national distribution

No one would dispute that our 56,000 sq ft warehousing headquarters in Smethwick, West Midlands is impressive. But it's important to remember that it only forms part of the Barnwell success story. Because, strategically located throughout the country at key sites are our 4 satellite distribution operations at Bristol, Dartford, Glasgow and Manchester.

Each of our branches has its own independent stock holding of the most popular sealing products to suit their individual geographic areas. Knowledge of local industries and applications by key branch personnel ensures that customers can get the best advice on sealing solutions for their own operating environments.

All our branch staff are dedicated to providing the same high levels of service as our headquarters personnel. In this way we can always assure customers of the fastest and most comprehensive distribution, delivery and support - wherever they may be within the UK.

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Bristol BS11 9DE
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ROTARY SHAFT SEALS

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the seal of approval in sealing technology

Established in 1972 by the founder and current chairman Mike Barnwell, the Company has grown from its humble beginnings in Smethwick to being the largest Oil Seal Specialist in the U.K. The Company controls its operations from the Head Office in the West Midlands, occupying a 56,000 square feet warehouse and office complex. Barnwell distributes to over 3,000 customers via satellite warehouses situated strategically at Aylesbury, Bristol, Glasgow and Manchester.

Barnwell's specialist knowledge in sealing devices is complimented by an increasing range of non-core products enabling Barnwells to be a complete service provider to major companies in a diverse range of markets.

Many Barnwell products are produced from our own tooling by manufacturers worldwide who meet our exacting specifications.

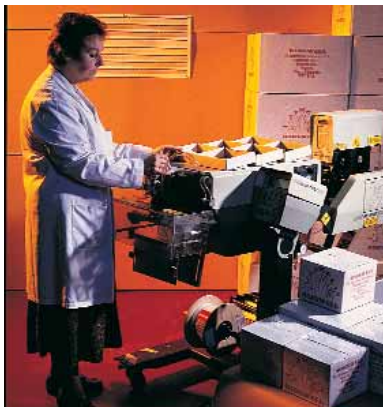
Standard parts are sourced from reputable companies who can demonstrate a commitment to quality.

A Dedication to Quality

At Barnwell we have an unfaltering belief in the quality of our products. Quality is always the prime consideration when selecting suppliers, and only those products whose specifications meet the high standards demanded by our quality control department are accepted. All incoming goods are inspected to established sample plans and, where necessary, goods will be laboratory tested by specialist technicians to ensure that they match the manufacturers' declared specifications.
To guarantee the continuation of our stringent quality control Barnwell have developed a supplier evaluation programme whereby periodic checks are conducted to ensure that our manufacturers maintain the required quality standards.

Applying Solutions at the Cutting Edge of Sealing Technology

Buying from Barnwell Services Limited means more than simply sourcing a product. Our skilled technical staff are always on hand to assist you in choosing the optimum sealing products to suit your application requirements. In order to assess the best products for a particular sealing requirement, or should an end user be experiencing difficulties with any sealing problems, our engineers will always be pleased to pay you a visit and endeavour to provide a rapid solution. Seals for most applications can be custom-made if required: our engineers will be happy to discuss your requirements.



A Rapid Response to Customer Requirements

Our commitment to customer service is paramount. With over 20,000 items in stock, turnaround is very efficient. Orders for stock items will be dispatched the same day via our own transport or sub-contracted to one of our reliable freight forwarders.
Non-standard items are ordered immediately and delivery timescales kept to minimum.

Extensive Stock

Seals for most OEM and replacement applications are stocked, and constantly replenished, at our warehouses: stocks serve the majority of industrial, automotive, marine and associated applications.

Key Product lines

- ☐ **Rotary Shaft Seals**
- ☐ **Hydraulic/Pneumatic Seals**
- ☐ **'O Rings & B/U Washers**
- ☐ **Rubber Mouldings & Extrusions**
- ☐ **Gaskets**
- ☐ **Sealants**
- ☐ **Circlips**
- ☐ **Leather Seals**
- ☐ **Shaft Repair Kits**
- ☐ **'O' Ring Kits**
- ☐ **Sealing Washers**
- ☐ **Split Seals**
- ☐ **Truck & Trailer Seals**
- ☐ **Heavy Duty & Mechanical Face Seals**
- ☐ **'V' Seals**
- ☐ **Quadri-Lip Seals**
- ☐ **'O' Ring Cord & Splicing Kits**

BARNWELL
THE SEAL OF APPROVAL

INDEX

The Rotary Shaft Seal

What is it?

Also known as an oil seal, shaft seal, lip seal, elastomeric lip seal or any variation of these. It is a simple device for excluding dust, dirt, water or any other contaminant whilst retaining lubricant in rotary shaft equipment. Generally it has been developed as a means of protecting the bearings of rotating shafts.
This brochure attempts to highlight the various Rotary shaft seals including mechanical face seals, water pump seals, gland packings and 'V' seals that are readily available.

How does it work?

The basic principle of sealing is straight forward - the flexible lip is held against the rotating part (usually the shaft) whilst the casing (or O.D.) is pressed into the housing or bore and holds the seal in place. The sealing lip needs some form of lubrication to avoid overheating and is usually energized by means of a garter spring.

Are there different types?

Many - too numerous to list, covering a vast range of designs, sizes and materials suitable for a never ending range of applications. Some designs conform to International Standards such as BS1399 and DIN 3760 for metric sizes and seal types, but the majority have been manufactured to suit particular applications - hence the enormous selection available.

This brochure is intended to assist in this selection and will consider seal type, materials and sizes.

How should they be ordered?

The simplest way is to know either the preferred manufacturers part number, the overall sizes of shaft diameter, housing diameter and bore depth, or use this brochure to establish the Barnwell ordering reference.
Many of the old traditional names of seal manufacturers have either changed or disappeared in this age of "acquisitions". If no longer available, we will advise you and offer a suitable alternative seal, from stock whenever possible.

If your concern is getting the right seals for the job, you will need to know something about the application as well as the overall sizes. If you have any doubts - CONTACT US, we will help in your seal selection.

What materials are available?

Leather is probably the oldest of the lip materials still in common use, but the move towards mass production methods has seen a massive increase in the development of synthetic rubbers which lend themselves to accurate and repeatable injection and compression moulding. Nitrile is still by far the most common elastomer for "normal" use, whilst Viton is rapidly replacing Polyacrylic and Silicone for high temperature applications. Viton also has high resistance to abrasion and chemical attack making it a preferred elastomer. Recent developments in the use of PTFE for Rotary shaft seals has caused widespread interest particularly for high speed shaft rotation or poor lubrication applications. The bar charts on the opposite page can be used as a guide to material selection.

How are they used?

Once you have selected the most suitable seal available, considering environment, temperature, shaft speed, pressure, lubrication availability, as well as size of course, the seal should be stored adequately and then fitted properly. Here are a few suggestions that could help:-

Storage and Handling

There is a British Standard laid down for the control of synthetic rubbers. BS 3574 (1989) helps to determine shelf life - for instance Nitrile and Polyacrylic are Group 'B' rubbers and have a 7 year life, whilst silicone and Fluoroelastomers (Viton) are Group 'C' rubbers and have a 10 year shelf life. PTFE and leather do not come into this category but like the others should be kept in the original packing for as long as possible away from direct light, dust and humidity. Ozone, which can also be produced by battery driven fork lift trucks has a very bad effect on synthetic rubbers. Finally protect the sealing lip - DO NOT hang the seals on nails, wire etc.

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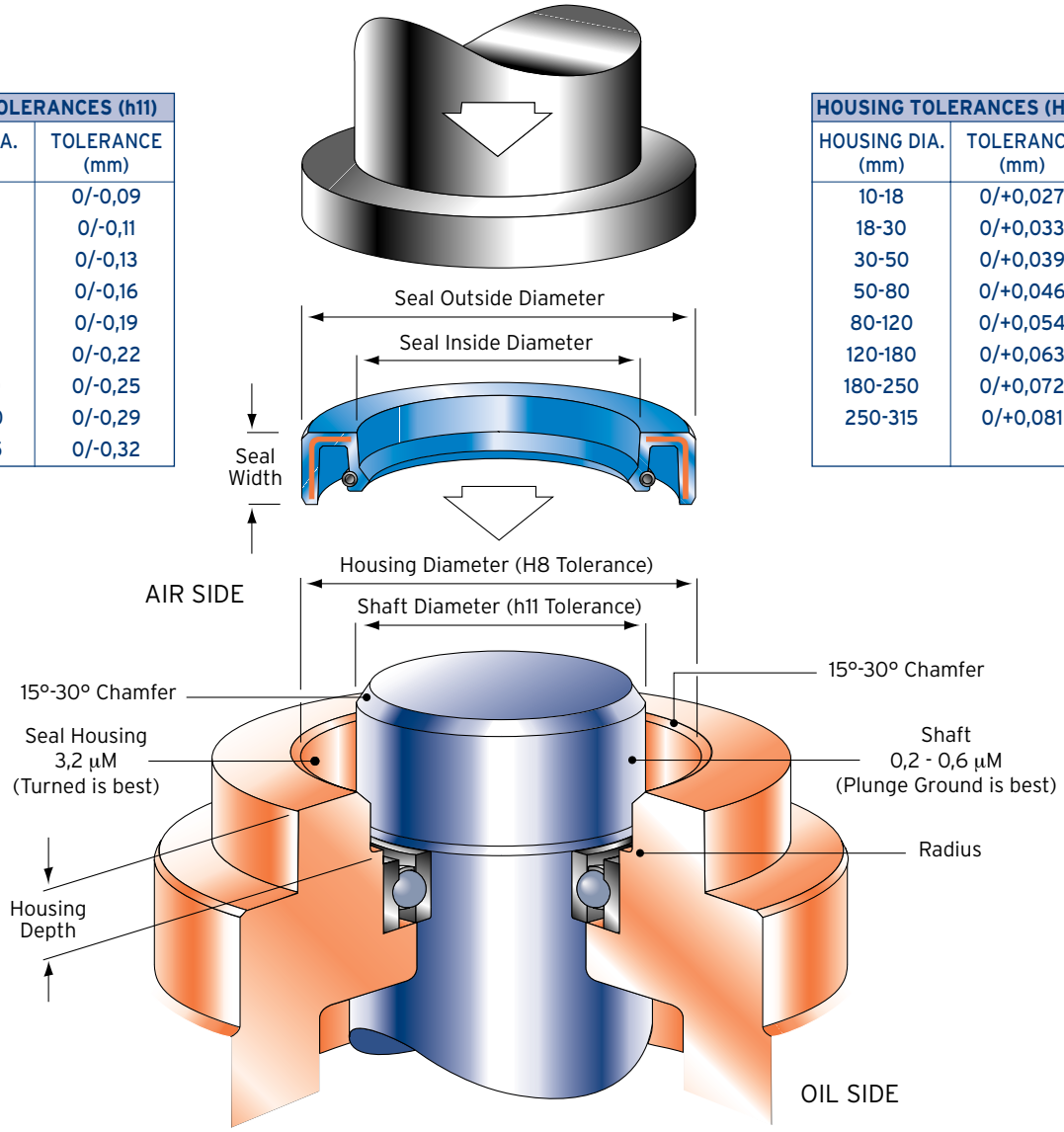
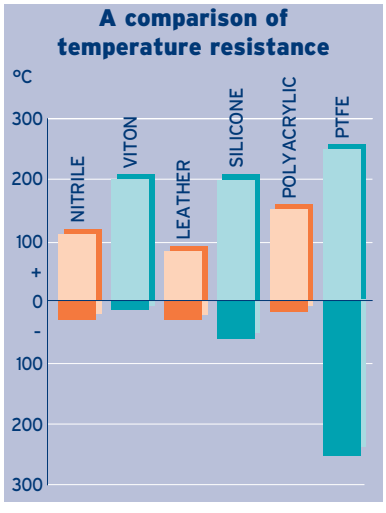
SHAFT TOLERANCES (h11)	
SHAFT DIA. (mm)	TOLERANCE (mm)
6-10	0/-0,09
10-18	0/-0,11
18-30	0/-0,13
30-50	0/-0,16
50-80	0/-0,19
80-120	0/-0,22
120-180	0/-0,25
180-250	0/-0,29
250-315	0/-0,32

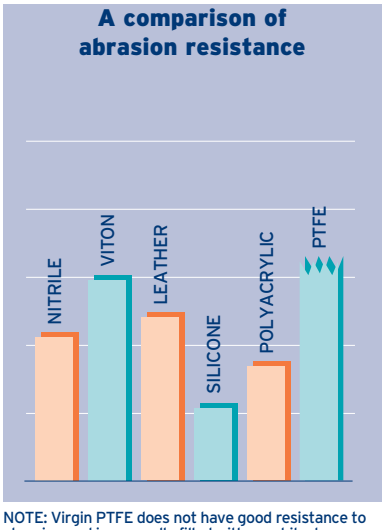


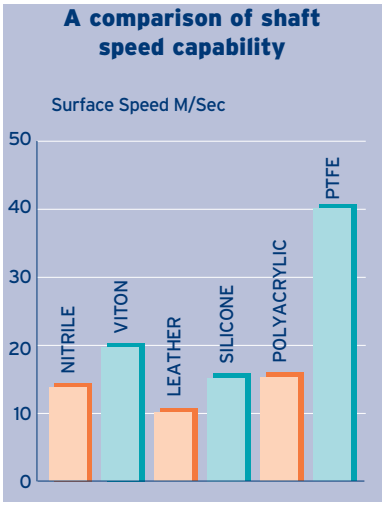
HOUSING TOLERANCES (H8)	
HOUSING DIA. (mm)	TOLERANCE (mm)
10-18	0/+0,027
18-30	0/+0,033
30-50	0/+0,039
50-80	0/+0,046
80-120	0/+0,054
120-180	0/+0,063
180-250	0/+0,072
250-315	0/+0,081

Installation

If the seal is being fitted to original equipment you may have some influence over the shaft and housing bore finish, but if you are replacing a worn seal you still need to take into account the condition of these 2 essential parts. Check for sharp edges and burrs - particularly on the shaft and housing chamfers or you could ruin the seal before you start up. If the shaft is too worn consider using a BARNWELL shaft repair kit.







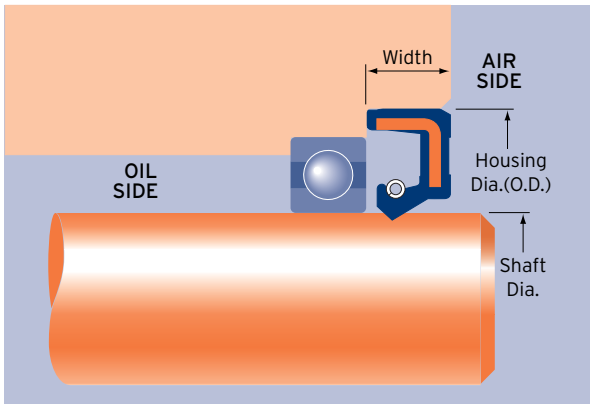
NOTE: Virgin PTFE does not have good resistance to abrasion and is generally filled with graphite, bronze or glass.

Type A

Rubber O.D., metal insert, sprung single lip type shaft seal

This is by far the most commonly used shaft seal design. The rubber O.D. permits replacement without damage to the housing bore, yet still retains the seal without the need for circlips, sealants or a retaining plate. Not suitable for high pressure applications.

ALTERNATIVE STYLES IN COMMON USE



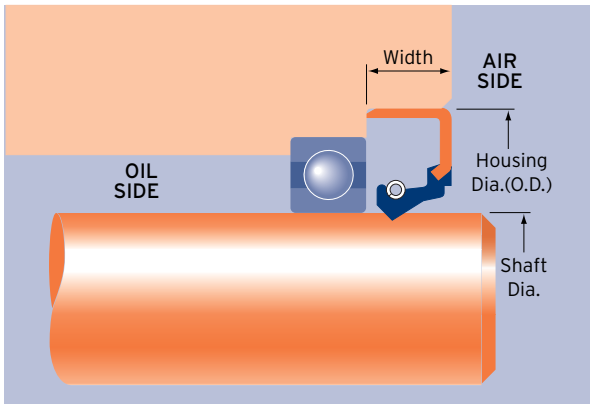
SIZE RANGE:
Shaft dias. .25" to 13.0" imp. range
4mm to 480mm metric range
PRESSURE RATING:
10 p.s.i. (0,7 Bar) max.
SHAFT SPEED:
3600 ft/min. (20m/sec)
(see chart on page 5)
MATERIALS AVAILABLE:
Nitrile, Viton, Polyacrylic, Silicone

BARNWELL REFERENCE
A - O.D. x shaft x width (ins) - material
A - Shaft x O.D. x width (mm) - material

Type B

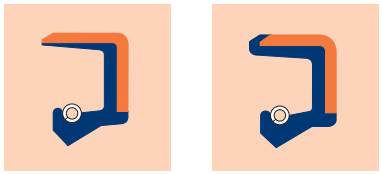
Metal O.D., sprung single lip type shaft seal

This is more often specified when a more positive housing fit is required. Particularly with heavy machinery where vibration and movement could be a consideration. No other form of housing retention is required, but use with high temperature aluminium housings should be avoided in case thermal expansion differentials could be a problem.



BARNWELL REFERENCE
B - O.D. x shaft x width (ins) - material
B - Shaft x O.D. x width (mm) - material

ALTERNATIVE STYLES IN COMMON USE

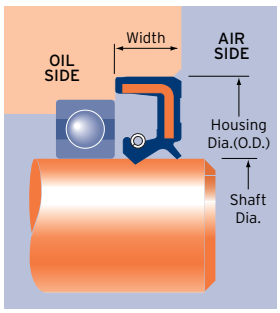


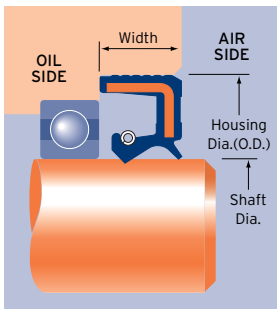
SIZE RANGE:
Shaft dias. .25" to 13.0" imp. range
4mm to 480mm metric range
PRESSURE RATING:
10 p.s.i. (0,7 Bar) max.
SHAFT SPEED:
3600 ft/min. (20m/sec)
(see chart on page 5)
MATERIALS AVAILABLE:
Nitrile, Viton, Polyacrylic, Silicone

Type AS

Rubber O.D., metal insert, single sprung lip and dirt lip (semi-dual)

Similar construction to the 'A' Type - rubber O.D., with metal insert, primary lip and an additional dirt/dust lip (sometimes called a wiper) moulded within the overall seal width or alternatively protruding outside the seal face. Both types are usually referred to as "semi-dual" lip type, as the name suggests they help prevent the ingress of dust/dirt into the primary lip area. Available in inch and metric sizes in Nitrile, Viton, Silicone and Polyacrylic, similar to the 'A' type range.



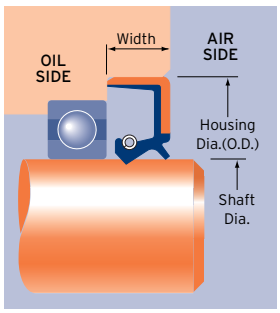


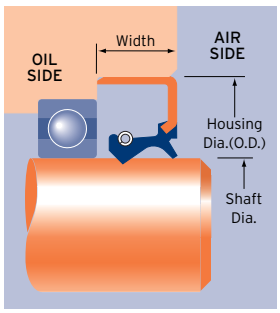
BARNWELL REFERENCE
AS - O.D. x shaft x width (ins) - material
AS - Shaft x O.D. x width (mm) - material

Type BS

Metal O.D., single sprung lip and dirt lip (semi-dual)

Similar construction to the 'B' type, metal O.D. (both ground and pressed & coated available), primary lip and additional dust/dirt lip (also called a wiper) moulded within the overall seal width but sometimes protruding outside the seal face. Usually referred to as "semi-dual" lip type they prevent the ingress of dust/dirt into the primary lip area. Available in inch and metric sizes in Nitrile, Viton, Silicone and Polyacrylic. Similar to "B" type range.





BARNWELL REFERENCE
BS - O.D. x shaft x width (ins) - material
BS - Shaft x O.D. x width (mm) - material

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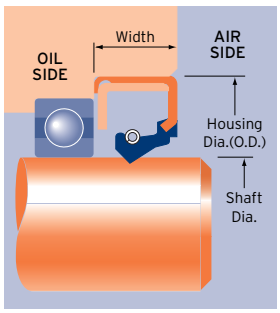
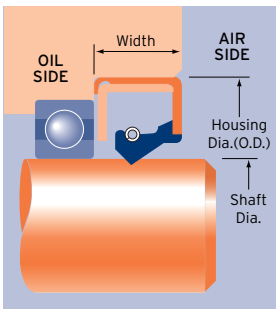
Type S

Totally encased built up single lip type

The totally metal encased, single sprung lip seal is a very rigid construction particularly useful for heavy or dirty applications. The additional reinforcing inner cup can also be used for assembly in the "reverse" direction. Available in Nitrile, Viton, Polyacrylic and Silicone in inch and metric sizes.



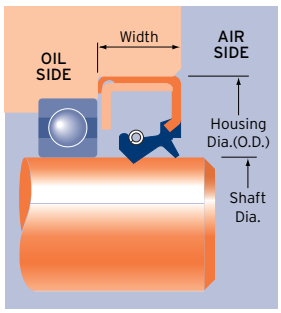


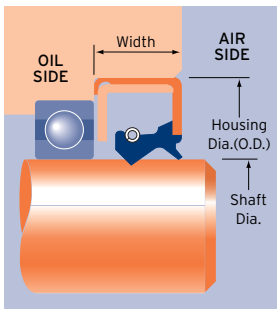
BARNWELL REFERENCE
S - O.D. x shaft x width (ins) - material
S - Shaft x O.D. x width (mm) - material

Type SAS

Built up semi-dual type

Similar in construction to the 'S' type, this seal has the benefit of an additional moulded dirt lip as shown in the more common 'BS' type. Also available in Nitrile, Viton, Polyacrylic and Silicone as well as in inch and metric sizes.

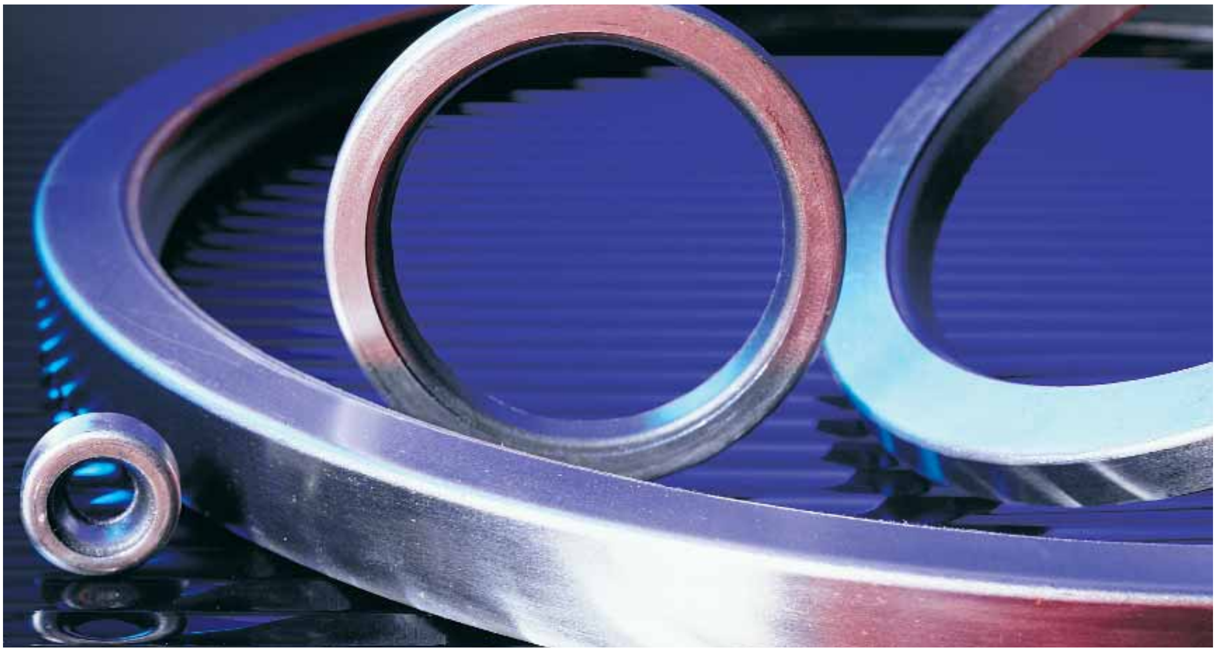




BARNWELL REFERENCE
SAS - O.D. x shaft x width (ins) - material
SAS - Shaft x O.D. x width (mm) - material

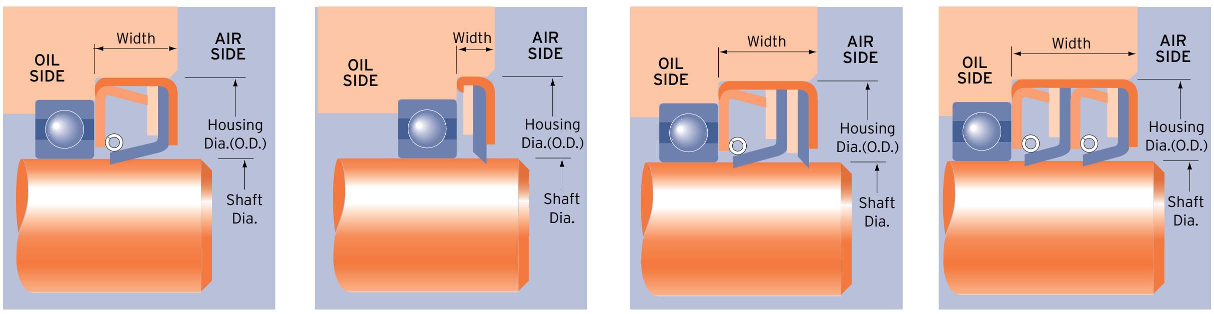
Type L

Leather



Leather seals are particularly suited to arduous, dirty and often poorly lubricated duties because they are pre-lubed and absorb some of the retained fluids. In certain instances they can withstand conditions that synthetic rubber seals cannot.

Best used on slower shaft speeds (200ft/min, 10m/sec) and lower temps (-30°C to +90°C). Available in a wide range of styles and sizes, both in inch and metric, many from stock.



BARNWELL REFERENCE

L - O.D. x shaft x width (ins)	**LAS** - O.D. x shaft x width (ins)	**BG** - O.D. x shaft x width (ins)	**LDT** - O.D. x shaft x width (ins)
L - Shaft x O.D. x width (mm)	**LAS** - Shaft x O.D. x width (mm)	**BG** - Shaft x O.D. x width (mm)	**LDT** - Shaft x O.D. x width (mm)

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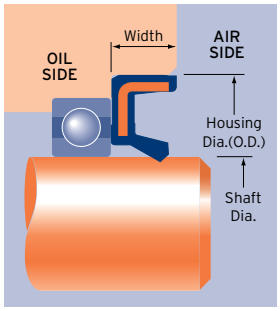
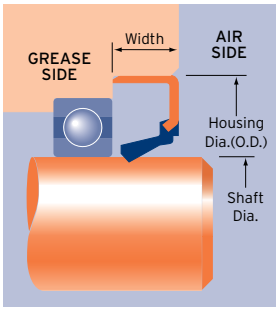
Type ABG and BG

The springless type seal is generally used either as a grease retainer or to prevent the ingress of dust or water. Usually associated with light duties with slow speeds, no pressure, ambient temperature and grease rather than oil lubrication. When the lip is reversed, facing away from the lubricant it is an effective secondary seal or wiper keeping out water or other fluids such as cutting oil and coolant. Available with metal O.D. (BG) or rubber O.D. (ABG) in Nitrile and Viton, in both inch and metric sizes.



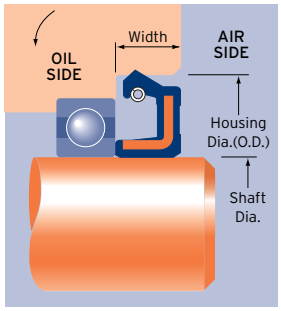


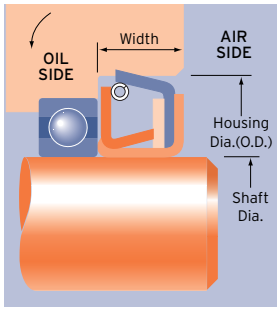
BARNWELL REFERENCE

ABG - O.D. x shaft x width (ins)
ABG - Shaft x O.D. x width (mm)
BG - O.D. x shaft x width (ins)
BG - Shaft x O.D. x width (mm)

Type EXT-R and EXT-L

External seals are used generally for rotating hub applications. Seals, either rubber or metal I.D. are pressed onto the stationary shaft and seal against the bore. Housings must be kept smooth to prevent excessive wear as this diameter is greater than the normal running surface (shaft). The sprung lip version is the most popular but there are versions without springs as well as multi-grooved types sometimes found on agricultural equipment. Available in inch and metric, rubber or leather lips.





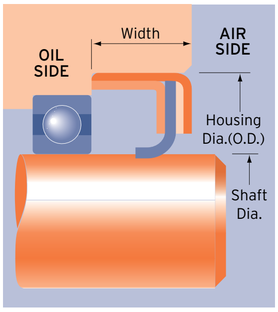
BARNWELL REFERENCE

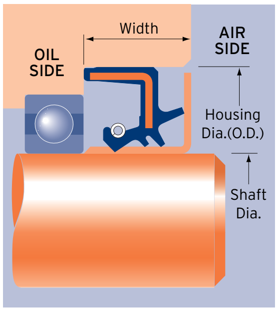
EXT-R - O.D. x shaft x width (ins)
EXT-R - Shaft x O.D. x width (mm)
EXT-L - O.D. x shaft x width (ins)
EXT-L - Shaft x O.D. x width (mm)

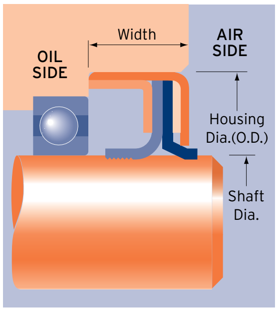
Type SP

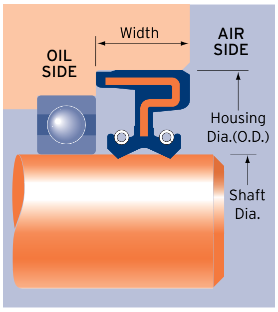
Special Designs

As purpose-built machinery is constantly being developed, the need for "special" or "non-standard" rotary shaft seals also grows. Todays "specials" will almost certainly be tomorrow's "standards". Lip materials will include PTFE and more exotic synthetic elastomers and unitized or "cassette" designs will become more common. We show some typical types which are now available in a wide range of size and material combinations. Low and medium size batch production enables the Buyer and Designer far greater scope to Tool-up for designs which were once too expensive to envisage. Contact our Engineers for further discussions on new designs for a never ending range of Sealing applications.









BARNWELL REFERENCE

SP - O.D. x shaft x width (ins)

SP - Shaft x O.D. x width (mm)

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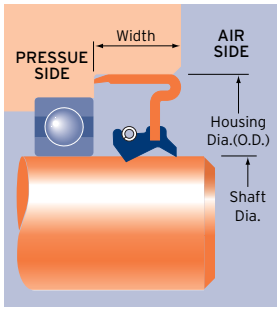
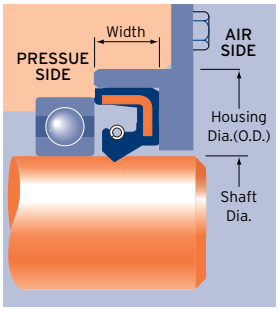
High Pressure Seals

The conventional shaft seals already described are not suitable for sealing pressures much over 10 p.s.i. (0,7 Bar). When such applications occur the best solution is to vent the seal area to atmosphere. If this is not possible, as with a pump, and a mechanical seal is considered un-economical, then there is a limited choice of solutions. The seal may have to be positively retained in its housing to prevent "pop-out", the lip may have to be supported to prevent "inversion", or both.

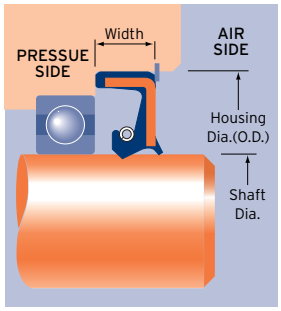
There are purpose made high pressure seals, but care must be taken over selection.
Consider:- pressure causes heavy lip contact with the shaft, driving out lubricant with a resultant increase in under-lip temperature. So shaft speeds must be low, shaft alignment must be good and shaft surface finish must be smooth, preferably plunge ground to the required specification. Lubrication to the sealing lip should also be good - clean and plentiful.



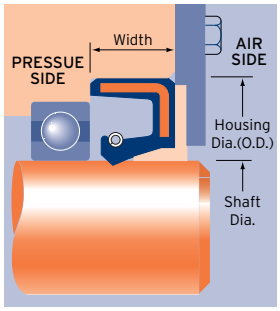
METAL O.D. PLAIN OR DUST LIP



RUBBER O.D. HEAVY PLAIN LIP - RETAINED



RUBBER O.D. NARROW WIDTH WITH EXT. DUST LIP - RETAINED



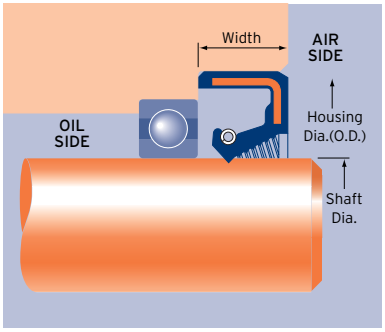
CONVENTIONAL RUBBER O.D SINGLE LIP SEAL WITH BACK-UP WASHER - RETAINED

Housings should not be oversized or too smooth if rubber O.D. seals are to be used, seal retention may be the best option.

Pressure seals are available in Nitrile , Viton and PTFE in both inch and metric sizes.

Type ADP (DPSM)

Hydrodynamic Lip



What are they?

Hydrodynamic lips are generally regarded as lip refinements designed to improve sealing at the top limits of shaft speed, heat, vibration or shaft eccentricity. Where plain lip performance has given only marginally satisfactory results, it is worth considering the use of shaft seal with this "positive action feature".

How do they work?

The hydrodynamic feature is generally moulded into the rear face of the sealing lip or "Air Side". It can take several forms as favoured by leading oil seal manufacturers, some of which are patented designs. The most common are moulded helixes, but care must be taken when using these as they are "uni-directional" and if used for the wrong direction of rotation can actually encourage leakage. The safest designs are therefore the "bi-directional" features. These appear as moulded ribs, waves, double helixes and triangular pads - all claim to assist in pumping lubricant or other sealed fluids from under the lip back into the machine or sump. During the development of these features care to avoid "over-pumping" action, which may have lead not only to the entry of the oil film but also to any other fluid or foreign matter present, must have been considered. The various designs of Hydrodynamic or Positive action lips have now been in evidence for over 35 years in some form or another and are widely available as standard in metric sizes, plus a limited range of inch sizes, in both Nitrile and Viton material.

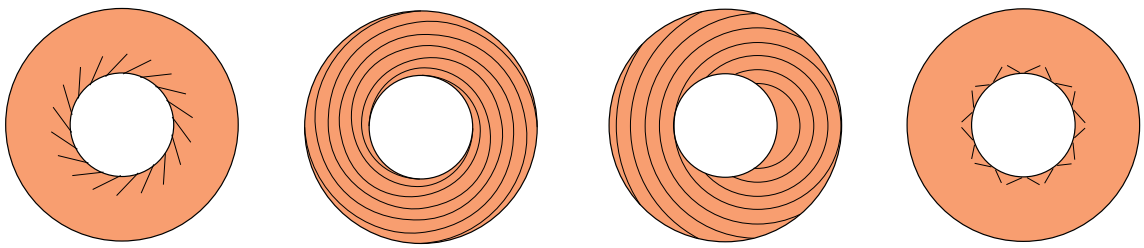
How should they be fitted?

In exactly the same way as a plain lip seal. Lubricate both the O.D. and I.D. lip with clean oil or the sealed fluid and install as previously described with the garter spring facing towards the bearings (into the oil).
There is an increasing use of ribbed or semi-ribbed rubber O.D. seals - these are not hydrodynamic features but seal retainers, particularly useful where aluminium housings are used or high thermal expansion may be a problem.

How should they be ordered?

The most common seal of this type is the Spiroseal, available in the full standard metric range in Nitrile and Viton material. It has a plain rubber O.D., metal insert and single sprung lip. Barnwell ordering reference is ADP - see listing.

OTHER HYDRODYNAMIC FEATURES



BARNWELL REFERENCE

ADP - Shaft x O.D. x width (mm) - material

SIZE LISTING (INCH)

A	B	AS	BS	S	L	ABG/BG
						

Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range
0·250	0·750	·25-·375	0·812	1·375	·125-·375	1·250	1·500	·125-·500	1·562	2·375	·187-·500
0·312	0·750	"	0·875	1·250	"	1·250	1·625	·187-·500	1·562	2·437	"
0·312	0·875	"	0·875	1·375	"	1·250	1·687	"	1·562	2·500	"
0·375	0·750	"	0·875	1·500	"	1·250	1·750	"	1·562	2·687	"
0·375	0·875	"	0·875	1·625	"	1·250	1·812	"	1·625	2·125	"
0·375	1·000	"	0·875	1·750	·125-·500	1·250	1·875	"	1·625	2·187	·250-·500
0·437	0·875	"	0·937	1·500	"	1·250	2·000	"	1·625	2·250	"
0·437	1·000	"	0·937	1·625	"	1·250	2·062	"	1·625	2·375	"
0·437	1·125	"	0·937	1·750	"	1·250	2·125	"	1·625	2·437	"
0·500	0·875	"	1·000	1·250	"	1·250	2·187	"	1·625	2·500	"
0·500	1·000	"	1·000	1·375	"	1·250	2·250	"	1·625	2·562	"
0·500	1·125	"	1·000	1·437	"	1·250	2·375	"	1·625	2·625	"
0·562	1·000	"	1·000	1·500	"	1·312	1·875	"	1·625	2·750	"
0·562	1·125	"	1·000	1·562	"	1·312	2·000	"	1·625	2·875	"
0·562	1·250	"	1·000	1·625	"	1·312	2·125	"	1·687	2·187	"
0·625	0·937	"	1·000	1·750	"	1·375	1·875	"	1·687	2·500	"
0·625	1·000	"	1·000	1·875	"	1·375	2·000	"	1·687	2·687	"
0·625	1·125	"	1·000	1·937	"	1·375	2·062	"	1·687	2·750	"
0·625	1·250	"	1·000	2·000	"	1·375	2·125	"	1·750	2·125	"
0·625	1·312	"	1·062	1·500	"	1·375	2·250	"	1·750	2·250	"
0·625	1·375	"	1·062	1·625	"	1·375	2·375	"	1·750	2·375	"
0·625	1·500	"	1·062	1·750	"	1·375	2·500	"	1·750	2·437	"
0·650	1·500	"	1·062	1·875	"	1·437	2·125	"	1·750	2·500	"
0·687	1·062	"	1·062	2·000	"	1·437	2·250	"	1·750	2·625	"
0·687	1·125	"	1·125	1·500	"	1·437	2·500	"	1·750	2·687	"
0·687	1·250	"	1·125	1·562	"	1·500	1·875	"	1·750	2·750	"
0·687	1·375	"	1·125	1·625	"	1·500	2·000	"	1·750	2·875	"
0.750	1·000	"	1·125	1·750	"	1·500	2·062	"	1·750	3·000	"
0.750	1·125	"	1·125	1·875	"	1·500	2·125	"	1·812	2·500	"
0.750	1·187	"	1·125	2·000	"	1·500	2·187	"	1·812	2·625	"
0.750	1·250	"	1·125	2·250	"	1·500	2·250	"	1·875	2·500	"
0.750	1·375	"	1·187	1·500	"	1·500	2·375	"	1·875	2·625	"
0.750	1·500	"	1·187	1·750	"	1·500	2·500	"	1·875	2·687	"
0.750	1·625	"	1·187	2·000	"	1·500	2·750	"	1·875	2·750	"
0·812	1·187	"	1·187	2·250	"	1·562	2·250	"	1·875	2·875	"

SIZE LISTING (INCH)

A	B	AS	BS	S	L	ABG/BG
						

Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range
1·875	3·000	·250-·500	2·500	3·000	·250-·625	3·125	4·125	·375-·625	3·625	5.250	·375-·750
1·875	3·187	"	2·500	3·062	"	3·125	4·250	"	3·687	4·750	"
1·937	2·500	·250-·625	2·500	3·250	"	3·125	4·500	"	3·687	4·875	"
1·937	2·750	"	2·500	3·375	"	3·125	4·750	"	3·687	5·000	"
1·937	3·000	"	2·500	3·500	"	3·187	4·250	"	3·687	5·125	"
2·000	2·500	"	2·500	3·543	"	3·250	4·000	"	3·687	5·625	"
2·000	2·625	"	2·500	3·625	"	3·250	4·250	·250-·625	3·750	4·500	"
2·000	2·687	"	2·500	3·750	"	3·250	4·500	·375-·625	3·750	4·625	"
2·000	2·750	"	2·500	3·875	"	3·250	4·750	"	3·750	4·750	"
2·000	2·875	"	2·562	3·375	"	3·250	4·875	"	3·750	5·000	"
2·000	3·000	"	2·625	3·375	"	3·312	4·375	"	3·750	5·250	"
2·000	3·125	"	2·625	3·500	"	3·375	4·125	"	3·812	4·875	"
2·062	2·875	"	2·625	3·625	"	3·375	4·375	"	3·875	4·750	"
2·062	3·000	"	2·625	3·750	"	3·375	4·500	"	3·875	4·875	"
2·125	2·750	"	2·687	3·500	"	3·375	4·625	"	3·875	5·000	"
2·125	2·875	"	2·750	3·500	"	3·375	4·750	"	3·875	5·125	"
2·125	3·000	"	2·750	3·625	"	3·375	5·000	"	3·875	5·375	"
2·125	3·187	"	2·750	3·750	"	3·375	5·250	"	3·875	5·687	"
2·125	3·250	"	2·750	3·875	"	3·437	4·250	"	3·937	5·000	"
2·125	3·500	"	2·750	4·000	"	3·437	4·500	"	4·000	4·750	"
2·187	3·000	"	2·812	3·625	"	3·437	4·750	"	4·000	4·875	"
2·250	2·875	"	2·875	3·625	"	3·500	4·125	"	4·000	5·000	"
2·250	3·000	"	2·875	3·750	"	3·500	4·375	"	4·000	5·125	"
2·250	3·125	"	2·875	3·875	"	3·500	4·500	"	4·000	5·250	"
2·250	3·187	"	2·875	4·000	"	3·500	4·750	"	4·000	5·375	"
2·250	3·250	"	2·875	4·500	"	3·500	5·000	·375-·750	4·000	5·500	"
2·250	3·375	"	2·937	3·750	"	3·500	5·125	"	4·000	5·750	"
2·312	3·125	"	3·000	3·750	"	3·500	5·250	"	4·062	5·125	"
2·375	3·000	"	3·000	3·875	"	3·500	5·375	"	4·125	5·000	"
2·375	3·125	"	3·000	4·000	·375-·625	3·562	4·625	"	4·125	5·125	"
2·375	3·250	"	3·000	4·125	"	3·625	4·500	"	4·187	5·000	"
2·375	3·375	"	3·000	4·375	"	3·625	4·625	"	4·187	5·250	"
2·375	3·500	"	3·000	4·500	"	3·625	4·750	"	4·187	5·750	"
2·437	3·250	"	3·062	4·125	"	3·625	4·875	"	4·250	5·000	"
2·437	3·500	"	3·125	4·000	"	3·625	5·000	"	4·250	5·250	"

TELEPHONE +44(0)121 429 8011 (20 LINES) FAX +44(0)121 434 3016

SIZE LISTING (INCH)

A	B	AS	BS	S	L	ABG/BG
						

Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range
4·250	5·375	·375-·750	5·125	6·125	·375-·750	6·125	7·125	·375-·875	7·875	9·375	·375-·875
4·250	5·500	"	5·125	6·250	"	6·187	7·250	"	8·000	9·500	"
4·250	5·625	"	5·125	6·375	"	6·250	7·000	"	8·000	10·000	·500-1·000
4·250	5·750	"	5·187	5·937	"	6·250	7·187	"	8·250	9·750	"
4·250	6·000	"	5·187	6·250	"	6·250	7·250	"	8·250	10·000	"
4·312	5·375	"	5·250	6·000	"	6·250	7·500	"	8·375	9·875	"
4·375	5·375	"	5·250	6·250	"	6·312	7·375	"	8·500	10·000	"
4·375	6·000	"	5·250	6·500	"	6·375	7·375	"	8·500	10·500	"
4·437	5·500	"	5·250	6·750	·375-·875	6·437	7·500	"	8·625	10·125	"
4·500	5·250	"	5·312	6·375	"	6·500	7·500	"	8·750	10·250	"
4·500	5·375	"	5·375	6·250	"	6·500	7·750	"	8·750	10·500	"
4·500	5·500	"	5·375	6·375	"	6·500	8·000	"	8·875	10·375	"
4·500	5·750	"	5·437	6·500	"	6·500	8·250	"	9·000	10·000	"
4·500	6·000	"	5·500	6·250	"	6·562	7·625	"	9·000	10·500	"
4·500	6·250	"	5·500	6·500	"	6·625	7·500	"	9·250	10·750	"
4·500	6·375	"	5·500	6·750	"	6·625	7·625	"	9·500	11·000	"
4·562	5·625	"	5·500	7·000	"	6·687	7·500	"	9·625	11·125	"
4·625	5·625	"	5·625	6·625	"	6·750	7·750	"	9·750	11·125	"
4·625	6·000	"	5·625	6·375	"	6·750	8·000	"	10·000	11·500	"
4·687	5·750	"	5·625	6·500	"	6·750	8·250	"	10·250	12·000	"
4·687	6·250	"	5·625	6·625	"	6·750	8·500	"	10·500	12·000	"
4·750	5·500	"	5·625	6·750	"	7·000	8·000	"	10·750	11·500	"
4·750	5·750	"	5·625	7·000	"	7·000	8·125	"	11·000	12·250	·625-1·250
4·750	6·000	"	5·687	6·750	"	7·000	8·250	"	11·500	13·000	"
4·750	6·250	"	5·750	6·750	"	7·000	8·500	"	11·500	13·500	"
4·812	5·875	"	5·750	6·875	"	7·125	8·625	"	12·000	13·000	"
4·875	5·875	"	5·750	7·000	"	7·250	8·500	"	12·000	14·000	"
4·875	6·250	"	5·750	7·500	"	7·250	8·750	"	12·250	14·750	"
4·937	6·000	"	5·875	6·875	"	7·375	8·875	"	13·000	15·000	"
5·000	5·750	"	5·937	7·000	"	7·500	9·000	"			"
5·000	6·000	"	6·000	7·000	"	7·625	9·125	"			"
5·000	6·250	"	6·000	7·187	"	7·625	9·500	"			"
5·000	6·500	"	6·000	7·250	"	7·750	8·750	"			"
5·000	6·750	"	6·000	7·500	"	7·750	9·000	"			"
5·062	6·125	"	6·062	7·125	"	7·750	9·250	"			"

SIZE LISTING (METRIC)

A	B	AS	BS	S	*ADP	L	ABG/BG
							

Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range
4	8	2	12	19	3	17	30	7-10	22	50	8-10
4	11	6	*12	22	4-8	*17	32	6-10	23	40	8-10
4	12	6	*12	24	6-7	17	34	4	24	32	4
5	9	2	12	25	5-8	*17	35	6-10	*24	35	7
5	10	2	12	26	7-8	*17	40	6-10	24	36	6-10
5	15	6	*12	28	7	17	47	7-10	*24	37	7
5	16	7	*12	30	7-10	18	24	3-4	*24	40	7-10
5	22	8	12	32	5-10	18	26	4-6	24	45	8
6	10	2	13	19	3	18	28	7-8	*24	47	7-10
6	12	2	13	26	5-7	*18	30	7-8	24	50	8-10
*6	16	4-7	13	30	7-10	*18	32	7-8	25	32	4
6	19	6-7	14	20	3	*18	35	7-10	25	33	4-6
*6	22	7-8	14	22	3-4	*18	40	7-10	*25	35	4-8
7	11	2	*14	24	6-7	19	27	4-6	25	36	7
7	14	2-4	14	25	5-7	19	30	5-8	25	37	5-8
*7	16	4-7	14	26	7	19	32	6-10	25	38	6-7
*7	22	6-7	*14	28	7	19	35	6-10	*25	40	5-10
8	12	3	*14	30	7-10	19	40	6-10	*25	42	6-12
8	15	3	14	32	7-10	19	26	4	25	45	7-10
*8	16	5-7	*14	35	7-10	20	28	4-6	25	46	6-8
8	18	5-7	15	21	3-4	*20	30	5-10	*25	47	6-10
8	20	7-8	15	23	3	*20	32	5-10	25	50	8-12
*8	22	6-8	*15	24	5-7	20	33	8-10	*25	52	7-12
*8	24	7	15	25	5-7	*20	35	6-10	25	62	7-12
9	13	3	*15	26	4-7	20	36	7	26	34	4
9	16	3	15	28	6-9	20	37	6-10	26	35	7
*9	22	7-10	*15	30	4-10	20	38	7-10	*26	37	7
*9	24	7	*15	32	5-10	*20	40	6-10	26	40	8-10
*9	26	7	*15	35	5-10	20	42	6-10	*26	42	7-10
10	14	3	15	40	7-10	20	45	7-10	*26	47	7-10
10	16	4-7	16	22	3-4	*20	47	7-10	26	52	8-12
10	17	3-5	16	24	3-7	20	52	7-10	27	37	7
10	18	5-7	16	25	3	21	29	4	27	41	8-10
*10	19	7	*16	28	6-7	22	28	4-5	27	47	6-11
*10	22	7-8	*16	30	6-10	22	30	4	27	50	8-12
*10	24	7	*16	32	7-10	*22	32	6-7	28	35	4
*10	26	7	*16	35	7-10	*22	35	6-10	28	37	4
11	17	4	16	40	7-10	22	38	7-8	*28	38	7
*11	22	7-8	17	23	3	*22	40	7-12	*28	40	7-10
*11	26	7	17	25	3-4	22	42	7-10	28	42	7-10
12	16	3	17	26	6	22	45	7-8	*28	47	5-10
12	18	3	*17	28	6-7	*22	47	7-10	28	48	8-10

*Sizes available in Type ADP

TELEPHONE +44(0)121 429 8011 (20 LINES) FAX +44(0)121 434 3016

SIZE LISTING (METRIC)

A	B	AS	BS	S	*ADP	L	ABG/BG
							

Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range
28	50	7-10	35	58	8-13	*42	55	6-9	50	72	8-12
*28	52	7-12	35	60	8-12	42	56	7-8	50	75	8-12
28	62	9-12	*35	62	5-12	42	58	7-10	50	78	8-13
29	38	4	35	65	8-12	42	60	7-12	*50	80	8-13
30	37	4	35	72	8-12	*42	62	6-12	50	85	6-13
*30	40	4-10	35	80	8-13	42	65	8-12	50	90	8-13
*30	42	5-10	*36	47	7	*42	72	8-12	51	72	10
30	44	7-10	*36	50	6-10	43	53	4	*52	68	7-12
30	45	7-10	*36	52	7-10	43	60	8-10	*52	69	10-12
*30	47	6-10	36	54	7-8	43	75	10	*52	72	8-12
30	48	8-10	36	56	10-12	44	60	8-12	*52	80	10-13
*30	50	7-12	36	58	8-10	44	62	8-12	52	85	8-13
*30	52	7-12	*36	62	7-12	44	65	8-10	53	68	10
30	55	7-12	36	68	8-10	44	72	8-12	54	80	10-13
30	56	8-15	37	47	4-8	45	52	4	54	85	10-15
30	60	8-10	37	50	10	45	55	4-8	55	68	8
*30	62	6-12	37	62	7-12	45	58	7-9	*55	70	8-10
31	72	8-10	38	48	4	*45	60	7-12	*55	72	8-12
32	47	7-10	*38	50	7	*45	62	7-12	55	75	8-12
32	42	4-8	*38	52	6-10	*45	65	8-12	55	78	9-13
*32	45	4-8	38	54	6-10	45	68	8-12	*55	80	8-13
*32	47	7-12	*38	55	7-12	45	70	8-12	*55	85	8-13
32	50	7-12	38	56	8-12	*45	72	7-12	55	90	8-13
*32	52	5-12	38	60	8-10	45	75	6-12	56	70	8
32	55	8-12	*38	62	7-12	45	78	10-13	56	72	7-10
32	56	8-12	38	65	8-12	45	80	8-13	*56	80	8-13
33	45	7	38	72	8-12	45	85	8-13	*56	85	8-10
33	50	6-10	40	47	4	46	65	8-10	57	90	13
33	52	6-10	40	50	4-8	46	72	8-10	*58	72	8-10
34	45	7	*40	52	5-12	47	65	8-12	58	75	8-12
34	46	8-10	*40	55	6-12	47	72	8-12	58	78	8-13
34	50	8-10	40	56	8-12	*48	62	7-10	*58	80	8-13
34	52	7-10	40	58	8-12	48	65	7-12	58	85	8-13
34	58	10-13	40	60	7-13	48	68	8-12	58	90	8-13
34	62	8-10	*40	62	7-12	48	70	8-12	60	72	8
35	42	4	40	65	8-12	*48	72	7-12	*60	75	8
35	45	4-8	40	68	6-12	48	80	8-13	60	78	9-13
*35	47	5-10	40	70	8-12	50	58	4	*60	80	7-13
*35	50	7-12	*40	72	7-12	50	62	5-10	*60	85	8-13
*35	52	7-12	40	80	8-13	*50	65	7-10	*60	90	8-13
35	55	6-12	41	62	8-10	*50	68	8-14	60	95	10-13
35	56	8-12	42	52	4-8	*50	70	8-14	60	100	10

*Sizes available in Type ADP

SIZE LISTING (METRIC)

A	B	AS	BS	S	*ADP	L	ABG/BG
							

Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range	Shaft Dia.	Housing Dia. (O.D.)	Width Range
60	110	8-13	80	105	10-13	110	150	12-15	175	200	15
61	75	8	*80	110	10-13	112	140	9-13	175	215	16
62	75	10-13	80	120	10-13	115	135	12-13	180	200	15
62	80	8-12	80	125	10-13	*115	140	12-15	*180	210	15
*62	85	8-13	82	105	12-13	*115	150	12-15	180	215	15-16
*62	90	8-13	82	110	12-13	118	150	15	180	220	15-16
*62	100	10-13	84	110	12	120	140	7-13	185	210	13
*63	85	8-13	*85	100	9-13	*120	150	12-15	190	215	15-16
63	88	8-10	85	105	10-13	*120	160	12-15	*190	220	15-16
*63	90	8-12	85	110	10-15	122	150	13-15	190	230	16
64	80	8-13	85	115	12-13	*125	150	12-15	*200	230	15-16
64	85	10-13	*85	120	10-15	*125	160	12-15	200	250	15
64	90	10-13	85	130	10-13	128	150	13-15	205	230	15-16
65	80	8	87	110	13	*130	160	12-15	*210	240	15
*65	85	8-13	88	110	10-13	*130	170	12-15	210	250	15-20
*65	90	8-15	88	115	12	132	160	13-15	215	240	12
*65	100	8-13	*90	110	8-15	135	160	12-15	218	250	16
66	90	10-13	90	115	9-13	135	165	12-15	*220	250	11-16
67	80	10	90	120	12-15	*135	170	12-15	*230	260	15
67	85	10	90	130	12-13	140	160	12-15	230	270	15-16
68	85	8-10	92	120	12-13	140	165	15	230	280	15-16
*68	90	8-13	95	110	9-12	*140	170	12-15	*240	270	15-16
*68	100	10-12	95	115	12-13	140	180	15	240	280	15-16
*70	85	7-8	*95	120	12-15	145	165	13-15	*250	280	15-16
*70	90	7-13	*95	125	10-15	145	170	13-15	260	290	16
70	92	11	*95	130	12-13	*145	175	13-15	260	300	16-20
70	95	10-13	98	120	12-14	145	180	13-15	280	310	15-16
*70	100	6-13	98	125	13	150	170	15	280	320	18-20
70	105	10-13	98	128	10	*150	180	12-15	300	340	16-20
70	110	8-13	100	115	9	150	190	12-15	310	350	18
72	84	7	*100	120	8-15	155	174	12	320	360	18-20
72	90	8-13	*100	125	12-15	155	180	15	340	372	16
*72	95	10-13	*100	130	10-15	155	190	13-15	340	380	18-20
*72	100	10-13	100	140	12-13	160	180	15	350	380	16
75	90	8-12	100	150	12-13	160	185	10	360	400	18-20
*75	95	8-13	104	125	10-12	*160	190	13-15	370	410	15-18
*75	100	10-13	105	125	12-13	160	200	12-15	380	420	20
75	105	10-13	*105	130	12-15	165	190	13-15	390	430	16-18
75	110	10-13	*105	140	12-15	165	200	15	400	440	20
*78	100	10-13	110	128	9	170	190	13-15	420	460	20
78	110	10-13	*110	130	12-15	*170	200	12-15	440	480	20
*80	100	10-13	*110	140	12-15	170	215	16	480	520	20

*Sizes available in Type ADP

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Type SPS Seals

SPS Seals are solid rubber or rubber/reinforced fabric construction with a selection of garter springs to suit the application. Sizes are available to suit shafts from 3" upward, with no maximum limit. Widths and radial cross-sections generally conform to standard inch or metric sizes. SPS Seals can be supplied split or endless for "on-site" splitting with lubrication ports where required.

Operating Temperature

Temperature:	-40 to +100 degrees C (Nitrile)
	-40 to +240 degrees C (Viton)
Pressure:	10 p.s.i. maximum
Shaft speed:	3500 ft/min maximum

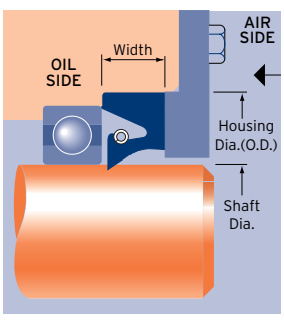
It is recommended that SPS split seal be positively retained by a suitable plate (as shown in the diagrams). Wherever possible the split should be located at the top point and care should be taken that the spring joint does not coincide with the seal split. Also ensure that the splits in the retainer plate do not coincide with the seal split. For ease of assembly it is often quite feasible to butt joint the seal ends on site, prior to fitting the garter spring. A suitable Barnwell adhesive is available upon request. Care must be taken not to interfere with the spring or the sealing lip and it is advisable to pre-lube the seal during installation.

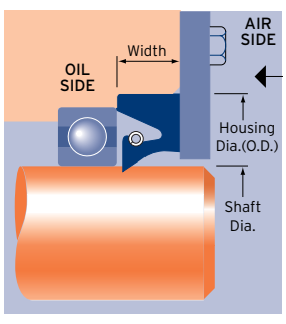
Typical Applications

SPS Seals should be used for large diameter rotating equipment where access to the seal is difficult, or where costly down-time must be minimised e.g. marine drive shafts, rolling mill equipment, gearboxes for mining, quarrying and off highway applications.

Available Materials

SPS Seals are available in solid Nitrile rubber, fabric reinforced rubber or solid Viton. Standard garter springs are high carbon spring steel, but stainless steel and phosphor bronze are also available for marine duties. Non-clogging spring covers can also be supplied for special critical applications.

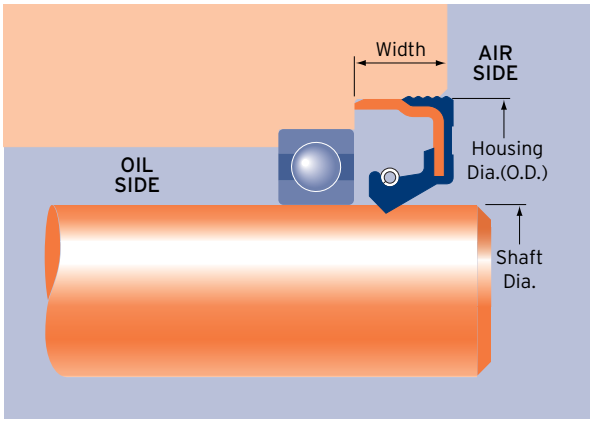




Automotive /Hub Seals

The automotive industry worldwide is the largest single market for fluid sealing components and in particular for rotary shaft seals. It is not surprising then, that most seal manufacturers have something to offer for the most popular applications - engine and transmission seals for passenger cars. The truck and bus sector requirements are slightly different, especially with wheel seals where very high mileage is expected between bearing and brake overhaul.

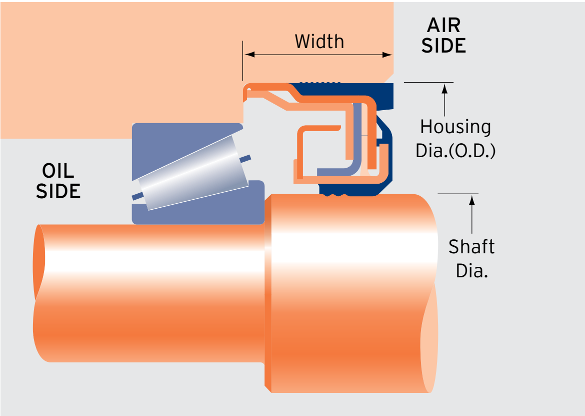
For this reason unitised hub seals have made a big impact and are now essential for modern trailer fleets. We show 6 variations all requiring special installation tools. They are usually in Nitrile material and inch sizes but there is an increasing demand for Viton and metric sizes.

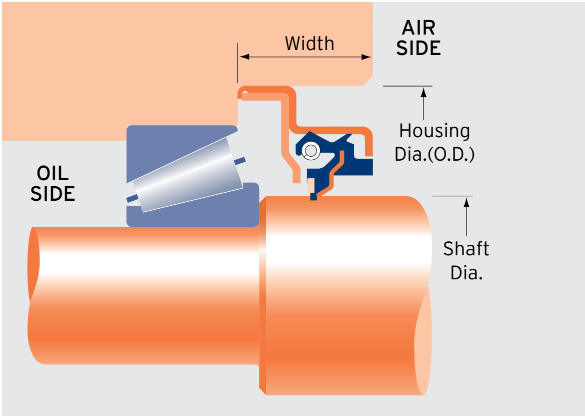


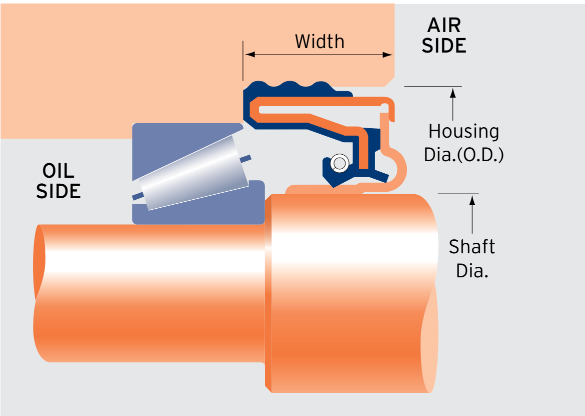
ALTERNATIVE STYLES IN COMMON USE

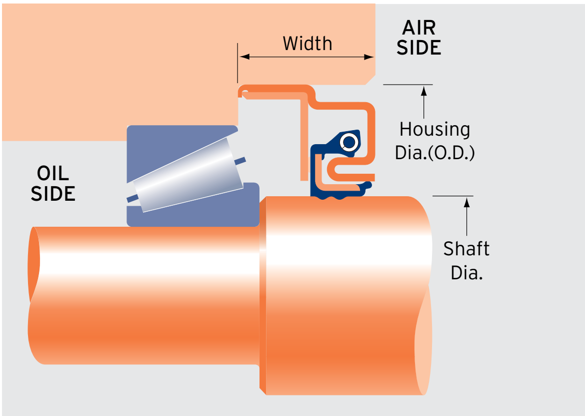
Automotive /Hub Seals

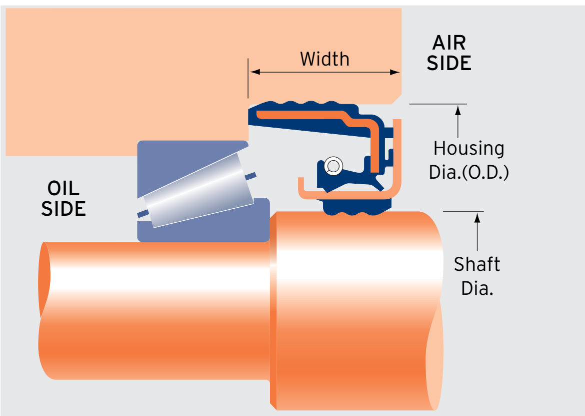
(Truck Bus & Trailer)

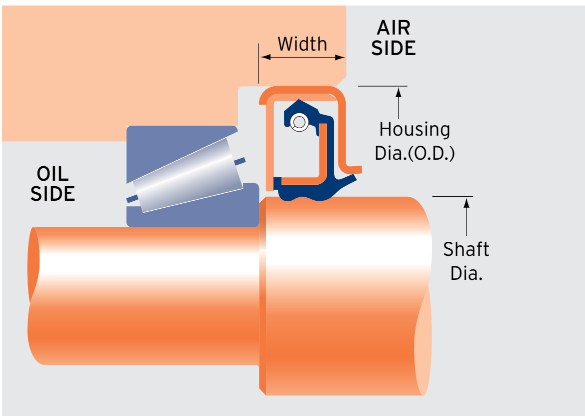




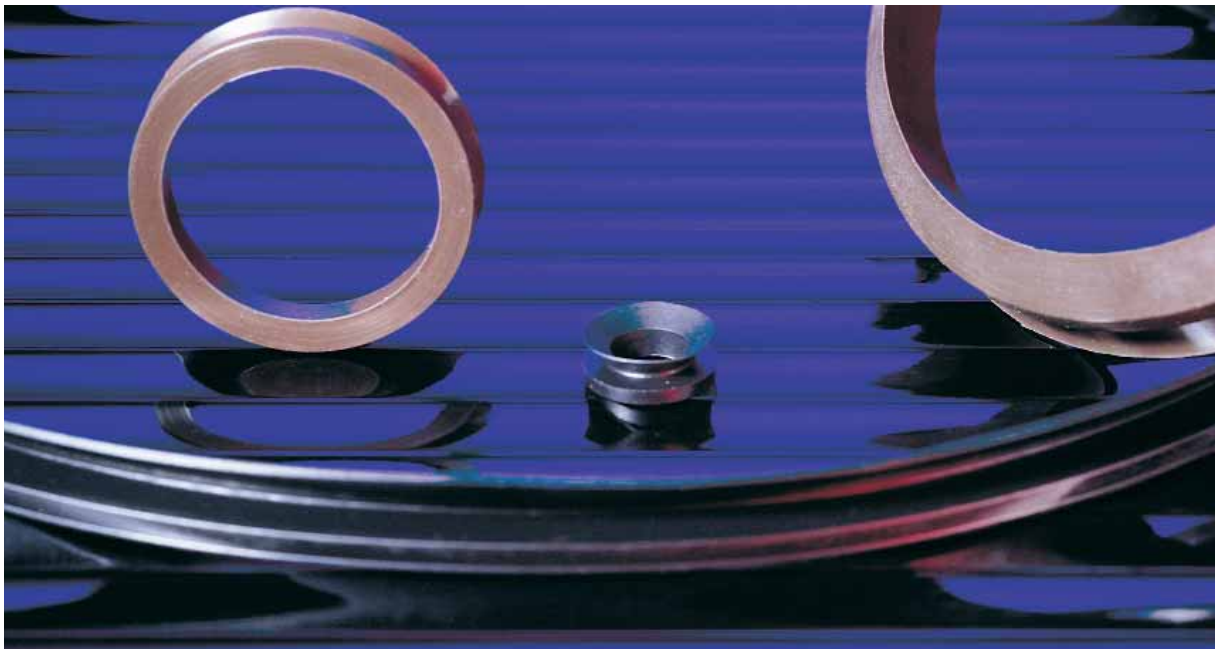




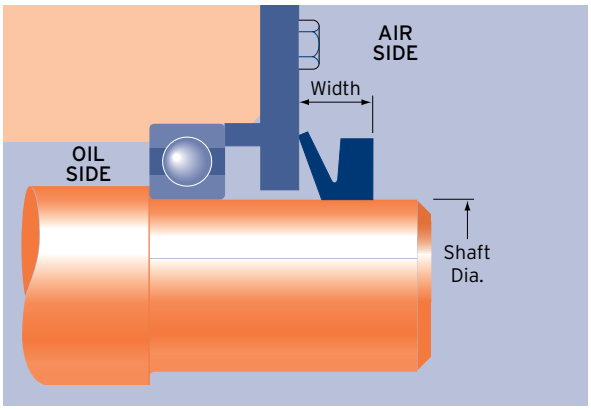




V Seals



This all-rubber seal is generally a stretch fit onto a rotating shaft and unlike the previous RADIAL shaft seals described, this is an AXIAL seal. It can be used as a primary seal for grease or oil but is more commonly used as a secondary seal preventing the ingress of dirt, dust or water. Several styles are available, the more popular shown here.



ALTERNATIVE STYLES IN COMMON USE

SIZE RANGE:
Shaft dias. 0.125" to 78" imp. range
3mm to 2000mm metric range
PRESSURE RATING:
Nil
SHAFT SPEED:
2400 ft/min. (12m/sec)
MATERIALS AVAILABLE:
Nitrile and Viton

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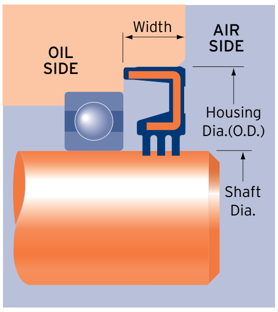
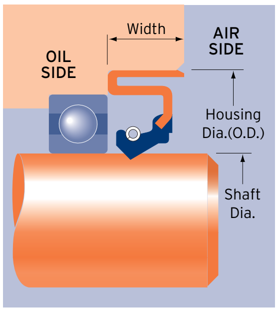
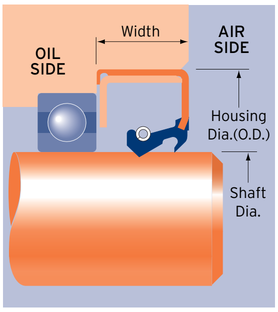
Miscellaneous Seals and Arrangements

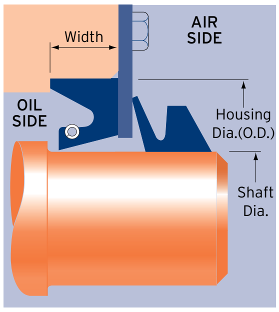
In addition to the standard or stock items shown in this brochure, we are able to supply virtually any type or size of seal at short notice to meet the demands of industry. Where it is economical to use modern high volume processes we can expedite and assist in the design of seals suitable for all types of applications - automotive, industrial, marine, agricultural etc.

Automotive Unitized hub seals, crank and cam-shaft seals, water pump seals, gaskets and shaft repair kits.
Industrial Non-standard rotary shaft seals, split-seals, V-Seals, heavy duty face seals, mechanical face seals, 'O' rings, rubber sheet and cord.
Marine Brass cased seals,stainless steel or phosphur bronze sprung seals, all rubber seals.
Agricultural External seals, leather seals, sealing kits.
In addition we stock sealants, circlips, sealing washers, hydraulic and pneumatic seals.





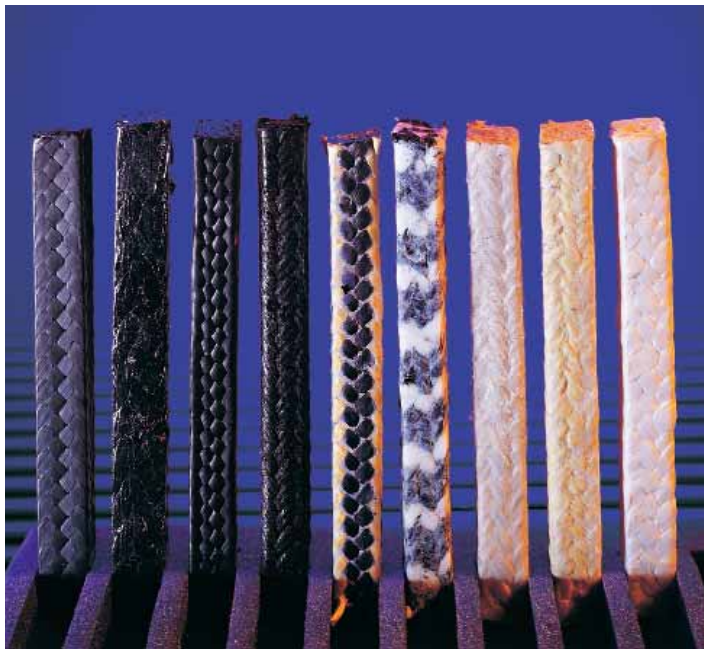




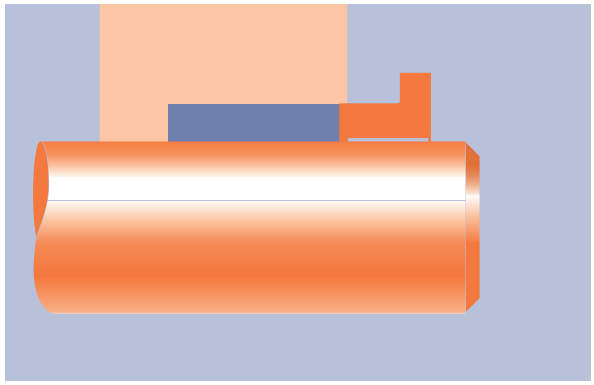
Mechanical Face Seals

We are able to supply a range of Heavy-Duty Face Seals popular with off-road crawler type machines. There are 2 versions available - the straight bore HDDF and the Caterpillar type Duo-Cone. Popular sizes are held in stock and a full range can be sourced on a short lead time.
Also available are the "general purpose" mechanical face seals commonly used in a wide range of pump applications and designs, specifically used with automotive water pumps.

Gland Packings



Soft packings or gland packings for any Pump or Valve application are available from stock. Now that ASBESTOS is considered environmentally unsound, there is a renewed interest in a vast array of packing materials.
We have the supply and support of one of the world's leading manufacturers to not only supply your current requirement but to advise on future developments in this vital industry.



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