121°C	Black	70	general purpose	heat exchanger applications
X		X		X	E0740-75	-57 to 121°C	Black	75	general purpose, low extractables for EP material	heat exchanger applications
	X				E7871-75	-55 to 121°C	Black	75	general purpose, can be provided in long continuous lengths	
X				X	E0540-80	-57 to 121°C	Black	80	general purpose	heat exchanger applications
X				X	E0652-90	-51 to 121°C	Black	90	general purpose	heat exchanger applications
X				X	E0962-90	-51 to 121°C	Black	90	excellent steam resistant, operates at 260°C in steam	heat exchanger applications
Silicone – VMQ, PVMQ										
X		X		X	S0469-40	-54 to 232°C	Rust	40	general purpose	
X				X	S0595-50	-54 to 232°C	Rust	50	general purpose	
X				X	S0613-60	-54 to 232°C	Rust	60	general purpose	
		X			SW258-60	-54 to 232°C	Gray	60	high tear strength, good flex fatigue	CMP applications
		X			SW259-70	-54 to 232°C	Blue	70	high tear strength, good flex fatigue	CMP applications
X		X		X	S0455-70	-54 to 232/260°C	Rust	70	high temperature	
X		X		X	S0604-70	-54 to 232°C	Rust	70	general purpose	
X				X	S1224-70	-54 to 232°C	Rust	70	general purpose	
Fluorosilicone – FVMQ										
X	X			X	L1120-70	-73 to 177°C	Blue	70	general purpose	oxide etch, ash
X		X		X	LM159-70	-74 to 177°C	Blue	70	general purpose	etch, asher applications
Polytetrafluoroethlene – PTFE										
			X		0100	-255 to 230°C	White	60[1]	virgin PTFE, excellent for cryogenic applications, good for gases	
			X		0102	-195 to 230°C	Turquoise	60[1]	modified PTFE, lower creep, reduced permeability and good wear resistance	

[1]Hardness Shore D per ASTM D2240



Sealing Solutions for Microelectronics

Parker develops and manufactures engineered sealing solutions. From O-rings and composite seals made with high purity FFKM elastomers, to thermoplastics, extruded profiles and metal seals, we offer a complete line of sealing solutions for the micro-electronics market.

In addition, our shielding and grounding products protect critical electronics from the harmful effects of EMI. And our thermal interface materials cool hot microprocessors and power supplies.

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 the most basic applications to the most aggressive plasma chemistries, high temperature thermal processes, high pressures and ultra high vacuum.

Sealing Environment

- **Fluorinated and oxygen rich plasmas and gases**
- **UPDI water**
- **Application temperatures to 1000°C**
- **Low erosion rate and minimal particle generation**
- **Extremely low outgassing and metals content**
- **Ultra high vacuum (UHV)**
- **Wet and dry fabrication processes including deposition (HDPCVD, SACVD, PECVD, CVD, ALD), diffusion, etching, resist stripping, ashing, cleaning, ion implant and chemical mechanical planarization (CMP)**

Market Environment

- **Dramatic technology advances pose significant sealing challenges**
- **Fab capacities are increasing at high levels with strong demands for cost savings**
- **Global market with increasing presence throughout Asia**
- **Dynamic market cycles**

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

Microelectronics Product Overview

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

UHP Slit Valve Doors
At the forefront of slit valve door innovation since their design inception, Parker continues to reduce total cost of ownership with our engineered seal designs and bonding technology, dramatically lowering particle count and increasing seal life (10x) versus conventional doors and OEM bonded doors.

End Effectors
Used in the transfer of wafers, either by vacuum or by friction, our end effectors feature a custom engineered seal chemically bonded to the end effector blade. The bonded seal is engineered to reduce particle generation and optimize wafer contact area, ensuring consistent wafer transfer, cycle after cycle.

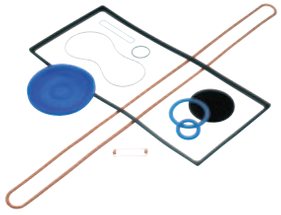
Electrochemical Plating Contact Ring Integral Seals
These seals are engineered to optimize wafer-edge exclusion and provide repeatable sealability during the electrochemical plating process. The design consists of low-extractable Parker UHP elastomers chemically bonded to thermoplastic or corrosion-resistant metal rings, exemplifying Parker's superior bonding technology.

UHP Gate Valve Doors
Continuing to extend seal life dramatically over the OEM door design, the Parker UHP gate valve door unites the strengths of Parker exclusive UHP elastomers, advanced bonding technology and a uniquely engineered sealing element to decrease particle generation and increase resistance against dynamic mechanical wear and chemical attack.

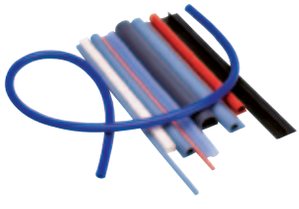
EMI Shielding and Thermal Management
In addition to our broad range of sealing products, we produce a complete line of thermally and/or electrically conductive materials. These products are used in a variety of semiconductor processes and microprocessors, and are manufactured to meet rigid purity and surface finish requirements.

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.

Metal Sealing Solutions
For use in the most extreme temperature, chemical and vacuum environments, we provide a wide range of standard and custom-engineered metal sealing systems. Each resilient metal core, plating material and seal configuration is coordinated to provide reliable seal performance when long-term sealability is the number one criteria.



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.



Parfab™ Extruded Profiles
Parker offers a wide variety of standard extruded profiles in many configurations, such as: solid and hollow-O, solid and hollow-D, U-channel, rectangular, solid and hollow square and hollow-dart, which can be designed for specific application needs.

Machined PTFE & Thermoplastic Shapes
Parker specializes in tight tolerance custom machined thermoplastic components up to 30" in diameter in over 100 custom blended materials. Our proven designs, CAD support and experienced design engineers make complex product development effortless.

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.

Sealing Systems

Our expertise allows us to find unique solutions to your sealing challenges without sacrificing design integrity. By integrating the seal with its mating components, we can reduce inventory and make end products easier to assemble – that's just one way we add value for the customer.

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

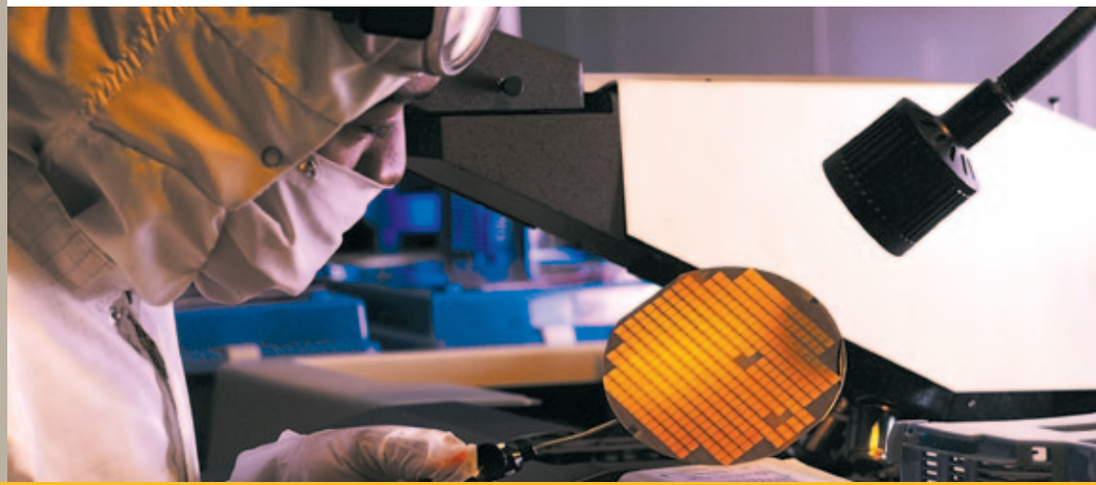
Utilizing advanced non-linear Finite Element Analysis (FEA) software, our engineers can perform extremely accurate virtual simulations of performance based on actual physical test data. These simulations eliminate the need for multiple iterations of costly prototype tooling, and dramatically reduce development 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, TS 16949:2002, AS 7115, ISO 14001, and we're constantly striving to improve customer satisfaction and product quality.

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 microelectronics 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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