



# **ERIKS Sealing Technology**

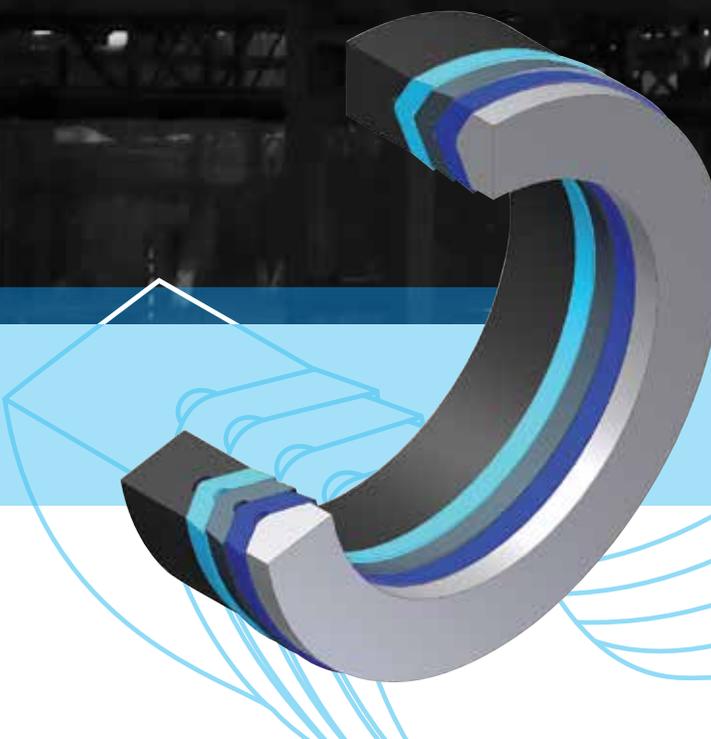
Polymer Sealing Solutions for the Chemical Process Industry

know-how makes the difference

**ERIKS**

“An in-depth understanding of complex polymer chemistry and its effect upon the mechanical performance of a seal, is vital to ensure correct seal specification and subsequent reliable operation.”

**Mick Holland**  
General Manager  
ERIKS Sealing Technology



### Valve Stem Packing Seal

A proven solution for reliable high pressure sealing with minimal fugitive emissions.

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All information in this documentation has been compiled with care to ensure accuracy. Despite this we can bear no liability for error and/or changes in legislation that may affect content. Recommendations are intended as guidelines only, for further information and technical assistance, please consult your ERIKS representative.

## Leader in Sealing Technology

**ERIKS is a leading force and innovator working for you in the process industry and for your equipment manufacturers, fulfilling the twin roles of specialist MRO supplier and OEM design with comprehensive technical support. ERIKS has service and technology centres in 24 countries ensuring we are always on-hand to keep you working.**

ERIKS Sealing Technology is a world leader in high-performance O-rings, elastomeric and polymer seals. Our focus on your markets and passion for technology helps us to engineer new solutions for your applications and has established ERIKS as the know-how team.

We hold ISO 9001:2008 certification across both of the UK sealing core competence centres and throughout our distribution network for peace of mind.

Whether your requirement is for individual products, small batches or production volumes, ERIKS Sealing Technology's manufacturing, logistics and quality systems ensure delivery of the highest levels of service.

We are the preferred partner of the key global seal manufacturing companies, giving ERIKS an unrivalled insight into their capabilities and resources available to add value to your business and the products that you produce.

### Technical Solutions

We also have a comprehensive process to identify problems and opportunities through consultation, to recommend, prioritise and implement improvements, and then to provide the necessary training and ongoing support to ensure the continued smooth running of customers' assets.

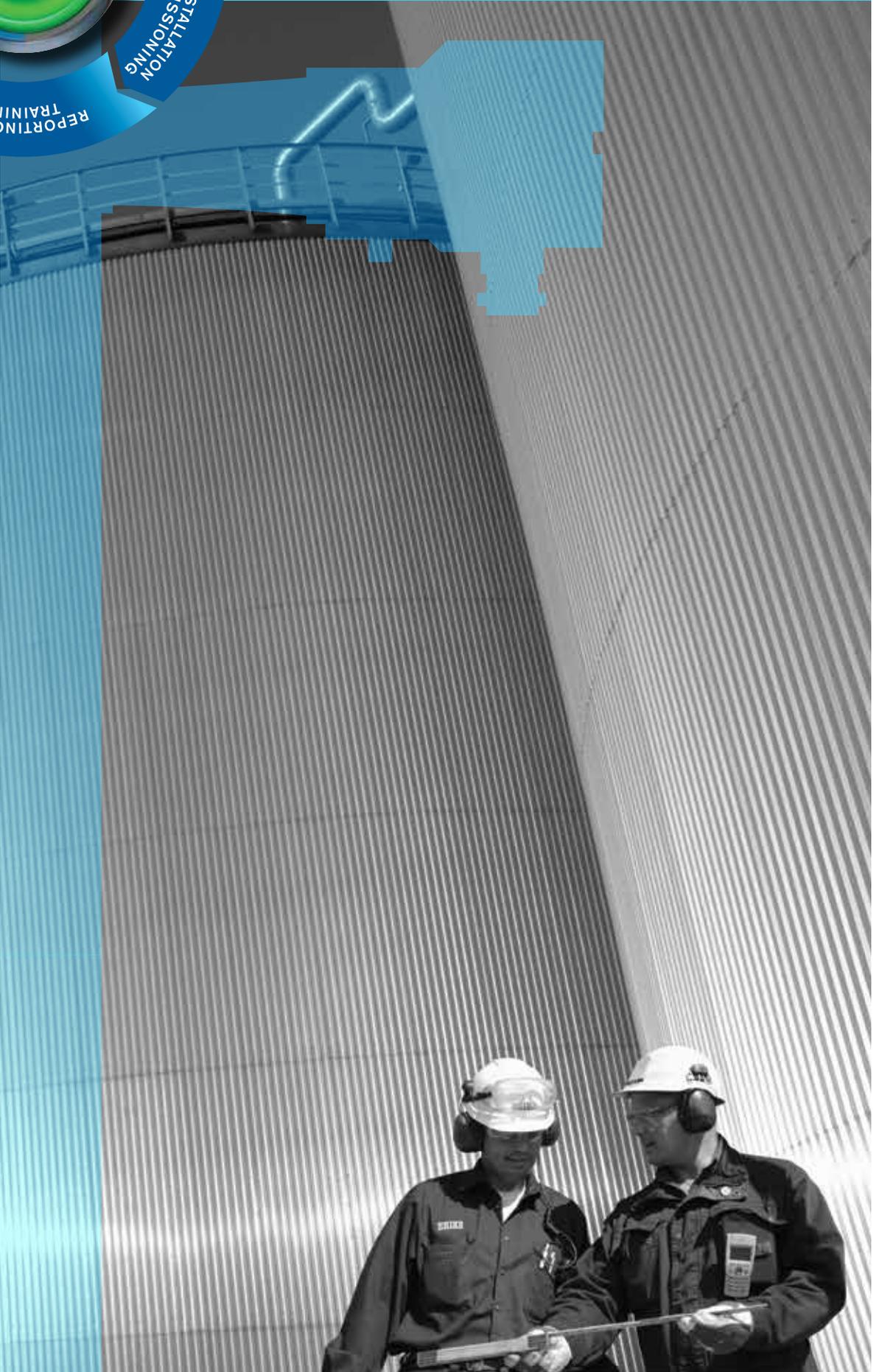
These steps to success are designed – and proven – to help customers achieve their productivity and profitability goals.

### ERIKS' focus on five core activities:

- Sealing technology
- Power transmission, including electromechanical services and condition monitoring
- Flow technology
- Industrial plastics
- Tools and maintenance products

These products are supported by advanced technical and logistics services that form the link between our know-how and your reliability.





## Stock Availability

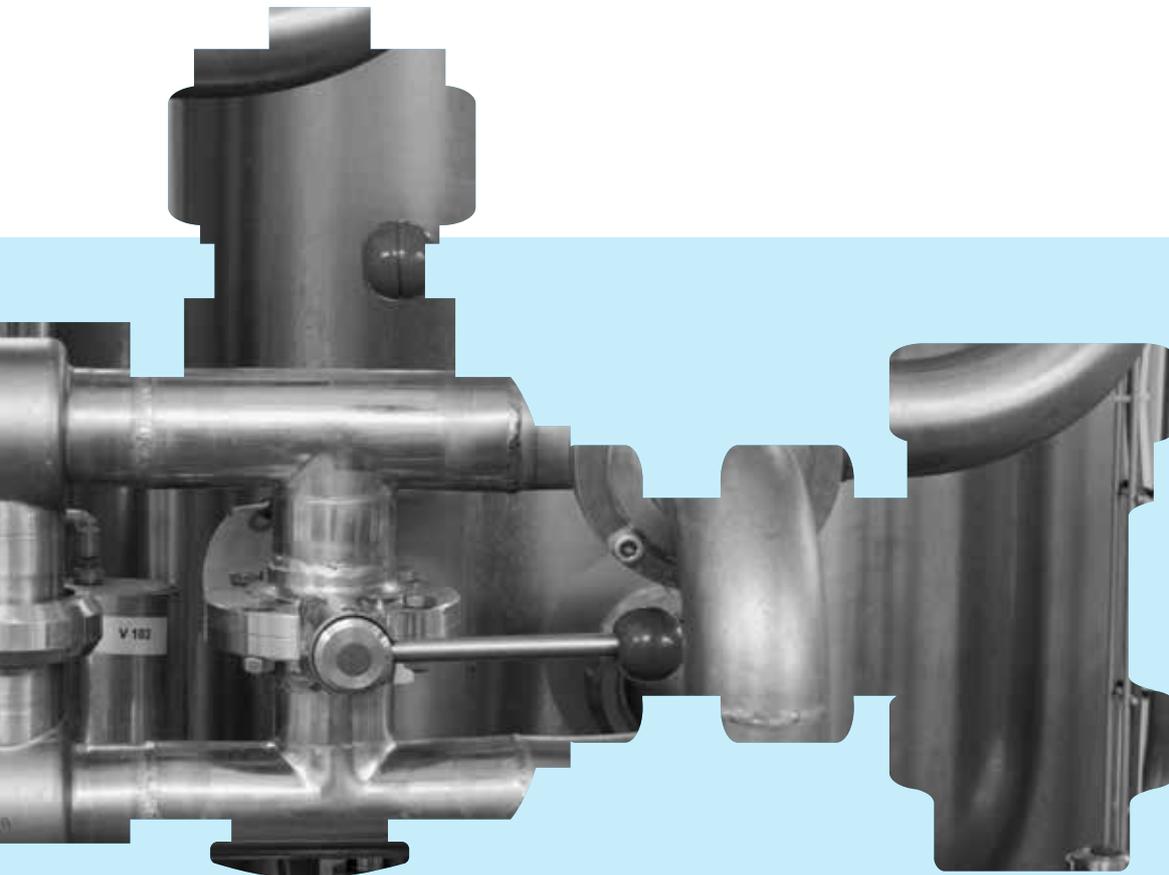
As Europe's largest stockholder of sealing and associated products, you are assured of the highest levels of availability to keep your site working. Our expertise will also help you select the correct item from our range or specify the optimal customised solution.

With over 28,000 product lines our specialist sealing product resource includes the following:

- O-rings (BS1806, BS4518, AS568, ISO 3601, DIN 3771, JIS)
- Hydraulic Seals
- Back-up Rings
- Mechanical Seals
- Hygienic Seals (Triclover, SMS, DIN 11864, RJT, DIN 11851, IDF)
- Mechanical Seals
- Rotary Seals

## Support

- Dedicated office based technical support staff/customer service
- Field based Sealing Technology application engineers and specialists
- Excellent technical support from skilled research and development engineers
- 24-hour call out service available



## Service Centre Network – Local to You

ERIKS are local for the quickest response. Our network of 70 Service Centres and 25 Repair Workshops ensures product and application know-how is immediately and locally available, to provide essential support 24/7.

Our local teams have a direct line to all the technical support you may need along with visibility of our own stocks and those of our supply partners.

## Integrated Solutions

ERIKS Integrated Solutions is a dedicated division and resource within ERIKS UK that provides maintenance

procurement and logistics on your site which is relied upon by many major UK companies.



## Product Design

In an environment dedicated to innovation and free thought, our highly talented design team, work with the latest 3D Computer Aided Design tools to capture design intent with your teams. This technology proves an invaluable tool in communicating and developing conceptual solutions involved in co-engineering partnerships as we can share 3D data in many standard formats including IGES and STEP.

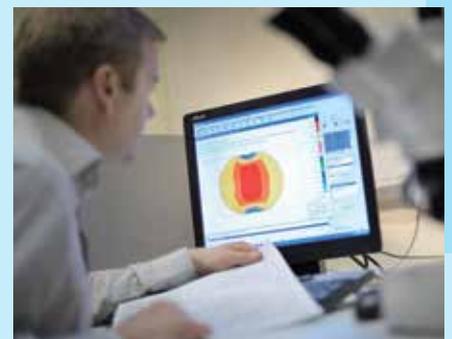
Aerospace standard change control and configuration management techniques are used to ensure that the design intent is fully embodied into the finished

product; with our combined visual and CMM dimensional measurement system being programmed from the original 3D CAD model.

### Finite Element Analysis (FEA)

Using FEA as a mathematical technique to predict deflection (strain), stress, reaction force and contact pressure based on dimensional information, physical constraints and material properties improves design integrity and speed. Our Materials Technology Centre can generate temperature specific,

validated, hyper-elastic material models on which to base these analyses. FEA allows our engineers to rapidly iterate to optimal design solutions, minimising product development time and cost.



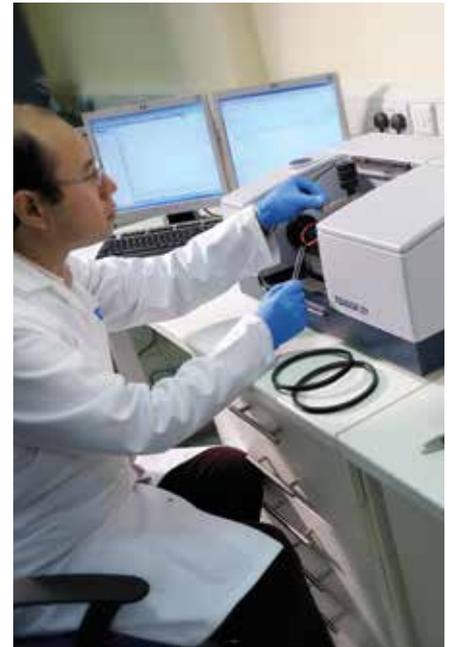
## Material Technology Centre

**ERIKS Material Technology Centre is a testimony to our commitment to the highest level of product quality and customer satisfaction possible.**

Situated in Warrington this facility benefits from continuous investment in technology and people and is one of the major factors in ERIKS Sealing Technology's success. The Material Technology Centre's principal activities are to ensure our high quality standards are maintained and to develop new compounds or technical solutions for your applications.

### Capabilities:

- Hardness (°IRHD/Shore A)
- Compression-set
- Tensile strength
- Chemical and heat aging
- Ozone resistance
- Material composition
- Dimensional measurements
- Surface defects
- Material properties at temperatures from  $-70^{\circ}\text{C}$  to  $300^{\circ}\text{C}$
- Wet bench analysis
- Extraction testing
- Failure analysis



### Fourier Transform Infra-red Spectroscopy (FTIR)

Molecules have specific frequencies at which they naturally rotate or vibrate. By exposing a material sample to a spectrum of infra-red frequencies the equipment can identify which molecules are present by detecting which frequencies are absorbed. This technique is used to identify the base polymers material type in quality control and to identify thermo-chemical decomposition.

### Thermo-Gravimetric Analysis (TGA)

TGA is used to identify weight loss of a compound either isothermally over time or over a ramped temperature range. The relative composition of compounds can be identified, to quantify polymer, organic and inorganic filler contents and types.



## Test and Validation

We run test programmes to SAE standard specifications, our own demanding internal validation standards, customer specific requirements and special test programmes for development projects or competitor benchmarking.

### Summary of standard test capability

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**Maximum Seal OD:** 400mm

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**Speed:** Max 7,000 rpm

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**Rotation:** Clockwise/Anti-clockwise

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**Orientation:** Shaft or housing rotation

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**Pressure:** 0-10 bar (water, oil, air)

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**Temperature:** 80-200°C

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**Shaft Eccentricity:** Adjustable up to 1mm

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**Housing Offset:** Adjustable up to 2mm

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**Torque Measurement:** Max 20 Nm

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**Data Logging:** Speed, temperatures and pressures

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**Environmental:** Slurry, dust, water

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## Elastomers

Elastomeric materials are described as having non-linear, viscoelastic behaviour, this means that they exhibit elastic recovery, time dependent behaviour and the relationship between load and deflection is not linear.

Elastomers used in sealing are often described as compounds, meaning that they are a mixture of ingredients manufactured under specific conditions. A compound typically comprises:

- **Polymer backbone** – a long chain of molecules made up of one or more monomeric units, this governs the basic thermal, chemical and physical properties of a compound. ISO and ASTM classifications define families of elastomer such as NBR, FKM etc.

- **Cross-link** – polymer chains are tied together by cross links, short chains of molecules e.g. sulphur, to prevent chain slippage and create elastic behaviour. Different cross link systems will fundamentally change thermo-chemical or physical properties

- **Fillers** – organic or inorganic solid particles with specific shapes and chemistries that tailor physical properties such as tensile strength, hardness, elongation at break, modulus and compression-set

- Other ingredients used to achieve specific manufacturing, application or cost requirements

A typical HNBR 85 Shore A compound may have 20 ingredients and may contain only 30% polymer by weight. Therefore it is important not just to specify the family of polymer backbone and hardness, but to specify an individual compound/grade in order to achieve consistent performance.

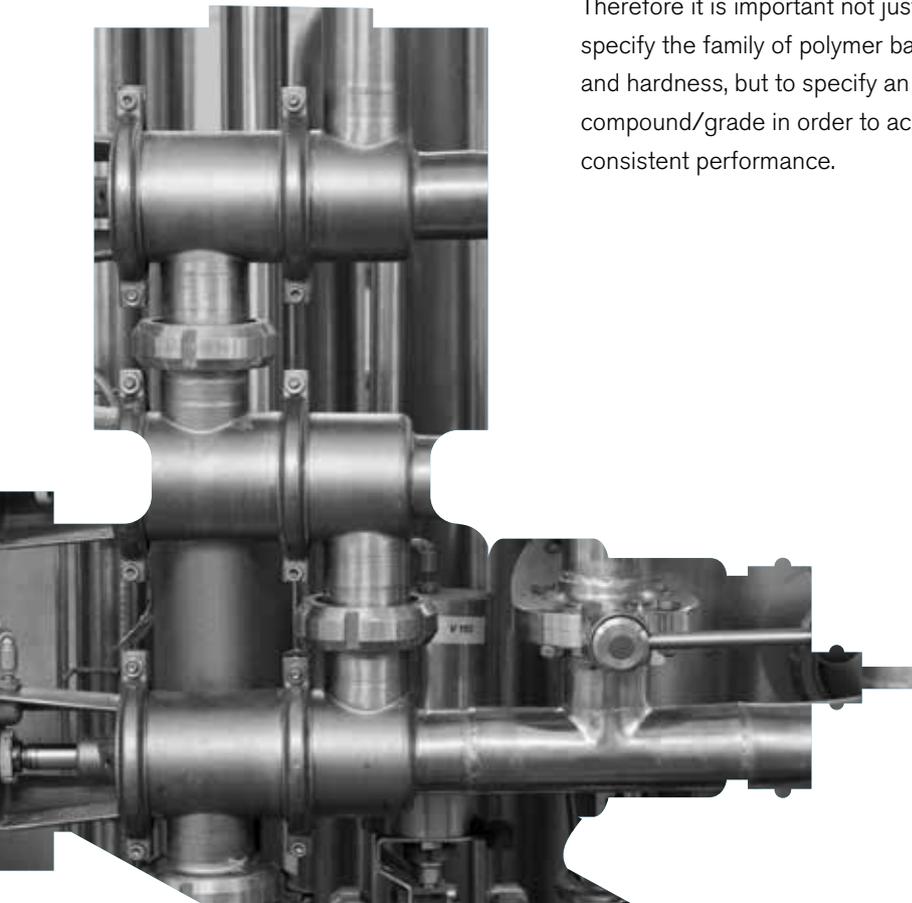
## Acrylonitrile Butadiene Rubber (NBR)

### Nitrile

Nitrile is the most commonly used elastomer in the seal industry. Nitrile is a copolymer of two monomers; Acrylonitrile (ACN) and Butadiene. The properties of this elastomer are ruled by its ACN content which is broken down into three classifications:

High Nitrile	>45% ACN content
Medium Nitrile	30-45% ACN content
Low Nitrile	<30% ACN content

The higher the ACN content, the better its resistance to hydrocarbon oils. The lower the ACN content the better its flexibility in low temperature applications. Medium Nitrile is, therefore, most widely specified due to its good overall balance in most applications. Typically, Nitriles can be compounded to work over a temperature range of  $-35^{\circ}\text{C}$  to  $+120^{\circ}\text{C}$  and are superior to most elastomers in regard to compression-set, tear and abrasion resistance. Nitrile possesses excellent resistance to oil-based fluids, animal fats, vegetable oils, greases, water and air.



## Hydrogenated Nitrile Rubber (HNBR)

The properties of Hydrogenated Nitrile Rubber (HNBR) are dependent upon the acrylonitrile content and the degree of hydrogenation of the butadiene copolymer. They have a better oil and chemical resistance than Nitrile Rubber and can withstand much higher temperatures. HNBR has excellent resistance to hydrogen sulphide, steam, hot water and ozone. Physical



properties (e.g. tensile and tear strength, elongation, abrasion resistance, compression-set, etc.) are also excellent and compounds display strong dynamic behaviour at elevated temperatures. HNBR can either be cured with sulphur or peroxide, depending upon which properties are the most important. Typical applications include accumulator bladders, diaphragms, gaskets and seals. Limitations include poor electrical properties, poor flame resistance and attack by aromatic oils and polar organic solvents.

## Fluorocarbon Rubber (FKM/FPM)

### Viton®

FKMs are frequently used to resist extreme temperatures or harsh chemicals. The strong carbon-fluorine bonds that

make up the polymer structure provide high thermo-chemical resistance, giving excellent aging characteristics shown by low compression-set at elevated temperatures.

FKMs offer excellent resistance to mineral oils and greases, aliphatic, aromatic and some chlorinated hydrocarbons, petrol and diesel fuels, silicone oils and greases. However FKM shows poor resistance to ethers, ketones, esters and amines.

FKM is available as a copolymer (two monomers), terpolymer (three monomers) and tetrapolymer (four monomers). Each type determines both fluorine content and chemical structure which in turn significantly impact the chemical resistance and temperature performance of the polymer.

## Types of fluorocarbon rubber

Type	ASTM Fluorine Content	Typical cure system	Description
Copolymer (A/E)	65% – 65.5%	Bisphenol	General purpose with excellent mechanical properties.
Terpolymer (B or F)	67%	Peroxide	Improved fluid and oil/solvent resistance, including improved steam and methanol resistance.
Tetrapolymer (G)	67% – 69%	Peroxide	Improved fluid, acid, solvent resistance over other types. Compression-set better than terpolymers.
Tetrapolymer (GF)	67% – 69%	Peroxide	Good high temperature performance and chemical resistance but reduced mechanical properties and low temperature performance.
Tetrapolymer (GLT)	67% – 69%	Peroxide	Improved low temperature performance but reduced chemical resistance.
Tetrapolymer (GFLT)	67% – 69%	Peroxide	Good all-round low/high temperature performance and chemical resistance.
Low temperature	67% – 69%	Peroxide	Speciality polymers are available that further extend the low temperature performance of FKMs.

See our data-sheets for Genuine Viton® certifications.

Kalrez®, Viton® and Genuine Viton® are registered trade marks of Dupont Performance Polymers.

## Elastomers – continued

### TFE/P (FEPM)

#### Aflas®/Viton® Extreme®

Tetrafluoroethylene and propylene (FEPM) is a copolymer with a fluorine content of approximately 54%. FEPM is also ideal for media such as phosphate-esters, mineral oils, silicone oils, acids and bases, hot water and steam up to 170°C.

Aflas® is often preferred over FKM in steam and amine applications as it does not contain the VF<sub>2</sub> monomer, the point of chemical attack.

Viton® Extreme® offers superior ketone resistance than standard FKMs.

### Perfluoroelastomers (FFKM)

Perfluoroelastomers (FFKM) have a fully fluorinated polymer backbone resulting in fluorine content of over 71%. As all of the bonds on the backbone are carbon-fluorine then FFKM materials offer the ultimate thermo-chemical resistance shown by the good

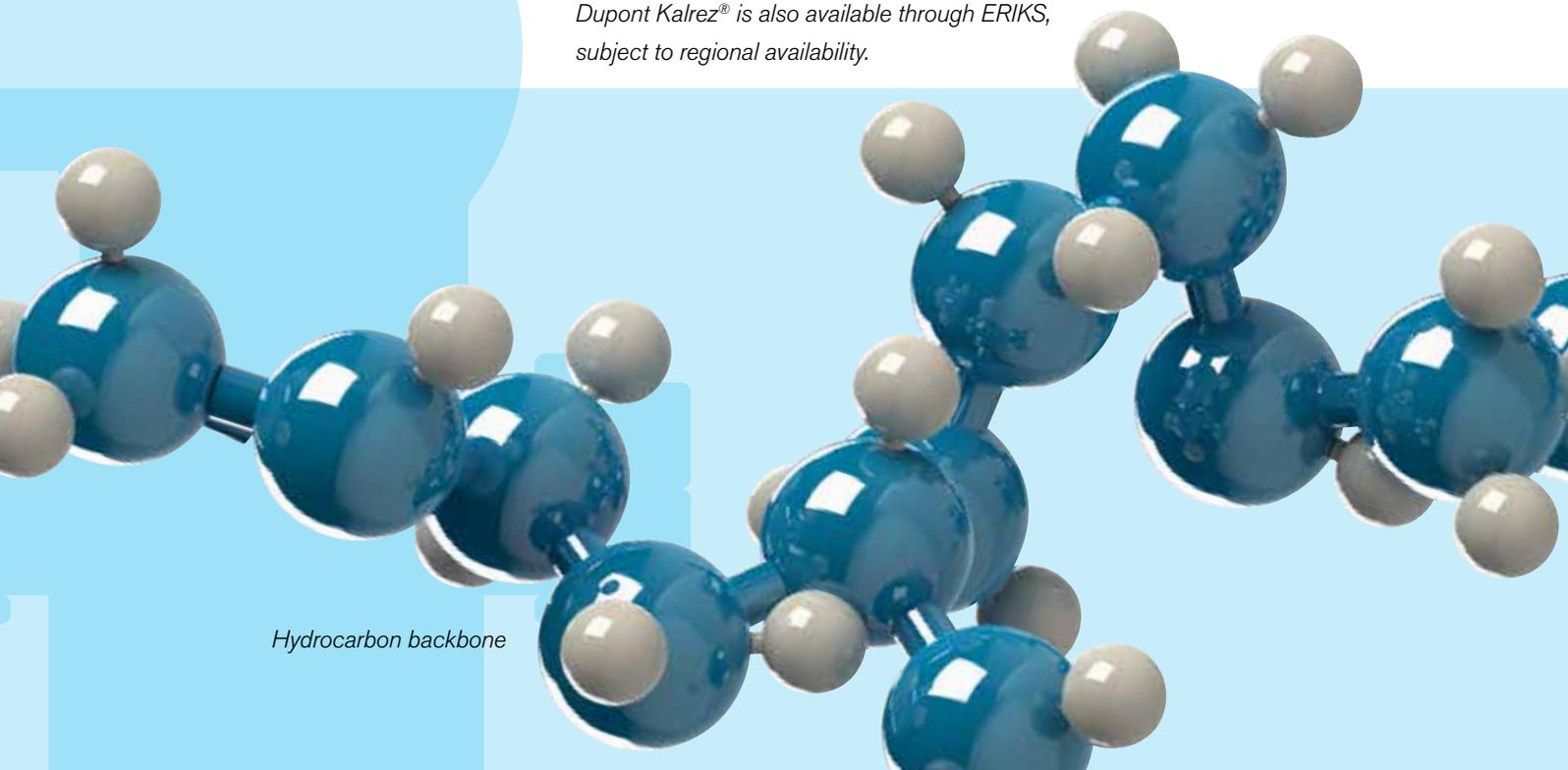
long-term high temperature compression-set resistance. Although all FFKM polymer backbones are fully fluorinated the cross linking systems used to join the polymer chains together differ significantly, resulting in differing temperature and chemical resistance.

#### Types of perfluoroelastomers

Common FFKM Types		
Peroxide	240°C	Broad chemical resistance.
Triazinic	327°C	High temperature, excellent mechanical properties. Reduced chemical and steam resistance.
Modified Triazinic	275°C	Broad chemical resistance, excellent mechanical properties.
Modified Peroxide	325°C	High temperature resistance, excellent mechanical properties, reduced amine and base resistance.

*Dupont Kalrez® is also available through ERIKS, subject to regional availability.*

*Hydrocarbon backbone*



## Polyurethane Rubber (AU/EU)

Polyurethane is a thermoplastic resin with elastomeric type properties. It exhibits outstanding mechanical and physical properties when compared to other elastomers. It has high resistance (abrasion and tear) and poses the highest tensile strength available to any elastomer. Typically Polyurethanes have working temperatures of approximately  $-40^{\circ}\text{C}$  to  $+82^{\circ}\text{C}$ . AU has outstanding resistance to petroleum-based oils and hydrocarbon fuels and EU monomer has resistance to water, grades being classed as hydrolysis resistant or not.

## Ethylene Propylene Rubber (EPR) and Ethylene Propylene Diene Monomer (EPDM)

Ethylene Propylene is available as a copolymer (EPR) or as a terpolymer (EPDM). These elastomers have excellent resistance to heat, water, steam, weathering and ozone. Ethylene Propylene based compounds are not recommended for use with mineral or petroleum based fluids.

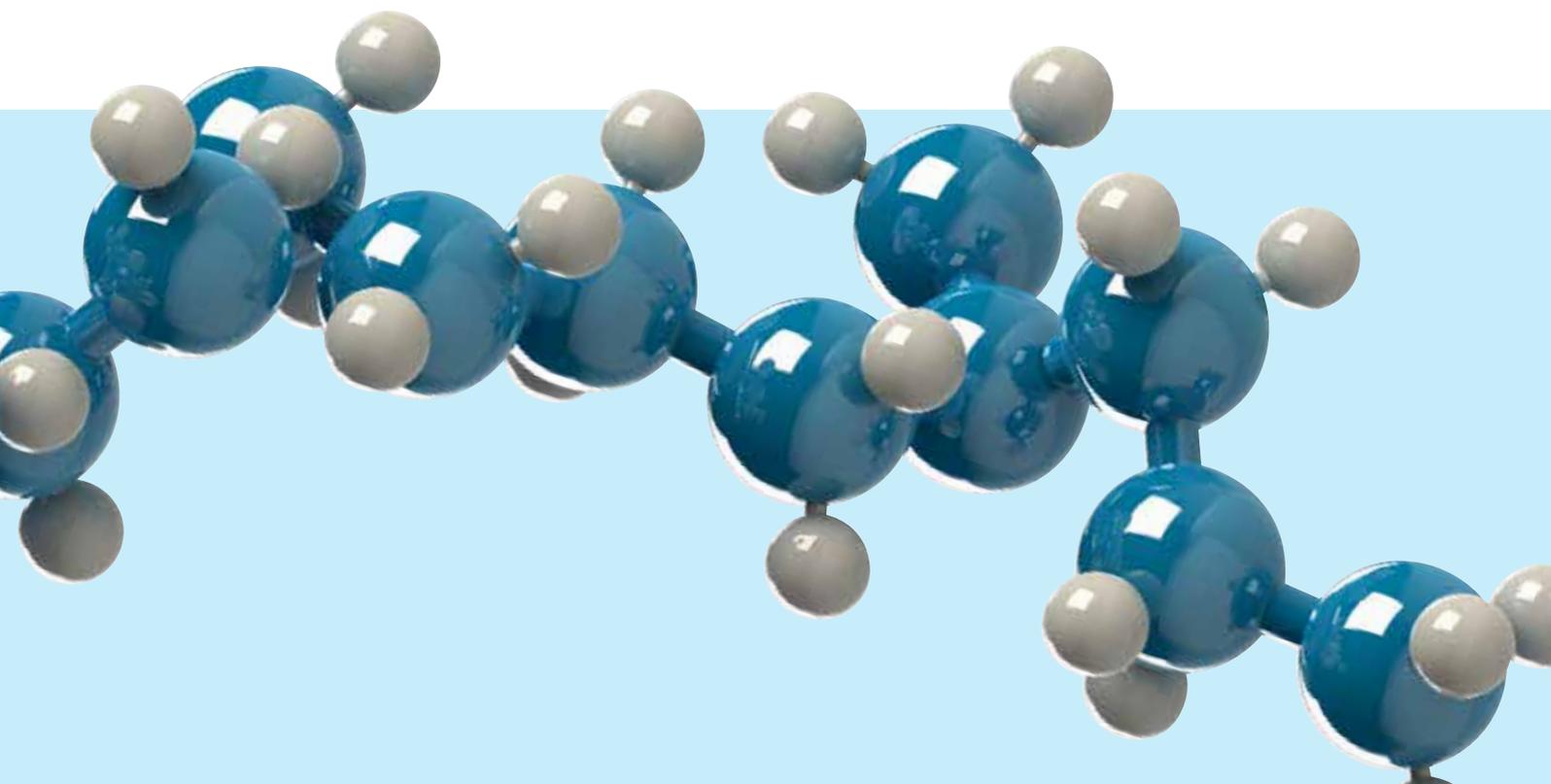
Sulphur cured grades offer a typical temperature range of  $-50^{\circ}\text{C}$  to  $+120^{\circ}\text{C}$  and optimal mechanical properties. Peroxide-cured grades can reach a maximum temperature of approximately  $+150^{\circ}\text{C}$  in hot water, alcohols, organic and inorganic acids and bases.

## Silicone (VMQ)

Silicone elastomers are commonly used for extreme temperature range ( $-50^{\circ}\text{C}$  to  $+230^{\circ}\text{C}$ ) and offer good low temperature flexibility. They also offer superior dielectric properties and good resistance to ultra violet radiation, oxygen and ozone.

Silicone is best suited to non-dynamic applications, as this elastomer type possess relatively low tear strength and abrasion resistance, although higher strength grades are available.

Silicone compounds are very clean and are used extensively in food and medical applications, as they do not impart any taste or odour. They are also compliant with engine and transmission oils, animal and vegetable oils/fats and brake fluids.



## Selection of Standard ERIKS Compounds

We have over 130 different compounds for specific applications.

Elastomer	Compound Reference	Colour	Hardness	Temperature	Application
Nitrile, NBR, Buna N	36624	Black	70	-35 to +110°C -31 to +230°F	Standard compound with good compression-set values and medium acrylonitrile content for use with hydraulic oils, vegetable oils, animal fats, acetylene, alcohols, water, air, fuels and many other fluids.
	47702	Black	90	-25 to +110°C -13 to +230°F	Similar to 36624 with higher hardness for higher pressure applications.
Ethylene Propylene, EPDM, EPM	55914	Black	70	-55 to +130°C -67 to +266°F	Standard, sulphur cured EPDM compound with very good compression-set for use with solvents, alcohols, ketones, esters, organic and inorganic acids. Not recommended for animal fats, vegetable or mineral oils.
	55914PC	Black	70	-50 to +150°C -58 to +302°F	High performance peroxide cured EPDM compound with very good compression-set, steam, ozone and weathering resistance.
Silicone, VMQ	714177	Red	70	-55 to +230°C -67 to +446°F	General purpose silicone with excellent physical and temperature resistance up to 220°C. Extremely high and low temperature range for use in air, oxygen dry heat, ozone, hot water to 150°C, and glycol based brake fluids. Silicones are recommended only for static applications.
Fluorocarbon FKM, A-Type	51414	Black	75	-20 to +200°C -4 to +392°F	General purpose compound with very low compression-set characteristics at high temperatures and chemical resistance to oils, fats, fuels. Suitable for vacuum applications.
	51414G	Green	75	-20 to +200°C -4 to +392°F	General purpose compound with very low compression-set characteristics at high temperatures and chemical resistance to oils, fats, fuels. Suitable for vacuum applications.
	514320	Black	90	-20 to +200°C -4 to +392°F	Similar to 51414 with higher hardness for higher pressure applications.
Fluorocarbon FKM, A-Type	514141	Black	75	-10° to +200°C +14°F +392°F	GF-Terpolymer with improved steam and temperature resistance.
Perfluoroelastomer, FFKM	FFKM-75-162	Black	75	+275°C +527°F	Broadest range of chemical and temperature resistance for chemical processing industry. Suitable for acids, basics, amines, steam, ethylene oxide and many other aggressive chemicals.
	FFKM-75-164	Black	75	+310°C +590°F	High temperature compound with superb compression-set characteristics and improved resistance against steam and amines. Very suitable for temperature cycle applications.
Teflex®	FEP/VMQ		N/A	-60 to +200°C -76 to +392°F	General purpose encapsulated O-ring, with improved compression-set characteristics at low temperatures. Not recommended for vacuum applications due to high gas permeability. Not for dynamic applications.
	FEP/FKM		N/A	-20 to +200°C -4 to +392°F	High thermal and chemical resistance. Not recommended for dynamic applications. Recommended for vacuum applications.
	PFA/VMQ		N/A	-60 to +260°C -76°F +500°F	High temperature encapsulated O-ring. Not recommended for vacuum applications. Not for dynamic applications.

## Physical Properties of ERIKS Compounds

Technical Data	36624	47702	55914	55914PC	714177	51414	51414G	514320	514141	FFKM-75-162	FFKM-75-164
Colour	Black	Black	Black	Black	Red	Black	Green (RAL 6011)	Black	Black	Black	Black
Hardness (ISO 48 Method M) $\pm 5$ °IRHD	70	90	70	70	70	75	75	90	75	75 (Shore A)	75 (Shore A)
Specific Gravity	1.25	1.25	1.13	1.12	1.25	1.85	2.07	1.87	1.88	-	-
Minimum operating temperature °C	-30	-30	-50	-55	-60	-20	-20	-20	-10	-	-
TR-10 °C	-22	-22	-40	-45	-60	-16	-16	-16	-16	-	-
Maximum operating temperature °C	120	120	130	150	220	200	200	200	200	275	310
Tensile strength MPa	13	16	10	10	7	13	12	14	19.3	14	13
Elongation %	250	150	250	330	300	170	170	120	328	130	137
<b>Compression-set (ISO 815 method A)</b>											
Test time (hours)	22	22	22	22	22	24	24	24	22	70	70
Test temperature °C	100	100	100	150	150	200	200	200	175	200	200
Result – Slab %	12	13	16	15	20	12	14	14	14	-	-
Result – O-ring 3.53 mm %	20	25	26	25	40	18	19	18	-	14.2	22.9
<b>Heat Aging (ISO 188)</b>											
Test time (hours)	70	70	70	70	70	70	70	70	70	-	-
Test temperature °C	100	100	100	100	100	200	200	200	250	-	-
Hardness change °IRHD	6	4	14	12	12	4	5	5	4	-	-

## Common Chemical Compatibilities of Materials

Media	Nitrile NBR	Ethylene Propylene EPDM	Fluorocarbon Viton® A	Fluorocarbon Viton® GF
Organic Acids	Poor	Poor	Fair	Good
Mineral Acids	Poor to Fair	Good	Good to Excellent	Excellent
Strong Bases, High pH	Good	Excellent	Poor	Poor
Alcohol	Good	Excellent	Poor	Good
Steam	Fair	Excellent	Poor to Fair	Good
Aromatic Hydrocarbons	Poor	Poor	Fair to Good	Good to Excellent
Chlorinated Hydrocarbons	Poor	Poor	Excellent	Excellent
Amines	Poor	Excellent	Poor	Fair
Ammonia, Aqueous Liquid	Good	Good	Poor	Poor
Ammonia, Gas	Good	Good	Poor	Poor
Low Molecular Weight Caronolys (MTBB, MBK, MIBK, etc.)	Poor	Good	Poor	Poor



*Chemical immersion test/wet bench analysis.*

Silicone VMQ	Fluorsilicone FVMQ	Hydrogenated Nitrile HNBR	Aflas® TFE/P	Perfluoroelastomer FFKM
Good	Good	Fair	Excellent	Excellent
Poor	Poor	Poor to Fair	Excellent	Excellent
Fair	Good	Good	Excellent	Excellent
Good	Fair to Good	Excellent	Excellent	Excellent
Fair	Poor	Excellent	Excellent	Good to Excellent
Poor	Good to Excellent	Excellent	Excellent	Excellent
Poor	Poor	Fair	Poor	Excellent
Poor	Fair to Good	Poor	Good	Good to Excellent
Good	Good to Excellent	Good	Excellent	Good to Excellent
Excellent	Good	Good	Excellent	Good to Excellent
Poor	Poor	Poor	Poor	Excellent



*Uncured polymer*

## Thermoplastics

### Polytetrafluoroethylene (PTFE)

PTFE is a thermoplastic polymer and not an elastomer. PTFE is unaffected by virtually all known chemicals over a wide range of temperatures. PTFE lacks elasticity which prevents its use as an elastomeric sealing ring, however it is commonly used for anti-extrusion as a back-up ring and for non-stick requirements. Non-filled ('Virgin') grades are stable up to +260°C and quite flexible and resistant to breaking under tensile and compression stresses. PTFE is available as various filled grades to enhance its physical characteristics. Typical filler types include:

- **15-25% glass-filled** for improved deformation and wear
- **25% carbon-filled** for considerable wear and deformation improvement
- **15% graphite-filled** to lower the coefficient of friction
- **40% bronze-filled** for excellent wear, deformation strength, thermal conductivity (reduced chemical resistance)

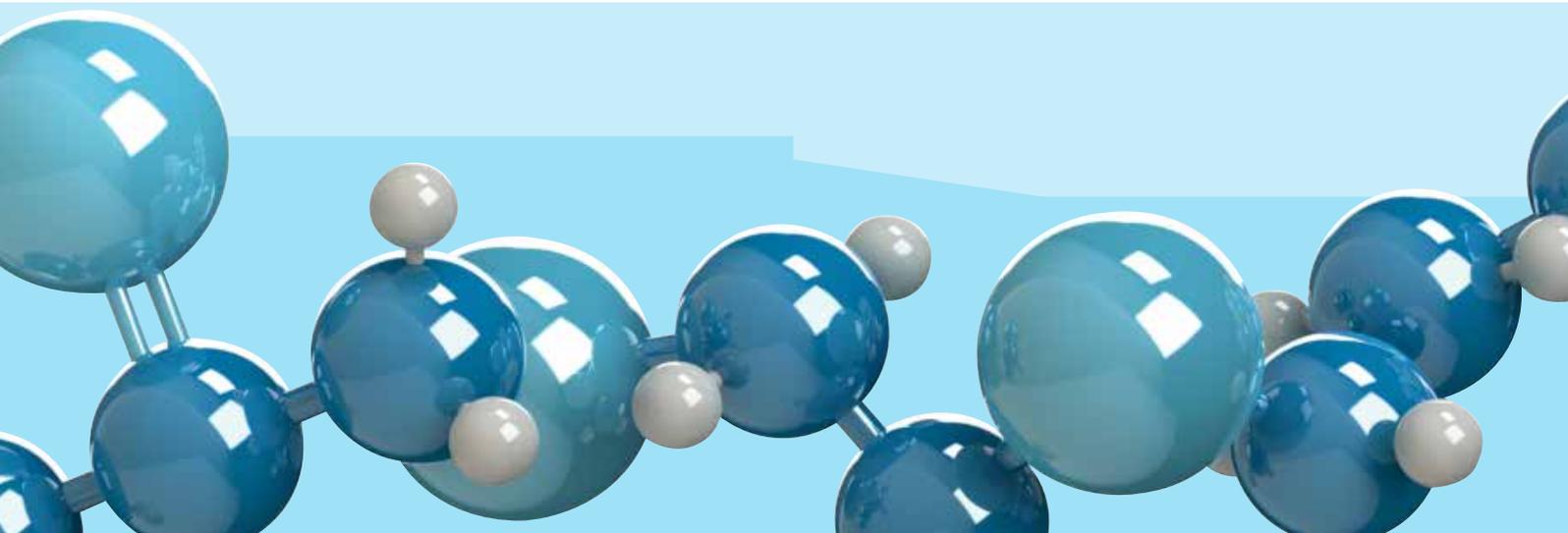
### Fluoroethylene Propylene-Perfluoroalkoxy (FEP/PFA)

This polymer is made from chemically modified fluorocarbon copolymers. FEP is often used to encapsulate other elastomers to increase chemical resistance. FEP/PFA appears more like a plastic than a rubber; they are extremely resilient and have excellent chemical resistance but they have a lower melting point than PTFE. FEP/PFA has a moderate abrasion resistance but have excellent non-stick characteristics. Their temperature range is approximately -100°C to +200/250°C for FEP/PFA respectively. FKM cores are typically used for gas applications due to lower gas permeability, otherwise VMQ are typical.

### Polyaryletheretherketone (PEEK)

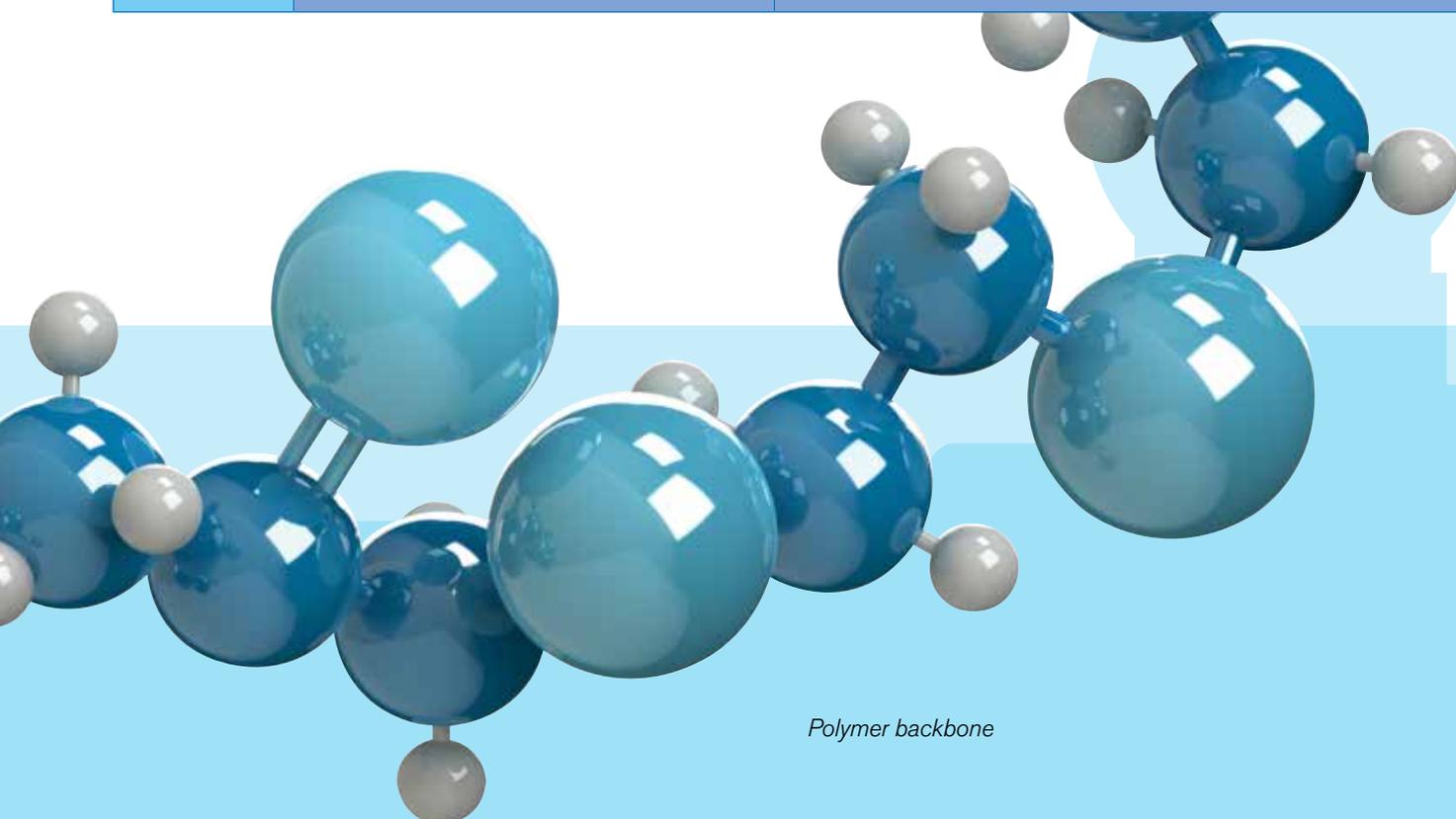
PEEK is a semicrystalline thermoplastic that is physically strong and highly resistant to wear, hydrolysis and thermal degradation. PEEK is available as non-filled ('Virgin') grades and various filled grades which modify its physical characteristics.

- **Virgin PEEK** has excellent mechanical properties at high temperatures, excellent chemical resistance, low moisture absorption, good wear and abrasion resistance
- **Glass-filled** grades have increased compression strength and shear strength at higher temperatures
- **Carbon-filled** grades have enhanced compression strength, tensile strength and wear-resistance



## Standard ERIKS Thermoplastic Grades

Material Reference	Description	Application
E400	Virgin Polytetrafluoroethylene (PTFE)	Static, Low Duty Cycles.
E431	Glass and Molybdenum Disulphide reinforced PTFE	Dynamic/Static, Medium Duty Cycles, Hardened Metal Running Surfaces.
E471	Graphite reinforced PTFE	Dynamic, Medium Duty Cycles.
E462	Carbon/Graphite reinforced PTFE	Dynamic, Medium Duty Cycles.
E491	Ekonol reinforced PTFE	Dynamic/Static, Medium to High Duty Cycles, Minimum 45 HRc Running Surface.
E282Z	Carbon/Graphite/PPS reinforced PTFE	Dynamic/Static, High Duty Cycles, Hardened Metal Running Surfaces.
V1	PEEK 450 Virgin	Back-up Rings
V2	PEEK 450 CA30 Carbon filled	Dynamic Anti-extrusion Elements/Bearings.
V3	PEEK 450 GL30 Glass Filled	Bearings
V4	PEEK 450 FC30 Lubricated	Bearings



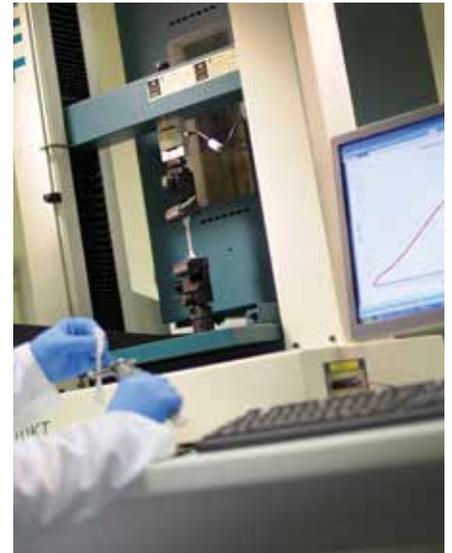
## Pressure Guidelines

Sealing of extreme pressure applications typically requires robust high modulus, high hardness materials. On the contrary elastomers, with a reduced hardness and lower modulus are more compliant and complement lower pressure sealing applications.

It is normal practice to specify elastomers with a high hardness, for high pressure applications. With the vast array of elastomeric compounds and formulations available today, it is possible to utilise materials with a relatively low hardness and a relatively high modulus.

The chart to the right is a simplified representation of Nitrile Elastomers under continuous use at 70°C (158°F). Elevated operating temperatures considerably weaken elastomers; therefore the chart is not applicable to ambient burst tests, or operation at extremes of temperature.

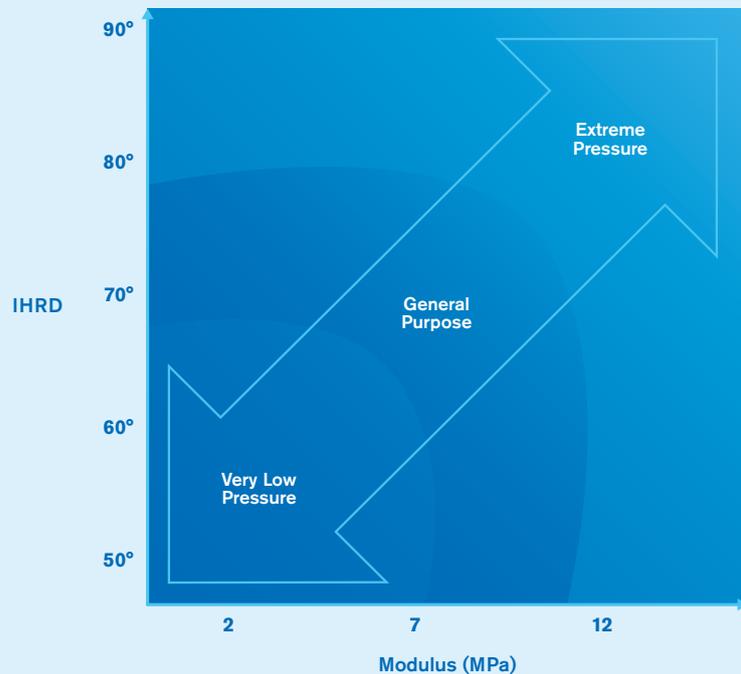
Combinations of pressure and clearance that lie to the right of the pertinent line could result in extrusion of an O-ring. The addition of an Anti-Extrusion Ring(s) or use of different seal geometry is advised.



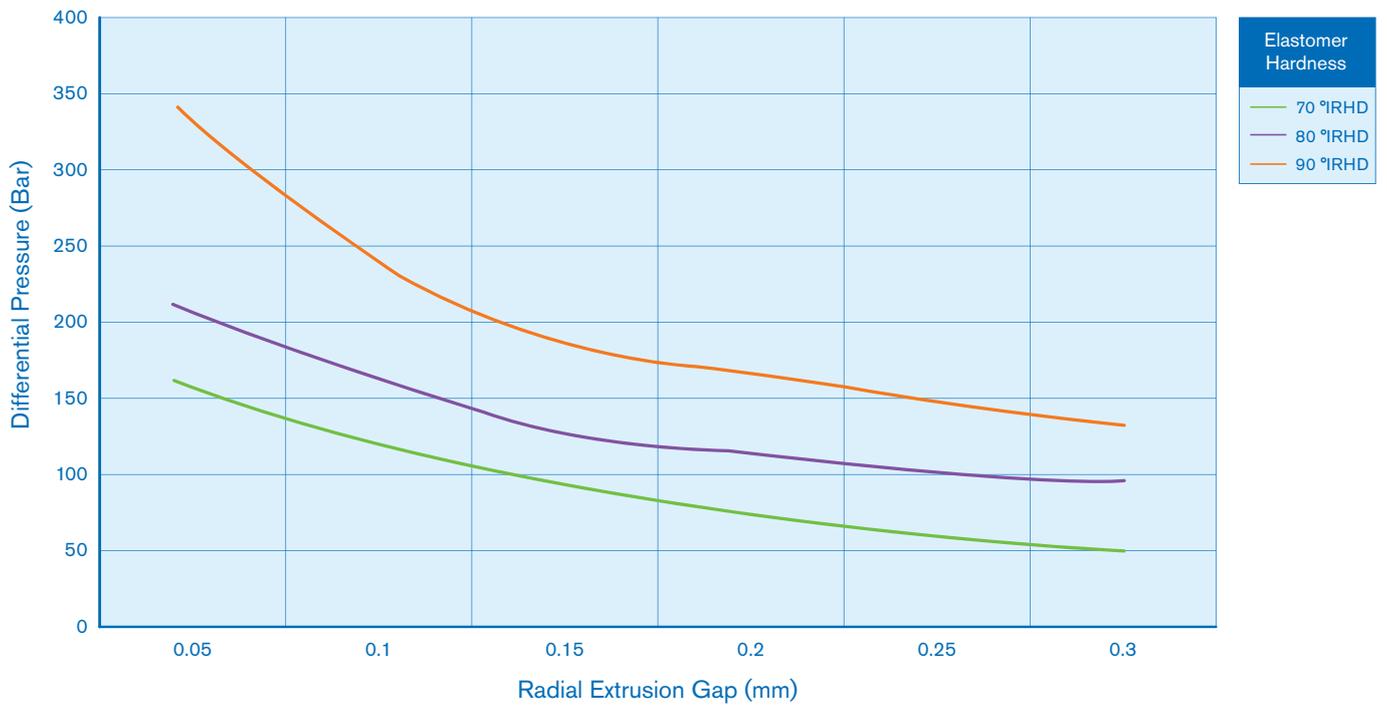
### Rules to Determine Elastomeric Material Selection

Low hardness and low modulus, elastomers complement lower pressure sealing applications.

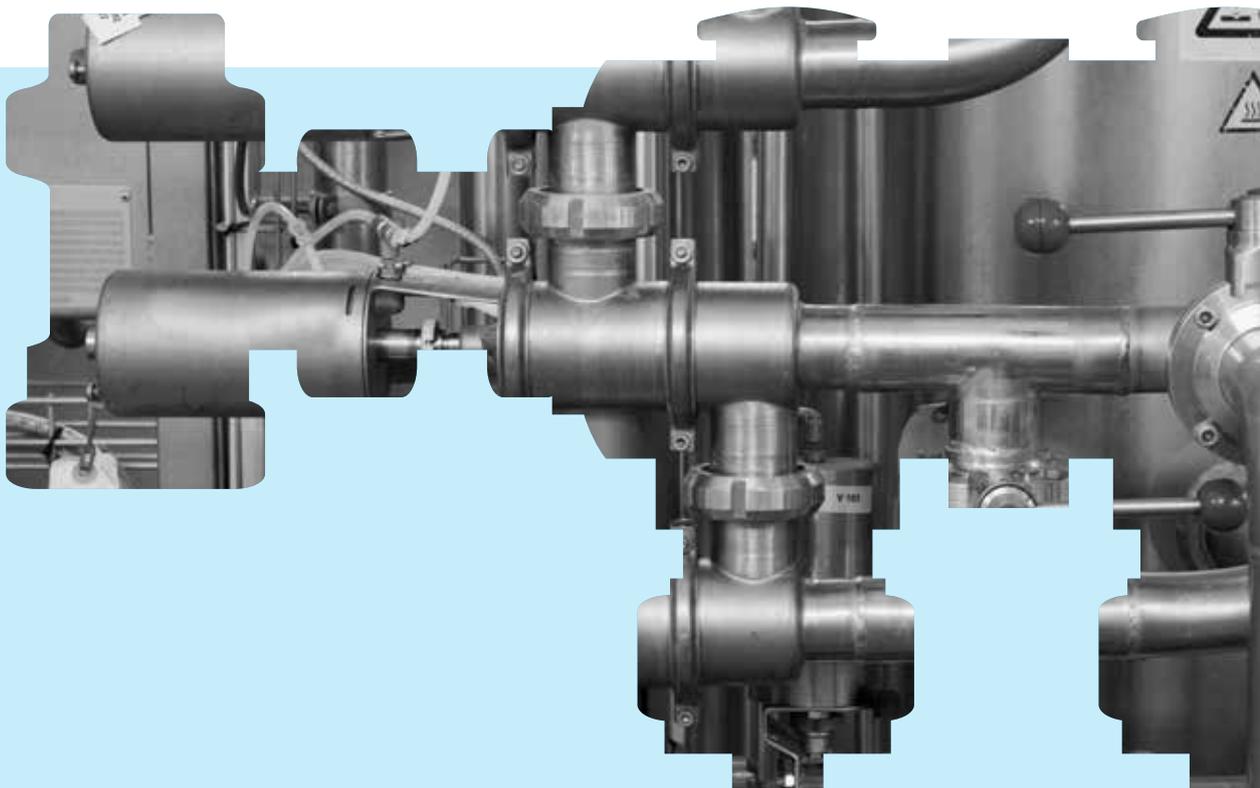
Extreme pressure applications require materials that are robust, with high modulus and high hardness.



## O-ring Pressure Capability



Contact ERIKS for assistance in selecting the correct solution for your high pressure application.



## Case Study

### Summary

**Industry** Marine

**Application** Fluid Transfer Loading Arm Seals

### Issue

A designer, manufacturer and supplier of ambient and cryogenic marine loading arms to companies worldwide required large cross section elastomer seals able to resist a wide variety of chemicals.



### Solution

ERIKS Sealing Technology designed and manufactured Viton® GF V-rings providing a commercially viable technical solution.

This material allows the final user to transfer a wide range of fluids from marine tankers, through the loading arms, to onshore storage tanks and vice versa.



### Outcome

The customer has been delighted with ERIKS' commercial and technical know-how and support.

### Other Benefits

By providing an improved on-time delivery performance, the customer can now supply complete loading arms and spares more efficiently to its end customers.

## Case Study

### Summary

**Industry**

Chemical

**Application** Solvent Based Cleaning Fluids



### Issue

ERIKS Sealing Technology were already sole suppliers for O-rings used by Europe's leading innovator, designer and manufacturer of dispensers worldwide.

Subsequently, they were asked to supply PTFE Spring Energised Lip Seals, used in the vast majority of the customer's dispensers.

The incumbent supplier offered long lead times and promised delivery dates were frequently missed, delaying shipments to the dispenser manufacturer's own customers.

### Solution

By working closely with the customer's technical and design teams, ERIKS have been able to design and manufacture a commercially and technically suitable alternative seal, and exceed the customer's price and application targets.



### Outcome

ERIKS Sealing Technology has delighted the customer by providing an alternative seal to solve their supply issues with the current provider.

ERIKS stock the parts at our UK stores in Dudley, West Midlands, for immediate delivery.

### Other Benefits

ERIKS Sealing Technology are able to provide local support, via our ERIKS Service Centre.

## O-ring

### Product overview

The most common type of static seal is the flexible elastomer O-ring. O-rings provide an affordable seal that in most cases are simple to install and subject to correct material selection, give acceptable life between maintenance checks.

Available in a variety of materials to suit every sealing application, fully moulded O-rings are manufactured to several international sizes standards, including BS1806, BS4518, AS568 and ISO 3601. Alternatively non-standard custom sizes, up to 2.5m (8ft) diameter can be produced to specific requirements.

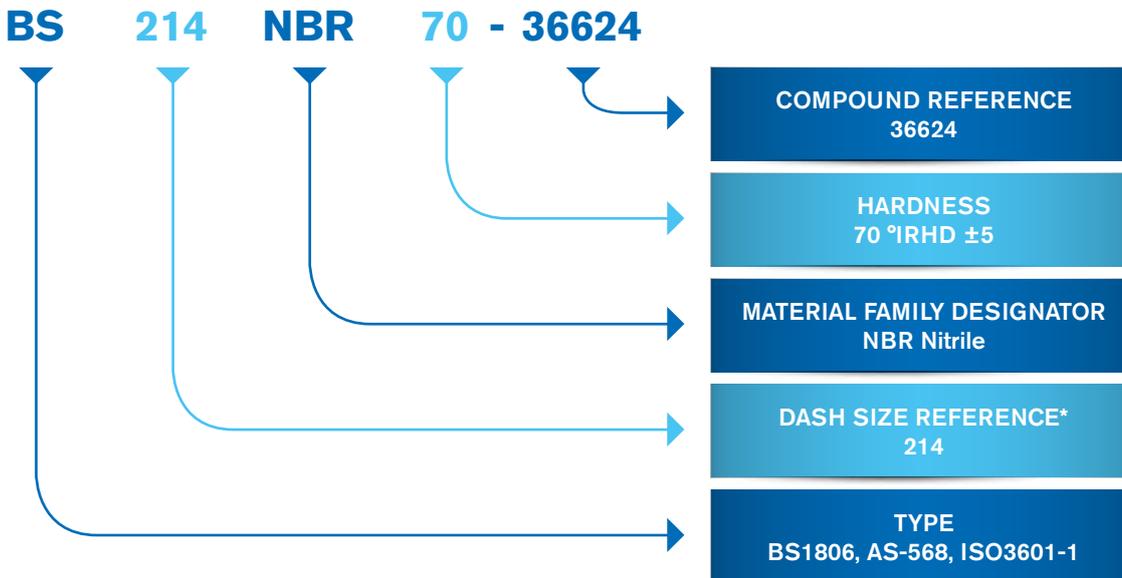


### O-ring Standard Compounds

Elastomer	Material Family Designator	Compound Reference	Colour	Hardness °IRHD	Temperature	Application
Nitrile, NBR, Buna N	NBR	36624	Black	70	-35 to +110°C -31 to +230°F	Standard compound with good compression-set values and medium acrylonitrile content for use with hydraulic oils, vegetable oils, animal fats, acetylene, alcohols, water, air, fuels and many other fluids.
Ethylene Propylene, EPDM, EPM	EP	55914	Black	70	-55 to +130°C -67 to +266°F	Standard, sulphur cured EPDM compound with very good compression-set for use with solvents, alcohols, ketones, esters, organic and inorganic acids. Not recommended for animal fats, vegetable or mineral oils.
	EP	55914PC	Black	70	-50 to +150°C -58 to +302°F	High performance peroxide cured EPDM compound with very good compression-set, steam, ozone and weathering resistance.
Silicone, VMQ	SIL	714177	Red	70	-55 to +230°C -67 to +446°F	General purpose silicone with excellent physical and temperature resistance up to 220°C. Extremely high and low temperature range for use in air, oxygen dry heat, ozone, hot water to 150°C, and glycol based brake fluids. Silicones are recommended only for static applications.
Fluorocarbon FKM, A-Type	FPM	51414	Black	75	-20 to +200°C -4 to +392°F	General purpose compound with very low compression-set characteristics at high temperatures and chemical resistance to oils, fats, fuels. Suitable for vacuum applications.
	FPM	51414G	Green	75	-20 to +200°C -4 to +392°F	General purpose compound with very low compression-set characteristics at high temperatures and chemical resistance to oils, fats, fuels. Suitable for vacuum applications.
Fluorocarbon FKM, A-Type	FPM	514141	Black	75	-10 to +200°C +14 +392°F	GF-Terpolymer with improved steam and temperature resistance.
Perfluoroelastomer, FFKM	FFKM	FFKM-75-162	Black	75	+275°C +527°F	Broadest range of chemical and temperature resistance for chemical processing industry. Suitable for acids, basics, amines, steam, ethylene oxide and many other aggressive chemicals.
	FFKM	FFKM-75-164	Black	75	+310°C +590°F	High temperature compound with superb compression-set characteristics and improved resistance against steam and amines. Very suitable for temperature cycle applications.

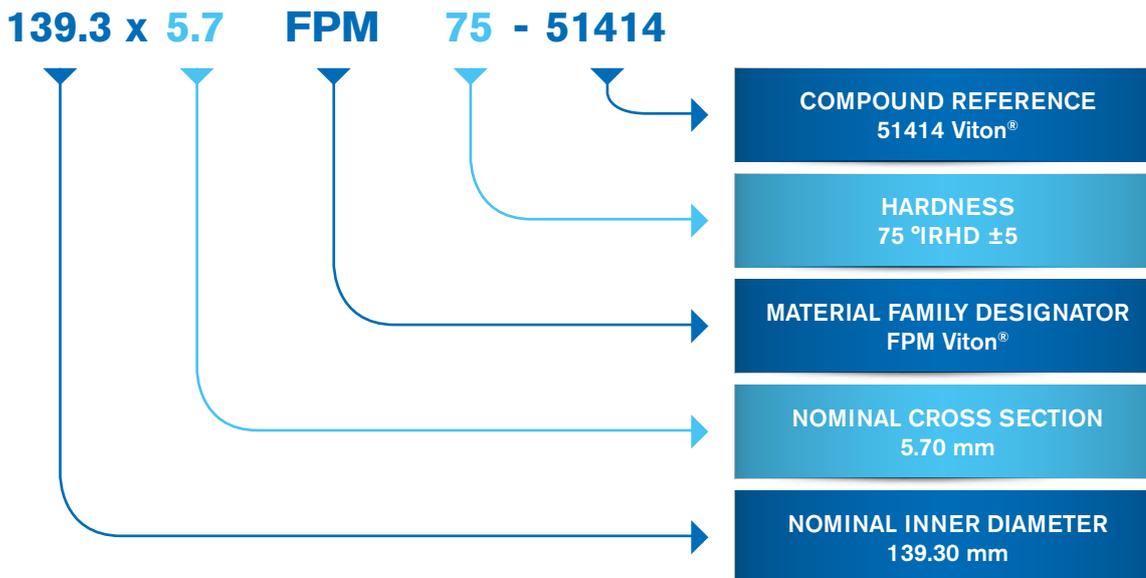
O-rings are available in the compounds detailed in the table on pages **14-15**.

### Imperial O-rings



O-rings are supplied to ISO3601-1 class 2 tolerances unless otherwise specified.

### Metric O-rings



O-rings are supplied to ISO3601-1 class 2 tolerances unless otherwise specified.



\*O-ring and hardware dimensional details are available at:

<http://oring-groove-wizard.eriks.co.uk/DiameterGrooves.aspx>

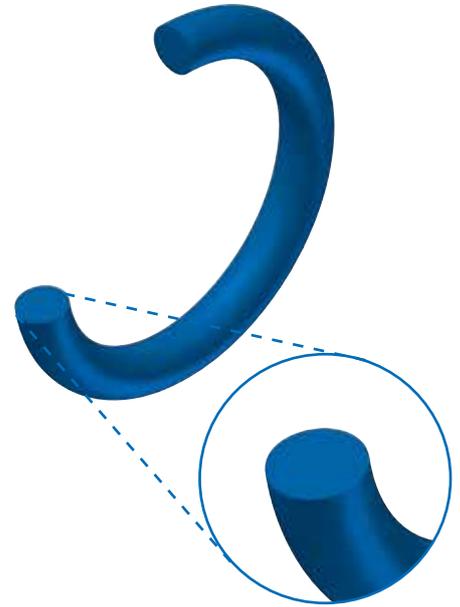
## Vulc-O-ring

### Product overview

ERIKS has developed a very successful method of producing O-rings from extruded cord to a very high technical standard.

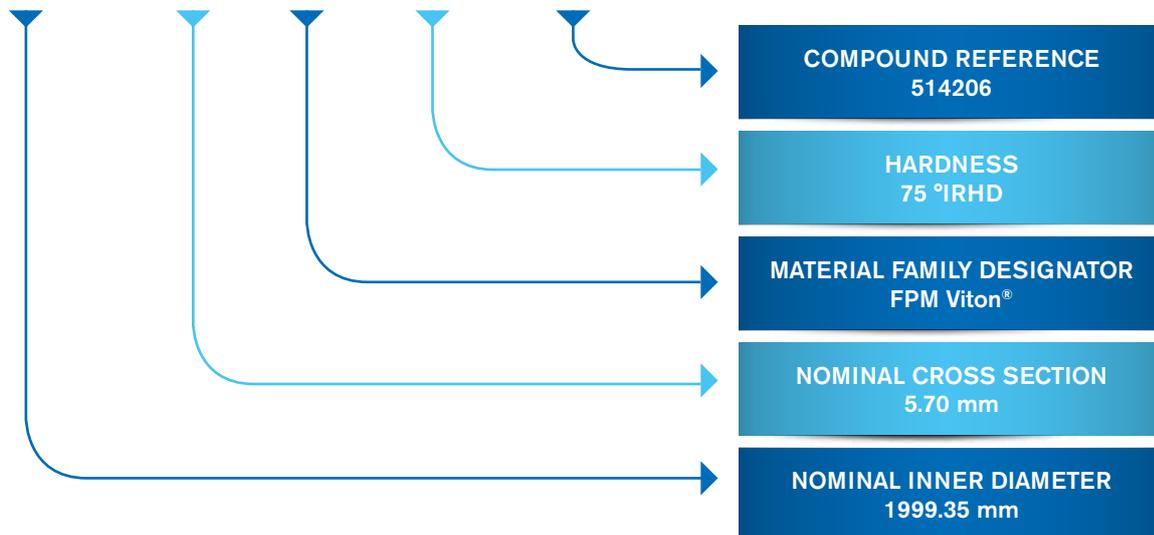
#### The main benefits of Vulc-O-rings are:

- Moulds are not required resulting in cost savings
- No upper diameter restrictions such as moulding
- No flash lines are present
- Can be used in standard housings
- Short lead times



### Metric Vulc-O-rings

**1999.35 x 5.7 FPM 75 514206 - VULC**



### Vulc-O-ring Materials

Elastomer	Material Family Designator	Compound Reference	Colour	Hardness °IRHD
Nitrile (NBR)	NBR	366185	Black	75
Fluorocarbon (FKM) A Type	FPM	514206	Black	75
Fluorocarbon (FKM) GF Type	FPM	514141	Black	75
Silicone (VMQ)	SIL	714206	Red	75
Ethylene Propylene Diene Monomer	EPDM	559303	Black	75

# Teflex® O-ring

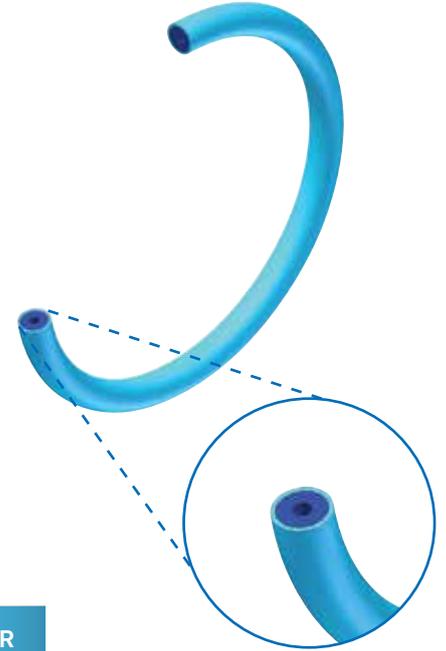
## Product overview

Teflex® seals provided designers and engineers with a seal that combined the chemical resistance of PTFE with the resilience of rubber.

Encapsulated seals are available with two types of jacket - FEP and PFA.

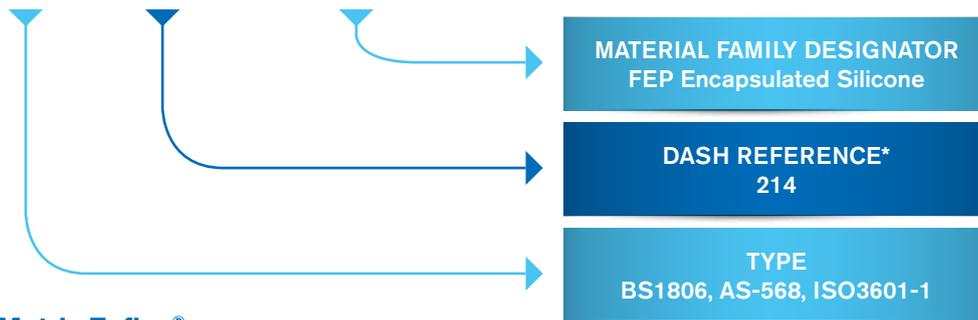


The energising core is available in Viton® or Silicone. For low temperature applications, or where lower closure forces are required, either a solid silicone or hollow silicone core is specified.



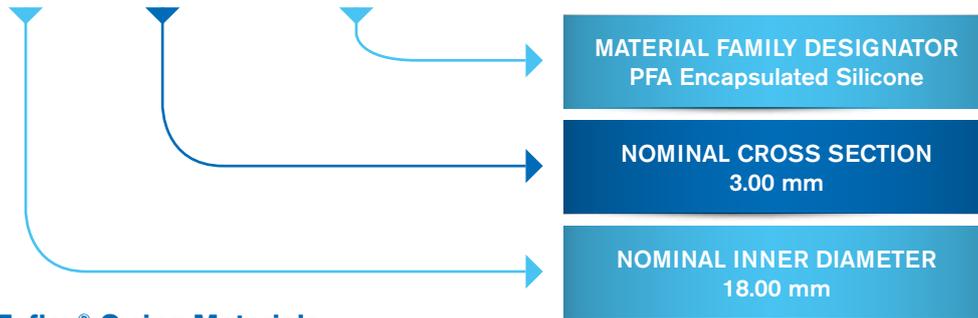
## Teflex® O-rings

**BS 214 FEP/SIL**



## Metric Teflex®

**18 x 3 PFA/SIL**



## Teflex® O-ring Materials

Compound Reference	Temperature Range	Application	Material Family Designator
FEP/VMQ	-60 to +200°C	General purpose encapsulated O-ring, with improved compression-set characteristics at low temperatures. Not recommended for vacuum applications due to high gas permeability. Not for dynamic applications.	FEP/SIL
FEP/FKM	-20 to +200°C	High thermal and chemical resistance. Not recommended for dynamic applications. Recommended for vacuum applications.	FEP/FPM
PFA/VMQ	-60 to +260°C	High temperature encapsulated O-ring. Not recommended for vacuum applications. Not for dynamic applications.	PFA/SIL



\*O-ring and hardware dimensional details are available at:  
<http://oring-groove-wizard.eriks.co.uk/DiameterGrooves.aspx>

## X-ring

### Product overview

X-rings can be used in a wide variety of static and dynamic sealing applications. They are available in standard O-ring sizes.

Their four-lobed design provides a larger sealing area in comparison to a standard O-ring. The double seal action requires lower squeeze levels to maintain an effective seal, thus reducing friction level and improving seal life.

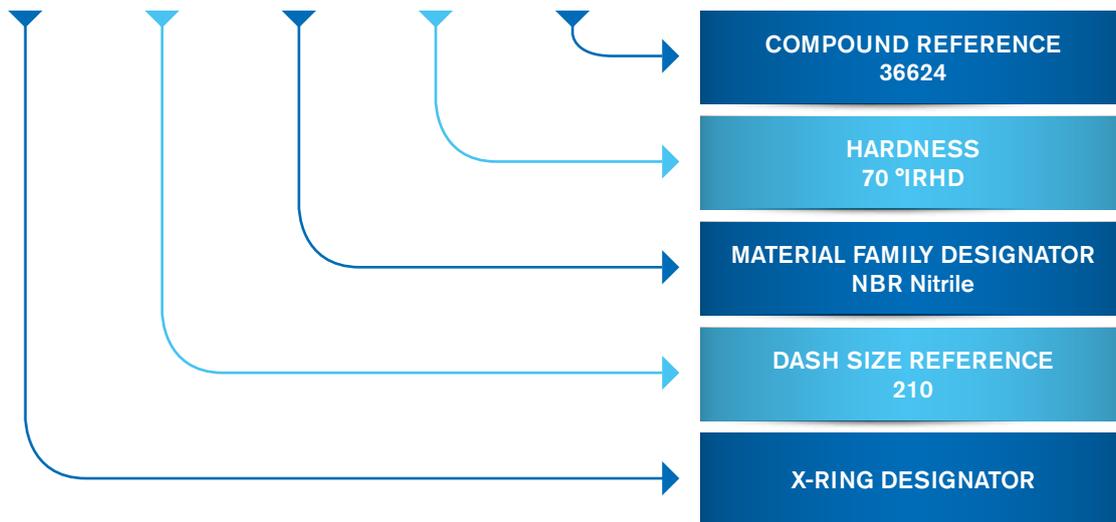
X-ring parting lines are between the lobes, away from the sealing surface, therefore eliminating the problems of leakage often resulting from a parting lines irregular surface as found on an O-ring.

X-rings are designed to out perform a standard O-ring in rotary seal applications. The four lobed configuration creates a more stable seal avoiding spiral twisting which can occur in reciprocating applications.



### X-Rings

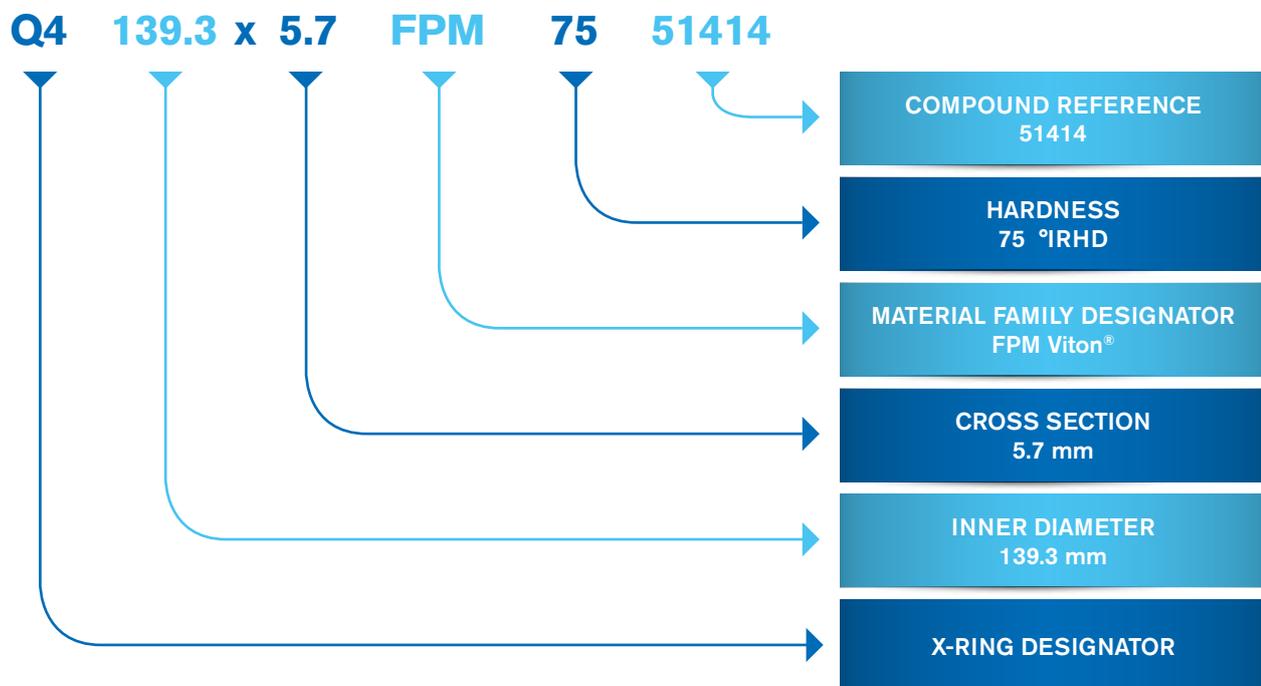
**Q4 210 NBR 70 - 36624**



## X-ring Materials

Elastomer	Material Family Designator	Compound Reference	Hardness °IRHD	Temperature Range (°C)	Application
Nitrile (NBR)	NBR	36624	70	-35 to +110	Excellent resistance to aliphatic hydrocarbons, mineral oils, greases, vegetable and animal oils/ greases, heating oil and diesel fuel.
Fluorocarbon FKM, A-Type	FPM	51414	75	-20 to +200	Resistant to mineral oils and greases, aliphatic, aromatic and also special chlorinated hydrocarbons, petrol, diesel fuels, silicone oils and greases. Suitable for high vacuum applications.

## Metric X-Rings



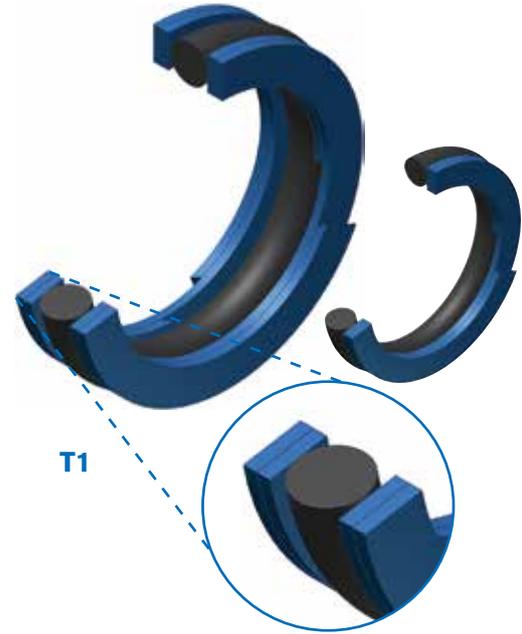
## Back-up Rings (Anti-extrusion Ring)

### Product overview

Back-up rings are used to extend the operating pressure of an O-ring. Either one or two back-up rings are co-located within a groove of increased width, on the low-pressure side of the seal. When pressure is applied to the sealing system the back-up ring is axially compressed, increasing its radial width to close the extrusion gap. The high shear strength of the back-up ring material is then able to contain the elevated pressures.

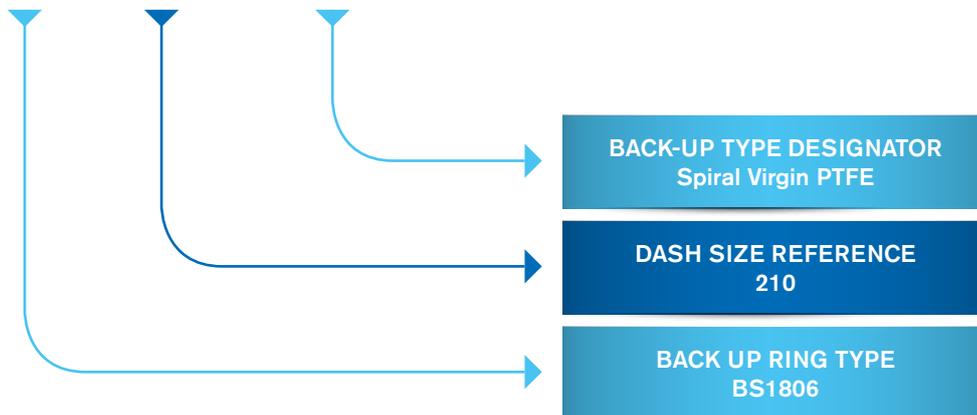
Unlike elastomers, which see visco-elastic extrusion, thermoplastic back-up ring materials fail if the maximum shear stress is greater than the shear strength of the material at the operating temperature.

The graphs and instructions on the following pages can be used to select the correct material.



### PTFE Back-up Rings

00 - 210 BUSP



### Back-up Type Designator

Designator	Type
BUSP	Spiral Back-up
BUCU	Scarf Cut Back-up
BUEN	Solid Back-up

### ISO 3601 Back-up Ring Material

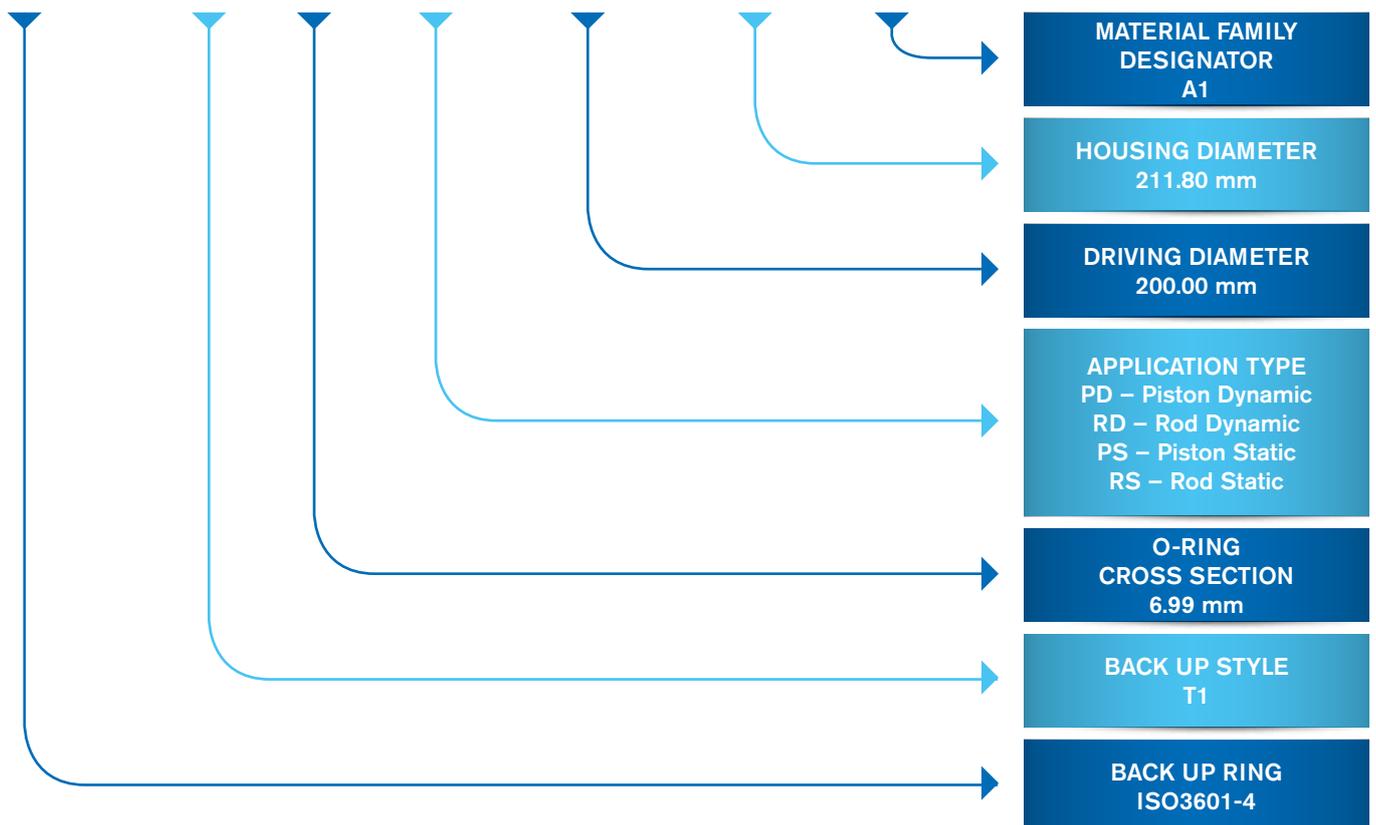
Material Family Designator	Description
A1	Virgin Polytetrafluoroethylene (PTFE)
V1	Virgin PEEK

Note: Back-up rings are groove specific, the above part numbering format being only suitable for BS1806 grooves. Hardware dimensional details are available at: <http://oring-groove-wizard.eriks.co.uk/DiameterGrooves.aspx>

	<b>T1</b> Spiral Turn Anti-Extrusion Ring	<b>T2</b> Scarf Cut Anti-Extrusion Ring	<b>T3</b> Solid Anti-Extrusion Ring	<b>T4</b> Scarf Cut Concaved Anti-Extrusion Ring	<b>T5</b> Solid Concaved Anti-Extrusion Ring
<b>Single</b>					
<b>Double</b>					
<b>Back-up ring type</b>					
	Spiral	Scarf cut	Solid	Scarf cut	Solid

**ISO3601 Back-up Rings**

**ISO3601-4 - T1 - 699 - PD - 20000 - 21180 - A1**



# Back-up Ring Material Selection Process

The graphs and instructions on these pages can be used to select the correct material.

**Step 1:**

Select the correct shear stress 3D plot for your O-ring cross-section. Plot the system's maximum diametral clearance and differential pressure then read off the appropriate shear stress.

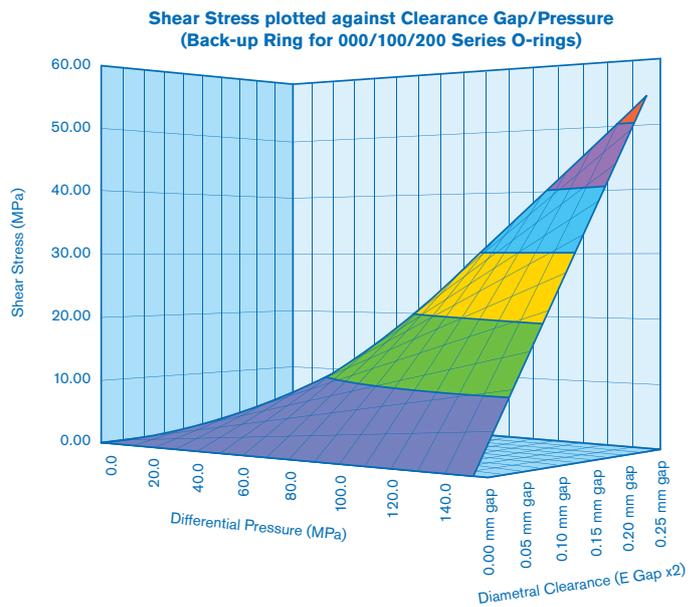
**Step 2:**

Apply an appropriate safety factor to this value (Minimum 2).

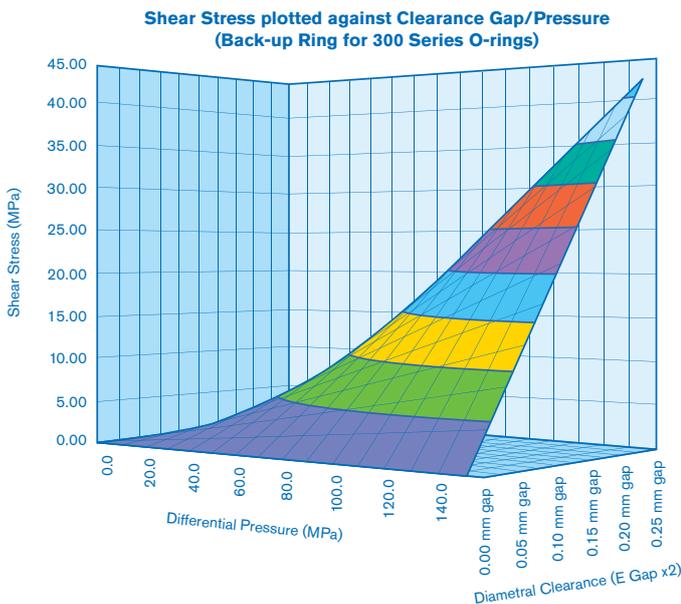
**Step 3:**

Select a material from the 'Material Shear Strengths' chart where the Shear Strength of the material is greater than the value calculated at Step 2, at the application operating temperature.

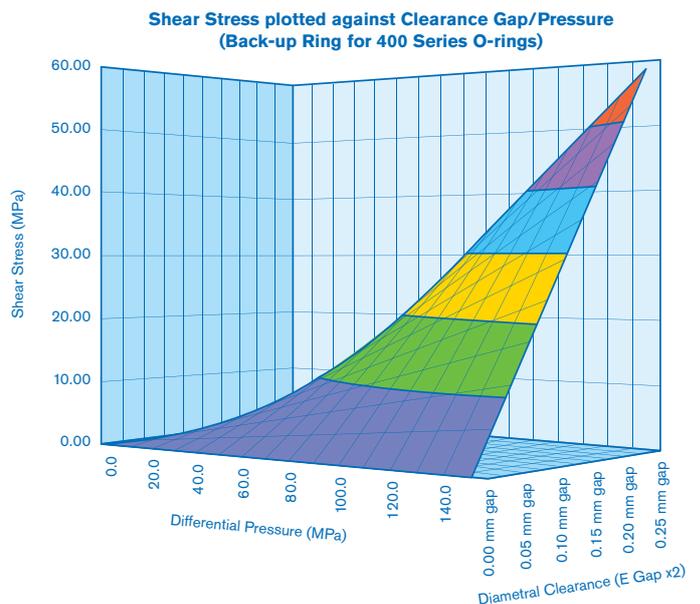
## Back-up Ring for 000/100/200 series



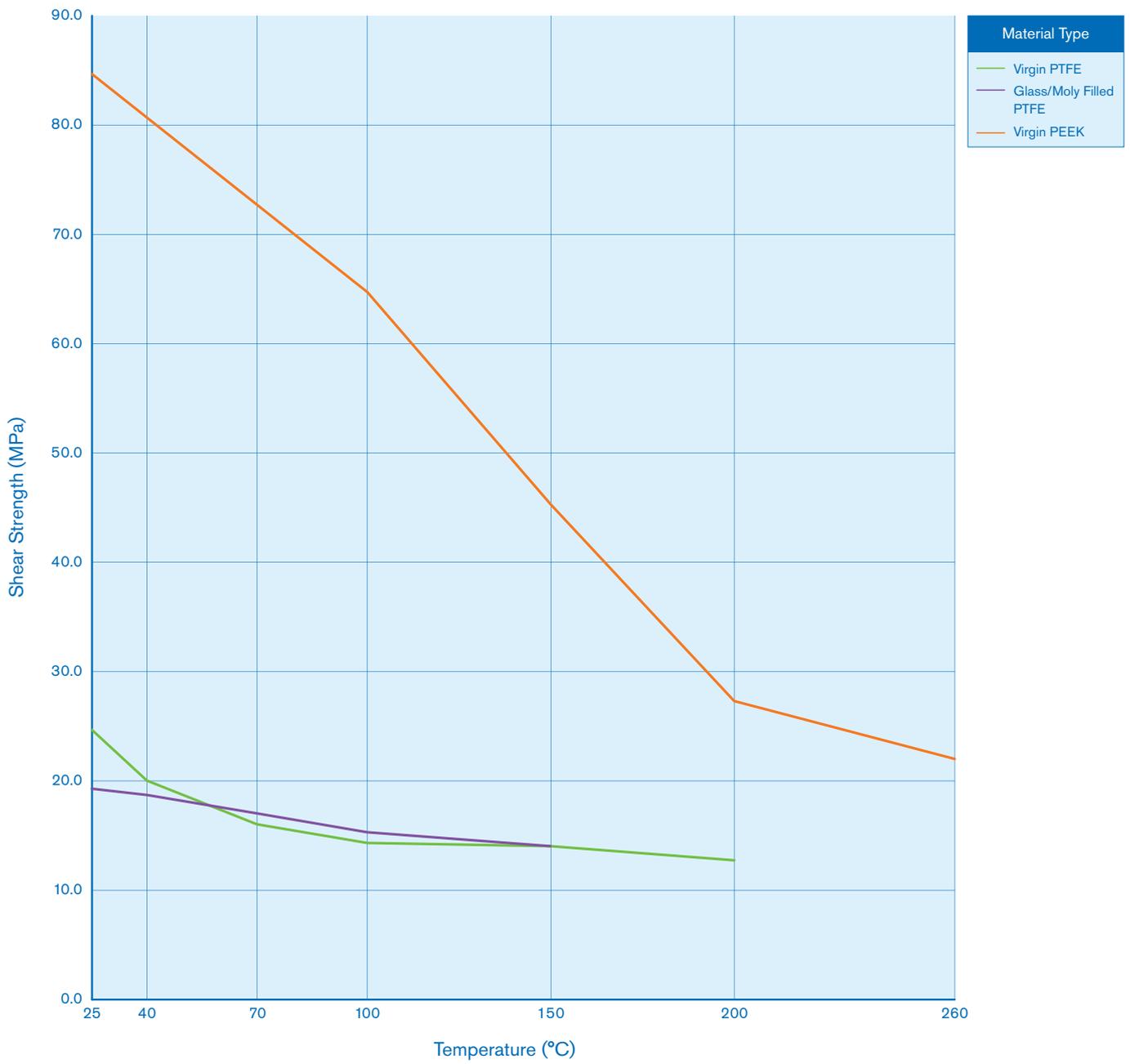
## Back-up Ring for 300 series



## Back-up Ring for 400 series



## Material Shear Strength Vs Temperature

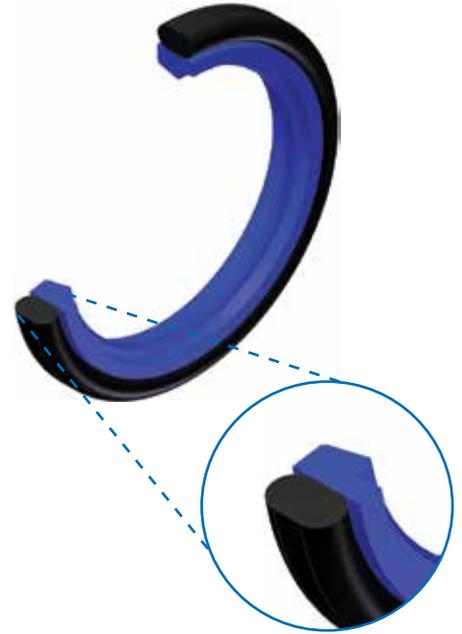


## Single Acting Cap Seal

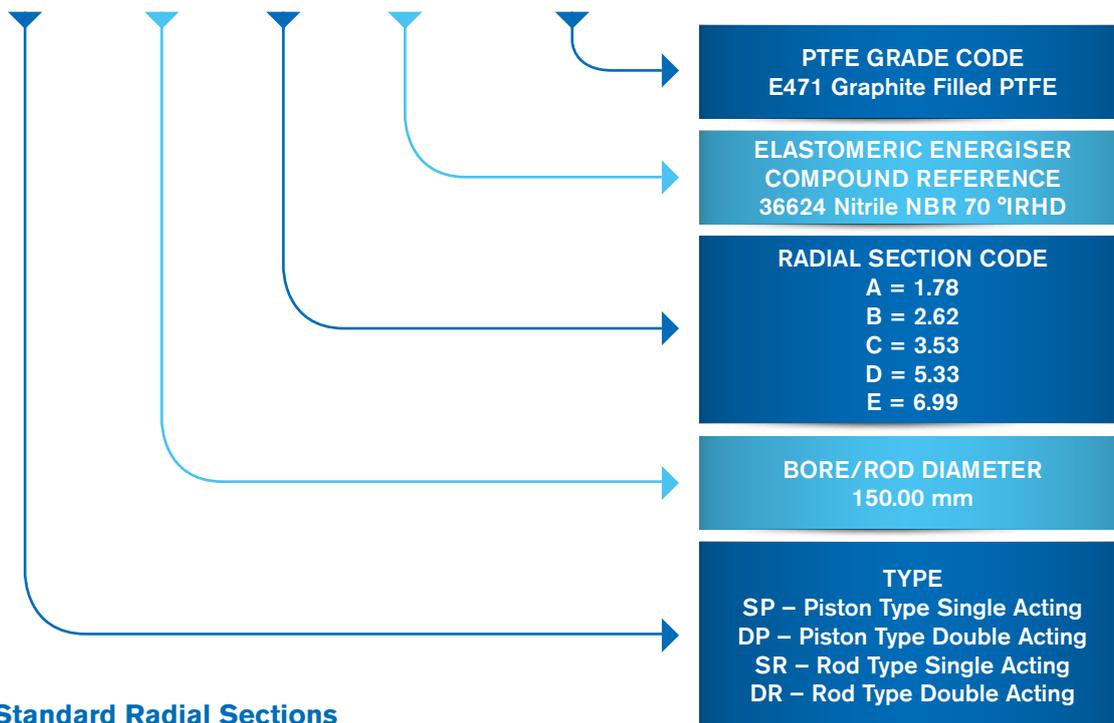
### Product overview

A self-actuating, pressure venting, extrusion resistant seal that combines low breakout and running friction with minimal leakage. The seal is constructed of a premium grade PTFE sealing element and an elastomer energiser.

The Single Acting Cap Seal is a reliable, compact, design with a long service life and is available in both rod and piston type geometries to retro-fit into ISO7425-2. Stick-slip is eliminated even after long periods of inactivity whether in a lubricated or non-lubricated environment, giving low breakout friction.



### C\*\* - 15000 - D - 36624 - E471 - PWI



### Standard Radial Sections

Radial Section Code	Standard Bore Diameter (mm)	Piston Groove Diameter (mm)	Rod Groove Diameter (mm)	Groove Width (mm)
A	8 – 16.9	-4.9	+4.9	2.20
B	17 – 26.9	-7.3	+7.3	3.20
C	27 – 59.9	-10.7	+10.7	4.20
D	60 – 199.9	-15.1	+15.1	6.30
E	200 – 255.9	-20.5	+20.5	8.10

## Energiser Materials

Elastomer	Compound Reference	Colour	Hardness °IRHD	Temperature	Application
Nitrile, NBR, Buna N	36624	Black	70	-35 to +110°C -31 to +230°F	Standard compound with good compression-set values and medium acrylonitrile content for use with hydraulic oils, vegetable oils, animal fats, acetylene, alcohols, water, air, fuels and many other fluids.
Ethylene Propylene, EPDM, EPM	55914	Black	70	-55 to +130°C -67 to +266°F	Standard, sulphur cured EPDM compound with very good compression-set for use with solvents, alcohols, ketones, esters, organic and inorganic acids. Not recommended for animal fats, vegetable or mineral oils.
	55914PC	Black	70	-50 to +150°C -58 to +302°F	High performance peroxide cured EPDM compound with very good compression-set, steam, ozone and weathering resistance.
Silicone, VMO	714177	Red	70	-55 to +230°C -67 to +446°F	General purpose silicone with excellent physical and temperature resistance up to 220°C. Extremely high and low temperature range for use in air, oxygen dry heat, ozone, hot water to 150°C, and glycol based brake fluids. Silicones are recommended only for static applications.
Fluorocarbon FKM, A-Type	51414	Black	75	-20 to +200°C -4 to +392°F	General purpose compound with very low compression-set characteristics at high temperatures and chemical resistance to oils, fats, fuels. Suitable for vacuum applications.
	51414G	Green	75	-20 to +200°C -4 to +392°F	General purpose compound with very low compression-set characteristics at high temperatures and chemical resistance to oils, fats, fuels. Suitable for vacuum applications.
Fluorocarbon FKM, GF-Type	514141	Black	75	-10 to +200°C +14 to +392°F	GF-Terpolymer with improved steam and temperature resistance.

## PTFE Grades

Material Reference	Description	Wear Factor (K)	Application
E400	Virgin Polytetrafluoroethylene (PTFE)	1500	Static, Low Duty Cycles.
E431	Glass and Molybdenum Disulphide reinforced PTFE	15	Dynamic/Static, Medium Duty Cycles, Hardened Metal Running Surfaces.
E471	Graphite reinforced PTFE	10	Dynamic, Medium Duty Cycles.
E462	Carbon/Graphite reinforced PTFE	15	Dynamic, Medium Duty Cycles.
E491	Ekonal reinforced PTFE	2	Dynamic/Static, Medium to High Duty Cycles, Minimum 45 HRc Running Surface.
E282Z	Carbon/Graphite/PPS reinforced PTFE	1	Dynamic/Static, High Duty Cycles, Hardened Metal Running Surfaces.

## Double Acting Cap Seal

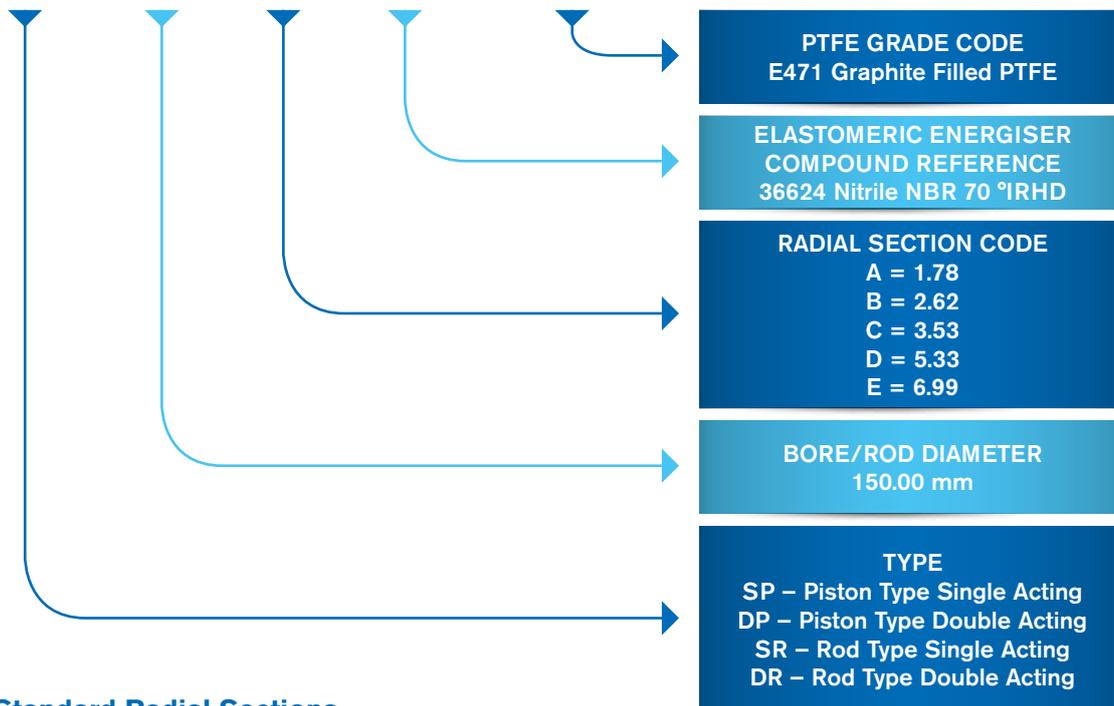
### Product overview

A self-actuating, bi-directional, extrusion resistant seal that combines low breakout and running friction with minimal leakage. The seal is constructed of a premium grade PTFE sealing element and an elastomer energiser.

The Double Acting Cap Seal is a reliable, compact design with a long service life and is available in both rod and piston type geometries to retro-fit into ISO7425-2. Stick-slip is eliminated even after long periods of inactivity whether in a lubricated or non-lubricated environment, giving low breakout friction.



### C\*\* - 15000 - D - 36624 - E471 - PWI



### Standard Radial Sections

Radial Section Code	Standard Bore Diameter (mm)	Piston Groove Diameter (mm)	Rod Groove Diameter (mm)	Groove Width (mm)
A	8 – 16.9	-4.9	+4.9	2.20
B	17 – 26.9	-7.3	+7.3	3.20
C	27 – 59.9	-10.7	+10.7	4.20
D	60 – 199.9	-15.1	+15.1	6.30
E	200 – 255.9	-20.5	+20.5	8.10

## Energiser Materials

Elastomer	Compound Reference	Colour	Hardness °IRHD	Temperature	Application
Nitrile, NBR, Buna N	36624	Black	70	-35 to +110°C -31 to +230°F	Standard compound with good compression-set values and medium acrylonitrile content for use with hydraulic oils, vegetable oils, animal fats, acetylene, alcohols, water, air, fuels and many other fluids.
Ethylene Propylene, EPDM, EPM	55914	Black	70	-55 to +130°C -67 to +266°F	Standard, sulphur cured EPDM compound with very good compression-set for use with solvents, alcohols, ketones, esters, organic and inorganic acids. Not recommended for animal fats, vegetable or mineral oils.
	55914PC	Black	70	-50 to +150°C -58 to +302°F	High performance peroxide cured EPDM compound with very good compression-set, steam, ozone and weathering resistance.
Silicone, VMQ	714177	Red	70	-55 to +230°C -67 to +446°F	General purpose silicone with excellent physical and temperature resistance up to 220°C. Extremely high and low temperature range for use in air, oxygen dry heat, ozone, hot water to 150°C, and glycol based brake fluids. Silicones are recommended only for static applications.
Fluorocarbon FKM, A-Type	51414	Black	75	-20 to +200°C -4 to +392°F	General purpose compound with very low compression-set characteristics at high temperatures and chemical resistance to oils, fats, fuels. Suitable for vacuum applications.
	51414G	Green	75	-20 to +200°C -4 to +392°F	General purpose compound with very low compression-set characteristics at high temperatures and chemical resistance to oils, fats, fuels. Suitable for vacuum applications.
Fluorocarbon FKM, GF-Type	514141	Black	75	-10 to +200°C +14 to +392°F	GF-Terpolymer with improved steam and temperature resistance.

## PTFE Grades

Material Reference	Description	Wear Factor (K)	Application
E400	Virgin Polytetrafluoroethylene (PTFE)	1500	Static, Low Duty Cycles.
E431	Glass and Molybdenum Disulphide reinforced PTFE	15	Dynamic/Static, Medium Duty Cycles, Hardened Metal Running Surfaces.
E471	Graphite reinforced PTFE	10	Dynamic, Medium Duty Cycles.
E462	Carbon/Graphite reinforced PTFE	15	Dynamic, Medium Duty Cycles.
E491	Ekonal reinforced PTFE	2	Dynamic/Static, Medium to High Duty Cycles, Minimum 45 HRc Running Surface.
E282Z	Carbon/Graphite/PPS reinforced PTFE	1	Dynamic/Static, High Duty Cycles, Hardened Metal Running Surfaces.

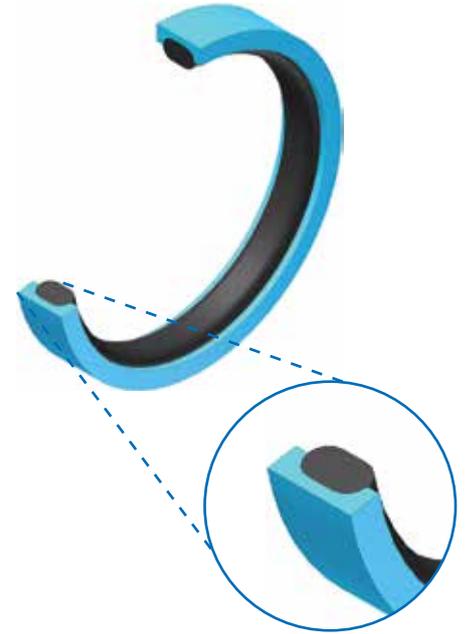
## Capped O-ring

### Product overview

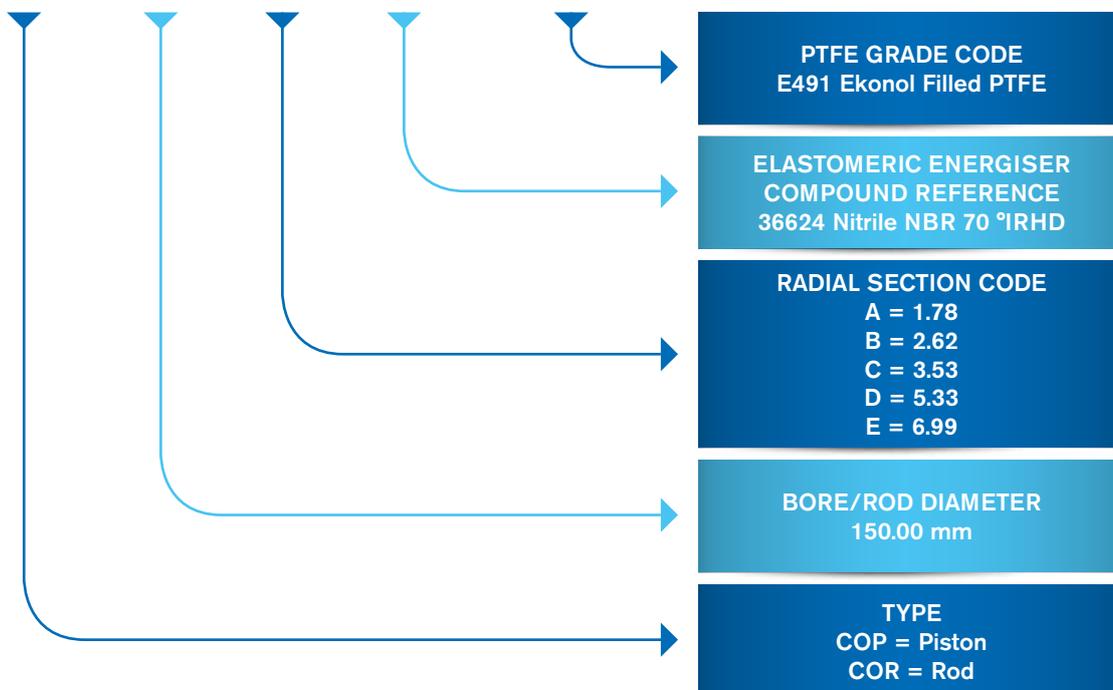
Capped O-rings are a cost-effective solution for providing cap seals for rod and piston seal applications. The seal assembly consists of a cap manufactured from one of ERIKS premier PTFE compounds and an O-ring to act as the seal energiser.

The design of the capped O-ring protects the elastomer from extrusion and nibbling. The specially profiled cap element acts as the seal's dynamic interface and prevents spiral failure and reduces stick slip, commonly associated with O-ring seals.

Our capped O-rings are designed to retrofit existing O-ring grooves, including AS4716 standard housing dimensions. Both metric and imperial sizes are available and can be tailored to fit housing dimensions provided. Our technical team can also advise on how to optimise O-ring squeeze to minimise seal friction.



### COP- 10000 - C - 36624 - E491 - PWI



## Energiser Materials

Elastomer	Compound Reference	Colour	Hardness °IRHD	Temperature	Application
Nitrile, NBR, Buna N	36624	Black	70	-35 to +110°C -31 to +230°F	Standard compound with good compression-set values and medium acrylonitrile content for use with hydraulic oils, vegetable oils, animal fats, acetylene, alcohols, water, air, fuels and many other fluids.
Ethylene Propylene, EPDM, EPM	55914	Black	70	-55 to +130°C -67 to +266°F	Standard, sulphur cured EPDM compound with very good compression-set for use with solvents, alcohols, ketones, esters, organic and inorganic acids. Not recommended for animal fats, vegetable or mineral oils.
	55914PC	Black	70	-50 to +150°C -58 to +302°F	High performance peroxide cured EPDM compound with very good compression-set, steam, ozone and weathering resistance.
Silicone, VMQ	714177	Red	70	-55 to +230°C -67 to +446°F	General purpose silicone with excellent physical and temperature resistance up to 220°C. Extremely high and low temperature range for use in air, oxygen dry heat, ozone, hot water to 150°C, and glycol based brake fluids. Silicones are recommended only for static applications.
Fluorocarbon FKM, A-Type	51414	Black	75	-20 to +200°C -4 to +392°F	General purpose compound with very low compression-set characteristics at high temperatures and chemical resistance to oils, fats, fuels. Suitable for vacuum applications.
	51414G	Green	75	-20 to +200°C -4 to +392°F	General purpose compound with very low compression-set characteristics at high temperatures and chemical resistance to oils, fats, fuels. Suitable for vacuum applications.
Fluorocarbon FKM, A-Type	514141	Black	75	-10 to +200°C +14 to +392°F	GF-Terpolymer with improved steam and temperature resistance.

## PTFE Grades

Material Reference	Description	Wear Factor (K)	Application
E400	Virgin Polytetrafluoroethylene (PTFE)	1500	Static, Low Duty Cycles.
E431	Glass and Molybdenum Disulphide reinforced PTFE	15	Dynamic/Static, Medium Duty Cycles, Hardened Metal Running Surfaces.
E471	Graphite reinforced PTFE	10	Dynamic, Medium Duty Cycles.
E462	Carbon/Graphite reinforced PTFE	15	Dynamic, Medium Duty Cycles.
E491	Ekonal reinforced PTFE	2	Dynamic/Static, Medium to High Duty Cycles, Minimum 45 HRc Running Surface.
E282Z	Carbon/Graphite/PPS reinforced PTFE	1	Dynamic/Static, High Duty Cycles, Hardened Metal Running Surfaces.

## Spring Energised Seal

### Product overview

The Spring Energised (SE) seal pressure activated seal, with assisted energisation provided by corrosion-resistant metal spring. When the seal is in situ, the spring is under compression and applies force to seal's sealing lips. This creates a tight barrier to prevent gas or fluids from leaking.

The spring also provides resiliency to compensate for seal wear, gland misalignment or eccentricity. While spring force provides adequate force for sealing at low pressure, at high pressure the system pressure augments the spring force to provide an even tighter seal. SE seals are precision machined from PTFE, filled PTFE and other high performance polymers. SE seals work consistently under a wide array of temperatures and pressures. ERIKS offers over 100 jacket materials, 8 spring materials, and 5 spring designs to meet your sealing needs.

### Spring Designation

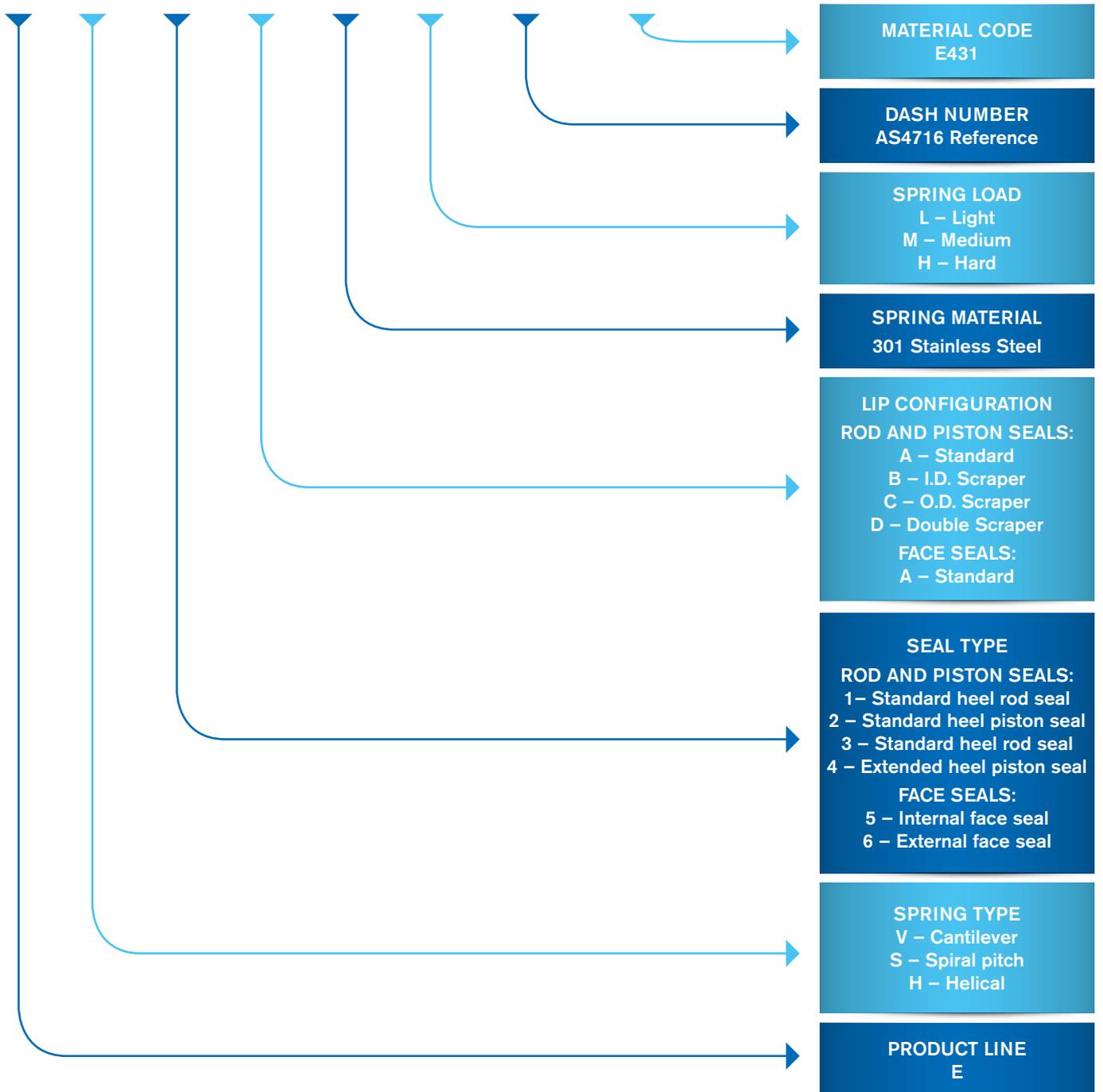
Spring Type	Material Code	Material Description
Cantilever	1	301 Stainless Steel
	6	316 Stainless Steel
	H	Hastelloy® C-276
	E	Elgiloy®
Spiral Pitch	2	302 Stainless Steel
	6	316 Stainless Steel
	H	Hastelloy® C-276
Helical	2	302 Stainless Steel
	H	Hastelloy® C-276

### PTFE Grades

Material Reference	Description	Wear Factor (K)	Application
E400	Virgin Polytetrafluoroethylene (PTFE)	1500	Static, Low Duty Cycles.
E431	Glass and Molybdenum Disulphide reinforced PTFE	15	Dynamic/Static, Medium Duty Cycles, Hardened Metal Running Surfaces.
E471	Graphite reinforced PTFE	10	Dynamic, Medium Duty Cycles.
E462	Carbon/Graphite reinforced PTFE	15	Dynamic, Medium Duty Cycles.
E491	Ekonal reinforced PTFE	2	Dynamic/Static, Medium to High Duty Cycles, Minimum 45 HRc Running Surface.
E282Z	Carbon/Graphite/PPS reinforced PTFE	1	Dynamic/Static, High Duty Cycles, Hardened Metal Running Surfaces.



**E - V - 1 - A - 1 - M - 136 - E431**



# Mechanical Seals

ERIKS Sealing Technology's range of mechanical seals manufactured under the Pioneer Weston name has an enviable reputation for supplying mechanical seals to many major OEMs and specifiers for over 50 years.

## Mechanical Seal Products

### Component Seals

Our extensive range of component seals is specifically designed to meet the exacting requirements of pump repairers and Original Equipment Manufacturers.

The range encompasses designs that interchange directly with the majority of major branded products. These seals are manufactured in a quality controlled environment to the very highest standards. Our products are available with a wide choice of face and static sealing element materials to withstand even the harshest of chemicals.

### Cartridge Seals

Cartridge seals are specifically designed to meet the demands of high-end MRO (Maintenance, Repair and Overhaul) applications where minimising downtime is a priority. These seals are typically found in agitators and reactor vessels.

These seals are delivered pre-assembled and to replace a seal, the engineer needs only to unbolt and remove the failed unit and then shaft and bolt up the new seal unit. To overcome application problems these seals are available with different combinations of flush. Quench and drain porting can be used to keep the faces cool, clear of debris and to prevent dry running.



### Bespoke Mechanical Seals

To complement the standard range ERIKS can work with you on your application to design and manufacture a bespoke seal for your more arduous or abrasive applications.





## Mechanical Seal Repair and Remanufacture

Save on the cost of a new mechanical seal by opting to have your existing unit re-manufactured by ERIKS. Your seal is returned to an 'as new' condition with the same performance and life and often in a shorter time scale than a replacement unit.

Our technicians and specialists repair and modify all leading brands as well as bespoke or custom seals and are expert in returning them to the highest standards, quickly and professionally using original or special design components where required. To date, we have re-engineered more than 10,000 custom mechanical seals to provide increased life and performance.

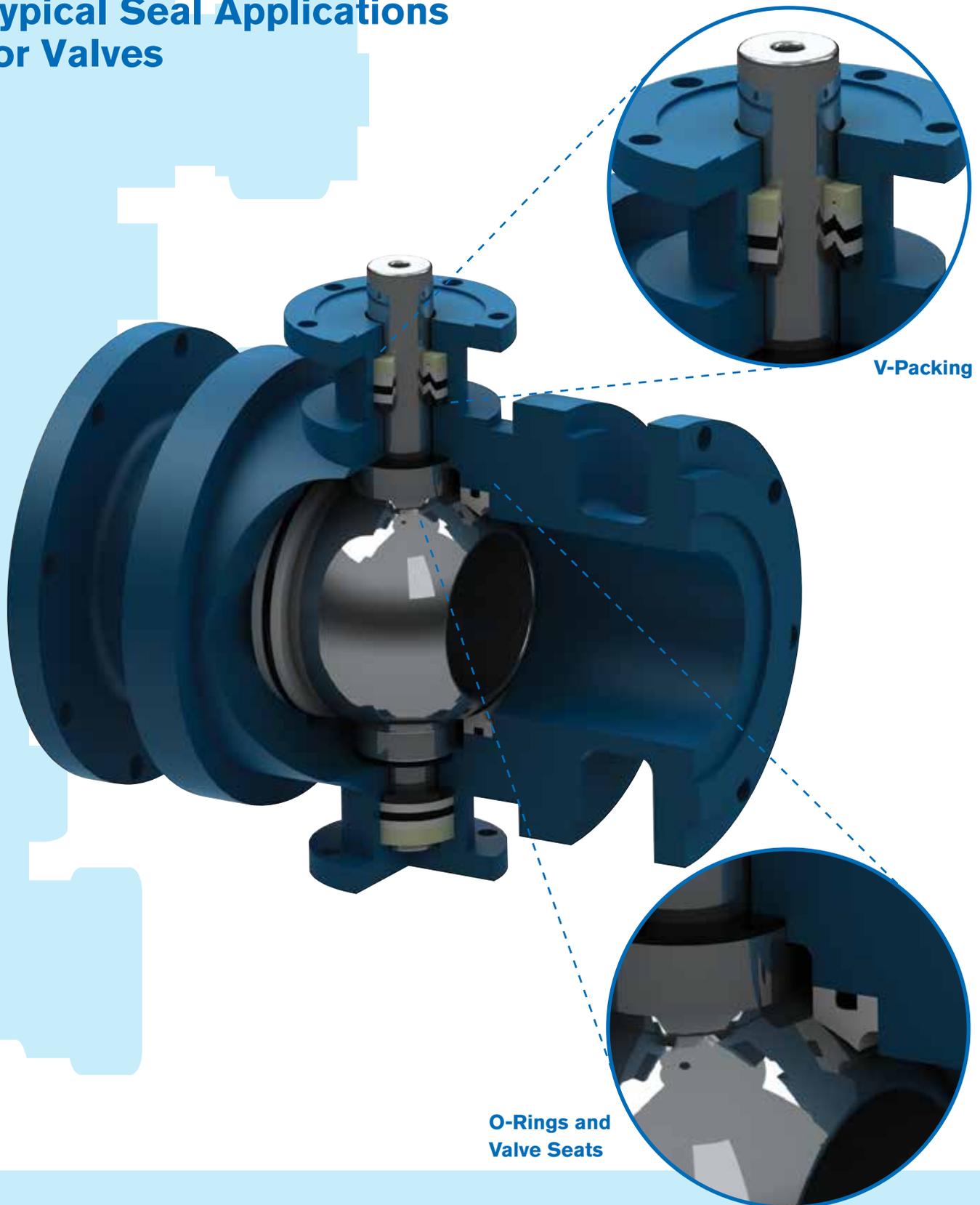
It's a simple service; send your seal to our Warrington facility marked for REPAIR and we'll do the rest.

What does ERIKS do with your seal?

- **Completely disassemble the seal**
- **Clean all parts ultrasonically, waterblast with micro granules and inspect for damage**
- **Polish and lap the recoverable sealing faces**
- **During and after the lapping we inspect the flatness of the seal faces with monochromatic light to one light band**
- **Replace elastomers and other parts that no longer meet the specification**
- **Reassemble and pressure test your mechanical seal**
- **Protectively package and dispatch back to you**



## Typical Seal Applications for Valves



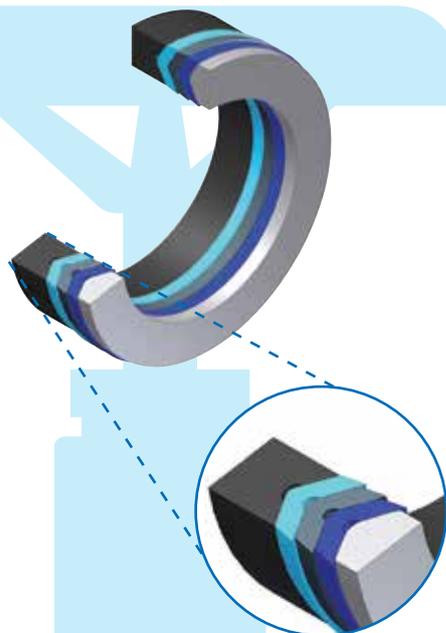
## V-packing

If seal redundancy is required, the multi-lip V-packing assembly is the seal of choice. Configurations of PTFE, Thermoplastic and Elastomer can be combined to provide sealing solutions across a broad range of parameters.

V-packing assemblies are available in both uni-directional and bi-directional designs. A typical uni-directional V-packing assembly consists of a header (primary) seal, V-rings (secondary seals) and an end adaptor. The number of V-rings can be tailored to meet the specific redundancy needs. To aid installation V-packing seal assemblies need to be installed in open glands.

High differential pressures can be tolerated, as the multi-lip redundancy can offer a suitable solution for low fugitive emission requirements. Each sealing lip is mechanically energised by the prior sealing element and provides support, thus increasing the seal assembly resistance to extrusion.

The practice of multi-lip redundancy optimises sealing integrity across the complete seal assembly and maximises sealing efficiency for ultimate leakage control. ERIKS V-packing assemblies are tailored to meet specific application environments. Please contact ERIKS UK with your application details or for further information.



## Metal O-rings and C-rings

Metal seals are used at the extremes of temperature and pressure. Used statically, against fine surface finishes they are available in a range of base materials and coatings to suit media and mating surface conditions. Metal seals are both resilient and may be pressure energised, making them extremely reliable. For further details consult [www.o-ring.info/en/technical-info/technical-handbook](http://www.o-ring.info/en/technical-info/technical-handbook)



## Rubber Moulded and Extruded Products

### Rubber Mouldings

The moulding of rubber and elastomeric compounds is accomplished by forcing the material into a shape using heat and pressure. Rubber and elastomers can be moulded by compression, transfer and injection methods. The volume of parts and type of compound required will determine the moulding method used. Our engineers participate with you to develop innovative solutions for your production.

### Extruded Rubber Profiles/ Inflatables

Our comprehensive product range incorporates not only rubber, but also Thermo Plastic Elastomer (TPE). Our TPE solutions are a prime example of our innovative thinking, combining two or three thermo plastic elastomers in one product to reduce the steps in the manufacturing process.

Our in-house CAD/CAM capability also enables us to quickly design and accurately manufacture innovative solutions to meet new applications and operating conditions.



## Gaskets

ERIKS' product knowledge ensures you always get the right gasket for the job, however large or small your needs. Our gasket installation kits for example, have the seals and gaskets logically packed for ease of assembly, to save you time.

We design, manufacture and supply a wide range of essential sealing and insulation components to many industries where equipment failure is not an option. Products include cut gaskets, packings, sheet jointing materials, moulded seals and shaped thermal insulation components, all vital to a modern industrial society.

ERIKS ensure that white goods manufacturers, petrochemical and chemical plants, power stations, utility suppliers, hospitals, the automotive industry, pipeline and boiler manufacturers and other key industries

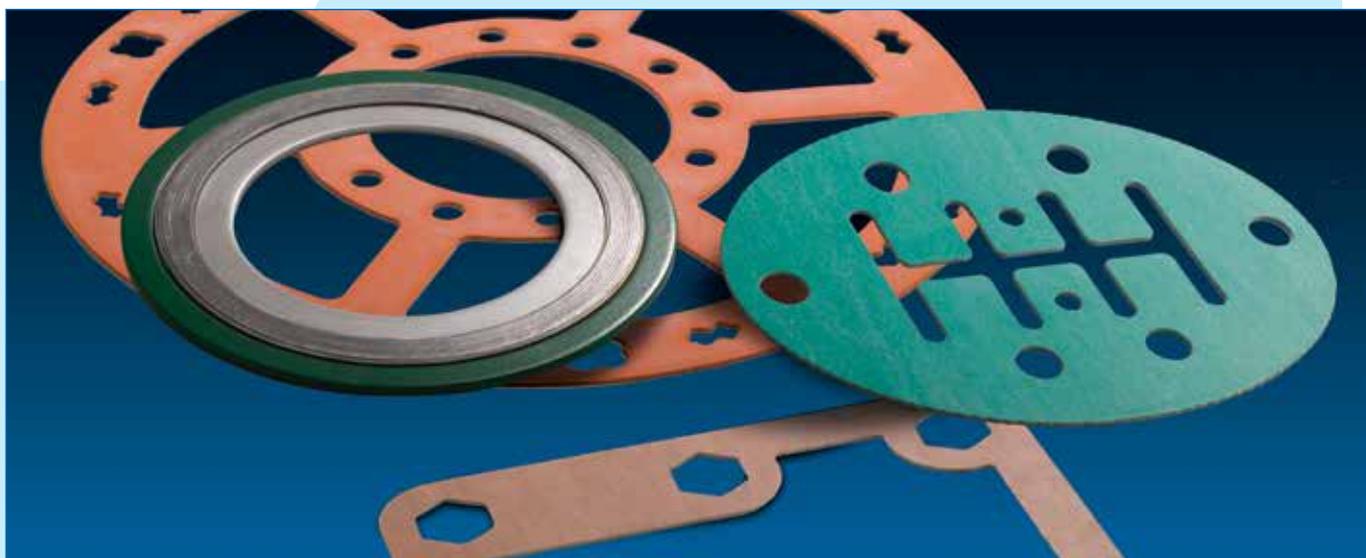
function effectively by supplying only the best materials available on the market.

By closely working with leading material manufacturers such as Novus, we can provide an extensive range of quality products at cost-effective prices. By doing this, we are able to provide an extensive range of seals, gaskets and insulation components, available in a wide range of exceptional materials to suit every demanding application. A summary of our product range is given below. Our highly qualified sales team will be delighted to provide detailed, technical advice as to performance and suitability for specific situations.

Cut gaskets and sheet jointing available from every imaginable sealing material, including specialised materials such as Flexitallic Sigma™ and Thermiculite™ ranges.

In addition we offer:

- **Spiral Wound Gaskets**
- **Valve and Pump Gland Packings**
- **Ring Type Joints and Kammprofiles**
- **Extrusions**
- **O-rings and Bonded Seals**
- **Rubber Mouldings Rubber Proof Woven Cloths**
- **Dry and Coated Woven Cloths**
- **Boiler House Products**
- **Thermal Insulation Fabrications**
- **Multi-ply Expansion Joints and Strip**
- **Boiler Combustion Chamber Insulation**
- **Boiler/Cooker Case Insulation**





# ERIKS Sealing Technology

ERIKS Sealing Technology offers a comprehensive range of high performance sealing products, supported by a world-class technical and logistical service to deliver the right seal on time to your critical applications.



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