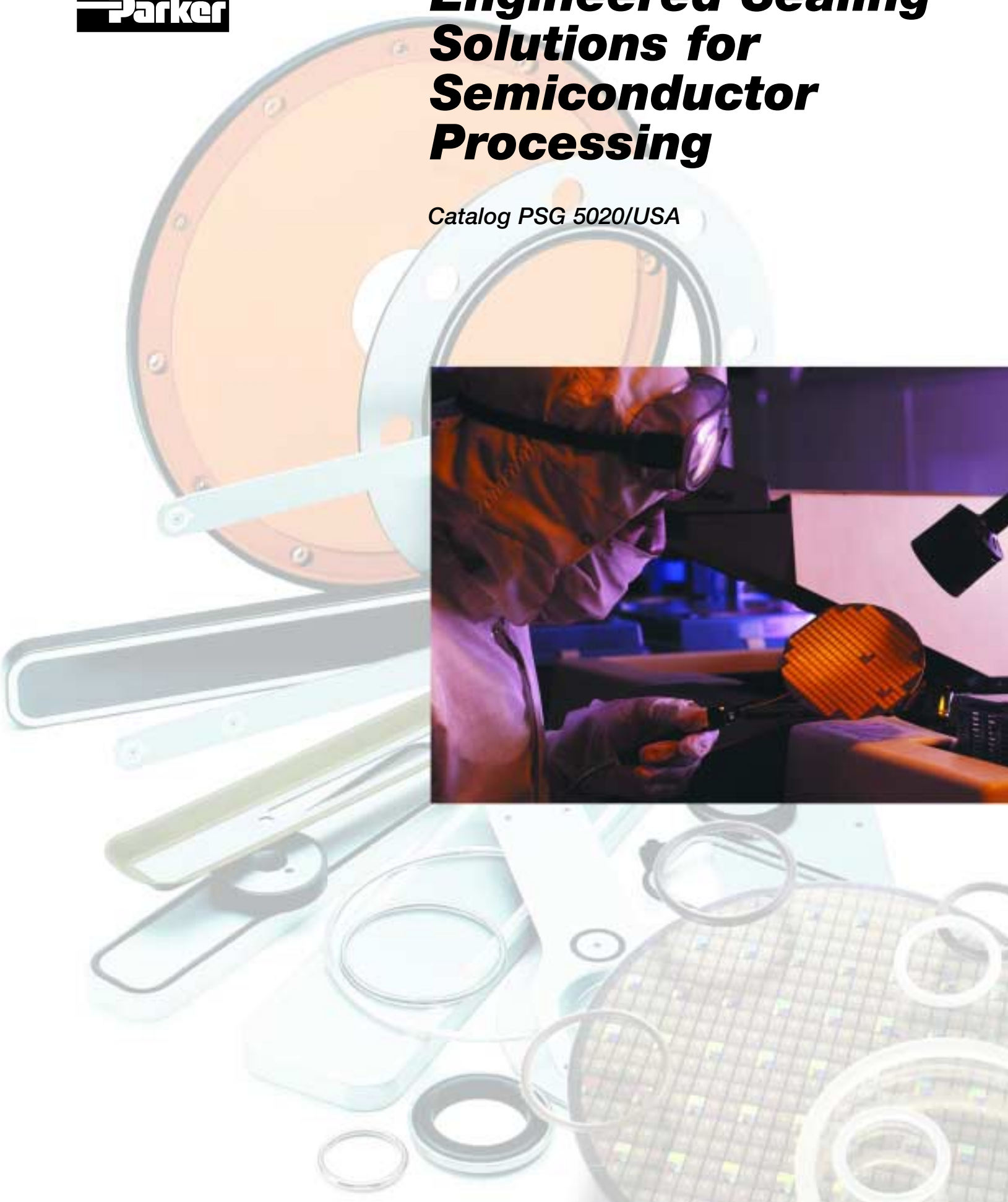




Engineered Sealing Solutions for Semiconductor Processing

Catalog PSG 5020/USA



Products That Perform

Parker Hannifin's Seal Group is a leader in the design and manufacture of high performance sealing devices for the semiconductor processing industry.

From o-rings and composite seals made with ultra-pure perfluorinated elastomers, to thermoplastics, extruded profiles and beyond, we offer a *complete* line of components and systems for use in physical and chemical vapor deposition (PVD, CVD) diffusion, etching, stripping, cleaning, ashing, ion implant and chemical mechanical planarization (CMP) processes, among others.

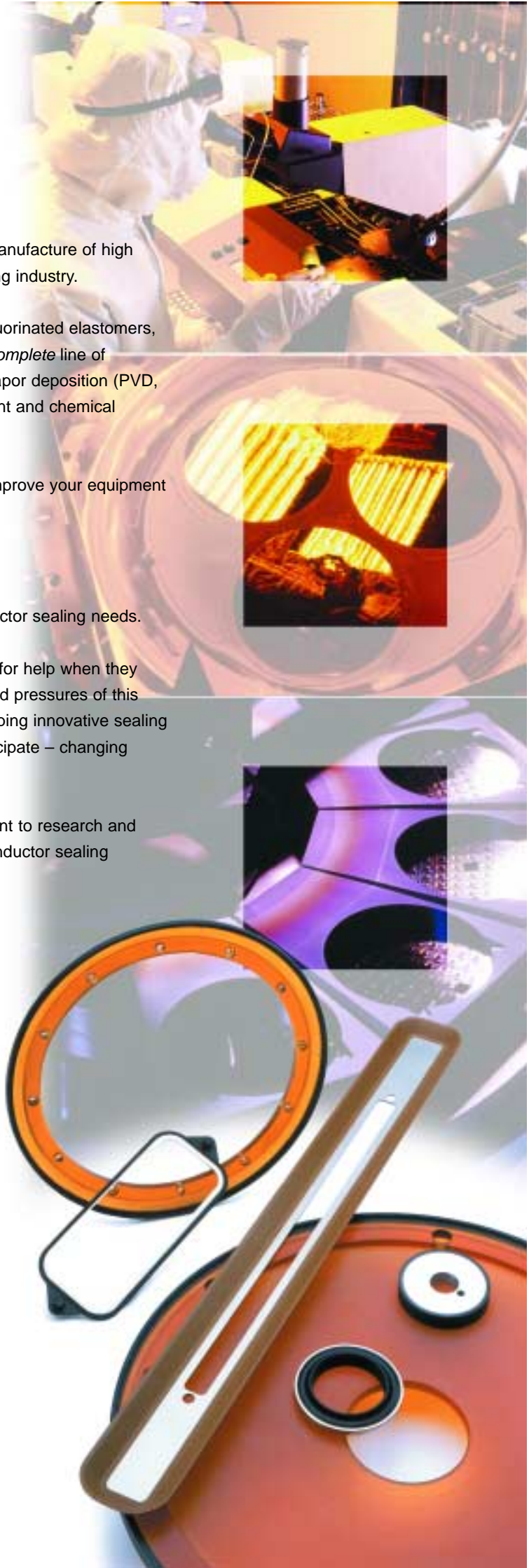
Best of all, every product we manufacture is engineered to improve your equipment performance and productivity.

Experience and Innovation

At Parker, we're uniquely qualified to answer your semiconductor sealing needs.

Some of the very first equipment manufacturers turned to us for help when they needed to seal the aggressive fluids, gases, temperatures and pressures of this evolving industry. And we've been helping ever since, developing innovative sealing products and formulations to keep pace with – and even anticipate – changing process technologies in fabs all over the world.

Our 50 years of experience, coupled with a strong commitment to research and development, make us your best resource for quality semiconductor sealing materials, products and support.



Product Selection

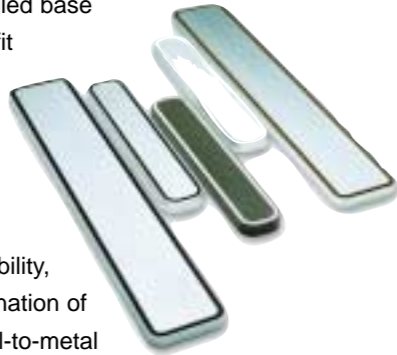
Parker offers the widest selection of semiconductor sealing products and materials available anywhere. Standard or custom, in exotic or traditional formulations - we can mix, manufacture and deliver the components you need to keep your processing equipment running safely, reliably and profitably.

High Performance O-Rings offer both static and dynamic sealing solutions for hydraulic, pneumatic and vacuum devices used in the fabrication of semiconductors. These o-rings are available in all AS568A inch sizes, as well as a wide range of international metric sizes to



DIN 3771 and ISO 3601 standards. In addition, we maintain tooling for over 1,500 non-standard o-ring sizes (available on special order). Parker O-Rings can be molded in a wide range of elastomer compounds, from basic neoprene to special perfluorinated materials such as Parofluor™ and Parofluor ULTRA™. Parofluor O-Rings solve critical application problems, increase mean-time-between failure (MTBF), improve process reliability and allow greater predictability for maintenance intervals. For applications that do not require the unique properties of Parofluor, we also offer o-rings in a variety of other sealing compounds, including fluorocarbon, Hifluor,™ silicone, fluorosilicone, nitrile, HNBR and ethylene propylene.

UHP Slit Valve Doors™ are engineered sealing systems designed to improve productivity and reduce downtime in critical semiconductor processing applications. These products consist of a custom-engineered ultra-high purity sealing element chemically bonded to an aluminum or stainless steel door. The UHP Slit Valve Door offers installed base retrofit



capability, elimination of metal-to-metal contact, dramatic particle reduction and increased seal life (10X) over conventional o-ring in a dovetail groove design.

End Effectors, used in the transfer of wafers between process chambers, feature a custom-engineered seal chemically bonded onto a metal, ceramic or plastic blade. The bonded seal reduces particle generation, and eliminates contamination resulting from a seal sticking to the back of a wafer. The seal geometry can be designed to hold a wafer during transport by a vacuum or by the friction of the elastomeric material.



Thermoplastic Thrust Plate Integral Seals™ protect against the leakage of fluids during the copper

PAROFLUOR™ Series Advanced Perfluorinated Elastomers

ULTRA PAROFLUOR™

For critical semiconductor processing environments where absolute purity is absolutely necessary, we offer Parofluor™ Series Advanced Perfluorinated Elastomers.

The Parofluor Series consists of a wide range of perfluorinated compounds, each with unique physical properties that offer a choice of performance levels.

Parofluor ULTRA, a selection of next-generation compounds within the Parofluor Series, represents the highest level of performance.

Parofluor materials, available in both black and white, retain their sealing capabilities in extremely high temperatures (up to 320°C/608°F continuous for ULTRA FF200-75). They are resistant to a wide variety of

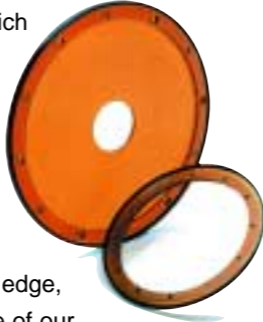
chemicals, including organic and inorganic acids, bases, amines, steam and hot water, ketones and aldehydes.

Parofluor materials can be formed into o-rings, molded shapes, metal/rubber composite seals, lip seals, packing products and other configurations.

All Parofluor products are manufactured in an ultra-high purity environment to prevent contamination. Packaging processes are performed in a clean room environment.

For more information on Parofluor Series Advanced Perfluorinated Elastomers, visit www.parofluor.com.

deposition process. This seal, which consists of a plastic retainer with an elastomer material chemically bonded to its edge, is an example of our superior plastic bonding technology.

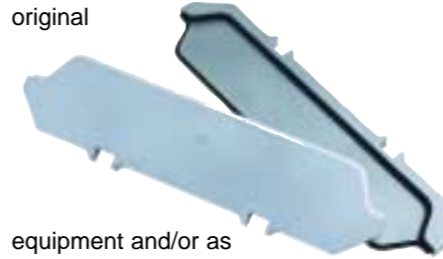


CMP Retainer Rings, made with our ultra-tough UltraCOMP™ Series Engineered Thermoplastic Compounds, are designed to hold semiconductor wafers in place during the chemical mechanical planarization process. These rings exhibit superior



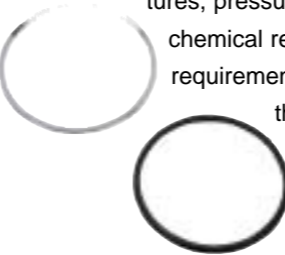
chemical and abrasion resistance for extended service life.

UHP Gate Valve Doors™ consist of a custom-engineered, ultra-high purity sealing element chemically bonded to an aluminum or stainless steel door. Designed to serve as original



equipment and/or as a replacement for gate doors that have reached their service limit, these products offer decreased particle generation and increased protection against mechanical wear, chemical attack and thermal cycling.

Resilient Metal Seals are used in environments where extreme temperatures, pressures and chemical resistance requirements exceed the capabilities of



elastomeric sealing products. We produce our metal seals in many cross sections including "C," "U," "E," and "V," with spring energized variations. Typical plating options include silver, gold, soft nickel, aluminum and copper.

FlexiSeals™ consist of a U-cup lip seal geometry energized by a metallic spring. These products are ideal for dynamic and static applications where extreme operating conditions or harsh environments prohibit the use of elastomeric seals. They are excellent for use in vacuum applications (window and lid seals) and wet process chemistries (CMP/Slurry and UPDI). Manufactured from PTFE and PTFE composites or other high performance polymer plastics, FlexiSeals are available with three types of standard spring energizers - stainless steel, Elgiloy® and Hastelloy®. These and other energizers including, elastomer o-rings and PEEK springs, are available to meet your specific application requirements.



ParFab™ Extruded Profiles can be custom fabricated into spliced rings and four-corner gaskets. Our ParFab products are available with or without pressure sensitive adhesive in most standard profiles. These products can be extruded in fluorocarbon, EPDM and silicone materials in ranges



from .040" to 2.00" cross sections. They can be spliced into rings/profiles with a minimum ID of 1.500", depending on extruded cross section. All ParFab products are manufactured using a hot vulcanized process to ensure strength at the spliced joint.

Centering Rings, or "KF-Type" flange seals, consist of an o-ring friction-fit to the inside or outside diameter of an aluminum or stainless steel ring. Available in standard ISO sizes, these rings are ideal for use in the specialty flanges common to semiconductor equipment vacuum systems.



Custom-Engineered Seals, in a virtually infinite range of shapes and cross-sections, are used in semiconductor applications too complex or unique for standard products. These seals can be designed to work as individual components in a system, or in combination with our other sealing products to improve process reliability and productivity.



Can be manufactured with Parofluor Series Advanced Perfluorinated Elastomers.

Quality Products – And More.

We know that your business depends on sealing products of exceptional quality and cleanliness.



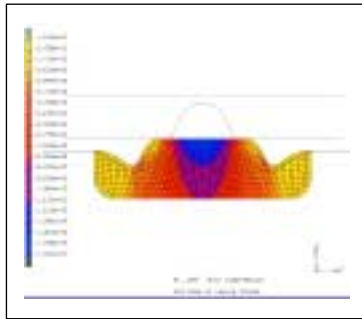
Parker's UHP processing keeps seal materials and products clean, from start to finish.

or better. And our vast distribution network allows us to bring the entire line of Parker sealing products right to your door.

When you choose Parker, you get these built-in benefits, plus an extra level of support and service that includes applications engineering assistance, advanced Finite Element Analysis (FEA) seal design and state-of-the-art testing facilities, where we can help you quickly identify – and solve – your sealing problems.

That's why our critical semiconductor seal production (Parofluor, Parofluor ULTRA and fluorocarbon materials) begins and ends in dedicated ultra-high purity (UHP) work cells, where every step is closely monitored through a batch-traceable statistical process control program.

All of our North American facilities are certified to ISO 9001/QS 9000 standards



Finite Element Analysis (FEA) simulation of a UHP Slit Valve Door under compression.

Beyond Sealing ...

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



Component or source level suppression of EMI signals can be integrated into the thermal management solution without the

use of soldered cans. Conductive elastomers can be overmolded onto heatsinks, lids and covers to provide increased design flexibility and performance.



THERMATTACH®
Thermally conductive Adhesive Tapes provide a strong bond in the assembly

Enhanced Ball Grid Array (EGBA) and Tape Ball Grid Array (TBGA) semiconductor packages.

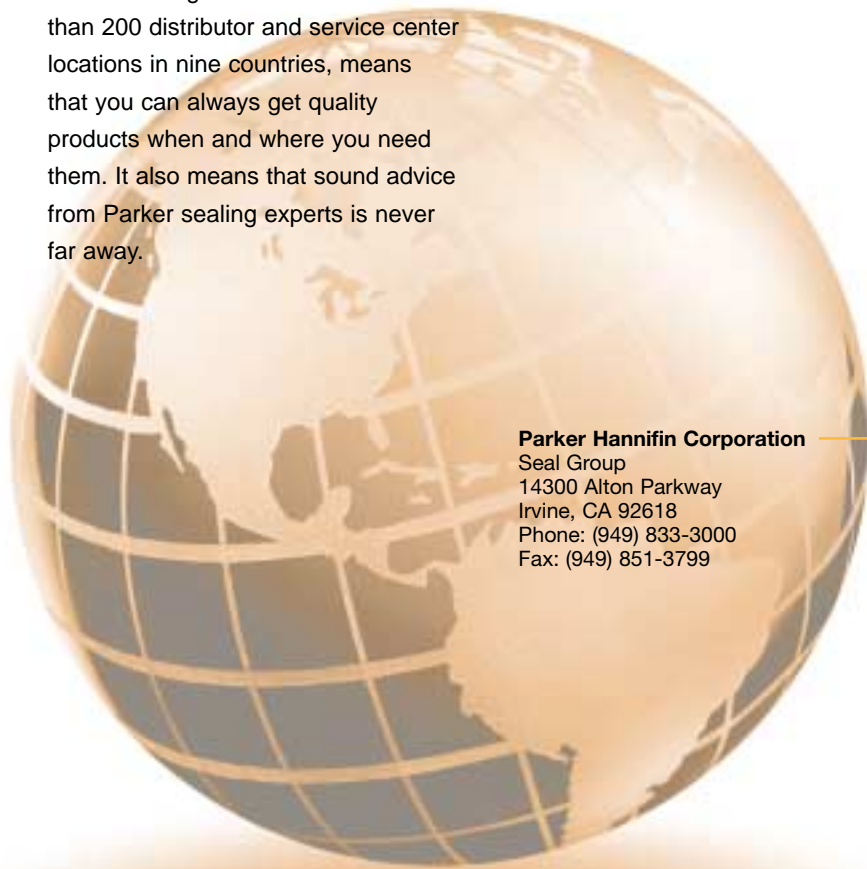


THERMFLOW®
Phase Change Thermal Interface Materials are specifically formulated for use

in high-performance devices requiring minimum thermal resistance for maximum component reliability.

Worldwide — Where You Need Us.

Around the corner or around the globe, Parker 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.



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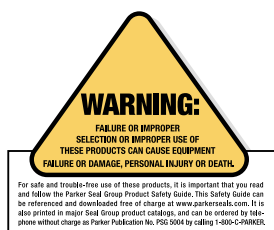
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Visit: www.parkerseals.com



anything **Parker**
Possible.™