

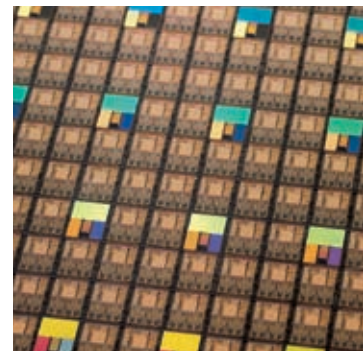


aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Composite Sealing Systems

Products • Markets • Solutions



ENGINEERING YOUR SUCCESS.

Parker Composite Sealing Systems

High-integrity solutions for challenging sealing environments



San Diego, CA USA — Headquarters



Tijuana, Mexico Facility



North Haven, CT USA Facility

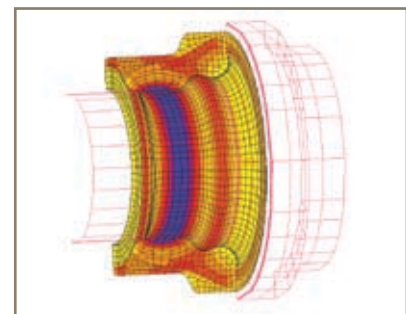
Headquartered in San Diego, California, Parker's Composite Sealing Systems Division (CSS) specializes in the design and manufacture of high integrity composite seals and sealing systems for some of the world's most demanding applications.

Originally established to provide ultra-reliable sealing devices for the emerging aerospace and military markets of the 1950s, today Parker brings its technical innovation to the aerospace, military, semiconductor, energy, oil and gas, life science, heavy-duty diesel, fluid power, and automotive markets. Our engineered static sealing solutions include metal and composite-retained elastomeric seals, oftentimes with specialized finishes, as well as resilient and crush metal seals and custom sealing systems. Our unique sealing geometry combines with over five decades of proven sealing expertise to provide the performance, reliability, longevity, and durability needed in demanding sealing environments.

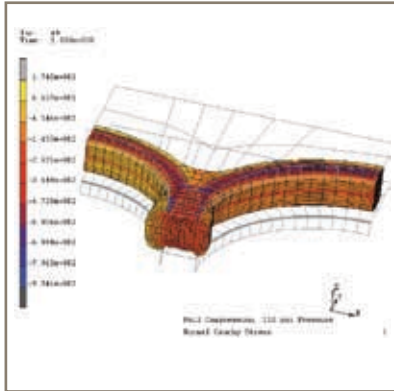
Value-added services

To improve product performance and streamline operations, Parker offers you development support through the following value-added services:

- Custom engineered system solutions
- Applications engineering expertise
- Finite element analysis (FEA)
- Materials development
- Design validation testing
- Rapid prototyping
- Ultra-high purity (UHP) processing
- Parts in assembly (PIA)
- Packaging and kitting
- Worldwide distribution and service center network



FEA is used to predict reactions of complex seal geometry in extreme environments



FEA is used to determine seal deformation under application loading

Simulated seal performance

Using advanced finite element analysis (FEA) software, our engineers can perform accurate “virtual” simulations of seal performance based on material test data. These simulations eliminate the need for multiple iterations of costly prototype tooling and reduce development lead times. They also ensure first-time selection of the right material for your application. FEA allows us to predict and analyze the following:

- Stress and strain distribution
- Pressure
- Load
- Stability
- Deformation/displacement
- Installation and removal forces

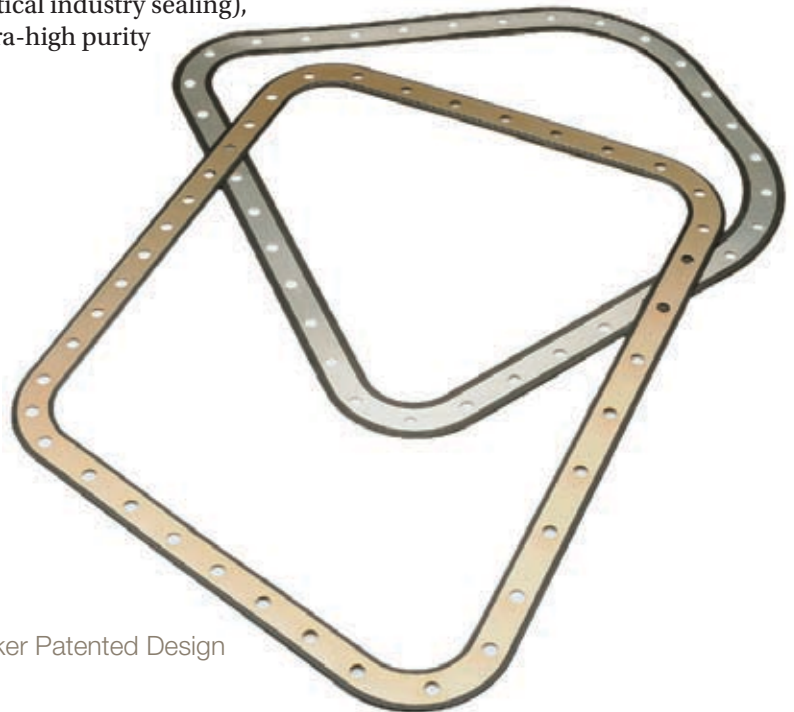
Quality standards

All of our North American facilities are certified to ISO 9000 and AS 9100 quality standards. We also have TS 16949, ISO 17025, ISO 14001, and NADCAP accreditation for special processing, in addition to specific customer approvals. For applications that demand an extra level of cleanliness (such as semiconductor and pharmaceutical industry sealing), we offer ultra-high purity processing.

Power of Parker

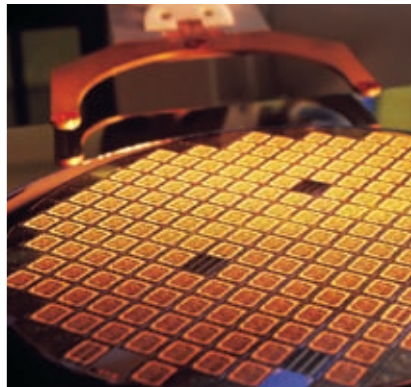
Working with CSS gives you access to all of Parker’s sealing solutions, which is a sizeable advantage. As a leading supplier of seals and sealing systems to hundreds of industries worldwide, our market-smart professionals will work cross-divisionally to create total system solutions that lessen your engineering burden, reduce total costs, and improve operating efficiency. What’s more, additional facilities located throughout the world allow us to anticipate and answer global market demands.

For more information about Parker’s broad range of seals and sealing systems, call us at (619) 661-7000 and ask for engineering assistance.



Parker Patented Design

Demanding Markets



Aerospace and military

If it floats, flies, drives or dives, Parker is on it. You can find our seals on most domestic and international commercial aerospace and military programs. Plus our products work equally well for quick, easy, and precise installation on the assembly line or in the field. Typical products and applications include:

- **Engine and accessory seals**
- **Fuel and air management**
- **Hydraulics and flight controls**
- **Braking system seals**
- **Structure, case, and cover seals**
- **Line and fitting seals (NAS and MS series seals)**
- **Electronic enclosures**
- **Hand-held devices**
- **Target acquisition systems**

Microelectronics

In 1996 Parker pioneered the first vulcanized slit valve door seal for wafer processing tools. Since then, we've continued to work with leading semiconductor OEMs to drive innovation and cost of ownership. Our unique technologies can be applied to the processing of integrated circuits, solar panels, and LCDs. We have engineered successes in:

- **UHP slit valve doors**
- **UHP gate valve doors**
- **UHP isolation valve seal plates**
- **Electrochemical deposition (ECD) contact ring seals**
- **Resilient metal seals for extreme environments**
- **Advanced elastomeric bonding technology**
- **Custom engineered sealing systems/kits**
- **Parker UHP fluoroelastomers and Parofluor™ perfluoroelastomers**

Energy, oil, and gas

Parker designs and manufactures standard and custom rubber, to metal and rubber, to composite seals, as well as resilient metal products. Solutions include:

- **Subsea manifold connector seals**
- **Blowout preventer (BOP) stack flange gaskets**
- **Valve bonnet seals**
- **Valve stem seals**
- **Downhole hydraulic control system seals/turnkey systems**
- **Power generation gas turbine products:**
 - Turbine seals
 - Combustor seals
 - Compressor seals
 - Fuel delivery system seals
- **Valve and manifold sealing systems**



Heavy-duty diesel and automotive

Parker has been a major supplier to the heavy-duty diesel and automotive market for over 30 years. We offer a variety of products and processes geared to driving value solutions for the industry's needs through technical innovation, extended life, and elimination of multiple components through parts in assembly (PIA). Applications include:

- Gear, transmission, and cover seals
- Drain and fill plug seals and sealing bolt assemblies
- Air management system seals
- Fuel system seals
- Air conditioning system seals
- Water/coolant and lubrication system seals
- Braking system seals
- Turbo charger inlet and outlet seals
- Emission system seals (EGR)



Life science

Parker has developed a wide range of specialty elastomers to meet the high-purity and fast-paced demands of the life science marketplace, including materials compliant to FDA and USP Class VI standards. Combining Parker's material technology with CSS engineering expertise, we are poised to solve the most challenging life science market applications with value-added solutions. Our solutions include:

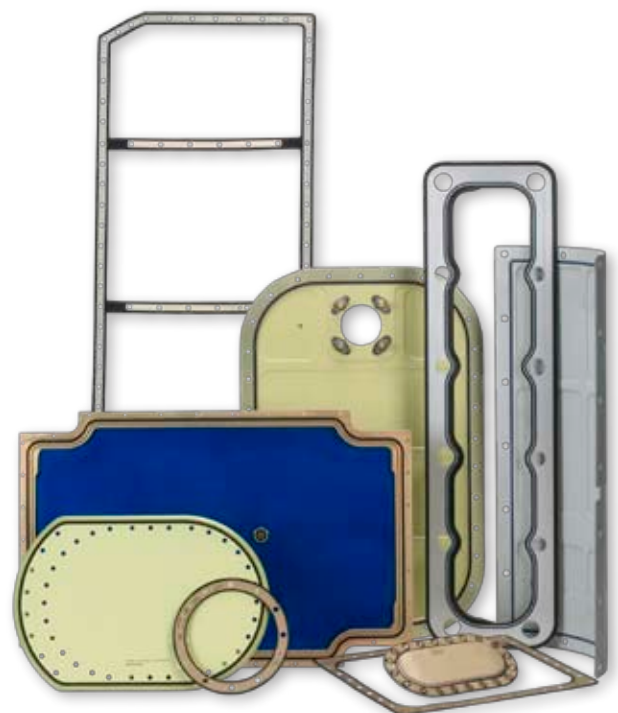
- Pharmaceutical valves
- Radial vacuum chamber seals
- Robotic surgical equipment seals
- Critical shipping container seals
- Vacuum chamber door seals



Additional markets

We also serve the following markets with a wide range of seals and sealing systems:

- Chemical processing
- Fluid power
- General industrial
- Consumer



Engineered Sealing Products

Gask-O-Seals™

Gask-O-Seals are a metal, plastic, or composite retainers with a machined groove in the retainer plate into which a custom engineered rubber element is molded. The elastomer seal may be mechanically and/or chemically bonded to create a dependable, responsive seal for flat or curved surfaces. Gask-O-Seals are typically used in applications requiring extreme reliability, longevity, and durability. They offer the following advantages:

- Quick and easy installation – a one-piece solution
- No retorquing required due to metal-to-metal contact
- Leak-proof sealing capability
- Extended service life
- Reusability

Gask-O-Seals

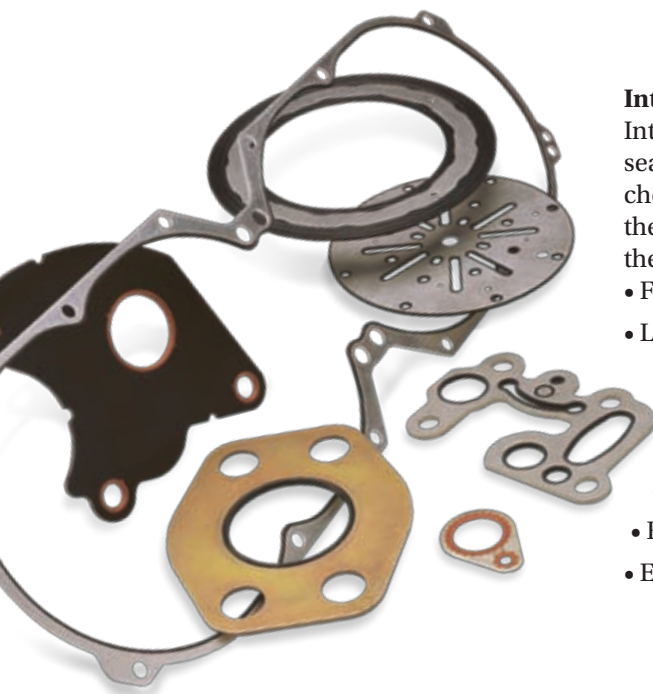


Integral Seals

Integral Seals™

Integral Seals eliminate the need for a machined groove in the mating sealing flanges. The seal is kept in place by mechanically and/or chemically bonding the elastomer to a frame edge that is separate from the flange. Integral Seals can be molded to very thin retainers. They offer the following benefits:

- Flexibility to conform to mating surfaces
- Low closure force required to seal
 - Customizable to meet the environmental and pressure sealing requirements
 - Quick and easy installation – a one-piece solution
- Direct retrofit capability – no changes required to mating hardware
- Reduced maintenance downtime
- Easy conformance to contoured surfaces



Fastener and Fitting Seals

Fastener and Fitting Seals

Fastener and fitting seals provide reliable static sealing for screws, bolts, tube fittings, and other fasteners. We offer Stat-O-Seals™, typically used for sealing under the heads of bolts and similar fasteners, ThredSeals™, for sealing around the thread roots of any threaded fastener, and Lock-O-Seals™, for sealing tube fitting bosses. Parker's "splined and coined" mechanical bond is used on many series and sizes. It ensures a positive attachment of the rubber to the retainer, eliminating missing or loose seal elements associated with bonded seals. Fastener and fitting seal advantages include:

- No machined o-ring grooves are required in the mating flange
- Precisely controlled optimum percent squeeze eliminates over-compression
- The retainer edge is visible after installation, facilitating easy visual inspection and reduced failures caused by missing seals
- The ridged self-centering design provides easy and accurate placement of the seal
- The solid metal-to-metal contact improves joint stability and eliminates retorquing
- Long reliable service and high reusability
- Rubber bolt interference provides for easy assembly since the washer stays on the bolt in any position



Metal Seals

When sealing requirements exceed the capabilities of elastomeric seals, resilient metal seals are often the solution. Manufactured by our Advanced Products Business Unit located in North Haven, Connecticut, resilient metal seals are made in a variety of shapes to address diverse sealing needs. The metal construction eliminates permeation problems and can handle an extremely wide range of temperatures and pressures. In fact, Parker has developed hundreds of different metal seal designs for the most demanding applications. Not only can we offer unequalled expertise in the design and manufacture of typical one-piece metal seals, we are also extremely well versed in the development of multi-piece, multi-function sealing systems.

Metal seal advantages include:

- Load, springback, and outer sealing layered ductility/hardness is optimized to ensure the highest sealing performance
- Bonded electroplating onto load-bearing substrate eliminates unnecessary parts
- Self-energizing forces
- Chemical compatibility and high temperature capability due to many jacket-material and plating options

Metal Seals





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