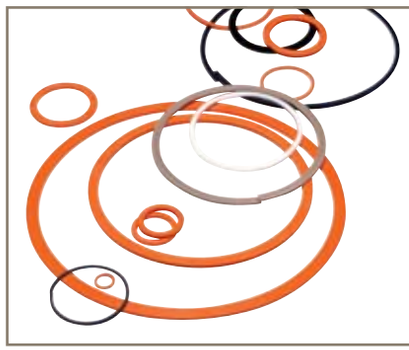
aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

# Sealing Solutions for Fluid Power Applications



Parker

ENGINEERING YOUR SUCCESS.

# Put Parker's Expertise & Experience to Work

## Value Added Services

Parker's product offering includes more than manufacturing and delivery. Custom seal kits, part marking and special packaging simplify inventory control of expendable components for heavy-duty fluid power equipment and tools.

## 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. And our manufacturing facilities are keeping pace with innovation with their custom machining and quick-turnaround PTFE manufacturing.

## Application Engineering

Our team of expert application engineers can help you find the most reliable, cost-effective sealing solution for your application. Parker engineers offer decades of experience in real-world sealing and a full complement of technology-driven design tools.

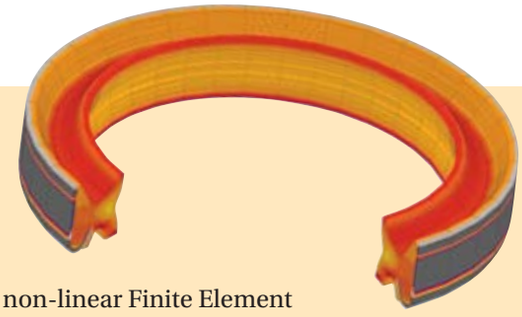
## Quality Initiatives

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, AS 7115, ISO 14001, and we're constantly striving to improve customer satisfaction and product quality through the implementation of:

- *Six Sigma methodology*
- *Lean manufacturing*
- *TQM methodology*
- *Feasibility studies*
- *Kaizen events*

## Worldwide—Where You Need Us

Around the corner or around the globe, Parker is ready with engineered solutions to your tough sealing challenges. Your local Parker 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.



## Advanced Computer Simulation

Utilizing advanced, non-linear Finite Element Analysis (FEA) software, our engineers can perform extremely accurate virtual simulations of performance, based on 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.

# Sealing Solutions for Fluid Power Applications

The equipment that moves today's industry is more reliable and highly-engineered than ever before. That's why Parker develops and manufactures engineered sealing solutions—technologically advanced sealing devices and materials that can keep pace with aggressive chemicals, high temperatures, rapid motion and high pressures. 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 virtually any application you can think of.

## Sealing Environment

- Operating pressures to 5800 psi (400 bar)
- Plastic temperatures to 275°F (135°C)
- Elastomer temperatures to 550°F (275°C)
- Metal seal temperatures to 2192°F (1200°C)
- Tolerances to +/- .001 in. (.025 mm)
- Rod speeds to 13 ft/sec (4 m/sec)

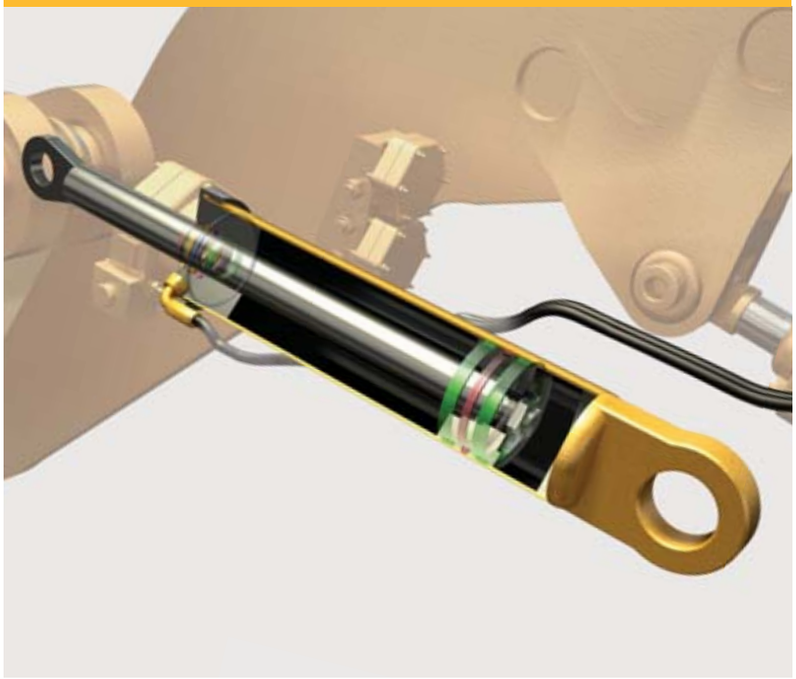
## Market Environment

- Heavy duty applications are continually evolving to improve performance, meaning systems run hotter with tighter tolerances than ever
- Product durability demands are surpassing 20,000 hours in operation and greater than 2,000,000 cycles without maintenance
- Systems use a range of fluids from standard hydraulic oils to EcoSafe and water-glycol formulations
- Increased globalization will grow demand for global logistics, spurring vendor partnerships and single order point systems

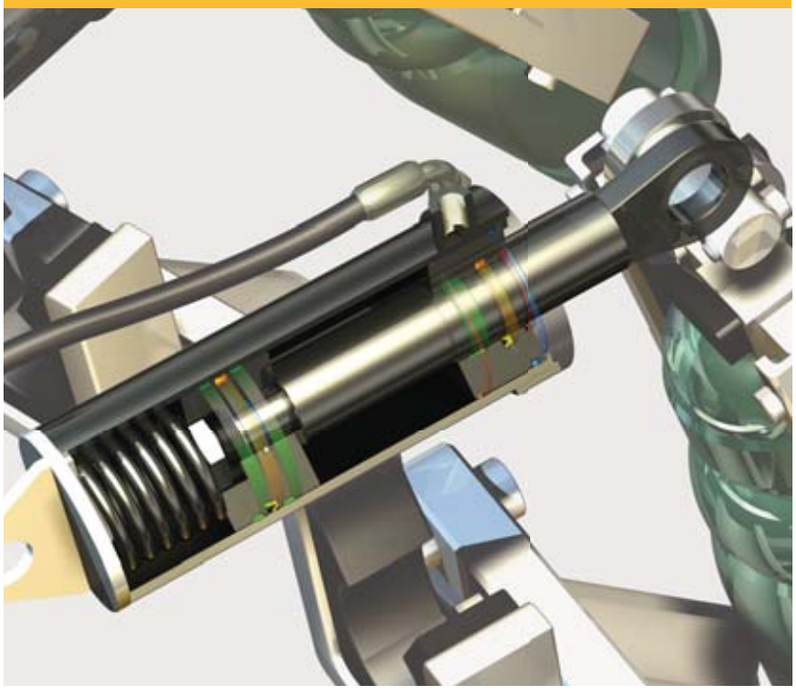
Around the corner or around the globe,
Parker is ready with engineered sealing solutions
to meet your most demanding applications.

# Parker Seals at Work in Heavy Duty Applications

## Hydraulic Cylinder Applications



## Pneumatic Cylinder Applications

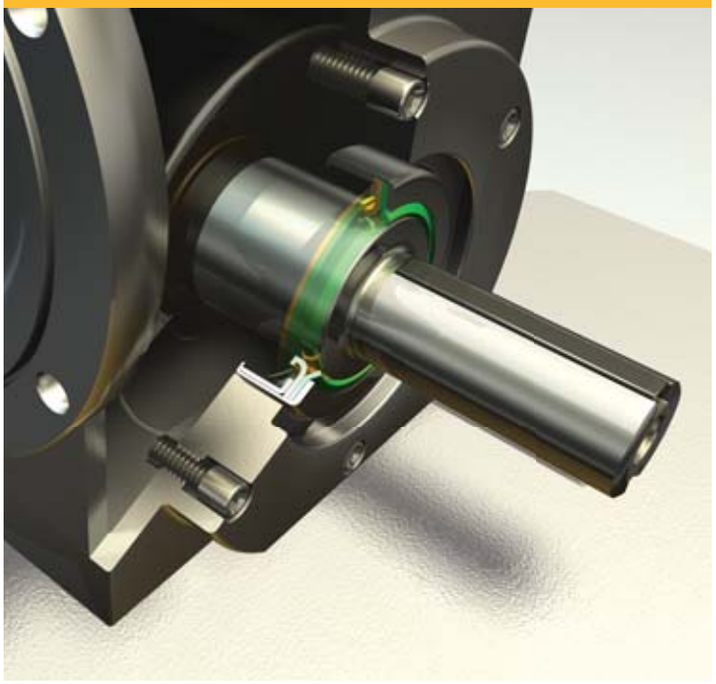


Shaft (Clipper) Seals

Protech Seals

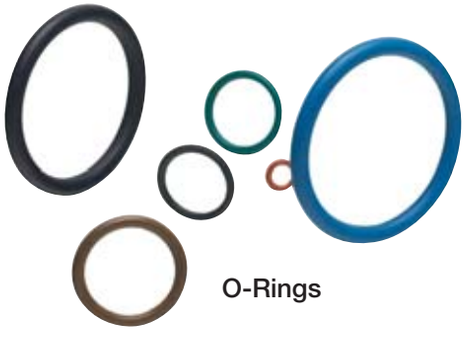
Flexi Seals

## Pump / Motor Applications



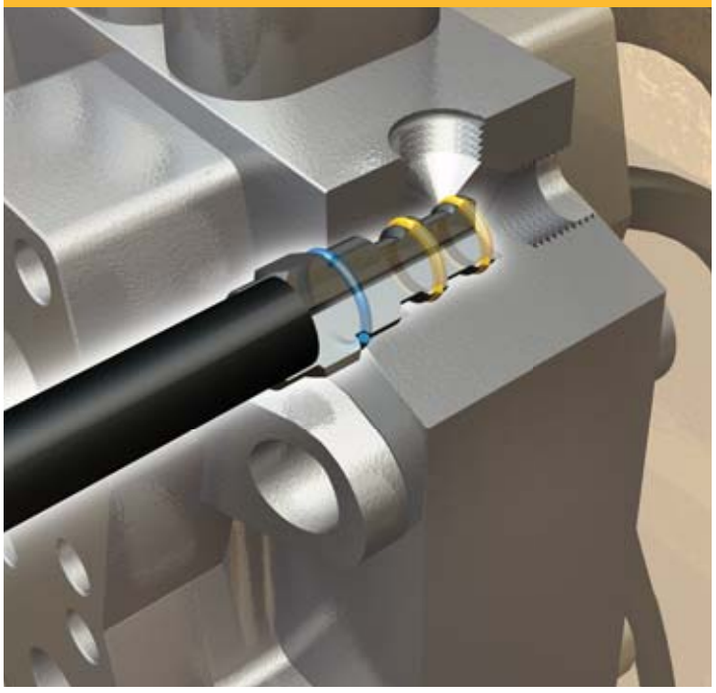
D-Rings

Back-up Rings



O-Rings

## Valves and Control Applications



# High-Performance Sealing Materials

| Parker Material Code | Material Trade Name | Color | Typical Applications & Description | Service Temperature Range °F (°C) | Tensile Strength @ Break psi (MPa) | Ultimate Elongation | Shore Hardness | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | D |
| **Thermoplastic Elastomers – TPU, Polyurethanes** | | | | | | | | |
| P4300A90 | Polyurethane Resilon® 4300 | Tan | Proprietary compound offering extended temperature range, high rebound | -65 to +275 (-54 to +135) | 8625 (59.5) | 560% | 92 | - |
| P4301A90 | Polyurethane Resilon® 4301 | Aqua Blue | For water- or petroleum-based fluids | -35 to 225 (-37 to +107) | 7129 (49.2) | 514% | 90 | - |
| P4304D60 | Polyurethane Resilon® 4304 | Brown | Offers higher extrusion resistance for seals and anti-extrusion devices | -65 to +275 (-54 to +135) | 6521 (44.9) | 556% | - | 55 |
| P4311A90 | Polyurethane Resilon® 4311 | Red | Formulation resists internal heat generated through hysteresis, ideal for shock applications | -65 to +275 (-54 to +135) | 7229 (49.8) | 632% | 91 | - |
| P4615A90 | Polyurethane Molythane® | Black | General purpose industrial polyurethane offering high abrasion resistance | -65 to +200 (-54 to +93) | 8134 (56.1) | 565% | 95 | - |
| P4622A90 | Polyurethane Ultrathane® | Yellow | Formulated with internal lubricants for lower friction to help reduce heat buildup | -65 to +225 (-54 to +107) | 6757 (46.6) | 466% | 94 | - |
| P4700A90 | Polyurethane | Green | Enhanced properties over 4615 to improve sealing capabilities from lower compression set | -65 to +200 (-54 to +93) | 5660 (39.0) | 511% | 92 | - |
| P5065A88 | Polyurethane | Dark Blue | Formulated for an improved low temperature range and higher resilience than 4615 | -70 to +200 (-57 to +93) | 5033 (34.7) | 660% | 86 | - |
| **Thermoplastic Elastomers – TPCE, Polymyte®** | | | | | | | | |
| Z4651D60 | Polymyte® | Orange | Used in applications requiring extended extrusion resistance and fluid compatibility | -65 to +275 (-54 to +135) | 5748 (39.6) | 775% | - | 58 |
| Z4652D65 | Polymyte® | Orange | Primarily used for back-up rings and other anti-extrusion devices | -65 to +275 (-54 to +135) | 6175 (42.6) | 700% | - | 62 |
| **Non-Filled PTFE** | | | | | | | | |
| 0100 | Virgin PTFE | White | Excellent for cryogenic applications & gases | -425 to 450 (-254 to 233) | 4575 (316) | 400% | 60 | - |
| **Filled PTFE** | | | | | | | | |
| 0102 | Modified PTFE | Turquoise | Lower creep, reduced permeability and good wear resistance | -320 to 450 (-195 to 282) | 4600 (317) | 390% | 60 | - |
| 0120 | Mineral Filled PTFE | White | Excellent low abrasion to soft surfaces & improved upper temperature performances. FDA materials | -250 to 550 (-157 to 288) | 4070 (281) | 270% | 65 | - |
| 0203 | Fiberglass Filled PTFE | Gold | Excellent compressive strength and good wear resistance | -200 to 575 (-129 to 302) | 3480 (240) | 190% | 67 | - |
| 0204 | Fiberglass & Moly Filled PTFE | Gray | Excellent for extreme conditions such as high pressure, temperature and longer wear life on hardened dynamic surfaces | -200 to 575 (-129 to 302) | 3100 (214) | 245% | 62 | - |
| 0205 | Fiberglass & Moly Filled PTFE | Gray | Improved compressive strength and wear in rotary applications | -200 to 575 (-129 to 302) | 3480 (240) | 190% | 67 | - |
| 0301 | Graphite Filled PTFE | Black | Excellent for corrosive service. Low abrasion to soft shafts. Good in unlubricated service | -250 to 550 (-157 to 288) | 3200 (221) | 260% | 60 | - |
| 0307 | Carbon-Graphite Filled PTFE | Black | Excellent wear resistance and reduces creep | -250 to 575 (-157 to 302) | 2250 (155) | 100% | 64 | - |
| 0401 | Bronze Filled PTFE | Bronze | Excellent extrusion resistance and high compressive loads | -200 to 575 (-129 to 302) | 3200 (221) | 250% | 63 | - |
| 0502 | Carbon Fiber Filled PTFE | Brown | Good for strong alkali and hydrofluoric acid. Good in water service | -200 to 550 (-129 to 288) | 3200 (221) | 150% | 60 | - |
| 0601 | Aromatic Polyester Filled PTFE | Tan | Excellent high temperature capabilities and excellent wear resistance | -250 to 550 (-157 to 285) | 2500 (172) | 200% | 61 | - |
| **UltraCOMP™ (PEEK)** | | | | | | | | |
| W4685 | UltraCOMP™ HTP | Tan | A homogenous engineered thermoplastic used for extreme conditions in many markets | -65 to +500 (-54 to +260) | 14000 (96.5) | | | |
| W4686 | UltraCOMP™ GF | Tan | 30% glass filled engineered thermoplastic with enhanced compressive strength | -65 to +500 (-54 to +260) | 22600 (156) | | | |
| W4737 | UltraCOMP™ CF | Black | 30% carbon fiber blend, provides enhanced tensile and compressive strength | -65 to +500 (-54 to +260) | 32400 (224) | | | |

| Parker Material Code | Material | Color | Typical Applications & Description | Service Temperature Range °F (°C) | Tensile Strength @ Break psi (MPa) | Ultimate Elongation | Shore A Hardness |
|---|---|---|---|---|---|---|---|
| **Nitrile (NBR)** | | | | | | | |
| N4115A75 | NBR | Black | General purpose nitrile with medium ACN content for use where a softer seal is required | -40 to +225 (-40 to +107) | 2215 (15.3) | 328% | 74 |
| N4181A80 | NBR | Black | Fiber added reinforcement helps retain lubrication for reduced friction. Used in 8600 wipers | -40 to +250 (-40 to +121) | 2437 (16.8) | 345% | 80 |
| N4121A90 | NBR | Black | High modulus for outstanding extrusion resistance plus good compression set | -40 to +250 (-40 to +121) | 2415 (16.7) | 247% | 89 |
| N4008A80 | NBR | Black | Premium, low ACN nitrile for use when low temperature sealability is required | -70 to +275 (-57 to +135) | 2141 (14.8) | 177% | 79 |
| N4182A75 | NBR | Black | General purpose nitrile for use when low temperature sealability is required | -65 to +225 (-54 to +135) | 1914 (13.2) | 278% | 79 |
| **Carboxylated Nitroxile® (XNBR)** | | | | | | | |
| N4257A85 | XNBR | Black | XNBR with internal lubricant to reduce friction. Ideal for pneumatic applications | 0 to +250 (-18 to +121) | 2845 (19.6) | 249% | 80 |
| N4274A85 | XNBR | Black | Premier XNBR in the industry formulated with proprietary internal lubricant | -10 to +250 (-23 to +121) | 3016 (20.8) | 241% | 83 |
| N4263A90 | XNBR | Black | Extra tough XNBR with increased hardness, modulus and tensile strength | -20 to +275 (-29 to +135) | 3103 (21.4) | 117% | 90 |
| **Hydrogenated Nitrile (HNBR)** | | | | | | | |
| N4031A85 (KA183) | HNBR | Black | Equivalent to Parker compound KA183A85, offers low temperature improvement | -40 to +320 (-40 to +160) | 1800 (12.4) | 100% | 88 |
| N4032A80 (KB162) | HNBR | Black | Equivalent to Parker compound KB162A80 offering improved chemical compatibility | -25 to +320 (-32 to +160) | 3335 (22.9) | 164% | 82 |
| N4033A90 (KB163) | HNBR | Black | Equivalent to Parker compound KB163A90 offering improved chemical compatibility | -25 to +320 (-32 to +160) | 3219 (22.2) | 107% | 88 |
| N4007A95 | HNBR | Black | Excellent extrusion resistance | -20 to +320 (-29 to +160) | 4698 (32.4) | 207% | 92 |
| **Ethylene Propylene (EPR)** | | | | | | | |
| E4207A90 | EPR | Black | General purpose 90A EPR, has excellent dimensional stability in water-based fluids & steam | -65 to +300 (-54 to +149) | 2285 (15.8) | 135% | 87 |
| E4259A80 | EPR | Black | General purpose 80A EPR, has excellent dimensional stability in water-based fluids & steam | -65 to +300 (-54 to +149) | 2142 (14.8) | 162% | 79 |
| E4270A90 | EPR | Black | Formulated for geothermal environments and steam up to +600˚F | -65 to +400 (-54 to +204) | 3047 (21.0) | 145% | 89 |
| **Fluorocarbon Elastomers (FKM)** | | | | | | | |
| V1289A75 | FKM | Black | Fluorocarbon material formulated for improved low-temperature applications | -40 to +400 (-40 to +204) | 1497 (10.3) | 163% | 78 |
| V4205A75 | FKM | Black | 70 Shore A general-purpose fluorocarbon resistant to chemical attack and heat | -20 to +400 (-29 to +204) | 2161 (14.9) | 202% | 76 |
| V4208A90 | FKM | Black | 90 Shore A general-purpose fluorocarbon resistant to chemical attack and heat | -5 to +400 (-21 to +204) | 1954 (13.5) | 152% | 90 |
| V4266A95 | FKM | Black | Features extended wear and extrusion resistance over general purpose fluorocarbons | -5 to +400 (-21 to +204) | 2442 (16.8) | 102% | 92 |
| V1238A95 | FKM | Black | Resistant to explosive decompression and extrusion. Shows no visual physical damage after prolonged exposure to 100% $CO_2$ concentrations | -20 to +400 (-29 to +204) | 3030 (20.9) | 95% | 93 |
| **Nylons** | | | | | | | |
| W4650 | MolyGard® | Gray | Heat stabilized, internally lubed 30% glass-reinforced nylon for standard tolerance wear rings | -65 to +275 (-54 to +135) | 17500 (121) | | |
| W4655 | Nylatron® | Gray | Wear resistant nylon with molybdenum disulfide for lower friction, suited for back-up rings | -65 to +275 (-54 to +135) | 13000 (89.6) | | |
| W4733 | WearGard™ | Green | High compressive strength, 35% glass-reinforced nylon for tight tolerance wear rings | -65 to +275 (-54 to +135) | 18300 (126) | | |

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