

# Electric Vehicles



**Engineered sealing solutions**  
for Electric Vehicle (EV) applications



Hybrid vehicles (HEV/PHEV) have a petrol or diesel engine combined with an electric motor and a relatively small battery. Full battery powered vehicles (BEV's) have large batteries that typically occupy the entire floor area underneath the seating compartment. We have a range of seals suitable for all applications in electric vehicles.

**Converters**

- Press-in-place coolant seals
- Press-in-place environmental seals

**Onboard chargers**

- Custom moulded connectors
- Perimeter seals

**Electrical control units**

- Overmould perimeter seals
- Press-in-place perimeter seals

**Motors**

- Dust exclusion, bearing isolator seals
- Press-in-place perimeter seals
- Radial oil seals
- Radial seals
- Shaft seals

**Gear boxes**

- Clutch bonded piston seals
- Clutch D-rings
- Fluid transfer seals
- Lip seals
- O-rings
- Press-in-place seals
- Radial seals
- Radial shaft oil seals
- Shaft seals

**Inverters**

- Cooling system o-ring seals
- Liquid silicone rubber perimeter seals
- Perimeter carrier gaskets
- Press-in-place perimeter seals

**High voltage connectors**

- Customer moulded connector
- EMI gaskets and shielding
- Perimeter seals
- Wire grommets (LSR)

**Batteries**

- EMI gaskets
- O-rings
- Perimeter seals
- Sealing washers
- Slimline compression limiters
- Water jacket seals



Products

We offer a range of rotary lip seal design configurations based on the type of service, speed, pressure and dynamic run-out for which the seal is designed, with a huge range of case materials and polymer based lip materials depending on application. Our range of PTFE rotary seals reduce heat generation and prevent leakage and are suitable for the high rotary speeds specific to electric vehicle motors and gearbox applications.



Rotary  
Seals

In application

Customer

A systems supplier of powertrain solutions in the field of electrification, hybridisation, and internal combustion power.

Application

A gearbox within an electric vehicle. The position of the seal was required between the wet transmission and dry e-motor, and pressed into a bulkhead housing.

Product

Rotary Seal



The application media was a synthetic oil; relatively standard for an automotive application, but because of the maximum working temperature, FKM (Viton) was the elastomer material to meet the required range.

As with many applications within electric vehicle gearboxes, the shaft speed was particularly high at 8500 RPM. Typically with these high speeds, seal design needs to ensure minimal friction to ensure the service life required.

On the dry e-motor side, the rubber lip was designed to act as a dirt and dust excluder, with slight clearance from the shaft to avoid friction which prevented damage to the seal and also unnecessary wear to the rotary system as a whole.

In the wet transmission side it was imperative that the oil was kept away from the e-motor with the same minimal friction requirements. As a result, our engineers designed the seal with an inlaid PTFE lip with 15% graphite fill. It was energised with a spring to ensure the force to achieve ultimate shaft sealing performance.

Products

Bespoke moulded rubber gaskets for individual and specialist seal applications. We can develop base elastomer materials to meet particular ASTM or ISO call-out requirements, or individual customer specifications such as chemical/fluid testing or compressive stress relaxation duration tests. We have a huge range of materials and compound development for demanding applications and provide low cost, rapid prototype tooling and samples.



Mouldings &  
Gaskets

In application

Customer

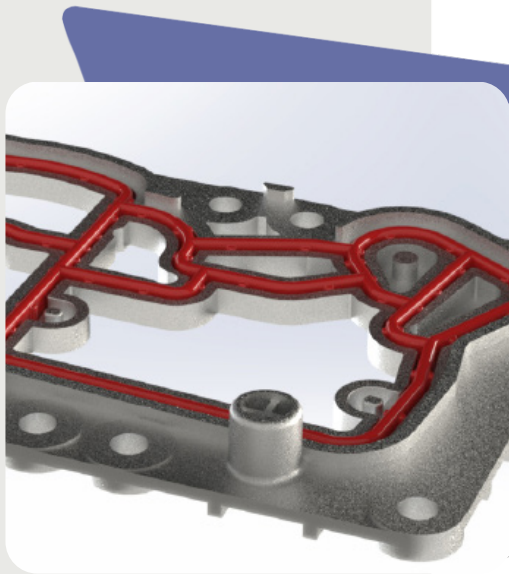
A developer of system solutions for transmission and powertrain and chassis development.

Application

A valve housing; the seal was required to perform under pulsating pressure of up to 50 Bar and temperatures of up to 150°C.

Product

Push in place rubber gasket



Our customer was experiencing failures of a seal designed and manufactured by another rubber seal provider. The original competitor gasket was experiencing chronic failures at the “T-junction” areas of the seal; at high temperatures and high pressures. Our engineers reviewed the existing gasket design and application conditions and immediately recommended an increase in height.

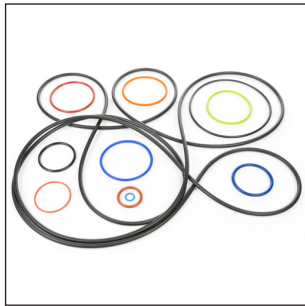
We analysed the customers test data and reviewed images of the tested parts, and determined that there were areas where the gasket was sliding in the groove and then shearing as the pressure pulsed. To resolve this issue, our engineers added beads to the rear of the T-intersections of the gasket. This provided additional support and further stabilised the gasket at the high-pressure stress points in the groove, thus reducing the amount of movement within the housing.

The number of additional beads added needed to be balanced carefully with calculations on groove fill. Further development captured the cleanliness requirements and altered radii on the beads.



# Products

Our elastomer o-rings are available in a wide range of sizes and manufactured to international standards including; AS568, ISO 3601, DIN 3771 and JIS. A vast range of metric and non-standard size o-rings are available. We supply miniature o-rings, large diameter o-rings, continuously moulded and spliced and vulcanised o-rings. Our o-rings can be moulded in a wide range of elastomer compounds with varying shore hardness and for applications with specific requirements.



O-Rings

# In application

## Customer

A manufacturer of high performance oil and vacuum pump solutions, and approached our engineers with a new o-ring application for review.

## Application

O-ring to meet Porsche material specification PN707 Class 2 (Oil), Class 5 (Fuel/FAME mix) and Class 12 (Blowby gas).

## Product

O-ring



Our engineers reviewed the application and we provided two material options. The first was a lower cost grade of FKM (Viton™) A grade, that would possibly meet the Porsche specification required. The second material was a medium to higher cost FKM (Viton™) B grade that would definitely meet the specification.

We supplied quotation for both material options and these included; production tooling, PPAP Level 3 submission (with samples), testing programme for both material variants and a pre-production batch of o-rings. Because of the urgent nature of the project, we were able to accommodate PPAP Level 3 grade o-rings for both materials to be manufactured from the same tool. Also, in order to save time we would conduct material testing in tandem with the manufacture and preparation of the the production tool. The choice of compound to be used in the tool would be made on review of the results of material testing.

On completion of the material testing, the customer reviewed the results with Porsche and the decision to produce o-rings from the FKM B grade was made.

# Quality Assurance

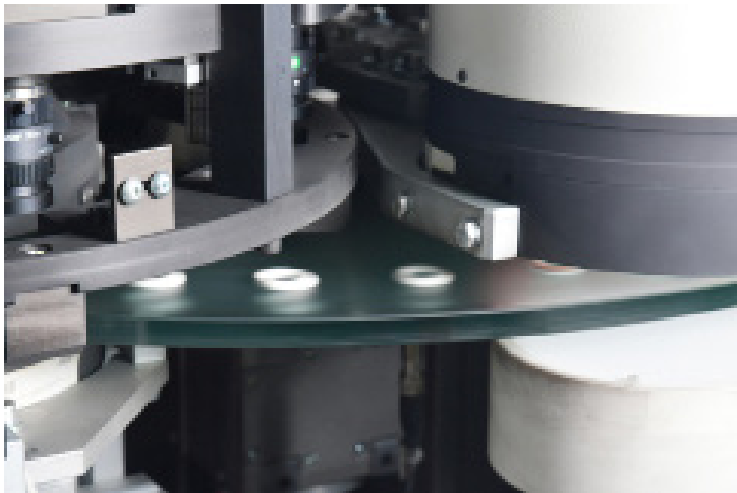
We maintain strict quality procedures at all stages of our design, development and manufacturing processes. We are ISO9001:2015 and ISO14001:2015 approved, and our manufacturing facilities approved to IATF16949:2016.

Our team of Quality Engineers and Quality Inspectors ensuring that advanced product quality planning is at the heart of our quality function.

We supply PPAP Level 3 documentation and samples as the standard quality assurance release with all automotive projects. CPK≥1.33 and PPK≥1.67 values are applied to critical dimensions and these values maintained for production batches with the use of 100% optical inspection on Basler and DOS machinery

Our stringent quality principles and proactive controls mean our customers have reduced claims and associated costs, increased change control, and prevention of productivity loss and line-stops.

With our manufacturing we develop continuous improvements to processes including; follow up-audits, implementation of adequate prevention measures, analysis and review of similar products to prevent future issues, effective root cause analysis and preventative actions review.



# Design & Development

We provide unrivalled technical and engineering support to ensure our customers benefit from the best possible seal performance at optimum cost.

We are dedicated to providing a complete design service; from initial seal geometry and profile choice, to material selection and prototyping, through to final production.

We work closely with your engineers to provide the most effective sealing solutions for each bespoke application.

Our Application Engineers utilise years of seal design experience and materials expertise, alongside technology such as 2D/3D CAD and FEA analysis programs to simulate performance before finalising each individual seal design.

