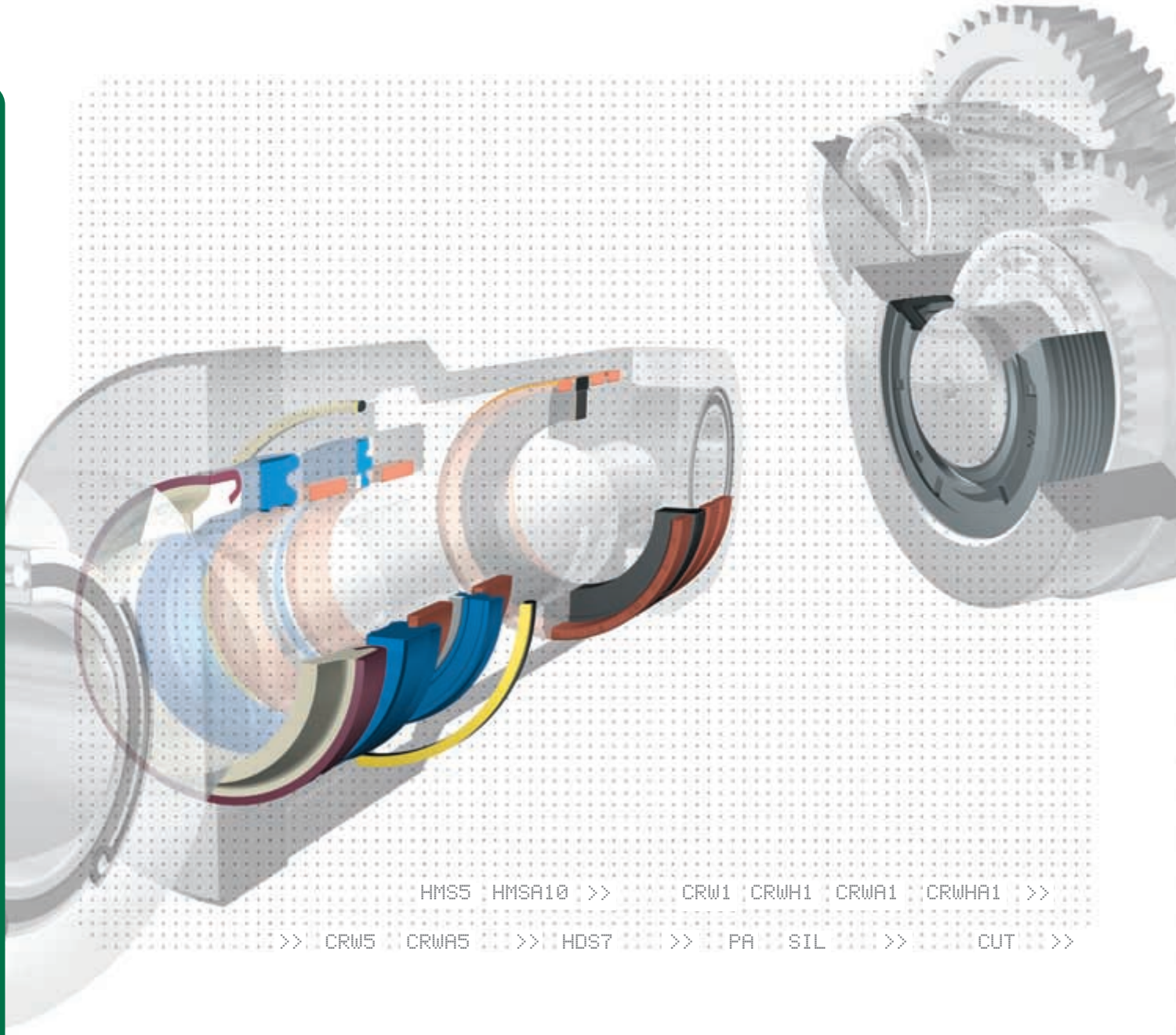
SKF

CR INDUSTRIAL SEALS

Product overview



FOREWORD


SKF – THE KNOWLEDGE ENGINEERING COMPANY

The business of the SKF Group consists of the design, manufacture and marketing of the world's leading brand of rolling bearings, with a global leadership position in complementary products such as radial shaft and hydraulic seals. SKF also holds an increasingly important position in the market for linear motion products, high precision aerospace bearings, machine tool spindles, plant maintenance services and is an established producer of high-quality bearing steel.

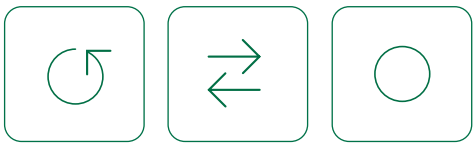
The SKF Group maintains specialized business operations to meet the needs of the global marketplace. SKF supports specific market segments with ongoing research and development efforts that have led to a growing number of innovations, new standards and new products.



The Group has a global ISO 14001 environmental certification. Individual divisions have been approved for quality certification in accordance with either ISO 9000 or QS 9000.

Some 80 manufacturing sites worldwide and sales companies in 70 countries make SKF a truly international corporation. In addition, our 7000 distributors and dealer partners around the world, the e-business marketplace and global distribution system put SKF close to customers for the supply of both products and services. In essence, SKF solutions are available wherever and whenever our customers need them. Overall, the SKF brand now stands for more than ever before. It stands for the knowledge engineering company ready to serve you with world-class product competencies, intellectual resources and the vision to help you succeed.

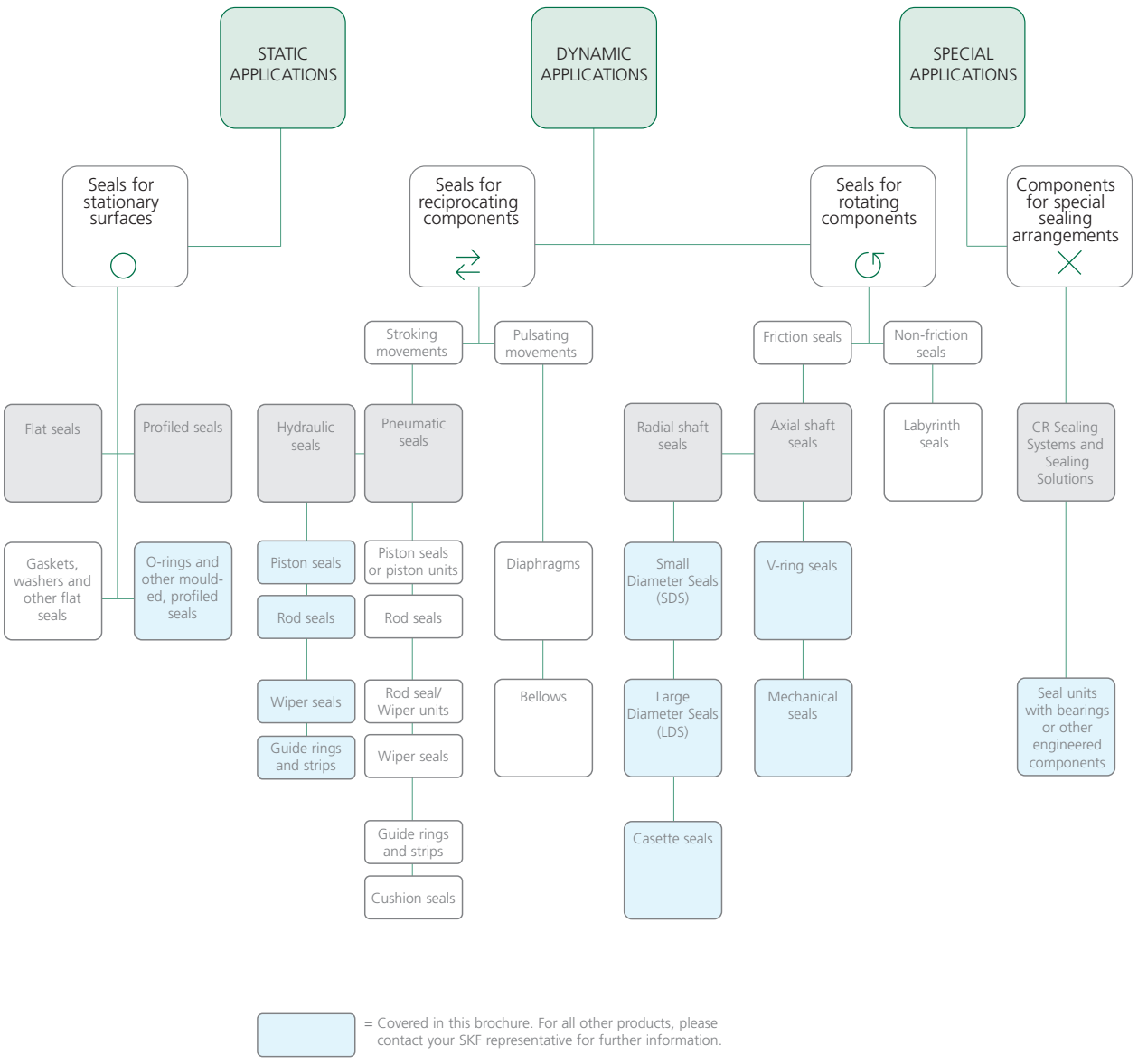

Seals and sealing technology are essential parts of the capabilities of SKF. Seals from SKF, with the product brands Chicago Rawhide and SEALPOOL, stand for excellence and leadership. These brands symbolize consistent endeavour to achieve total quality in all processes and imply three main benefits for our customers:
Reliability – thanks to modern, efficient products, based on worldwide application know-how, optimized materials, forward-looking designs and the most advanced production techniques.
Market lead – an advantage of our products and services. Our customers increase operating time, reduce down-time, and improve output and product quality.
Cost effectiveness – resulting from the favourable ratio between our product quality plus service facilities and the purchase price of the product.



This brochure is aimed to help our customers to find the single seal needed as spare part or as a suitable solution in an application requirement. It presents the SKF product range of CR Industrial Standard Seals, which are available from stock in any of the SKF distribution warehouses all over the world. Please contact your regional SKF representative for availability and delivery service.

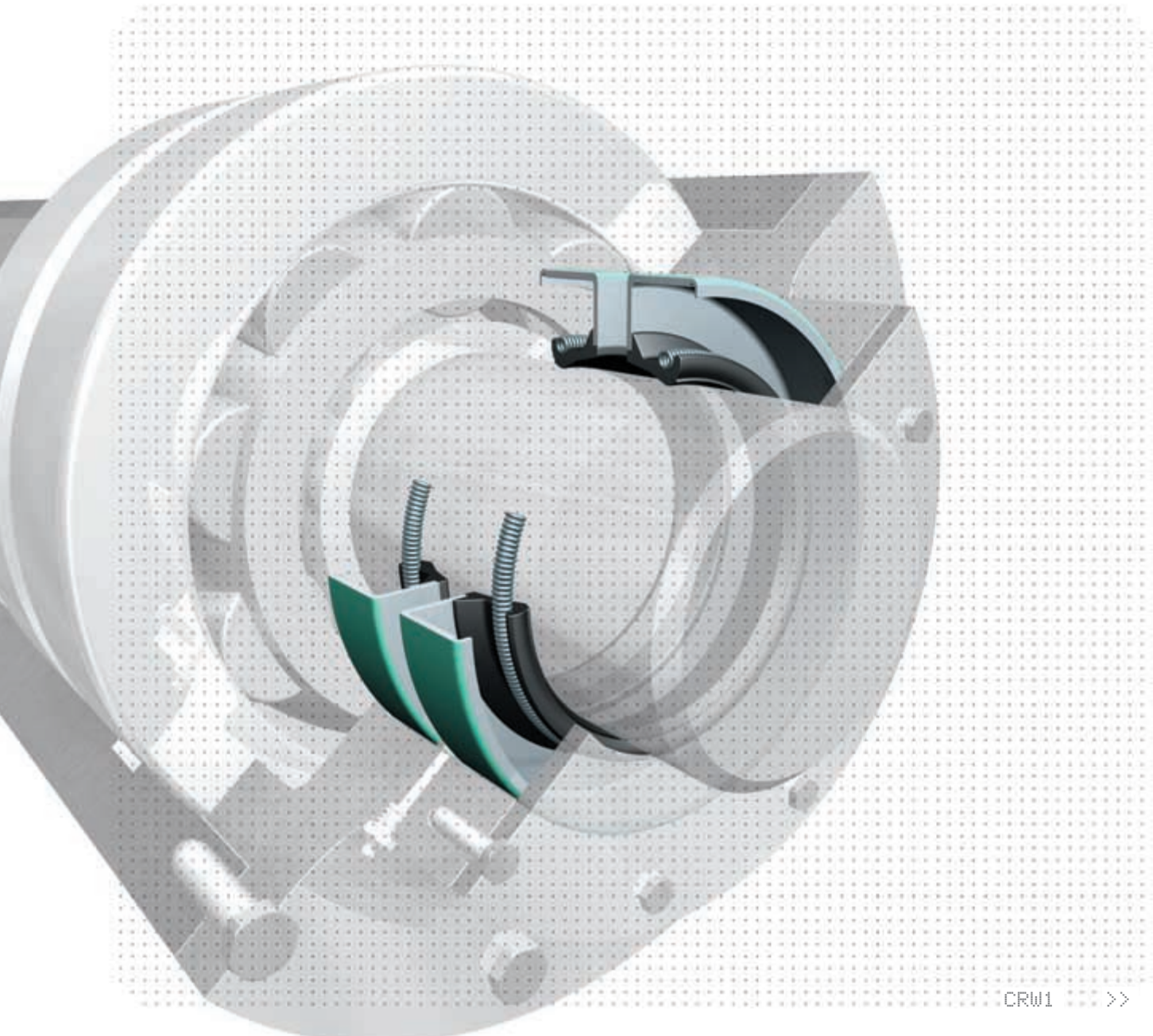
The application-orientated structure of this brochure helps you to easily identify the design, type and use of the part and inform you quickly about the basic technical data and operating conditions for a correct use. For more comprehensive technical data, please see our technical product catalogues ”CR Industrial Seals Handbook”, SKF publication 5300 and ”SEALPOOL Hydraulic Seals”, SKF publication 5397, or contact your regional SKF representative. You obtain direct technical advice and delivery service no matter where you are.

INDUSTRIAL SEALS APPLICATION AREAS

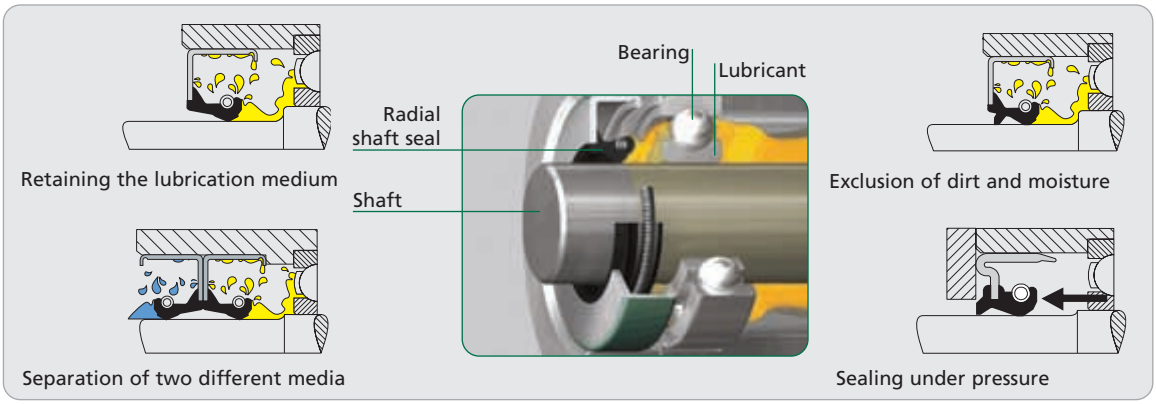


CONTENTS


CR RADIAL SHAFT SEALS



Whenever a shaft rotates, it needs a bearing arrangement for smooth and effective operation. Wherever there is a bearing, you will always find a seal helping it to reach its maximum service life and reliability. The most common types of seals, used in bearing arrangements, are radial shaft seals, in small diameter sizes (outside diameter up to 200 mm / 8 in) for general industrial requirements and the large diameter seals, LDS (larger than 200 mm / 8 in outside diameter), specially designed for heavy industry and large bearing arrangements. In general terms, a radial shaft seal is a barrier with four main functions:



In the following pages, the standard range of our CR Radial Shaft Seals is presented, with a short description of the main features for each seal type and design and recommendations regarding selection and application. Obviously, in this brochure, it is not possible to cover all the technical aspects sufficiently for all individual application requirements. Therefore, reference should be made in general to our ”CR Industrial Shaft Seals Handbook”, SKF publication 5300, where comprehensive, technical data for each type and design can be found. For information about availability and delivery time for the assortment of CR Radial Shaft Seals, please contact your nearest SKF representative or authorized distributor.

CR RADIAL SHAFT SEALS

Standard designs

THE RG SEALS FAMILY

FEATURES: New CR standard line of rubber covered radial shaft seals for the most demanding requirements in general industry. Designed according to DIN 3760/ISO 6194-1. Type HMSA10 RG with a secondary lip (”dust lip”), with zero lip/shaft interference, for protection against contamination. Spring loaded sealing lip, trimmed on the front face.

MATERIAL: Using the latest findings from the CR bearing seal material developments, this rubber compound for the range of HMS5 and HMS10 radial shaft seals has been developed for optimum use in oil lubricated applications, including synthetic oils for e.g. industrial gearboxes. Sealing lips and outside diameter: Acrylonitrile-butadiene rubber, hardness 75° Shore A, CR material code NBR 3243, with the main advantages:

- Very good oil compatibility versus synthetic oils
- Good wear resistance
- Good resistance against ageing
- Very good pumping characteristics

APPLICATIONS AND OPERATING CONDITIONS: Optimum use in bearing applications, lubricated with oil or grease in temperatures from –40°C to +100°C (104°F to 212°F), short-term up to 120°C (248°F), for synthetic lubricants max +80°C (176°F). The rubber covered outside diameter assures optimized sealing in the housing bore, even where there is considerable surface roughness, thermal expansion or split housing. Particularly suitable for sealing of low viscose lubricants or gaseous media. Surface speed: up to 14 m/s (2756 ft/min). Operating pressure: max 0,03 MPa (5 psi).

We recommend the use of seal type HMSA10 RG with a secondary lip when extra protection of the primary lip against contamination intruding is needed.

For comprehensive technical data and recommendations about machining and installation, please see our technical data sheet, SKF publication 5262 or ”CR Industrial Shaft Seals Handbook”, SKF publication 5300E, available at any SKF representative, or ask for a pdf file via cr@skf.com.

CR Radial Shaft Seals, type HMS5 RG and HMSA10 RG are stocked in a wide range of sizes, please contact your nearest SKF distributor or SKF sales representative for information about availability and delivery time.


HMS5 RG


HMSA10 RG

CR STANDARD SEALS FOR GENERAL INDUSTRIAL USE


HMS4


HMSA7

Radial shaft seals used for all industrial sectors. They are particularly suitable for split and/or light alloy housings with increased thermal expansion and/or poor surface quality of the housing bore. Advantageous for static sealing in housing against low viscosity liquid or gaseous media. The secondary lip of HMSA7 seals keeps dirt away from the sealing lip.

- HMS4: Seal with outside diameter of elastomeric material, carbon steel reinforcement ring, garter spring of carbon steel or stainless steel and conventional sealing lip.
- HMSA7: Seal with outside diameter of elastomeric material, carbon steel reinforcement ring, garter spring of carbon steel or stainless steel, conventional sealing lip and a secondary rubbing lip (”dust lip”).

CR Radial Shaft Seals, type HMS4 and HMSA7, are stocked in a wide range of sizes. Both seal designs are available in CR sealing lip material R (NBR) for general purpose and in CR lip material V (FPM) for higher operating temperature and for extended chemical resistance. Please contact us for information about availability and delivery time. For comprehensive technical data, recommendations about machining and installation and size lists, please see our catalogue ”CR Industrial Shaft Seals Handbook”, SKF publication 5300.


HMS4


HMSA7


CRS1


CRSA1


CRSH1


CRSHA1

CRS1, CRSH1, CRSA1, CRSHA1: Radial shaft seals of high stiffness particularly for difficult or rough installation and operating conditions. Limited static sealing between outside diameter and housing bore.

- CRS1: Seal with single steel shell, conventional sealing lip and carbon steel garter spring.
- CRSA1: Seal with single steel shell, conventional sealing lip, carbon steel garter spring and a secondary rubbing lip (”dust lip”).
- CRSH1: Seal with double steel shell, conventional sealing lip and carbon steel garter spring.
- CRSHA1: Seal with double steel shell, conventional sealing lip, carbon steel garter spring and secondary rubbing lip (”dust lip”).

For comprehensive technical data, recommendations about machining and installation and size lists, please see our catalogue ”CR Industrial Shaft Seals Handbook”, SKF publication 5300.

CR radial shaft seals of CRS design are stocked in a wide range of sizes. They are available in CR sealing lip material R (NBR) for general purpose and in CR lip material V (FPM) for higher operating temperature and for extended chemical resistance. Please contact us for information about availability and delivery time.


CRS1


CRSA1

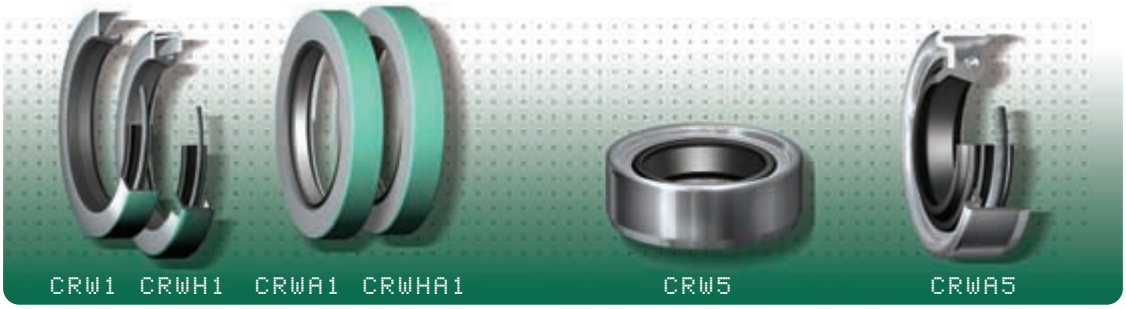

CRSH1


CRSHA1

CR RADIAL SHAFT SEALS

Standard designs

THE WAVESEAL FAMILY



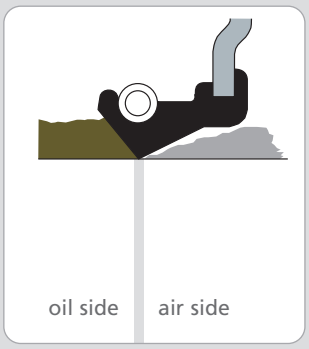
A Waveseal design from CR represents one of the most important developments in radial shaft seals.

The "conventional" sealing lip has a straight edge, whereas the edge of the CR Waveseal has a special hydrodynamic form. The Waveseal lip describes a sinusoidal, extended path on the shaft and thereby reduces the specific surface pressure in the sealing lip/shaft contact. As a consequence, CR Waveseals produce up to 20% less friction and up to 30% lower temperatures than conventional seals. These advantages also prevent the formation of deep tracks on the shaft and provide much longer service lives.

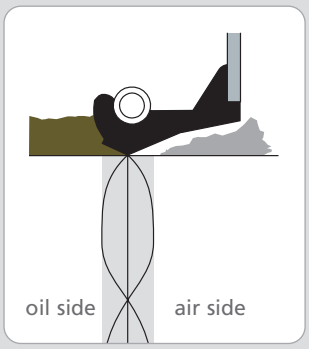
CR Waveseals are suitable for both directions of rotation; they pump the lubricant back into the bearing arrangement and expel contaminants. Their use is specially recommended where demands for operational reliability and long service life for machines and equipment are high. They are available in CR seal lip material R (NBR) for general purpose and in CR lip material V (FPM) for higher operating temperature and for extended chemical resistance.

On CR Waveseals, the secondary lip (dust lip) forms a narrow gap to the shaft and there is practically no contact. Because of this, the Waveseal with an additional dust lip can be operated at the same speeds as single-lip designs, without causing higher temperatures while providing enhanced sealing.

For comprehensive technical data and recommendations about machining and installation, please see our "CR Industrial Shaft Seals Handbook", SKF publication 5300.



Conventional sealing lip with straight edge



CR Waveseal with sinusoidal edge

FEATURES CRW1 Series: Low friction radial shaft seals with reduced heat generation for a very wide range of applications. Long-life seals for easy installation and a firm and accurate seating in the housing bore. Primarily for lubricant retention but seals of CRWA1 and CRWHA1 designs are also suitable for exclusion of dust and light contamination. CR Waveseals are coated on the outside diameter with Bore-Tite, a non-hardening, water-based polyacrylate sealant, which helps to fill out small imperfections in the housing bore.

CRW1: Seal with single steel shell, Bore-Tite coated outside diameter, hydrodynamically formed Waveseal lip and carbon steel garter spring.

CRWH1: Seal with double steel shell, Bore-Tite coated outside diameter, hydrodynamically formed Waveseal lip and carbon steel garter spring.

CRWA1: Seal with single steel shell, Bore-Tite coated outside diameter, hydrodynamically formed Waveseal lip, carbon steel garter spring and non-rubbing secondary lip.

CRWHA1: Seal with double steel shell, Bore-Tite coated outside diameter, hydrodynamically formed Waveseal lip, carbon steel garter spring and non-rubbing secondary lip.

FEATURES CRW5 Series: Radial shaft seals for applications where pressure differential across the seal is moderate. For easy installation and a firm and accurate seating in the housing bore. Primarily for lubricant retention, but the CRWA5 design will also exclude dust and light contamination. Where there is a pressure differential across the seal, the seal should be axially secured in the housing bore.

CRW5: Seal with steel shell, Bore-Tite coated outside diameter, hydrodynamically formed Waveseal lip and carbon steel garter spring.

CRWA5: Seal with steel shell, Bore-Tite coated outside diameter, hydrodynamically formed Waveseal lip, carbon steel garter spring and non-rubbing secondary lip.

CR Waveseals, CRW1 range, are stocked in a wide range of sizes. CR Waveseals, type CRW5, are only partially available from stock. Please contact us for information about availability and delivery time. For comprehensive technical data, recommendations about machining and installation and size lists please see our catalogue "CR Industrial Shaft Seals Handbook", SKF publication 5300.


CRW1


CRWH1


CRWA1


CRWHA1


CRW5


CRWA5

CR RADIAL SHAFT SEALS

PTFE Seals

THE CR RD SEALS FAMILY

RD10

RD11

CR RADIAL SHAFT SEALS OF PTFE WITH METAL CASE, SERIES RD

Radial shaft seals with one or more metal shells and sealing lip(s) of PTFE. They are designed to withstand e.g. aggressive environments, high temperatures, high pressures and non-lubricated services. For assembling in existing housings where traditional radial seals are used, provided that they are produced in accordance with DIN 3760/ISO 6194-1.

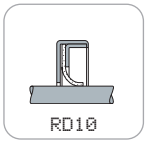
MATERIAL: Metal case in steel, aluminium or stainless steel, sealing lip in optional FDA approved PTFE materials, depending on each specific demand.

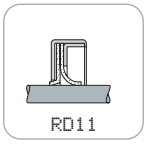
RD30

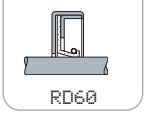
RD60

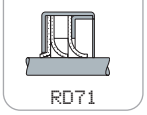
RD70

RD71





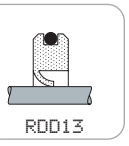




RDD13

CR RADIAL SHAFT SEALS OF PTFE WITHOUT METAL CASE, SERIES RDD

Radial shaft seals can also be produced purely of PTFE without a metal case. These are used e.g. in the food industry to enable dismounting of the equipment for cleaning. Radial shaft seals of PTFE are also appropriate in applications in aggressive environments or with temperatures below –20°C (–4°F). Type RDD without metal case has the same housing dimensions and the same technical specifications as type RD with a metal case.

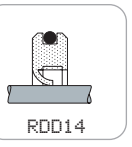


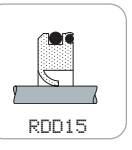
RDD14

RDD15

CR Radial Shaft Seals of PTFE, designs RD and RDD, can be delivered with short notice. Please ask your nearest SKF representative for availability and delivery time.

For comprehensive technical data and recommendations about machining and installation, please see our "CR Industrial Shaft Seals Handbook", SKF publication 5300.





CR RADIAL SHAFT SEALS

Sealing lip materials, overview

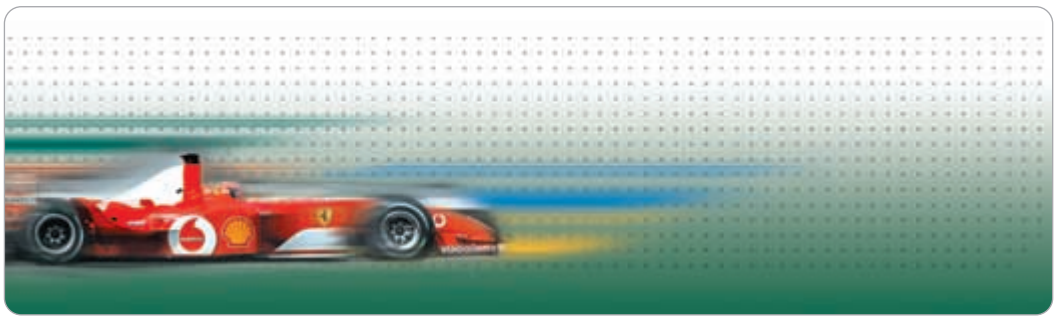
In addition to seal design, the sealing lip material significantly contributes to seal performance and reliability. To cater for the different demands of applications, CR seals are produced in a variety of sealing lip materials, see list below. These materials have characteristics, individual properties, making them particularly suitable for specific applications.

Details about physical properties and the chemical resistance of the seal materials to various media encountered in operation will be found in the section "Chemical resistance" in our CR Industrial Shaft Seals Handbook", SKF publication 5300.

A code is used to identify the material of the sealing lip of CR seals, see table below. The codes also appear in the designations of the radial shaft seals. For seals produced in a combination of materials, a combination of the code letters is used, e.g. RV (nitrile rubber with fluoro rubber).

CR SEALING LIP MATERIALS

COMPOSITION OF BASIC MATERIAL	DESIGNATION ACCORDING TO			PERMISSIBLE OPERATING TEMPERATURE RANGE
	CR	ISO1629 ISO1043.1 DIN 7728 PART 1	ASTM D1418 ASTM D1600	
Acrylonitrile butadiene rubber (nitrile rubber)	R (RG)	NBR	NBR	–50 to +100°C (–58 to +212°F)
Hydrogenated acrylonitrile butadiene rubber (Duratemp)	H	HNBR	NEM	–30 to +150°C (–22 to +302°F)
Carboxylated nitrile rubber (Duralip)	D	X-NBR	X-NBR	–50 to +100°C (–58 to +212°F)
Fluoro rubber (LongLife)	V	FPM	FKM	–40 to +200°C (–40 to +392°F)
Polytetrafluoro-ethylene (PTFE)	T	PTFE	PTFE	–70 to +260°C (–94 to +500°F)



CR RADIAL SHAFT SEALS

Standard designs, selection factor matrix

THIS MATRIX CAN ONLY PROVIDE A ROUGH GUIDE AND THE FINAL SEAL SELECTION SHOULD ONLY BE MADE AFTER A MORE DETAILED EXAMINATION OF SEALING PROPERTIES WITH RESPECT TO THE ACTUAL OPERATING CONDITIONS AND ENVIRONMENT. IF SEVERAL SEAL DESIGNS AND MATERIALS ARE SHOWN TOGETHER THEN THE RATINGS APPLY TO THE SPECIFIED DESIGN/MATERIAL.

SIGNS AND SYMBOLS

+++	VERY WELL SUITED (VERY GOOD)	R	NITRILE RUBBER
++	WELL SUITED (GOOD)	V	FLUORO RUBBER
+	SUITABLE (NORMAL)		
–	LESS SUITABLE (SATISFACTORY)		
– –	UNSUITABLE (POOR)		

SEALS TYPES						DESIGN				
						SHELL (OUTSIDE DIAMETER)		SEALING LIP		SECONDARY LIP
						STEEL	ELASTOMER (PLASTOMER)	DESIGN	MATERIAL	A = RUBBING B = NON-RUBBING
HMS5		HMSA10				–	R,V	normal	R,V	B (HMSA10)
HMS4		HMSA7				–	R,V	normal	R,V	A (HMSA7)
CRW1		CRWH1				+ Bore-Tite	–	Wave-seal	R,V	–
CRWA1		CRWHA1				+ Bore-Tite	–	Wave-seal	R,V	–
CRW5		CRWA5				+ Bore-Tite	–	Wave-seal	R,V	B (CRWA5)
CRS1		CRSH1				+	–	normal	R,V	–
CRSA1		CRSHA1				+	–	normal	R,V	A
RD10		RD30		RD60		+	–	special	PTFE	–
RD11		RD70		RD71		+	–	special	PTFE	RD11, RD71
RDD13		RDD14		RDD15		–	PTFE	special	PTFE	–

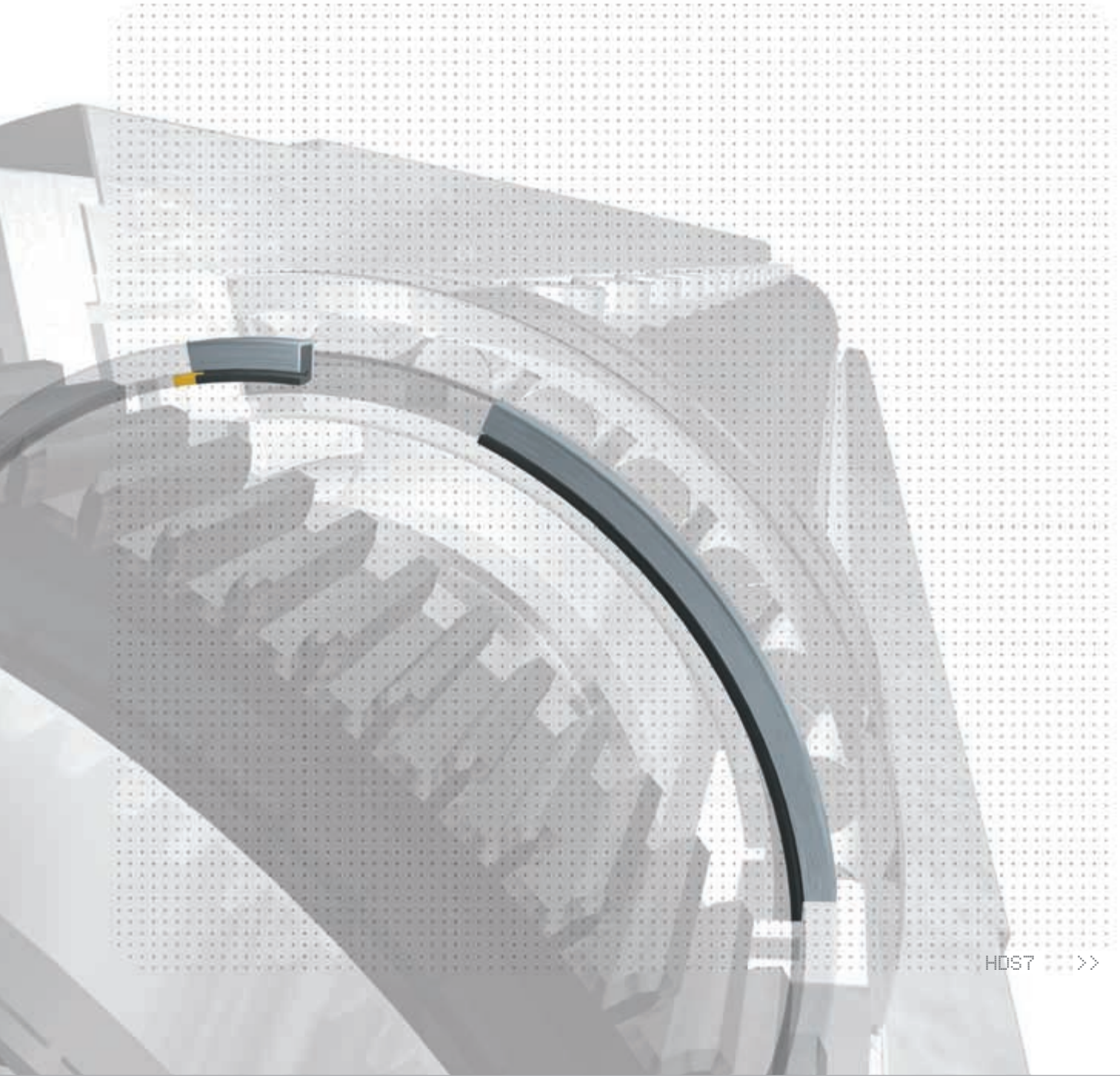
SUITABILITY

SEATING CONDITIONS					PRESSURE DIFFERENTIAL		OPERATING CONDITIONS						MEDIA				
TIGHT FIT	ROUGH SURFACE	THERMAL EXPANSION	SPLIT HOUSING BORE	EASE OF INSTALLATION	HOUSING BORE/ OUTSIDE DIAMETER	SEALING LIP/ COUNTERFACE	SLIDING SPEEDS < 14 m/s (< 2756 ft/min)	SLIDING SPEEDS > 14 m/s (> 2756 ft/min)	TEMPERATURES < 100 °C (< 212 °F)	TEMPERATURES > 100 °C (> 212 °F)	RUNOUT	COAXIALITY DEVIATION	GREASE	OIL	MODERATE PARTICULATE CONTAMINATION	MEDIA	HEAVY PARTICULATE CONTAMINATION
+++	+++	+++	+++	++	++	+	+	–	+	V	+	+	+++	+++	+++ HMSA10	++ (V)	+++
++	++	++	++	+	++	+	+	–	+	V	+	+	++	+++	++ HMSA7	++ (V)	+
+++ CRWH	+	–	– –	+	++	+++	++	+	+	V	+	+	++	+++	+	++ (V)	+
+++ CRWHA	+	–	– –	+	++	+++	++	+	+	V	+	+	++	+++	++	++ (V)	+
++	+	–	– –	+	++	+++	++	+	+	V	+	+	++	+++	+	++ (V)	+
+++ CRSH	–	–	– –	+	+	–	+	–	+	V	+	+	+	++	+	++ (V)	+
+++ CRSHA	–	–	– –	+	+	–	+	–	+	V	+	+	+	++	++	++ (V)	+
++	–	–	–	+	++	+++	+++	+++	+++	+++	+	+	+++	+++	–	+++	+++
++	–	–	–	+	++	+++	+++	+++	+++	+++	+	+	+++	+++	RD11 RD71	+++	+++
++ 1)	++ 1)	++ 1)	–	–	++	+++	+++	+++	+++	+++	+	+	+++	+++	–	+++	+++

1) together with a separate static seal

CR RADIAL SHAFT SEALS

Large diameter seals




A WIDE RANGE OF SEALING SOLUTIONS FOR HEAVY INDUSTRY

Heavy basic industries such as primary metals, construction, wind energy, forestry, mining and pulp & paper, provide a challenging environment for radial shaft seals. Operating in a wide range of speeds, temperatures, and environmental conditions, shaft seals are asked to reliably retain lubrication while avoiding harsh contamination from penetrating and potentially damaging capital equipment. Generally, CR Radial Shaft Seals for shaft diameters larger than 200 mm or 8 in are known as large diameter seals (LDS).

CR LDS are available from SKF in a variety of heavy-duty styles, configurations and materials:
- HD Metal Clad Designs, including the HDL ultra-high performance series
- the technologically advanced HDS7 (EP-2000) grease seal
- other types of the high-performing HDS series;
- all-rubber seals like the premium SBF seal
- the HSF fabric reinforced series, solid or split.

As a general recommendation, these different CR LDS designs are suitable in applications as follows:

APPLICATIONS	SOME ROLLING MILLS WIRE & BAR GENERAL MACHINERY INDUSTRIAL GEARBOXES	SOME ROLLING MILLS HOT STRIP MILLS COLD ROLLED PLATE MILLS INDUSTRIAL GEARBOXES	INDUSTRIAL GEARBOXES GENERAL MACHINERY ROLLING MILLS	SPECIAL MACHINERY: CRUSHERS, SHREDDERS, BAILERS, ETC.
	General Purpose	Grease, Water / Scale exclusion	Oil, high speed (>25 m/s, 4291 ft/min)	High DRO and STBM levels
HDS1,2,3	③	2	x	x
HDS7 (EP-2000)	x	③	x	x
HDL	2	1	③	③
HDS4, HDS6	2	2	③	2
SBF, HSF	③	1	x	x

1–Good solution, 2–Better solution, ③–Best solution, x–Not recommended

CR RADIAL SHAFT SEALS

Large diameter seals

THE CR METAL CLAD SEALS FAMILY

CR has developed the HDS7 as a grease seal with enhanced exclusion capabilities. It has a computer optimized, spring-less lip profile designed to retain lubricants and aggressively pump contamination away from the lip. The increased ability of the HDS7 to exclude contamination makes it an ideal equipment protector in heavily contaminated environments, such as the water and scale present in rolling mill applications. The spring-less lip concept of the HDS7 also reduces radial load. The HDS7 is available in a nitrile lip material for common applications, Duratemp for higher temperature conditions, and Duralip for applications where extra abrasion resistance is necessary. Short information about recommended operating conditions is shown in the table on page 24-25 in this brochure. For comprehensive technical data, recommendations about machining and installation as well as for information about available sizes, please see our technical brochure "CR Large Diameter Seals", SKF publication 5399.

The CR HDL seal is a premium metal clad oil seal that is especially designed to operate in severe conditions including high speeds and temperatures, high run-out, and high misalignment. Type HDLP has a non-frictional secondary sealing lip against contamination. The CR HDL seals have a stainless steel garter spring that is entrapped by individual finger springs, also made of stainless steel, around the entire circumference of the seal. This spring combination allows the seal to compensate for severe conditions in order to maintain high levels of sealing performance, operational life, and equipment reliability. The HDL is available with sealing lip in nitrile rubber, Duratemp and LongLife. Short information about recommended operating conditions for the CR HDL series is shown in the table on page 24–25. For comprehensive technical data, recommendations about machining and installation as well as for information about available sizes, please see our technical brochure "CR Large Diameter Seals", SKF publication 5399.

HDS1

HDS2

HDS3

HDS1, HDS2, AND HDS3: The most commonly used metal clad seals for general purpose applications. All three seal versions are encased in a heavy-duty steel shell and a stainless steel spring is standard.

The basic HDS1 has its stainless steel spring mounted in a protective Spring-Lock groove.

Where blind installations may increase the risk of spring displacement, the type HDS2 adds a Spring-Kover that bonds the spring to the groove.

The HDS3 adds a spark-free inner diameter, standard Duralip material and adjustable spacer lugs. The adjustable lugs are optional on all other HDS models, which are fixed with lugs.

Nitrile rubber is standard on all HDS seals (with the exception of the HDS3 where Duralip is standard), however all seal types can also be ordered in Duralip, Duratemp or LongLife elastomers.

Short information about recommended operating conditions is shown in the table page 24-25 in this brochure, for comprehensive technical data and recommendations on machining and installation, please see our "CR Industrial Shaft Seals Handbook", SKF publication 5300, or our technical brochure "CR Large Diameter Seals", SKF publication 5399.

The HDS seal product line is available in a wide variety of rubber materials in all sizes ranging from 200 to 1575 mm (8 to 62 in).

HDS1

HDS2

HDS3

CR RADIAL SHAFT SEALS

Large diameter seals

THE CR METAL CLAD SEALS FAMILY


HDSA2


HDSA1

HDSA, HDSB, HDSC: These seals are designed with a single rubber sealing element and an auxiliary exclusion element and are generally used where there is insufficient space for more than one seal. For shaft sizes up to 550 mm (21.750 in), the excluder lip is made of Duralip material. Leather is used for larger shafts.

Short information about recommended operating conditions is shown in the table on page 24–25 in this brochure. For comprehensive technical data, size list and recommendations about machining and installation, please see our technical brochure "CR Large Diameter Seals", SKF publication 5399.


HDSA2


HDSA1


HDSB2


HDSB1


HDSC2


HDSC1


HDSB1


HDSB2


HDSC2


HDSC1


HDSE2


HDSE1


HDSD2


HDSD1

HDSE: This style features dual elements with lips facing the same direction. This seal type is used where a back-up seal is desired for retention or exclusion purposes.

HDSD: The HDSD seal types are designed with dual sealing elements with lips facing opposite directions. This style is used for applications requiring the separation of two fluids.

When using an HDSD or an HDSE seal, it is very important to provide means to lubricate the sealing elements (i.e. the cavity between the sealing elements may be packed with grease or holes may be drilled from the outside diameter into the cavity between the lips).

Short information about recommended operating conditions is shown in the table on page 24–25 in this brochure. For comprehensive technical data, size list and recommendations about machining and installation, please see our technical brochure "CR Large Diameter Seals", SKF publication 5399.


HDSE2


HDSE1


HDSD1


HDSD2

THE CR ALL-RUBBER SOLID SEAL TYPES

SBF

SBF: The SBF seal design is a new rubber outside diameter seal with a flexible metal stiffening ring that allows mounting without the use of a cover plate. The SBF seal can be used as an upgrade to rubber fabric seals in many applications either they are grease or oil lubricated.

The SBF seals are available in both NBR and LongLife (FKM) materials with optional Spring-Kover. Please contact us for information about delivery time.

Short information about recommended operating conditions is shown in the table on page 24–25 in this brochure. For comprehensive technical data, size list and recommendations about machining and installation, please see our "CR Industrial Shaft Seals Handbook", SKF publication 5300, or our technical brochure "CR Large Diameter Seals", SKF publication 5399.

SBF

HDS4

HDS6

The CR family of all-rubber seals includes metal inserted (HDS4, HDS6 and SBF), fabric-reinforced (HSF) and all-rubber (HS) products. The fabric-reinforced and all-rubber versions are available as solid round or with an open joint or split.

HDS4 and HDS6: The HDS4 features a patented moulded-in garter spring which cannot be displaced during difficult installations and provides superior oil sealing ability while minimizing wear.

The HDS6 is a springless version designed for grease retention and contamination exclusion. Nitrile rubber is standard and can be ordered in the full range of CR LDS rubber compounds.

Both HDS4 and HDS6 are equipped with moulded 12,7 mm (0.5 in) spacer lugs which can be trimmed or removed if necessary.

The HDS4 and HDS6 are stocked in a limited range of sizes; please contact us for information on availability.

Short information about recommended operating conditions is shown in the table on page 24–25 in this brochure. For comprehensive technical data, size list and recommendations about machining and installation, please see our "CR Industrial Shaft Seals Handbook", SKF publication 5300, or our technical brochure "CR Large Diameter Seals", SKF publication 5399.

HDS4

HDS6

CR RADIAL SHAFT SEALS

Large diameter seals

THE CR ALL-RUBBER HS SOLID AND SPLIT SEAL TYPES

HS5

HS3

HS4

HS6

HS7

HS8

HS9

HS solid seals can be made as standard types from 203 mm (8 in) up to unlimited shaft size.

HS3 seals are all-rubber solid seals with a single spring-loaded element. The spring is held in an open groove; Spring-Kover is not available. HS3 is recommended for vertical and horizontal shafts. For proper fit, a cover plate is required.

The HS4 seal is an all-rubber solid seal with a single spring-loaded element. It features a Spring-Lock and is recommended for vertical and horizontal shafts. For proper fit, a cover plate is required. HS5 is the same as HS4 with the addition of a Spring-Kover for added protection against spring pop out and contamination.

HS split types: Where downtime is critical and shaft removal is impractical, type HS all-rubber split seals are ideal. They are simply placed around the shaft and pushed into the housing bore, then held firmly by a cover plate, which compresses the split joint together. HS split seals perform best with grease or heavy lubricants as well as with light lubricants, placed no higher than the shaft centreline.

HS7 is an all-rubber split seal with a single spring-loaded element, which has both Spring-Lock and Spring-Kover. HS7 does not have the high performance as other HS types, but it is the easiest one to install. For proper fit, a cover plate is required.

HS8 is an all-rubber split seal with a single spring-loaded element, Spring-Lock, Spring-Kover and a positive spring connection. The spring is entirely enclosed except for a small portion on either side of the split. HS8 provides the most positive sealing of all the split types and is the preferred design for use with lighter lubricant retention and water exclusion. HS8 performs best on horizontal shafts, but may also be used on vertical shafts. For proper fit, a cover plate is required.

HS9 is the split version of HS3. HS9 is not available with Spring-Kover. It is recommended for grease retention on horizontal shafts. For proper fit, a cover plate is required. The HS9 has limited size availability. For new applications, HS8 is recommended.

Short information about recommended operating conditions for the CR All-Rubber Seal Family is shown in the table, page 26-27 of this brochure. For comprehensive technical data and recommendations about machining and installation, please see our technical brochure ”CR Large Diameter Seals”, SKF publication 5399. HS all-rubber seals are made to order, please contact your local SKF Distributor or SKF representative for information about shortest delivery time.

HS3

HS4

HS5

HS6

HS7

HS8

HS9

FABRIC-REINFORCED SEALS, SERIES HSF


HSF1


HSF2


HSF3


HSF4

The HSF seal types consist of the HSF5, HSF6, HSF7 and HSF8 solid seal styles and their split versions HSF1, HSF2, HSF3 and HSF4. There is also a pressure profile HSF9 in solid version only. These seal styles are mainly used in heavy-duty applications such as: gear drives, propeller shafts, cold and hot mill-work rolls, pumps, paper machinery, etc.

The HSF5, HSF6 and HSF7 are fabric-reinforced seals with a strong, flexible, textile rubber back instead of a metal case.

The HSF5 is the standard, single-lip, rubber-fabric seal. The HSF6 adds radial lubrication grooves in the back of the seal and the HSF7 adds a circumferential lubrication groove.

The HSF8 offers a dust-lip version of the standard seal.

To attain optimum sealing performance, a retaining or cover plate is necessary to properly install and apply all HSF seal types. The plate creates an axial preload that ensures reliable static sealing performance of the seal. The plate should also be designed to avoid seal distortion upon assembly.

Short information about recommended operating conditions for the CR All-Rubber Seal Family is shown in the table, page 26–27 of this brochure. For comprehensive technical data and recommendations about machining and installation, please see our ”CR Industrial Shaft Seals Handbook”, SKF publication 5300, or our technical brochure ”CR Large Diameter Seals”, SKF publication 5399. This literature is available at any SKF representative.

HSF all-rubber seals are made to order in NBR and FKM material. Please contact your local SKF Distributor or SKF representative for information about shortest delivery time.


HSF5


HSF6


HSF7


HSF8


HSF9


HSF1


HSF2


HSF3


HSF4


HSF5


HSF6


HSF7


HSF8


HSF9

CR RADIAL SHAFT SEALS

Large diameter seals, recommended operating conditions

STANDARD DESIGN (PREFERRED DESIGN)	OTHER BASIC LINE DESIGNS	LIP CODE	OPERATING TEMPERATURE RANGE	
			°C	°F
 HDS7	 HDS6  HDS4	R D H	–40 to +121 –54 to +107 –40 to +149	–40 to +250 –65 to +225 –40 to +300
 HDL	 HDLA	R H V	–40 to +121 –54 to +107 –40 to +204	–40 to +250 –65 to +225 –40 to +400
 SBF		R V	–40 to +121 –40 to +204	–40 to +250 –40 to +400
 HDS2	 HDS1  HDS3	R D H V	–40 to +121 –54 to +107 –40 to +149 –40 to +204	–40 to +250 –65 to +225 –40 to +300 –40 to +400
 HDSA2	 HDSA1  HDSB2  HDSB1  HDSC2  HDSC1	R D H V	–40 to +121 –54 to +107 –40 to +149 –40 to +204	–40 to +250 –65 to +225 –40 to +300 –40 to +400
 HDSE2	 HDSE1  HDSD2  HDSD1	R D H V	–40 to +121 –54 to +107 –40 to +149 –40 to +204	–40 to +250 –65 to +225 –40 to +300 –40 to +400

	PRESSURE TOLERANCE MPa (psi)	SHAFT TO BORE MISALIGNMENT (STBM) mm (in)	MAXIMUM SHAFT DYNAMIC RUN-OUT (DRO) mm (in TIR)	MAXIMUM SHAFT SURFACE SPEED m/s (ft/min)	EASE OF INSTALLATION	ABILITY TO SEAL LIGHT LUBES AND EXCL. WATER
	0,07 to 0,103 (10 to 15)	1,57 (0.062)	2,36 (0.093)	25,4 (>5000) depending on operating conditions	Excellent	Highly effective exclusion of water and particle contamination and excellent retention of grease.
	0,07 to 0,103 (10 to 15)	2,5 (0.098)	2,36 (0.093)	25,4 (>5000) nitrile and Duratemp rubber 35,5 (>7000) LongLife rubber	Good	Excellent, including retention of light oils at high surface speeds and misalignment.
	0,07 to 0,103 (10 to 15)	1,5 (0.060)	2,36 (0.093)	25,4 (>5000)	Excellent	Excellent for oil or grease.
	0,07 to 0,103 (10 to 15)	1,57 (0.062)	2,36 (0.093)	25,4 (>5000)	Excellent (HDS2, HDS3) Good (HDS1)	Excellent for oil or grease.
	0,07 to 0,103 (10 to 15)	1,57 (0.062)	2,36 (0.093)	25,4 (>5000)	Excellent to good, varies with equipment design.	Excellent for oil or grease with exclusion of light to moderate contamination (HDSA/B). Good grease retention with increased protection from contamination (HDSC).
	0,07 to 0,103 (10 to 15)	1,57 (0.062)	2,36 (0.093)	25,4 (>5000)	Excellent (HDSD, HDSE2) Good (HDSD, HDSE1)	Excellent for oil or grease with exclusion of light to moderate contamination (HDSD) or separation of dual media. Good grease retention with increased protection from contamination (HDSE).

CR RADIAL SHAFT SEALS

Large diameter seals, recommended operating conditions

STANDARD DESIGN (PREFERRED DESIGN)	OTHER BASIC LINE DESIGNS	LIP CODE	OPERATING TEMPERATURE RANGE	
			°C	°F
 HS solid HS5	 HS3 HS4	R D H V	–40 to +121 –54 to +107 –40 to +149 –40 to +204	–40 to +250 –65 to +225 –40 to +300 –40 to +400
 HS split HS6	 HS9	R D H V	–40 to +121 –54 to +107 –40 to +149 –40 to +204	–40 to +250 –65 to +225 –40 to +300 –40 to +400
 HS7 HS8				
 HSF Solid HSF5	 HSF6 HSF7 HSF8 HSF9	R V	–40 to +121 –40 to +204	–40 to +250 –40 to +400
 HSF split HSF1	 HSF2 HSF3 HSF4	R V	–40 to +121 –40 to +204	–40 to +250 –40 to +400

	PRESSURE TOLERANCE MPa (psi)	SHAFT TO BORE MISALIGNMENT (STBM) mm (in)	MAXIMUM SHAFT DYNAMIC RUN-OUT (DRO) mm (in TIR)	MAXIMUM SHAFT SURFACE SPEED m/s (ft/min)	EASE OF INSTALLATION	ABILITY TO SEAL LIGHT LUBES AND EXCL. WATER
	HS4+HS5 0,07–0,103 (10–15) HS3 0,3 (5)	1,57 (0.062)	2,36 (0.093)	HS3 10,2 (2 000) HS4 15,2 (3 000) HS5 12,7 (2 500)	Excellent (HS4, HS5) Good (HS3)	Excellent (HS4, HS5) Good (HS3)
	Not recommended	1,57 (0.062)	2,36 (0.093)	HS6 10,2 (2 000) HS7 7,62 (1 500) HS8 10,2 (2 000) HS8 7,62 (1 500)	Fair (HS6, HS9) Excellent (HS7) Good (HS8)	Good to excellent for oil or grease (HS6, HS8) Good (grease only HS7) Fair to good (HS9)
	0,03 (5)	1,5 (0.060)	2,36 (0.093)	15,2 (>3 000) depending on the operating conditions	Good to excellent depending on mounting space	Excellent
	Not recommended	1,5 (0.060)	2,36 (0.093)	15,2 (>3 000) depending on the operating conditions	Fair to good depending on mounting space	Good to excellent

CR RADIAL SHAFT SEALS

Cassette seals and shaft sealing units

THE CR MUD BLOCK FAMILY

MUD1

MUD2

A new generation of oil and grease seals specifically for heavy-duty applications, where environmental and operating conditions are harsh.
In the Mud Block series, the geometry of the seal design has been altered to provide the optimum protection against water and mud ingress. Full rubber outside diameter designs can be provided with or without a flange, and the outside diameter can be fabricated half in rubber and half in metal.

The inner radial lip can be varied to offer oil or grease sealing. Mud Blocks can be fabricated in a variety of elastomeric materials, depending on each application's particular operating condition. The range of materials includes nitrile, polyacrylate and fluorinated elastomeric compounds.

The seals are tailored to the customer's requirements for assembly.

For comprehensive technical data, designs and size range and information about availability, please contact your SKF sales representative.

MUD3

MUD4

MUD5

MUD6

MUD7

MUD1

MUD2

MUD3

MUD4

MUD5

MUD6

MUD7

THE CR SCOTSEAL FAMILY

SCOTSEAL CLASSIC

Unitized shaft seals for one piece installation. For oil bath sealing and dirt exclusion in hub bearing arrangements, mainly on axels for commercial and off-road vehicles, gearboxes and differentials.

Three different executions:

CR Scotseal Classic: Unitized, one piece design, three sealing lips of nitrile rubber, metallic shell with Bore-Tite coating on the outer diameter. Proven and economical solution in heavy-duty applications.

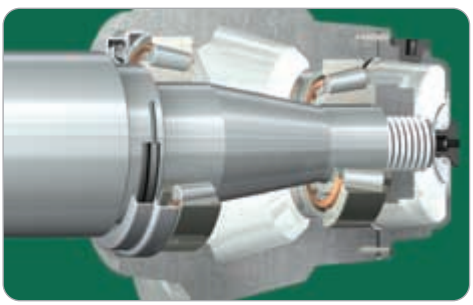
CR Scotseal Longlife: Unitized, one piece design with four sealing lips of hydrogenated nitrile rubber, metallic shell with Bore-Tite coating on the outer diameter. Abrasive resistant, usable in high temperatures and in synthetic lubricants.

CR Scotseal Plus XL: The most advanced design in the CR Scotseal Family. Unitized, one piece design with four sealing lips and a cover of hydrogenated nitrile rubber, abrasive resistant, usable in higher temperatures and in synthetic lubricants. Easy mounting, no installation tool required.

For comprehensive technical data, and size range and information about availability (delivery from stock), please contact your SKF sales representative.

SCOTSEAL LONGLIFE

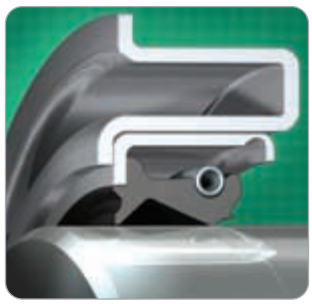
SCOTSEAL PLUS XL

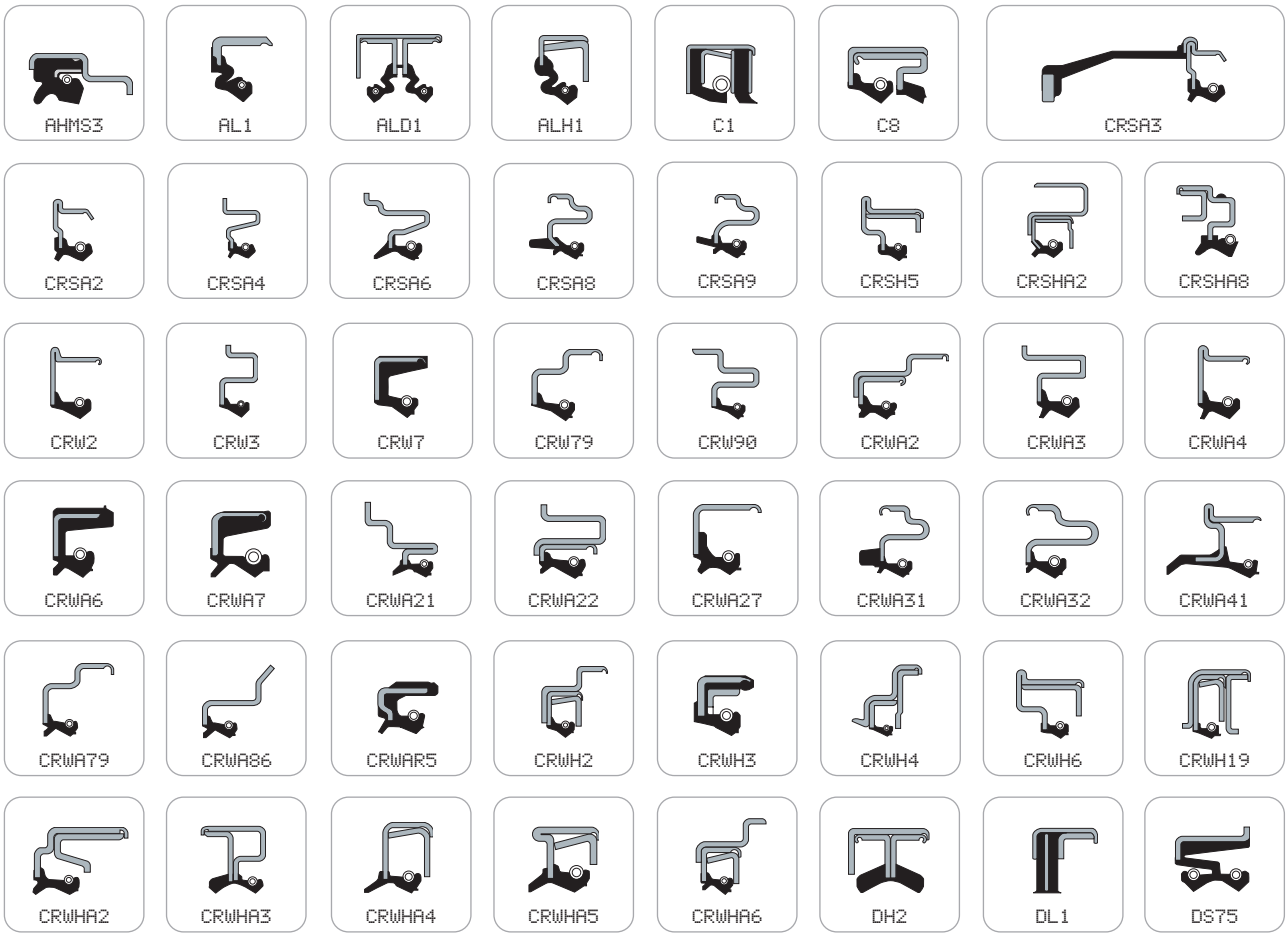


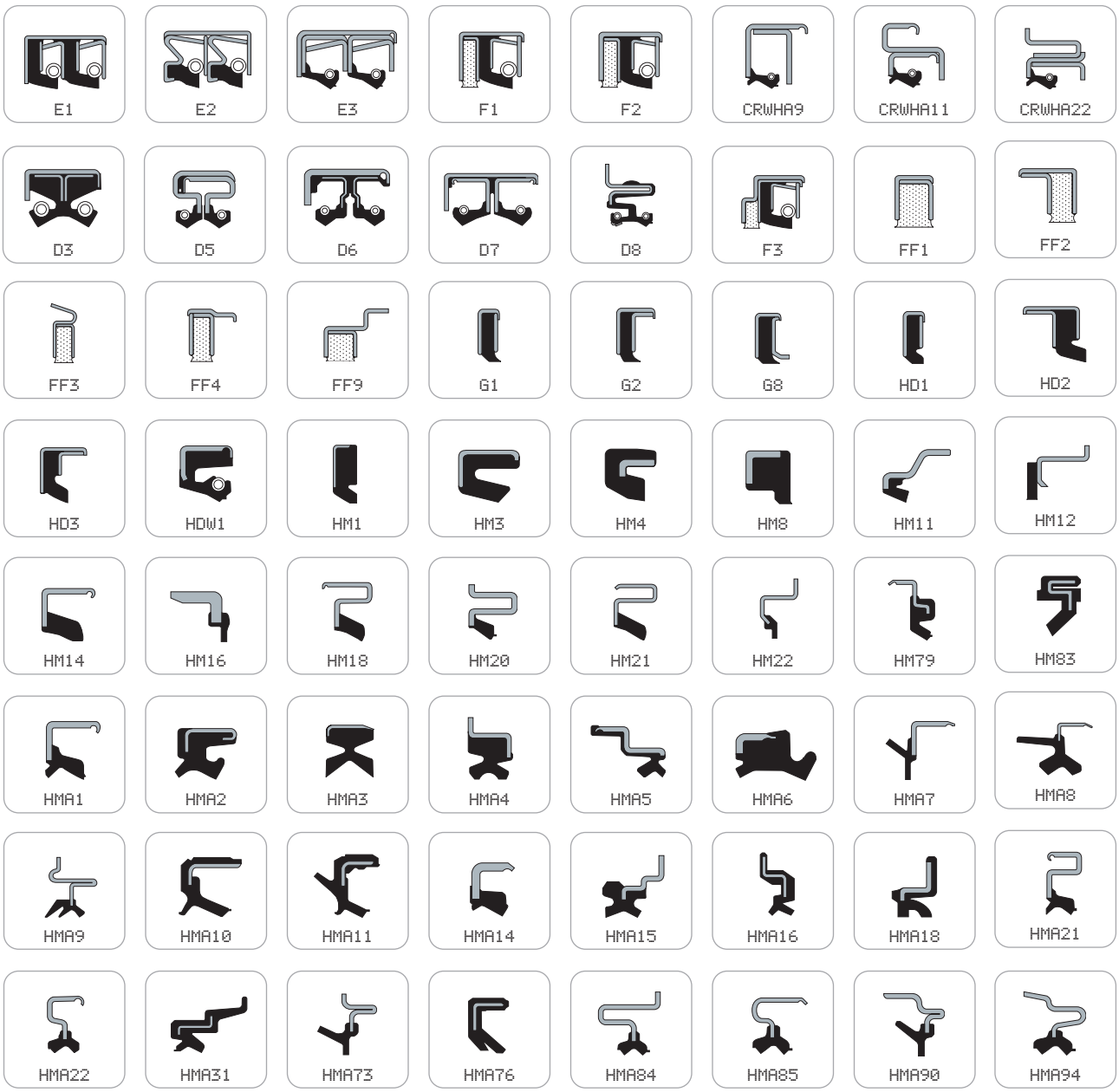
CR RADIAL SHAFT SEALS

Other popular CR designs

CR produces a large range of radial shaft seals in special designs. This is a selection of profiles in this range, applied in general industry worldwide. In case of demand for any of these designs, your SKF sales representative can give you more information about technical data and availability.



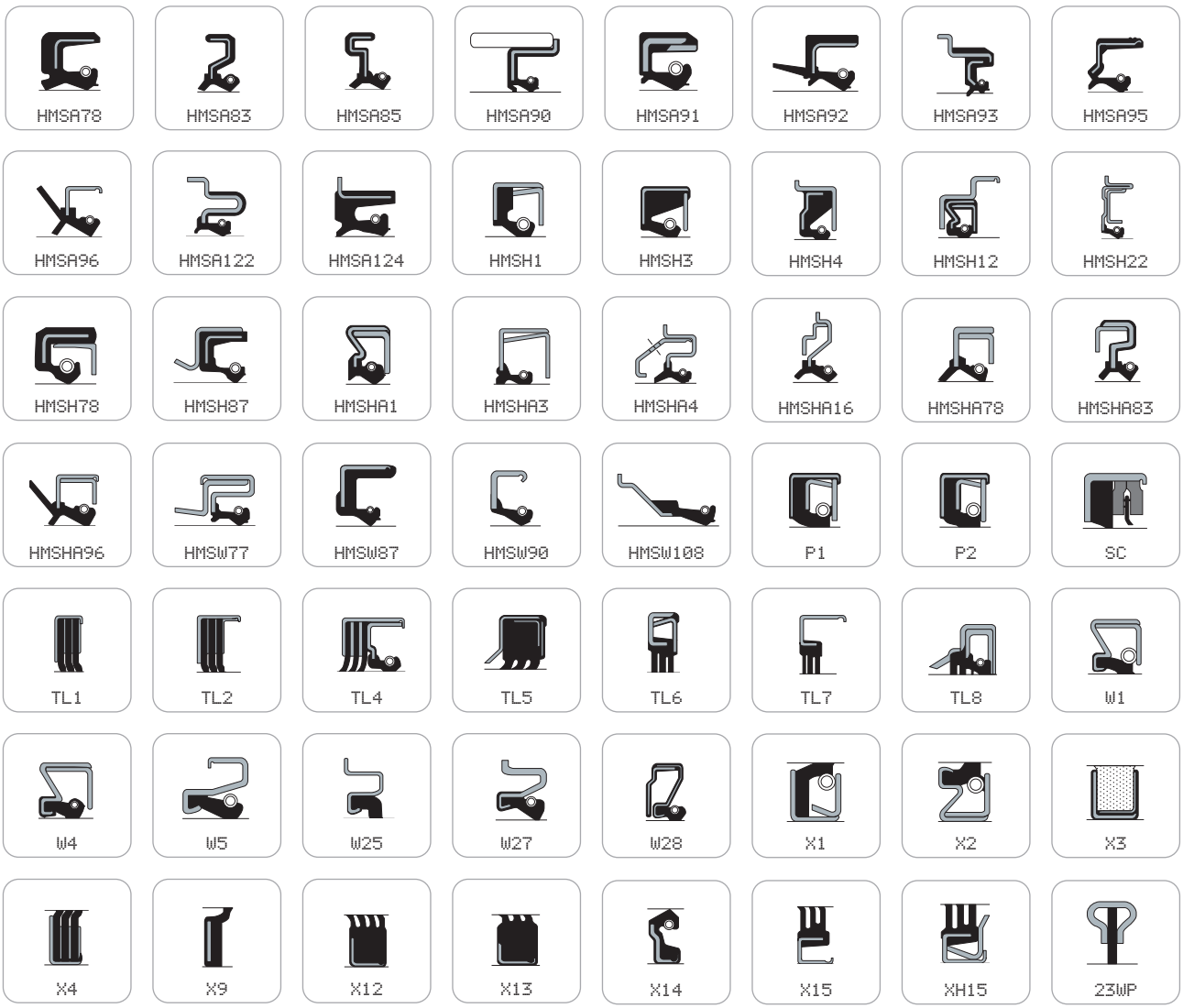



E1
E2
E3
F1
F2
CRWHA9
CRWHA11
CRWHA22
D3
D5
D6
D7
D8
F3
FF1
FF2
FF3
FF4
FF9
G1
G2
G8
HD1
HD2
HD3
HDW1
HM1
HM3
HM4
HM8
HM11
HM12
HM14
HM16
HM18
HM20
HM21
HM22
HM79
HM83
HMA1
HMA2
HMA3
HMA4
HMA5
HMA6
HMA7
HMA8
HMA9
HMA10
HMA11
HMA14
HMA15
HMA16
HMA18
HMA21
HMA22
HMA31
HMA73
HMA76
HMA84
HMA85
HMA90
HMA94

CR RADIAL SHAFT SEALS

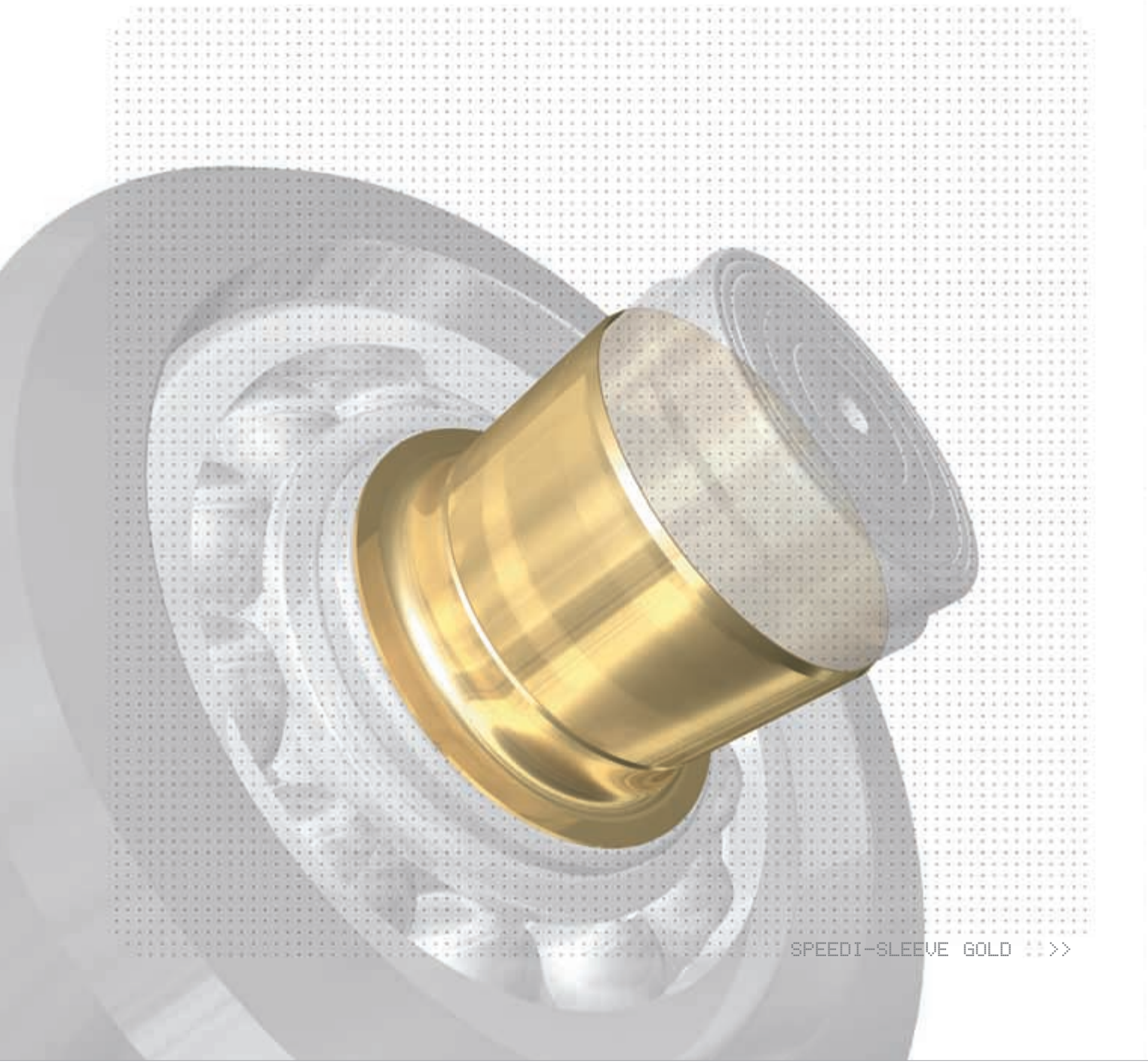
Other popular CR designs, continued

CR produces a large range of radial shaft seals in special designs. This is a selection of profiles in this range, applied in general industry worldwide. In case of demand for any of these designs, your SKF sales representative can give you more information about technical data and availability.

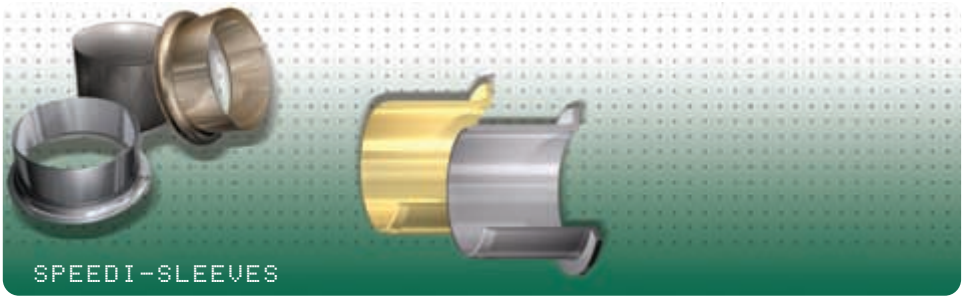

HMSA78
HMSA83
HMSA85
HMSA90
HMSA91
HMSA92
HMSA93
HMSA95
HMSA96
HMSA122
HMSA124
HMSH1
HMSH3
HMSH4
HMSH12
HMSH22
HMSH78
HMSH87
HMSHA1
HMSHA3
HMSHA4
HMSHA16
HMSHA78
HMSHA83
HMSHA96
HMSW77
HMSW87
HMSW90
HMSW108
P1
P2
SC
TL1
TL2
TL4
TL5
TL6
TL7
TL8
W1
W4
W5
W25
W27
W28
X1
X2
X3
X4
X9
X12
X13
X14
X15
XH15
23WP

CR WEAR SLEEVES

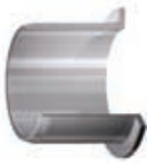
Or how to repair shafts the easy way



SPEEDI-SLEEVES



SPEEDI-SLEEVE GOLD



SPEEDI-SLEEVE

For radial shaft seals to perform efficiently, the condition of the shaft surface is of vital importance. However, high pressures, temperatures and speeds, inadequate lubrication and solid contaminants often lead to grooving on the shaft and have a negative influence on sealing performance.

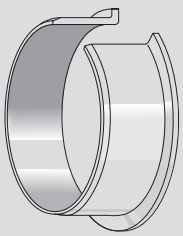
In such cases a simple seal replacement will not solve the problem and it is generally necessary to rework the shaft. Such reworking is time-consuming and costly.

CR wear sleeves have been designed to eliminate the need of reworking. They are simply pushed over the damaged surface enabling the shaft to be re-used within minutes and at a fraction of the cost of traditional reworking.

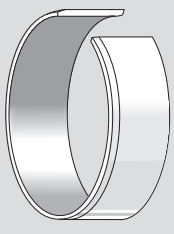
CR wear sleeves are available in two different designs, depending on size. One is the extremely thin-walled “Speedi-Sleeve”, which allows replacement seals of the same size as the original seals to be used. Speedi-Sleeve for normal operating and Speedi-Sleeve Gold for harsh operating conditions are produced for shaft diameters up to and including 203 mm (8 in).

For larger shafts, up to approximately 1150 mm (45.276 in) in diameter, CR produces the LDSLV wear sleeves in two designs, the LDSLV3 with a flange, and the LDSLV4 without a flange.

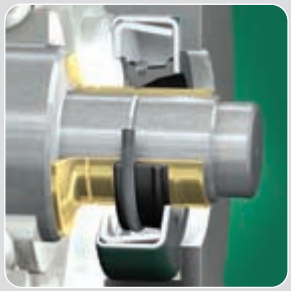
For comprehensive technical data, size listing and recommendations about installation, please see our “CR Indus-trial Shaft Seals Handbook”, SKF publication 5300, or our technical brochure “Speedi-Sleeve”, SKF publication 5149.



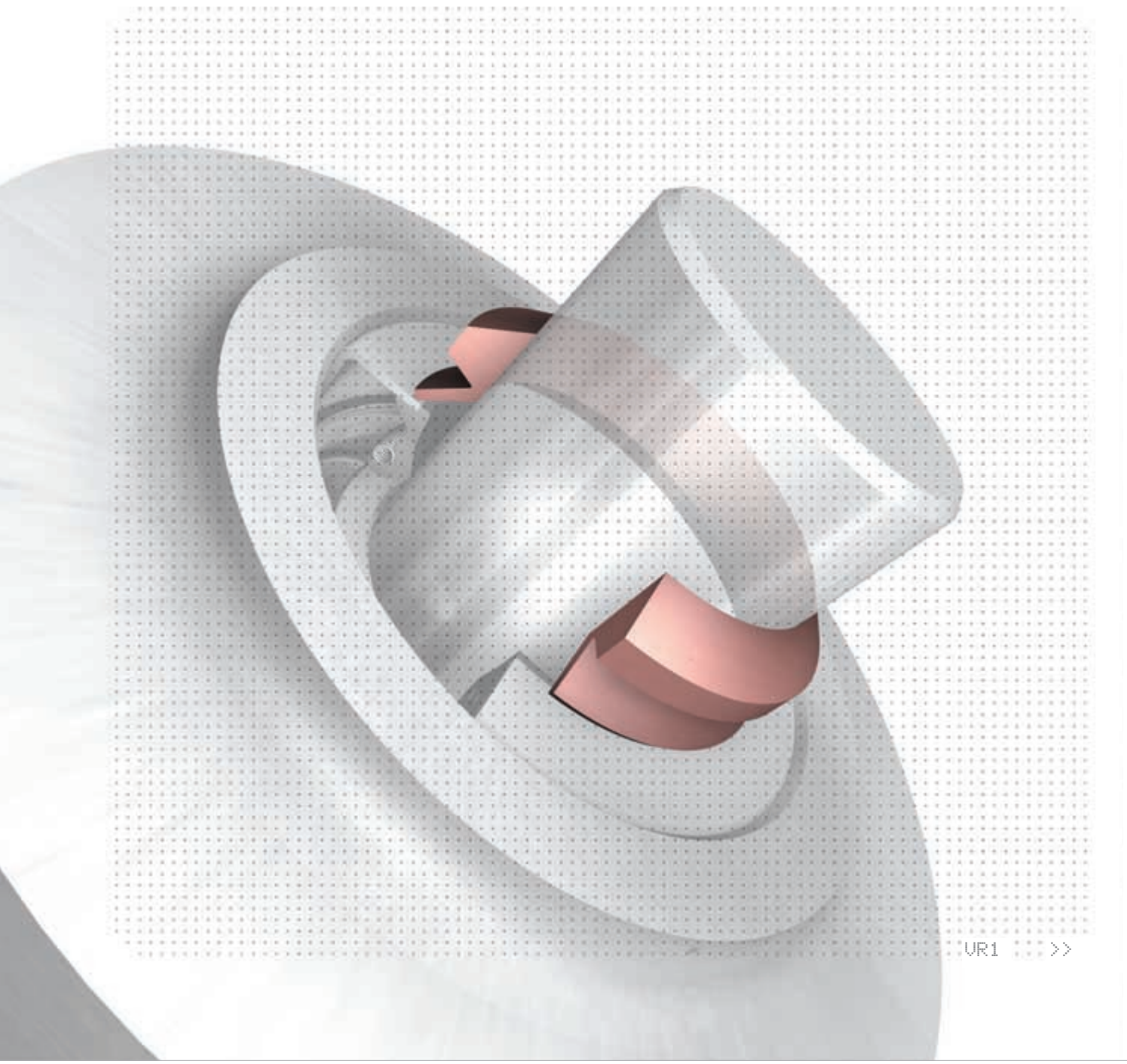
LDSLV3



LDSLV4



CR AXIAL SHAFT SEALS



CR AXIAL SHAFT SEALS

V-ring seals

GENERAL

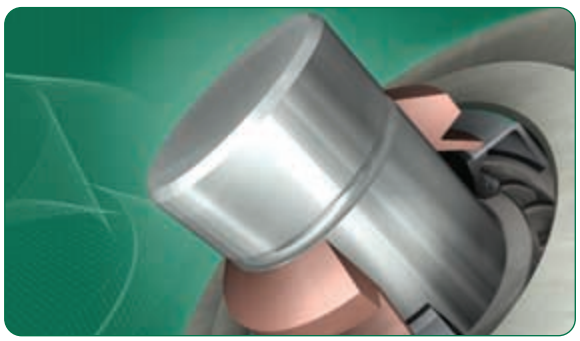
The V-ring is a unique all-rubber seal for rotary shafts. Developed in the 1960's, it has been used successfully by OEM and the replacement market worldwide in a wide range of applications.

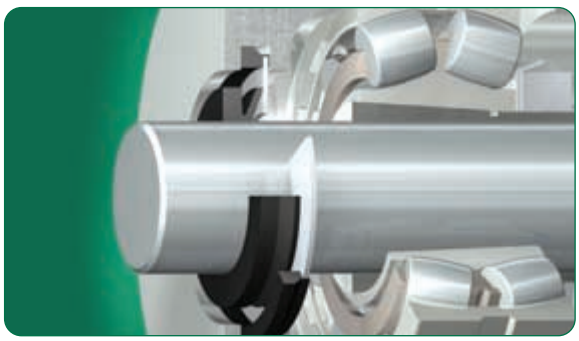
The V-ring is used alone to seal and fling out the ingress of dirt, dust and water while positively retaining grease. With its unique design and performance the V-ring protects a wide range of bearing types. It is often used as a secondary seal to protect primary seals, which do not perform well in hostile environments.

FUNCTION AND FEATURES

The V-ring has a body and a flexible conical shaped sealing lip with an integral resilient ”hinge”. It is stretched and mounted directly on the shaft, where it is held in place by the inherent tension of the seal body. It rotates with the shaft and seals axially against a stationary counterface by combining positive lip contact with centrifugal flinger action.

The counterface can be the end face of a bearing, a stamping, a bearing housing, or even the metal case of an oil seal. In many instances the V-ring can be stretched and installed over flanges and bearing housings without costly dismantling.





CR AXIAL SHAFT SEALS

V-ring seals

STANDARD DESIGNS

VR1

VR2

VR1 design: This is the most common design and is available for shaft diameters from 2,7 to 2020 mm (0.106 to 79.528 in), inclusive.

VR2 design: The body of this V-ring is wide and tapered. This gives the seal a very firm hold on the shaft. Seals of the VR2 design are available for the most commonly used shaft diameters in the range 4,5 to 210 mm (0.177 to 8.268 in). VR1 and VR2 designs are available from stock in CR lip material R and V. For comprehensive technical data, recommendations about machining and installation and size listing, please see our "CR Industrial Shaft Seals Handbook", SKF publication 5300.

VR1

VR2

VR3

VR4

VR3 design: These seals have a very narrow axial cross section made for compact arrangements and are often used in combination with labyrinth seals. They are available for shaft diameters in the range 135 to 630 mm (5.315 to 24.803 in).

VR4 design: These V-rings were designed as secondary seals for heavy-duty applications where the primary seal has to be protected against water and/or solid contaminants. They have the largest cross section of any V-ring design and also permit the largest axial displacements. They are available in the diameter range 450 to 2010 mm (17.716 to 79.134 in).

VR3 and VR4 designs are available from stock in CR lip material R and V. For comprehensive technical data, recommendations about machining and installation and size listing, please see our "CR Industrial Shaft Seals Handbook", SKF publication 5300.

VR3

VR4

VR5

VR6

VR5 and VR6 design: The heavy-duty large diameter style can easily be fitted with a standard clamping band for axial fixation in high-speed applications. Ideal for steel mills, ball mills and paper mills.

VR1 and VR2 designs are available from stock in CR lip material R and V. For comprehensive technical data, recommendations about machining and installation and size listing, please see our "CR Industrial Shaft Seals Handbook", SKF publication 5300.

VR5

VR6

DESIGN	VR1	VR2	VR3	VR4	VR5	VR6
min ∅ mm	3	5	110	300	300	300
max ∅ mm	∞	199	∞	∞	∞	∞

CR AXIAL SHAFT SEALS

Other designs

MVR AXIAL SHAFT SEALS

MVR1 MVR2

General: For added protection in extremely contaminated applications, in addition to our standard V-ring, SKF also offers the type MVR.
The MVR seals axially and function by combining positive lip contact with centrifugal flinger action. However, the MVR seal is different in that the rubber element is stretch fitted into a metal shell. The metal shell is then press-fitted onto the shaft. This shell provides excellent protection from heavy debris and it automatically accommodates high rotating speeds without auxiliary clamping devices.

Service life is considerably higher than that for radial seals in contaminated environments and can extend to thousands of hours.

For comprehensive technical data, recommendations about machining, installation and size lists, please see our catalogue “CR Industrial Shaft Seals Handbook”, SKF publication 5300.

MVR1

MVR2

AXIAL CLAMP SEALS

CT1

CT3 CT4

The CR axial clamp seals are designed for large and very large diameters and are eminently suitable as secondary seals for applications where otherwise the primary seals would be subjected to excessive quantities of particulate contaminants or water. The seals do not rotate but seal axially against a rotating counterface.

These CR axial clamp seals are made of appropriately profiled strips of non-reinforced nitrile rubber, which are held firmly in place by stainless steel screw-type clamps. They are available in the diameter range 150 to 4600 mm (5.906 to 181.102 in).

CR axial clamp seals are produced in three different designs:

CT1: Axial clamp seals of the CT1 design have a flat face sealing lip and are held in position by a screw-type clamp.

CT3: The seals of the CT3 design differ from those of the CT1 design only in the form of the sealing lip. This is again flat but provided with annular grooves. These serve to trap contaminants, which may have started to penetrate the lip/counterface contact.

CT4: Axial clamp seals of the CT4 design are extra wide and have a double clamp. The sealing lip is flat as for the CT1 design.

For comprehensive technical data, recommendations about machining, installation and size lists, please see our catalogue “CR Industrial Shaft Seals Handbook”, SKF publication 5300.

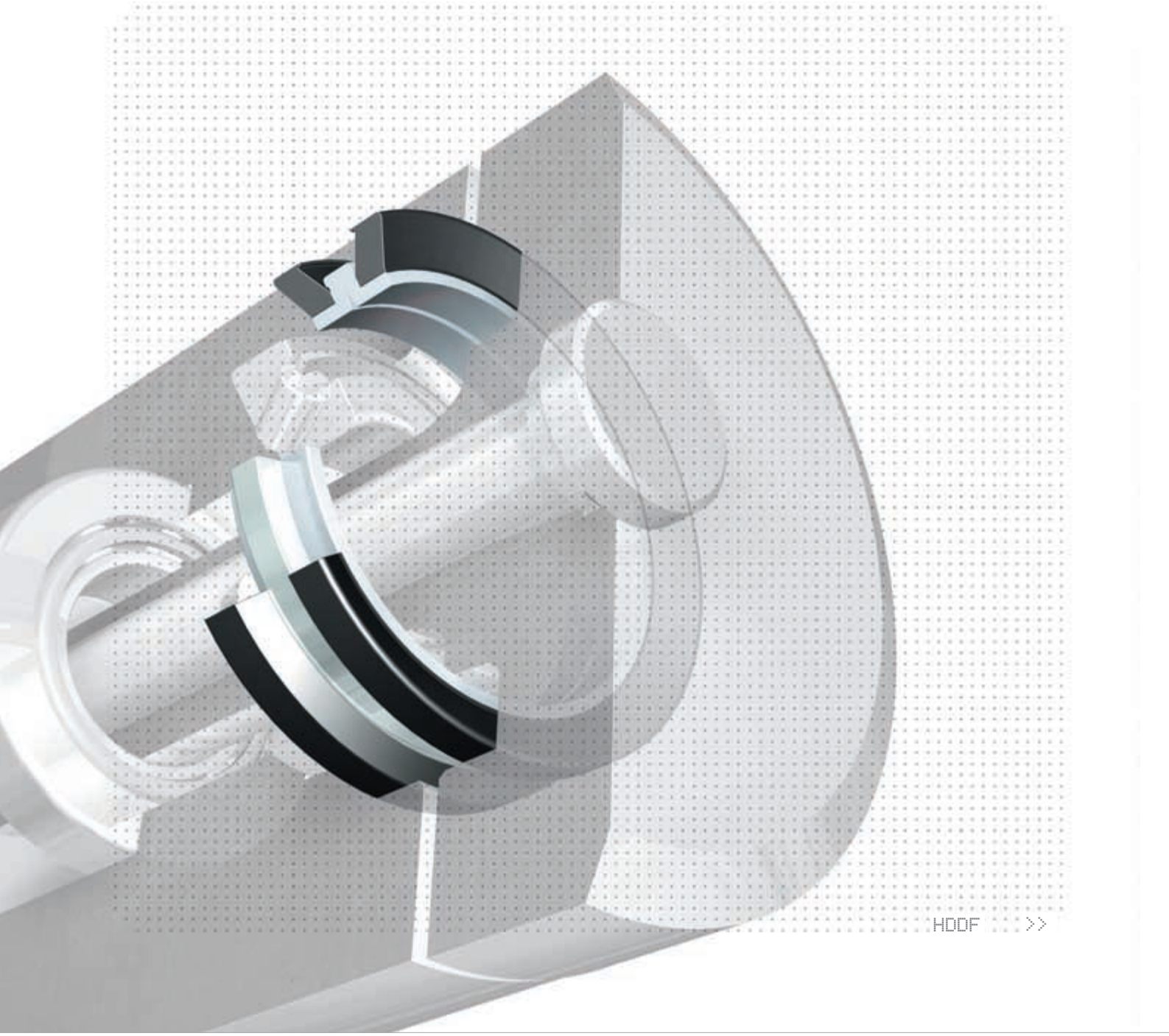
CT1

CT3

CT4

CR AXIAL SHAFT SEALS

Mechanical seals



CR AXIAL SHAFT SEALS

Mechanical seals, design HDDF

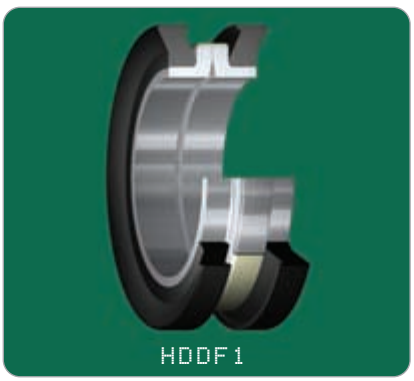
CR HDDF seals are mechanical seals for positive sealing in heavy-duty applications. They are designed for use under severe service conditions at relatively low peripheral speeds. CR HDDF offers reliable protection against solid and liquid contaminants as well as leak-proof retention of lubricants. The seals were originally developed for off-road and tracked vehicles but have been found to be equally suitable for a range of other applications where effective protection is required against sand, soil, mud, water etc. These applications include:

- all types of mixers, sand treatment equipment,
- conveyors and other construction equipment,
- agricultural machinery,
- washing mashines,
- grinding mills and other comminution equipment,
- ore dressing equipment, and
- mining equipment.

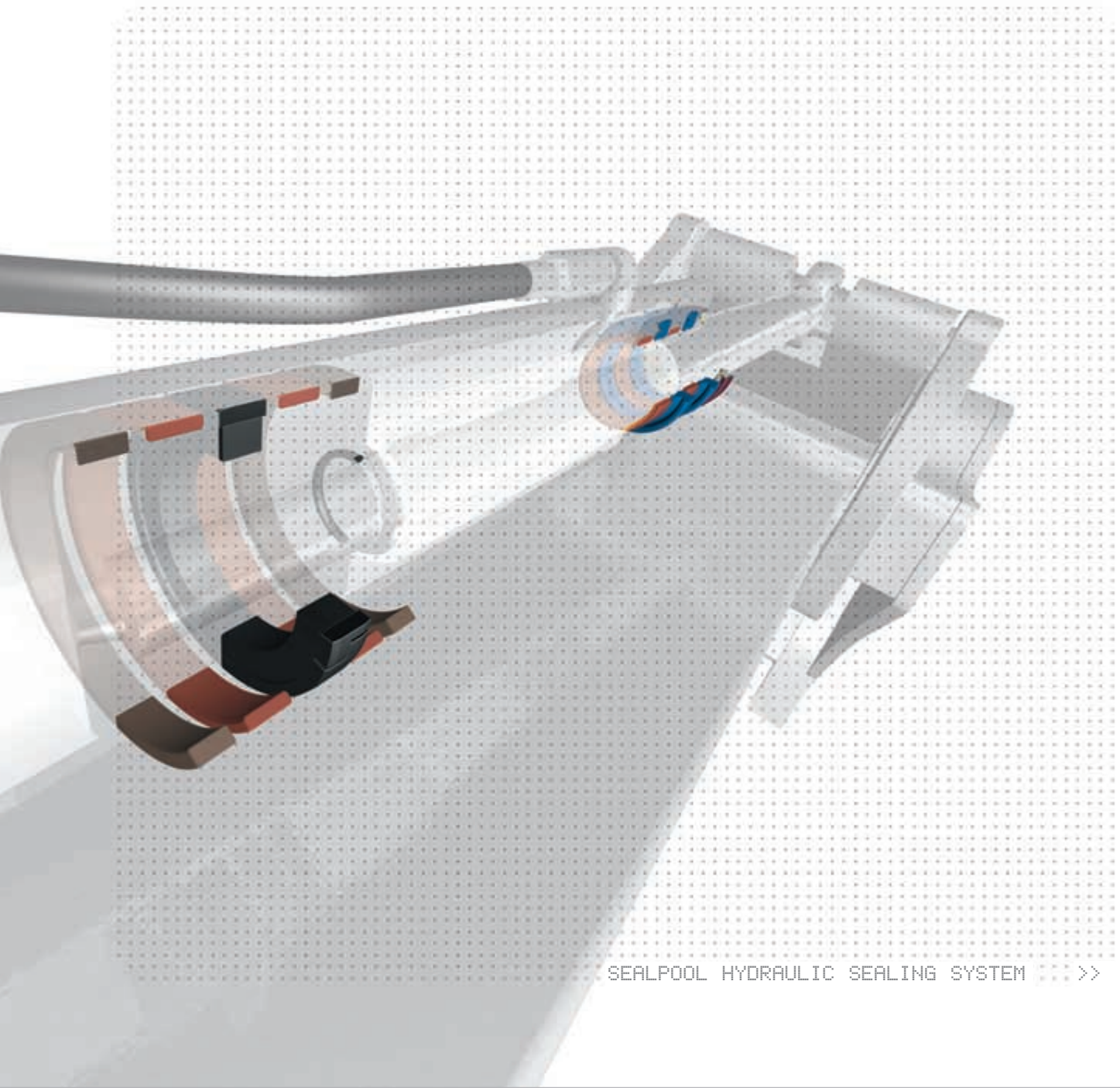
For comprehensive technical data, recommendations about machining, installation and size lists, please see our catalogue ”CR Industrial Shaft Seals Handbook”, SKF publication 5300, available at any SKF representative.

TABLE 1. PERMISSIBLE OPERATING CONDITIONS

OPERATING CONDITIONS	GUIDELINE VALUES
OPERATING TEMPERATURE, °C (°F)	
continuous operation	–50 to +100 (–58 to +212)
brief periods, maximum	+120 (+248)
PERIPHERAL SPEED, m/s (ft/min)	
continuous operation	up to 1,75 (344.49)
brief periods, maximum	up to 4 (787.4)
PRESSURE ACTING ON SEAL, MPa (psi)	
continuous operation	up to 0,2 (29.00)
brief periods	up to 0,35 (50.76)



SEALPOOL HYDRAULIC SEALS



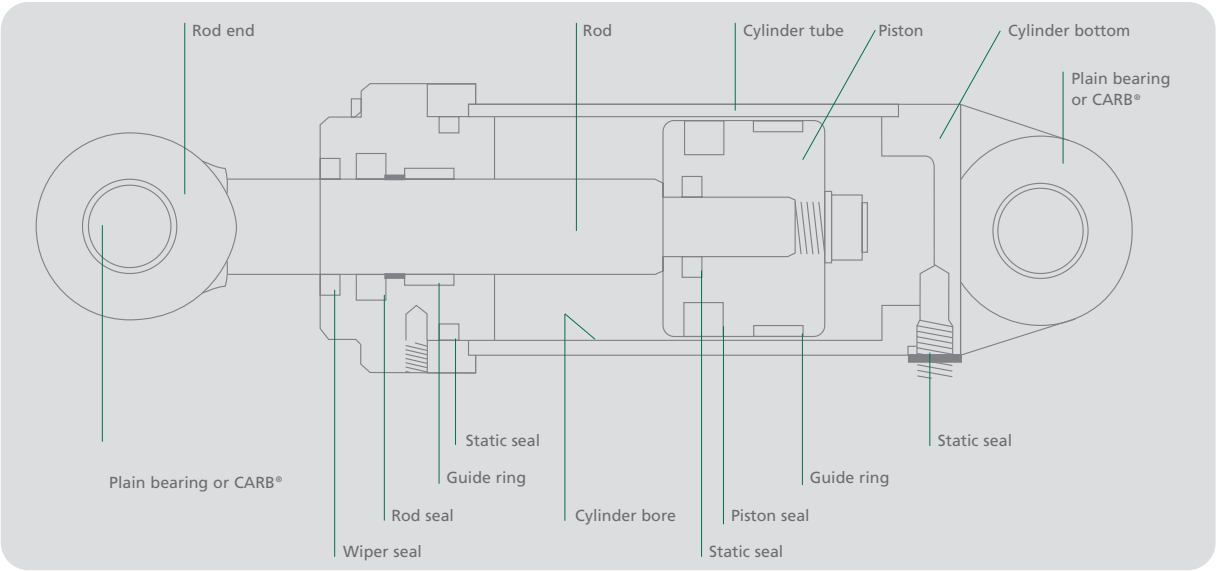
Hydraulic seals are divided into several design groups according to function, such as piston seals and rod seals, each of which includes several types of seal types to match a variety of operating requirements.

In this brochure, the range of SEALPOOL Hydraulic Seal types within the different seal design groups has its own chapter, containing a short presentation of the main features for each seal. The application-oriented structure of this brochure helps you to easily identify the type of hydraulic seal you require.

The data in this brochure relates to the state of development and production in early 2004. We reserve the right to make changes without prior notice.

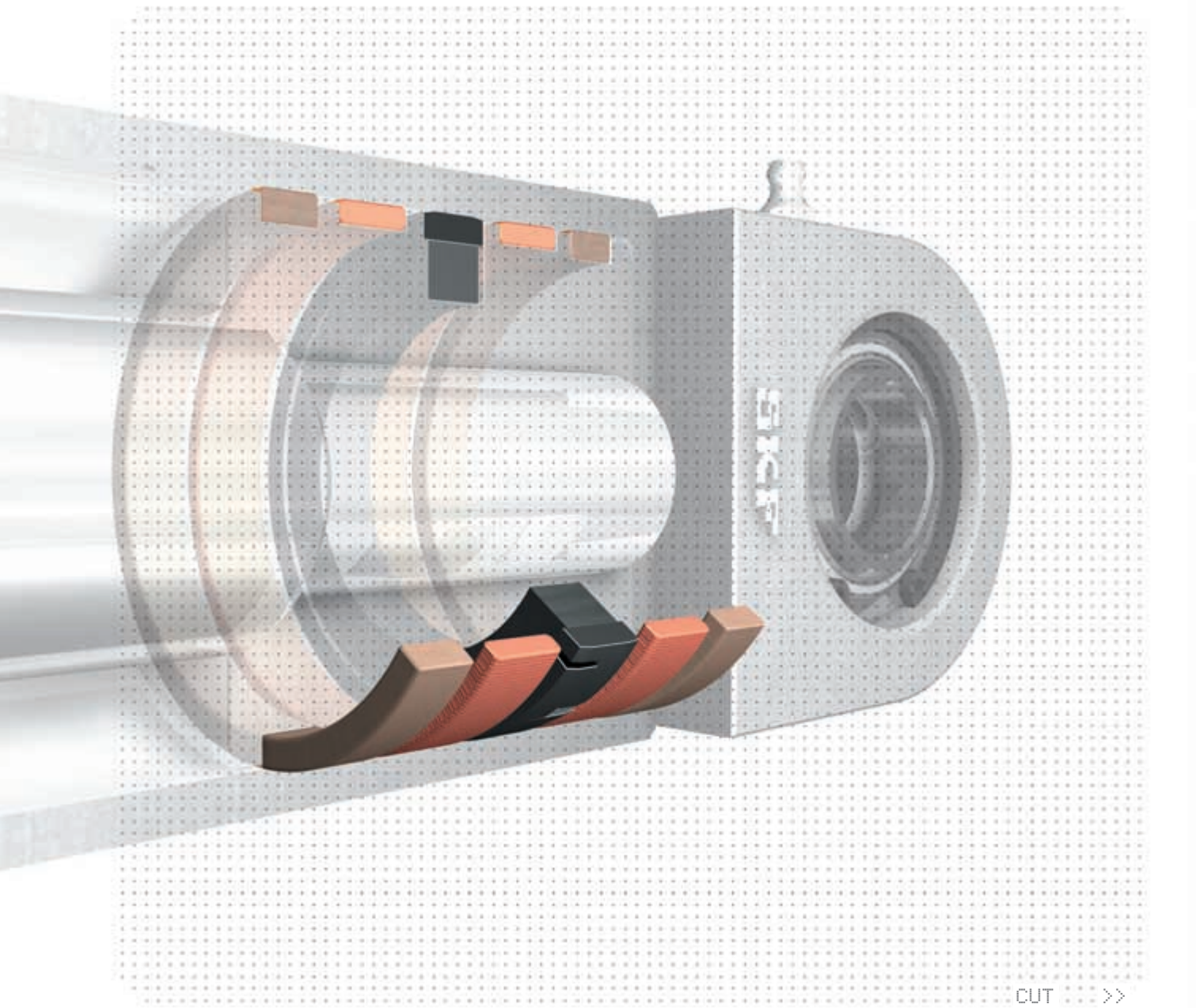
Specific technical product data, machining criteria and detailed application information for the various seal types, as well as the available range of types, sizes and their SKF product designations can be found in our technical catalogue, ”SEALPOOL Hydraulic Seals”, SKF publication 5397.

HYDRAULIC CYLINDER – TERMINOLOGY



SEALPOOL HYDRAULIC SEALS

Piston seals



CUT >>

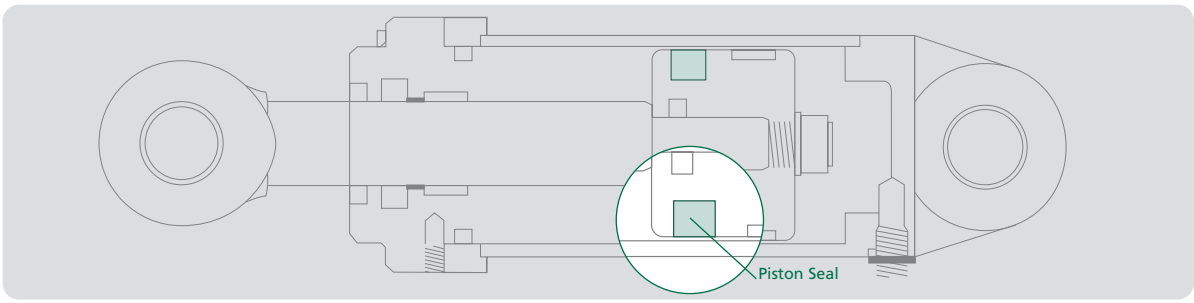
The basic demand on piston seals for hydraulic cylinders under the operating conditions, for which they have been chosen, is to maintain a high level of sealing performance during their service life.

The first choice of the type of piston seal is to a great extent depending on the way in which the cylinder operates, in single-acting or double-acting operations.

In general, for a cylinder which is exclusively single-acting, it is always best to choose the type of seal designed to provide optimum sealing qualities for single-acting functions with e.g. the thinnest possible lubrication film that can pass through the contact area between the seal and the cylinder tube surface.

The best sealing capacity of a double-acting cylinder is achieved by choosing a double-acting seal. A piston design where two single-acting seals on the piston for a double-acting cylinder are used can easily give rise to a breakdown. The reason is that a very high pressure can be trapped between the seals.

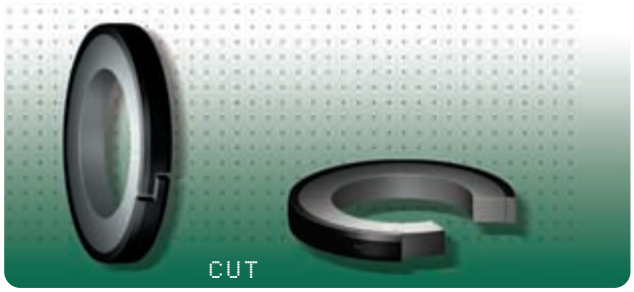
In this brochure, we present our range for both single- and double-acting piston seals with their main design features and operating condition areas. For comprehensive technical data and recommendations about the right choice of seal, as well as for information about machining and installation, please see our technical catalogue, ”SEALPOOL Hydraulic Seals”, SKF publication No 5397.

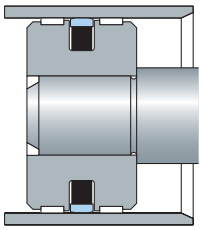


SEALPOOL HYDRAULIC SEALS

Piston seals

DOUBLE-ACTING PISTON SEALS




INSTALLATION EXAMPLE

Type CUT is a double-acting piston seal consisting of a slide ring of polyamide and a square cut energizer of nitrile rubber, enabling static sealing ability in the seal housing groove as well. The design with a cut slide ring provides a very simple assembly into a closed housing groove.

Type CUT is designed for use in heavy-duty hydraulic applications, mainly in double-acting cylinders. The material properties provide low friction, also under high pressure. Type CUT is also available in a specific material combination withstanding even tougher operating conditions.

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
CUT	PA, NBR	50 (500) 7252	1 197	–30 / +110 –22 / +230

The piston seal set type CUT has a range of advantages, which gives users added value:

- fits in existing housing designs according to ISO 7425-1
- only two parts to mount
- equilateral – cannot be mounted in wrong direction
- split – no tool required

Type CUT is also extremely wear and extrusion resistant, it with stands high pressure also at large radial clearance and it is excellent in bio oils.


CUT

DOUBLE-ACTING PISTON SEALS

GHT-MD1

GHT-MF1

GHT-ND6

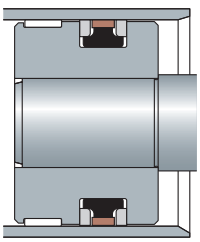
Series GHT is a double-acting piston seal for medium and heavy-duty applications and is available in several different designs and material combinations adjustable to the varying demands.

Type GHT-MD1 is designed for use in e.g. forest cranes and can work within the temperature range of –30°C to +100°C (–22°F to +212°F) at a maximum pressure of 40 MPa (5802 psi). Back-up rings of acetal resin, energizer of nitrile rubber and slide ring of a filled PTFE material.

Type GHT-MF1 is designed for use in e.g. cargo handling cranes and can work within the temperature range of –30°C to +90°C (–22°F to +194°F) at a maximum pressure of 40 MPa (5802 psi). Back-up rings of acetal resin, energizer of nitrile rubber and slide ring of polyurethane.

Type GHT-ND6 is designed for heavy-duty applications such as e.g. wheel loaders and excavators. Back-up rings of polyamide, an energizer of hydrogenated nitrile rubber and a slide ring of a filled PTFE material.

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
GHT-MD1	PTFE NBR, POM	40 (400) 5802	2 394	–30 / +100 –22 / +212
GHT-MF1	PU POM, NBR	40 (400) 5802	0,5 98	–30 / +100 –22 / +212
GHT-ND6	PTFE PA, HNBR	40 (400) 5802	2 394	–30 / +100 –22 / +212



INSTALLATION EXAMPLE

GHT-ND6

GHT-MF1

GHT-MD1

SEALPOOL HYDRAULIC SEALS

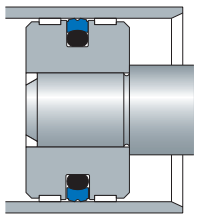
Piston seals

DOUBLE-ACTING PISTON SEALS

PEN

Type PEN is a double-acting piston seal consisting of a slide ring of polyurethane and an energizer of nitrile rubber, enabling static sealing ability in the housing groove as well.

The slide ring of type PEN is designed with a radius on the static side for optimal function with the O-ring. Type PEN is used in light and medium duty hydraulic applications and can be assembled in closed housing grooves without any tools.



INSTALLATION EXAMPLE

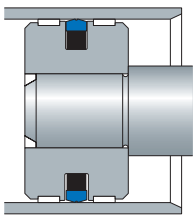
SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
PEN	PU, NBR	25 (250) 3626	0,5 98	–30 / +90 –22 / +194

PEN

URG

Type URG is a double-acting piston seal consisting of a slide ring of polyurethane and a square cut energizer of nitrile rubber. The slide ring has chamfered sealing edges to obtain optimal tightness and resistance to extrusion. Its notches in the radial face enable rapid reaction to changes in the pressure direction.

Type URG is used in cylinders for light and medium pressure applications, e. g. in earthmoving equipment, agricultural machinery and loading cranes.



INSTALLATION EXAMPLE

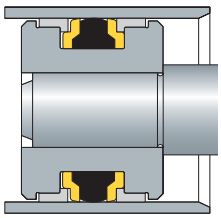
SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
URG	PU, NBR	25 (250) 3626	0,5 98	–30 / +90 –22 / +194

URG

M

Series type M, MD and M-R are double-acting, compact piston seals, consisting of a central sealing ring of nitrile rubber, support rings of a polyester elastomer and well integrated guide rings of acetal resin.

Type M and MD can be used in light-duty hydraulic applications, type MR in light and medium duty hydraulic cylinders. Type MD is appropriate in applications where a double-acting cylinder is used as a single acting with one side of the piston connected to the atmosphere side.



INSTALLATION EXAMPLE

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
M	NBR, POM	25 (250) 3626	0,5 98	–30 / +100 –22 / +212
MD	NBR, POM	25 (250) 3626	0,5 98	–30 / +100 –22 / +212
MR	NBR, POM	28 (280) 4061	0,5 98	–30 / +100 –22 / +212

M

MD

MR

MD

MR

SEALPOOL HYDRAULIC SEALS

Piston seals

DOUBLE-ACTING PISTON SEALS SERIES G AND GL

GH

PISTON SEALS SERIES G and GL: Double-acting piston seals, consisting of a dynamically sealing slide ring of PTFE or other thermo-plastic materials and a static elastomeric part, which also functions as an interference element. They are available in different designs and material combinations, all to meet demands on low friction, small housing dimensions and a long service life.

The following table gives a first indication about the right choice of type for different application demands. Comprehensive technical data and selection criteria can be found in our technical catalogue, "SEALPOOL Hydraulic Seals", SKF publication 5397.

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
G, GG, GL, GLG, GN, GS, GS-XX8	PTFE, NBR	16 (160) 2 321	2 394	–30 / +110 –22 / +230
GC, GH-XX8, GLC, GR	PTFE, NBR	25 (250) 3 626	2 394	–30 / +110 –22 / +230

GR

GN

GS

GC

GG

GH-XX8

G

GL

GLC

GLG

FEATURES AND FIELD OF APPLICATION OF SEALPOOL SLIDE RING SEALS

TYPE	FEATURE	APPLICATION FIELD
GH	Double-acting, notches and chamfers against the dynamic surface	Basic design for reciprocating movements
G, GL	Double-acting, sharp edges, no notches	Appropriate for impure media
GC, GLC	Double-acting, chamfered against the dynamic surface against extrusion	The chamfer provides improved protection
GG, GLG	Double-acting, grooves in the slide surface	Improved sealing ability
GN	Notches	For rapid pressure changes
GR	Double-acting, chamfers, notches and grooves in the dynamic surface and a radius on the static side	Appropriate for rotating and turning applications
GH-XX8	Double-acting, square ring as a static sealing element	Provides a decreased surface pressure against the dynamic surface and an increased sealing ability
GS	Single-acting slide ring seal	Applications with high demands on sealing ability

CHOICE OF MATERIAL

MEDIUM	MATERIAL, CONTRACT SURFACE	MS CODE SEAL	O-RING
Hydraulic oil Lubrication oil (mineral oil based)	Steel: min 33 HRC Chromed surface, cast iron	1) MS-292 (bronze filled) 2) MS-361 (glass fibre) 3) MS-426 PE-UHMW (max +80 °C / +176 °F)	MS-N70
	Stainless steel, aluminium, anodized or chromed bronze	1) MS-302 (carbon filled) 2) MS-851 (carbon fibre) 3) MS-426 PE-UHMW ((max +80 °C / +176 °F)	MS-F75
Water Water/glycol	Steel: min 33 HRC Chromed surface, cast iron,	1) MS-302 (carbon filled) 2) MS-851 (carbon fibre)	MS-N70 MS-F75 MS-E70
Water/oil emulsion	stainless steel, aluminium, anodized or chromed bronze	3) MS-304 (carbon filled) 4) MS-426 PE-UHMW (max +80 °C / +176 °F)	MS-N70 MS-F75
Hot water/steam	Steel: min 33 HRC Chromed surface, cast iron, stainless steel, aluminium, anodized or chromed bronze	1) MS-302 (carbon filled) 2) MS-851 (carbon fibre) 3) MS-304 (carbon filled)	MS-E70
Air, lubricated service Air, non-lubricated service	Steel: min 33 HRC Chromed surface, cast iron	1) MS-426 PE-UHMW (max +80 °C / +176 °F) 2) MS-361 (glass fibre) 3) MS-221, MS-231 (low-filled + colour pigment, only lubricated service)	MS-N70
	Stainless steel, aluminium, anodized or chromed bronze	1) MS-426 PE-UHMW (max +80 °C / +176 °F) 2) MS-302 (carbon filled) 3) MS-851 (carbon fibre) 4) MS-304 (carbon filled)	

SEALPOOL HYDRAULIC SEALS

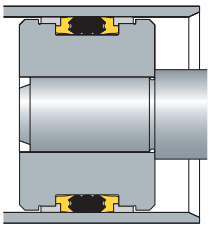
Piston seals

DOUBLE-ACTING PISTON SEALS

A

Type A is a double-acting, compact piston seal consisting of a central sealing ring of nitrile rubber, support rings of a polyester elastomer and integrated guide rings of acetal resin.

Example of application: medium and heavy-duty hydraulic cylinders in earthmoving equipment, agricultural machinery and standard cylinders, mostly as spare part for older hydraulic equipment. For new designed applications, the technically more advanced series SIL or TIL should be used.



INSTALLATION EXAMPLE

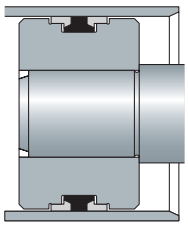
SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
A	NBR, POM	40 (400) 5802	0,5 98	–30 / +100 –22 / +212

A

MSS

Type MSS is a double-acting, compact piston seal consisting of a central sealing ring of nitrile rubber and guide/support rings of acetal resin.

Example of application: light-duty hydraulic cylinders in agricultural machinery and standard cylinders, mostly as spare part for older hydraulic equipment. For new designed applications, the technically more advanced series SIL or TIL should be used.



INSTALLATION EXAMPLE

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
MSS	NBR, POM	16 (160) 2321	0,5 98	–30 / +100 –22 / +212

MSS

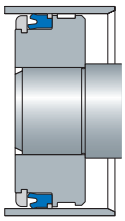
SINGLE-ACTING PISTON SEALS

SAARR

Type SAARR is a single-acting piston seal, consisting of an asymmetric, U-ring seal of polyetherurethane, an integrated back-up ring of acetal resin and a retainer ring of acetal resin.

Type SAARR is the most effective seal for pistons in single-acting cylinders, also in cold conditions, thanks to the polyetherurethane.

Example of application: earthmoving equipment, agricultural machinery and standard cylinders.



INSTALLATION EXAMPLE

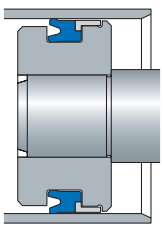
SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
SAARR	PU, POM	25 (250) 3626	0,5 98	–30 / +90 –22 / +194

SAARR

SA

Type SA and SAW are single-acting, asymmetric U-ring seals of polyetherurethane, type SAW with an integrated guide ring of acetal resign.

Example of application: all pressure areas within mobile and static hydraulics, earthmoving equipment, support cylinders, presses, and cylinders in agricultural machinery as well as standard cylinders.



INSTALLATION EXAMPLE

SAW

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
SA	PU	25 (250) 3626	0,5 98	–30 / +90 –22 / +194
SAW	PU, POM	25 (250) 3626	0,5 98	–30 / +90 –22 / +194

SA

SAW

SEALPOOL HYDRAULIC SEALS

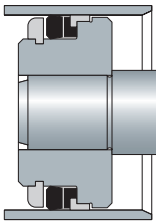
Piston seals

SINGLE-ACTING PISTON SEALS

SWRR

Type SWRR consists of a compact sealing ring of nitrile rubber with fabric reinforcement, an integrated back-up ring of acetal resin and a retainer ring of acetal resin.

Type SWRR is often used in single-acting cylinders with medium pressure operation.



INSTALLATION EXAMPLE

SWRR

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
SWRR	NBR, POM	25 (250) 3626	0,5 98	–30 / +100 –22 / +212

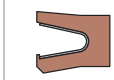
SPRING ACTIVATED PISTON SEALS

SUA

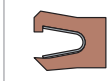
Series SU – spring activated, single-acting PTFE seals for both piston and rod. SU is appropriate for use as a dynamic seal at slowly rotating or reciprocating movements as well as a shaft seal or a static seal.

Series SU often replaces a rubber seal, e.g. an O-ring in applications with high or low temperatures, non-lubricated services, demands on low friction, aggressive media, high speeds, high pressures, vacuum etc. Series SU can be delivered with many different spring types and materials adjusted to the application demands.

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
SUA	PTFE, Stainless steel	25 (250) 3626	15 2953	–200 / +260 –328 / +500
SUD	PTFE, Stainless steel	25 (250) 3626	15 2953	–200 / +260 –328 / +500
SUS	PTFE, Stainless steel	25 (250) 3626	15 2953	–200 / +260 –328 / +500



SUA



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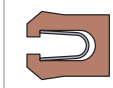


SUS

SUD

SUS

SEALPOOL HYDRAULIC SEALS

Piston seals, selection factor matrix

Please select your most important decisive factors when choosing seal design and installation and mark possible solutions. Then study further factors, installation instructions and dimension tables in our technical catalogue, "SEALPOOL Hydraulic Seals", SKF publication 5397.

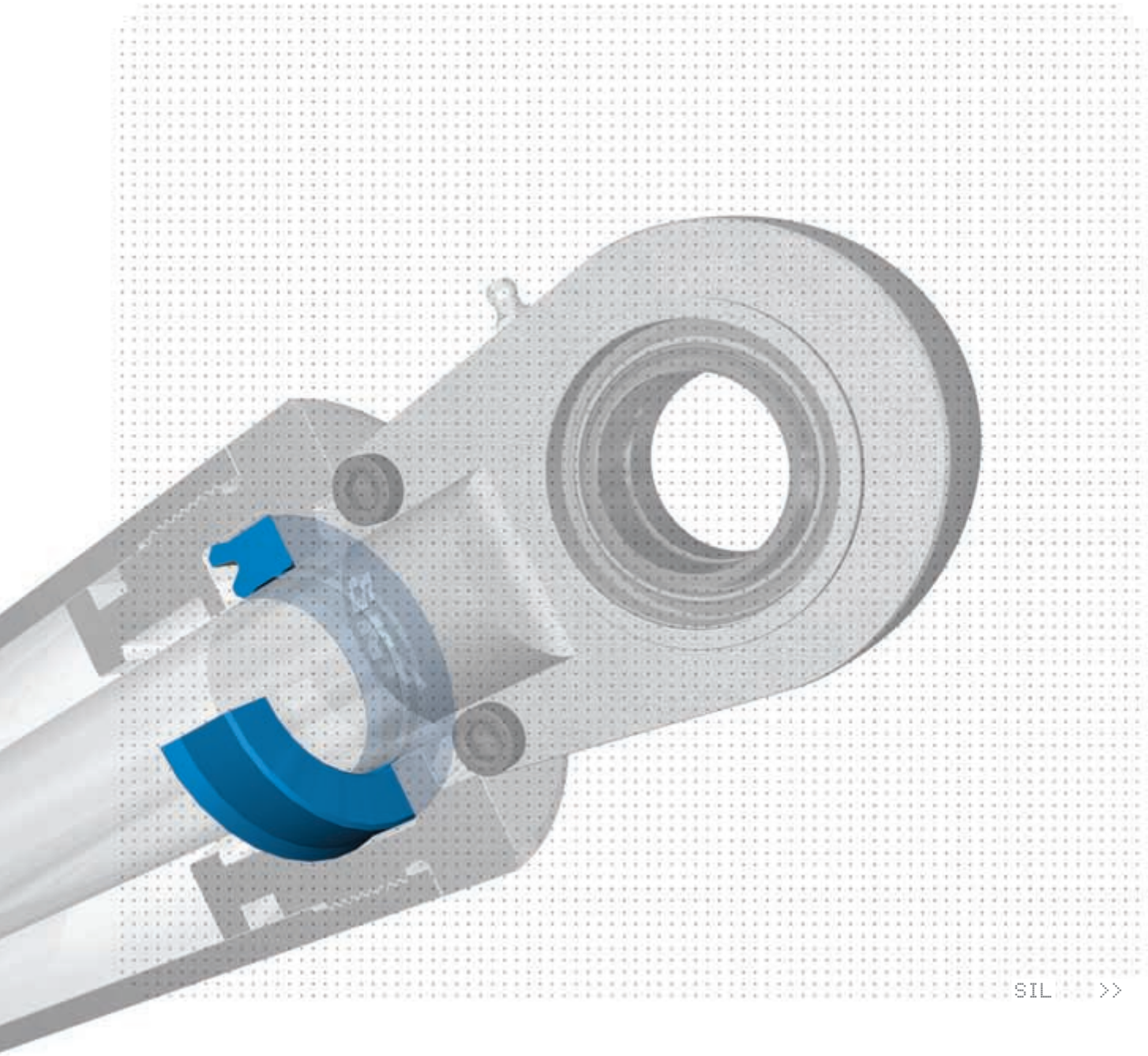
Figure 5 in the matrix represents the most appropriate design and figure 0 the least appropriate.

							
Type/series		**CUT**	**PEN**	**GHT**	**GH**	**GL**	**URG**
Material		PA NBR	PU NBR	PTFE NBR POM	PTFE NBR	PTFE NBR	PU NBR
Single-acting Double-acting		X	X	X	X	X	X
Pressure	< 16 MPa (2 321 psi)	5	5	5	5	5	5
	< 25 MPa (3 626 psi)	5	5	5	5	5	5
	< 40 MPa (5 802 psi)	5	3	5	5	3	3
High temperature	< +110 °C (+230 °F)	5	4	5	5	5	4
Low temperature	> –30 °C (–22 °F)	5	4	5	4	4	4
Friction	pressure = 0	5	5	5	5	5	5
	pressure > 0	5	5	5	5	5	5
Surface sensitivity		5	5	5	4	4	5
Tolerance sensitivity		5	5	4	4	4	5
Service life		5	5	5	4	4	5
Assembly		5	5	5	5	3	5
Cost of installation		5	5	5	5	4	4
Sealing ability	pressure = 0	5	5	5	4	4	5
	pressure > 0	5	5	5	4	3	5
Preferred in new designs		X	X	X	X		X
							

	 M	 M-R	 MD	 A	 SM	 MSS	 SAARR	 SA	 SWRR	 SAW
	NBR POM	NBR TP/PF	NBR POM	NBR POM	NBR POM	NBR POM	PU POM	PU	NBR POM	PU POM
							X	X	X	X
	X	X	X	X	X	X				
	5	5	5	5	5	5	5	5	5	5
	4	5	4	5	5	3	5	5	4	5
	4	4	3	5	3	1	4	3	3	3
	5	5	5	5	4	5	4	4	5	4
	4	4	4	5	4	4	5	3	4	3
	4	4	4	3	5	4	4	4	4	4
	4	4	4	4	4	4	4	4	4	4
	4	4	3	5	5	4	4	5	4	5
	4	5	4	5	4	4	4	4	4	4
	4	5	3	5	5	4	5	5	4	5
	5	5	5	4	5	5	5	5	5	5
	5	4	5	3	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5	5
										

SEALPOOL HYDRAULIC SEALS

Rod seals

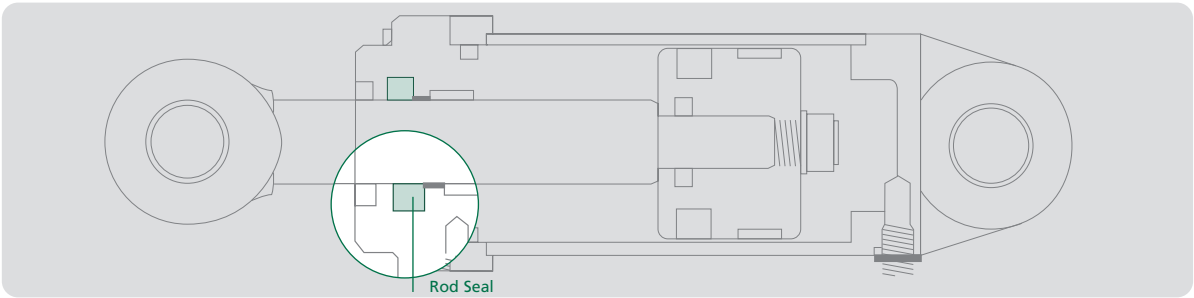


The rod seal is the seal in the hydraulic cylinder with the most demanding requirement specifications. In addition to normal wear and aging, this seal is directly affected by changes on the rod surface. The rod seal is often the decisive factor for the function of the hydraulic cylinder in its entirety. Leakage through the rod seal can in some cases cause accidents and environmental damages. Therefore, it is of significant importance to make the correct choice of rod seal and not the least, to be familiar with the properties of other existing seal types.

The rod seal's task is very difficult since it must seal at both high and low pressure, often in combination with alternating high and low temperature. The rod seal must leave a certain lubrication film, thin enough to return into the cylinder after having passed an effective wiper seal.

When choosing a rod seal, it is important to define the area of application and to make selection analyses with the support of carefully drawn-up requirement specifications. Rod seals are produced in several different designs in order to function at very varying operating conditions. Unfortunately, there is no completely perfect rod seal satisfying all, often conflicting, demands.

In this brochure, we present our standard range of SEALPOOL Hydraulic Rod Seals, with their main design features and operating conditions. For comprehensive technical data and recommendations about the right choice of seal, as well as for information about machining and installation, please see our technical catalogue, "SEALPOOL Hydraulic Seals", SKF publication 5397.



SEALPOOL HYDRAULIC SEALS

Rod seals

ROD SEALS, GENERAL RANGE

SIL

TIL

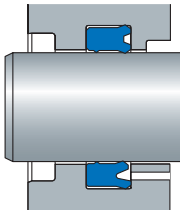
TICLA

Type SIL of polyurethane is our all-round rod seal. This seal is designed with an asymmetrical cross section with a short and strong dynamic seal lip in order to provide good sealing performance also at zero-pressure conditions. The outer seal lip is slightly longer and slimmer than the inner one in order to effectively seal statically at radial and axial movements at both low and high temperatures.

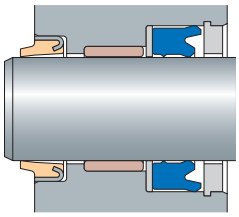
Type TIL of polyurethane is designed with short and strong seal lips providing a good contact force towards the surface of the seal housing groove. Type TIL is more compact than type SIL and is especially suitable for small radial seal section dimensions, i.e. 4 to 6 mm (0.039 to 0.236 in), where this type retains a good sealing performance at low- or zero-pressure conditions.

SIL and TIL are designed with a secondary sealing edge, which main task is to reduce the contact surface towards the rod at both low and high temperatures.

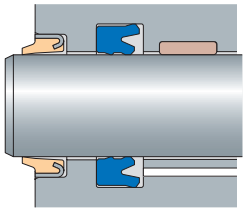
Type TICLA is a compact rod seal of polyurethane designed with an integrated back-up ring of acetal resin protecting the seal against extrusion into the gap. The compact design and the axial support ("nose") minimize the risk of air entering via the rod due to underpressure.



INSTALLATION EXAMPLE



INSTALLATION INTO OPEN GROOVE



INSTALLATION INTO CLOSED GROOVE

SIL

TIL

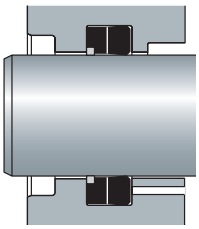
TICLA

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
SIL	PU	40 (400) 5802	0,5 98	–30 / +90 –22 / +194
TIL	PU	40 (400) 5802	0,5 98	–30 / +90 –22 / +194
TICLA	PU, POM	50 (500) 7252	0,5 98	–30 / +90 –22 / +194

SG

Type SG is a compact rod seal of fabric-reinforced nitrile rubber. The integrated back-up ring of acetal resin reduces the friction loss and the heat generation.

Type SG is used in new constructions for all-round use, specially in applications with hydraulic media based on water added with oil or glycol, where SG can be used in the temperature range –30 to +70 °C (–22 °F to +158 °F).



INSTALLATION EXAMPLE

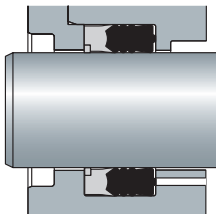
SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
SG	NBR, POM	25 (250) 3626	0,5 98	–30 / +100 –22 / +212

SG

AG

Type AG consists of a central sealing ring of nitrile rubber, a bottom ring of a polyester elastomer and an integrated back-up ring of acetal resin.

Type AG is used e.g. in hydraulic cylinders subjected to vibrations and can in many applications replace V-seal sets of fabric-reinforced rubber materials.



INSTALLATION EXAMPLE

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
AG	NBR, POM	40 (400) 5802	0,5 98	–30 / +100 –22 / +212

AG

SEALPOOL HYDRAULIC SEALS

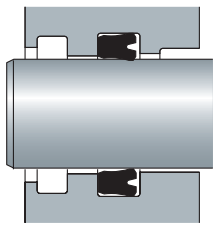
Rod seals

ROD SEALS, GENERAL RANGE

SKY

Type SKY is a symmetric U-ring seal of nitrile or fluoro-carbon rubber, designed to be installed in applications with lack of space and as spare parts for older hydraulic equipment.

Type SKY is preferably completed with a back-up ring of PTFE at pressures over 14 MPa (580 psi).



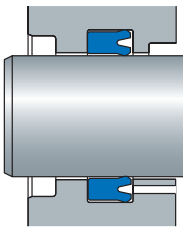
INSTALLATION EXAMPLE

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
SKY	NBR	25 (250) 3626	0,5 98	–30 / +100 –22 / +212

SKY

UN

Type UN is a symmetric U-ring seal of polyurethane for universal use, mostly as spare part for older hydraulic equipment. For new designed applications, the technically more advanced series SIL or TIL should be used.



INSTALLATION EXAMPLE

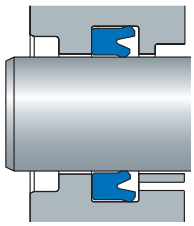
SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
UN	PU	40 (400) 5802	0,5 98	–30 / +90 –22 / +194

UN

SI

Type SI is an asymmetric U-ring seal of polyurethane. The outer lip is longer and slimmer in order to effectively seal statically.

Mostly used as spare parts in older hydraulic equipment. For new designs, the technically more advanced series SIL or TIL should be used.



INSTALLATION EXAMPLE

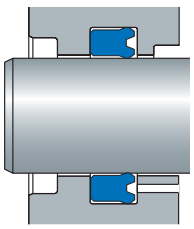
SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
SI	PU	40 (400) 5802	0,5 98	–30 / +90 –22 / +194

SI

TI

Type TI is a U-ring seal of polyurethane designed with short, symmetric and strong seal lips, providing a good contact force towards the surface of the seal housing groove.

The compact geometry of the type TI makes it suitable for small radial seal section dimensions. Particulate suited for use under vibrations and under pulsating pressure.



INSTALLATION EXAMPLE

TI

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
TI	PU	40 (400) 5802	0,5 98	–30 / +90 –22 / +194

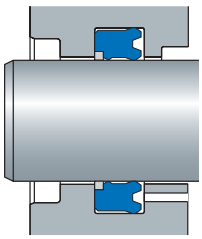
SEALPOOL HYDRAULIC SEALS

Rod seals

ROD SEALS, STANDARD RANGE

TILA

Type TILA is a compact U-ring seal of polyurethane with short and strong seal lips providing a good contact force towards the surface of the housing groove. A secondary sealing lip reduces the contact surface towards the rod and the integrated back-up ring of acetal resin reduces the friction loss and heat generation. Used in heavy-duty cylinders in heavy mobile hydraulics, for shock pressure, contamination and large gap widths.



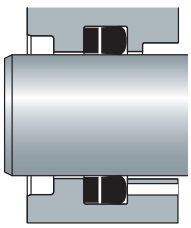
INSTALLATION EXAMPLE

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
TILA	PU, POM	50 (500) 7252	0,5 98	–30 / +90 –22 / +194

TILA

S

Type S is a compact rod seal of fabric reinforced nitrile rubber. Conventional design for use mostly as spare parts in light to medium hydraulic cylinders.



INSTALLATION EXAMPLE

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
S	NBR	16 (160) 2321	0,5 98	–30 / +100 –22 / +212

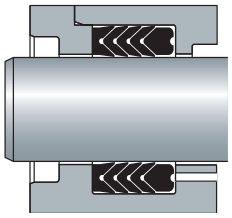
S

CH-5 CH-7

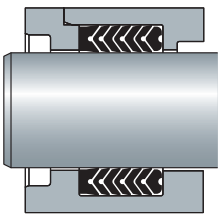
Seal sets for adjustable or fix seal housings in presses, marine hydraulics, road moulding systems and other large and heavy applications. Also popular as spare parts for older hydraulic equipment with simple and rough operation.

Type CH-5 has five lose parts: a bottom ring and three V-rings of fabric reinforced nitrile rubber and a top ring of fabric reinforced nitrile rubber or acetal resin.

Type CH-7 has seven lose parts: a bottom ring and three V-rings of fabric reinforced nitrile rubber, two V-rings of nitrile rubber as energizer, and a top ring of fabric reinforced nitrile rubber or acetal resin.



INSTALLATION EXAMPLE CH-5



INSTALLATION EXAMPLE CH-7

CH-5

CH-7

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
CH-5	NBR	25 (250) 3626	0,5 98	–30 / +100 –22 / +212
CH-7	NBR	25 (250) 3626	0,5 98	–30 / +100 –22 / +212

SEALPOOL HYDRAULIC SEALS

Rod seals

ROD SEALS, STANDARD RANGE SERIES G AND GL

G

GR

GS

GN

ROD SEALS SERIES G and GL: Double-acting piston seals, consisting of a dynamically sealing slide ring of PTFE and a static, elastomeric part, which also functions as an interference element. They are available in different designs and material combinations, all to meet demands on low friction, small housing dimensions and a long service life.

The following table gives a first indication about the right choice of type for different application demands. Comprehensive technical data and selection criteria can be found in our technical catalogue, "SEALPOOL Hydraulic Seals", SKF publication 5397.

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
G, GG, GL, GLG, GN, GS, GS-XX8	PTFE, NBR	16 (160) 2321	2 394	–30 / +100 –22 / +212
GC, GH-XX8, GLC, GR	PTFE, NBR	25 (250) 3626	2 394	–30 / +100 –22 / +212

GS-XX8

GC

GG

GL

GLC

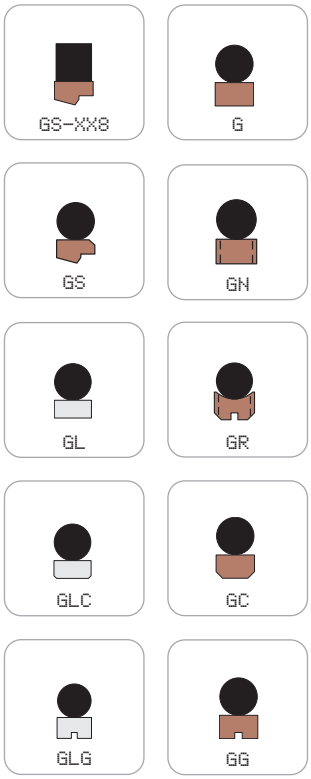
GLG

FEATURES AND FIELD OF APPLICATION OF SEALPOOL SLIDE RING SEALS

TYPE	FEATURE	APPLICATION FIELD
GH	Double-acting, notches and chamfers against the dynamic surface	Basic design for reciprocating movements
G, GL	Double-acting, sharp edges, no notches	Appropriate for impure media
GC, GLC	Double-acting, chamfered against the dynamic surface against extrusion	The chamfer provides improved protection
GG, GLG	Double-acting, grooves in the slide surface	Improved sealing ability
GN	Notches	For rapid pressure changes
GR	Double-acting, chamfers, notches and grooves in the dynamic surface and a radius on the static side	Appropriate for rotating and turning applications
GH-XX8	Double-acting, square ring as a static sealing element	Provides a decreased surface pressure against the dynamic surface and an increased sealing ability
GS	Single-acting slide ring seal	Applications with high demands on sealing ability

CHOICE OF MATERIAL

MEDIUM	MATERIAL, CONTRACT SURFACE	MS CODE SEAL	O-RING
Hydraulic oil Lubrication oil (mineral oil based)	Steel: min 33 HRC Chromed surface, cast iron	1) MS-292 (bronze filled) 2) MS-361 (glass fibre) 3) MS-426 PE-UHMW (max +80 °C / +176 °F)	MS-N70
	Stainless steel, aluminium, anodized or chromed bronze	1) MS-302 (carbon filled) 2) MS-851 (carbon fibre) 3) MS-426 PE-UHMW ((max +80 °C / +176 °F)	MS-F75
Water Water/glycol	Steel: min 33 HRC Chromed surface, cast iron,	1) MS-302 (carbon filled) 2) MS-851 (carbon fibre)	MS-N70 MS-F75 MS-E70
Water/oil emulsion	stainless steel, aluminium, anodized or chromed bronze	3) MS-304 (carbon filled) 4) MS-426 PE-UHMW (max +80 °C / +176 °F)	MS-N70 MS-F75
Hot water/steam	Steel: min 33 HRC Chromed surface, cast iron, stainless steel, aluminium, anodized or chromed bronze	1) MS-302 (carbon filled) 2) MS-851 (carbon fibre) 3) MS-304 (carbon filled)	MS-E70
Air, lubricated service Air, non-lubricated service	Steel: min 33 HRC Chromed surface, cast iron	1) MS-426 PE-UHMW (max +80 °C / +176 °F) 2) MS-361 (glass fibre) 3) MS-221, MS-231 (low-filled + colour pigment, only lubricated service)	MS-N70
	Stainless steel, aluminium, anodized or chromed bronze	1) MS-426 PE-UHMW (max +80 °C / +176 °F) 2) MS-302 (carbon filled) 3) MS-851 (carbon fibre) 4) MS-304 (carbon filled)	



SEALPOOL HYDRAULIC SEALS

Rod seals

SPRING ACTIVATED ROD SEALS

SUA

SUD

SUR

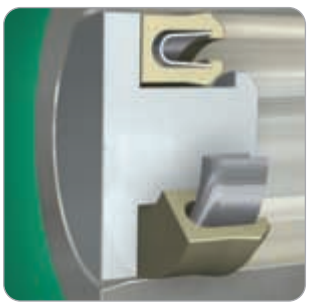
SUS

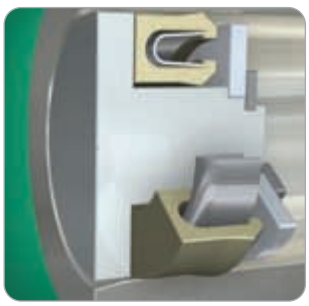
Spring activated PTFE rod seals: Series SU – spring activated, single-acting PTFE seal for both piston and rod. SU is appropriate for use as a dynamic seal at slowly rotating or reciprocating movements as well as a shaft seal or a static seal.

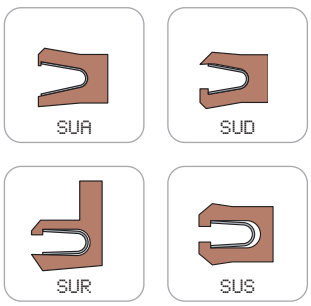
Series SU often replaces a rubber seal, e.g. an O-ring in applications with high or low temperatures, non-lubricated services, demands on low friction, aggressive media, high speeds, high pressures, vacuum etc.

Series SU can be delivered with many different spring types and materials adjusted to the application demands. Application areas are e g stationary hydraulic equipment, valves and food as well as pharmacy industy.

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
SUA	PTFE, Stainless steel	25 (250) 3626	15 2953	–200 / +260 –328 / +500
SUD	PTFE, Stainless steel	25 (250) 3626	15 2953	–200 / +260 –328 / +500
SUR	PTFE, Stainless steel	25 (250) 3626	15 2953	–200 / +260 –328 / +500
SUS	PTFE, Stainless steel	25 (250) 3626	15 2953	–200 / +260 –328 / +500







ROD SEALS, ACCESSORIES

STR

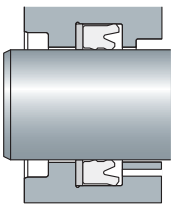
RI

Back-up ring type STR for rod seals: Back-up ring of acetal resin with the same sectional dimension as that of the seal, called “full face”. The basic design is split to facilitate assembly to the back surface of the seal.

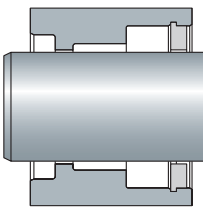
Retainer ring type RI: Retainer ring of acetal resin for rod seals for assembling on the pressure side of e.g. U-ring seals.

STR

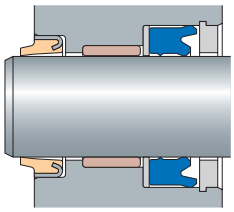
RI



INSTALLATION EXAMPLE STR



INSTALLATION EXAMPLE RI



INSTALLATION INTO OPEN GROOVE

SEAL TYPE	SEAL MATERIAL	MAX. PRESSURE MPa (bar) psi	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
STR	POM	– –	0,5 98	–30 / +100 –22 / +212
RI	POM	– –	0,5 98	–30 / +100 –22 / +212

SEALPOOL HYDRAULIC SEALS

Rod seals, selection factor matrix

Please select your most important decisive factors when choosing seal design and installation and mark possible solutions. Then study further factors, installation instructions and dimension tables in our technical catalogue, "SEALPOOL Hydraulic Seals", SKF publication 5397.

Figure 5 in the matrix represents the most appropriate design and figure 0 the least appropriate.



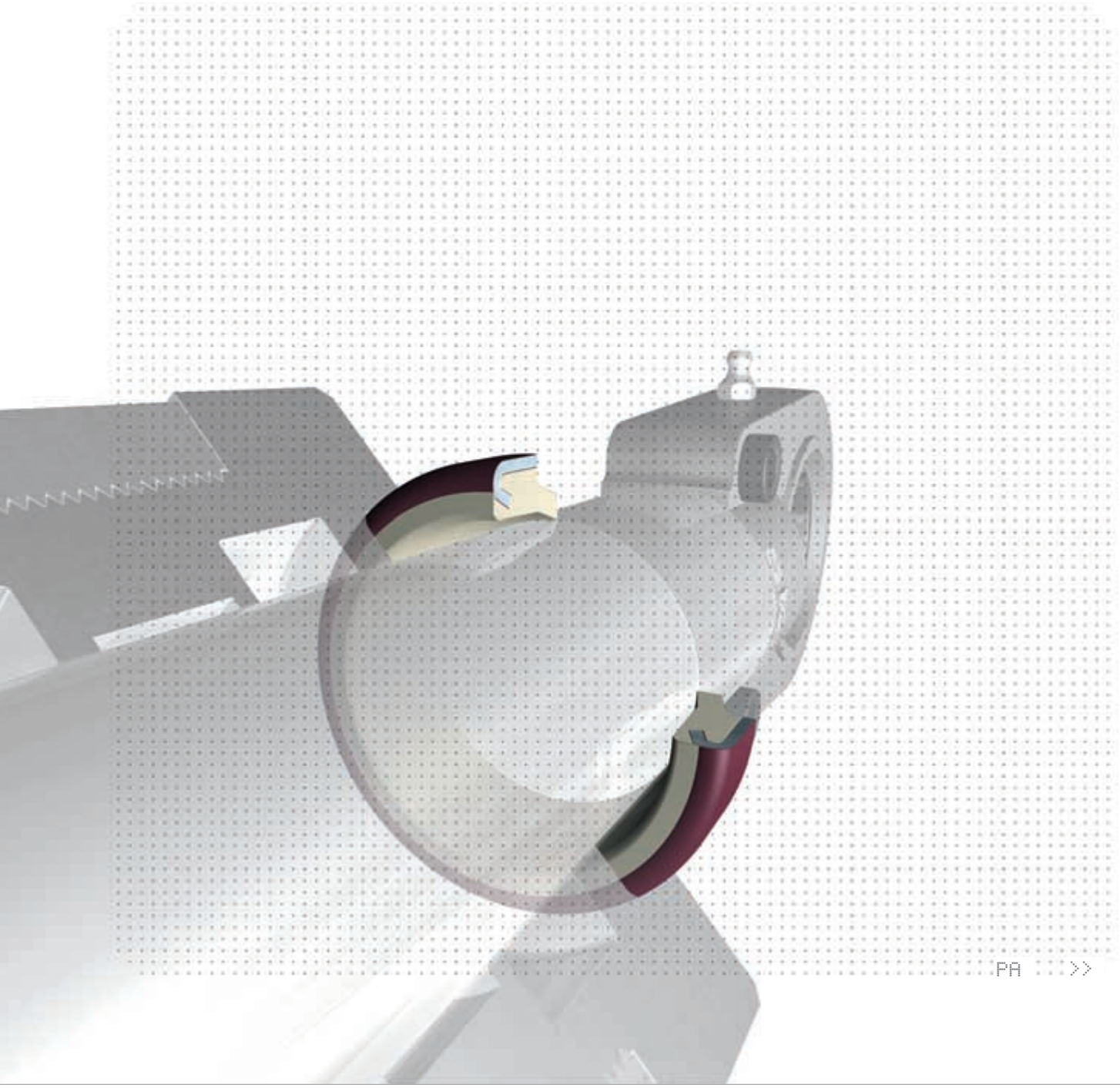


Type/series		SIL	TIL	TICLA	GS	SG	AG
Material		PU	PU	PU POM	PTFE NBR	NBR POM	NBR POM
Pressure	< 16 MPa (2 321 psi)	5	5	5	5	5	5
	< 25 MPa (3 626 psi)	5	5	5	5	5	5
	< 40 MPa (5 802 psi)	4	4	5	4	4	5
High temperature	> +110 °C / +230 °F	4	4	4	5	5	5
Low temperature	< –30 °C / –22 °F	5	4	4	4	4	4
Friction	pressure = 0		4	4	4	5	4
	pressure > 0		4	4	3	5	4
Surface sensitivity		5	5	5	3	3	4
Tolerance sensitivity		5	5	5	4	5	5
Service life		4	4	4	3	3	4
Assembly		5	5	4	3	4	4
Cost of installation		5	5	4	5	5	4
Sealing ability	pressure = 0	4	4	5	4	5	5
	pressure > 0	5	5	5	4	4	4
Preferred in new designs		X	X	X	X		

										
	SKY	**UN**	**SI**	**TI**	**TILA**	**S**	**GL**	**CH-5+CH-7**	**STR**	**RI**
	NBR	PU	PU	PU	PU POM	NBR	PTFE NBR	NBR	POM	POM
	4	4	4	4	5	4	4	5	–	–
	2	3	3	3	5	3	4	5	–	–
	0	2	2	2	4	2	3	3	–	–
	5	4	4	4	4	5	5	5	–	–
	4	3	3	3	3	4	4	5	–	–
	3	5	4	4	4	4	4	5	2	–
	3	4	3	3	3	4	3	5	3	–
	3	5	5	5	5	3	3	3	–	–
	4	5	5	5	5	5	4	5	–	–
	3	5	5	4	4	2	2	5	–	–
	5	5	5	4	4	2	2	5	–	–
	5	5	5	5	5	5	3	4	–	–
	5	3	5	5	5	5	5	3	–	–
	5	4	5	5	5	5	5	3	–	–
									X	X

SEALPOOL HYDRAULIC SEALS

Wiper seals



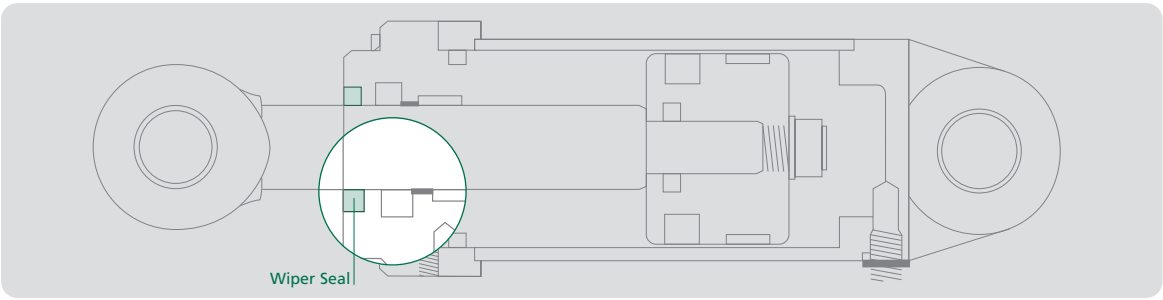
Contamination particles in the hydraulic system are the most common reason for breakdowns and short service life of seals. A major part of the particles reaches the system through the rod. The wiper seal's task is to prevent this.

The wiper seal is the most undervalued seal type in the hydraulic cylinder in relation to its important function. The choice of wiper seal should, however, be founded on as carefully drawn-up requirement specifications as the choice of piston and rod seals. The surrounding environment and service conditions must be taken into special consideration.

The wiper seal must be designed not only to fit the rod (dynamic function) but also to seal in the housing (static function).

In this brochure, we present our standard range of SEALPOOL Wiper Seals, with their main design features and operating conditions.

For comprehensive technical data and recommendations about the right choice of wiper seal, as well as for information about machining and installation, please see our technical catalogue, "SEALPOOL Hydraulic Seals", SKF publication 5397.



SEALPOOL HYDRAULIC SEALS

Wiper seals

METAL REINFORCED WIPER SEALS

PA

PAK

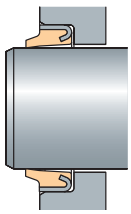
PAD

Type PA is a metal reinforced wiper seal of polyurethane with a steel case for press fit assembly. The design of the metal case provides a very high rigidity close to the bottom of the housing for an optimal fixation. Type PA is the most effective wiper seal type for demanding applications.

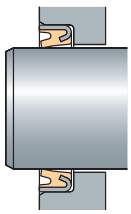
Type PAK is a metal reinforced wiper seal of polyurethane with a steel case for press fit assembly.

Type PAD is a metal reinforced, double-acting wiper seal of polyurethane with a steel case for press fit assembly. Type PAD is designed to be used in heavy-duty applications. Type PAD can also be completed with a retainer ring to withstand even tougher conditions.

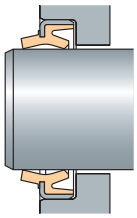
These metal reinforced wiper seal types are intended for assembly into open housings. For comprehensive technical data and recommendations machining and installation, please see our technical catalogue, "SEALPOOL Hydraulic Seals", SKF publication 5397.



INSTALLATION EXAMPLE
PA



INSTALLATION EXAMPLE
PAK



INSTALLATION EXAMPLE
PAD

SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
PA	PU	2 394	–40 / +90 –40 / +194
PAK	PU	2 394	–40 / +90 –40 / +194
PAD	PU	2 394	–40 / +90 –40 / +194

PA

PAK

PAD

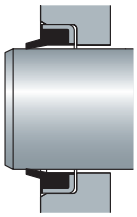
GA

SCB

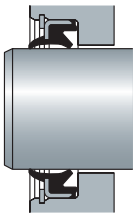
For less demanding applications, metal encased wiper seals with lip material nitrile rubber 80° IRH are used.

Type GA is a metal reinforced wiper seal of nitrile rubber for press fit assembly. Type GA can also be manufactured of fluorocarbon rubber at request. Type GA is designed to be used in light or medium duty applications.

Type SCB is a double-acting, metal reinforced wiper seal of nitrile rubber for press fit assembly. Type SCB can also be manufactured of fluorocarbon rubber at request. Type SCB is designed to be used in medium duty applications. Type SCB can also be completed with a retainer ring to withstand even tougher conditions.



INSTALLATION EXAMPLE
GA



INSTALLATION EXAMPLE
SCB

GA

SCB

SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
GA	NBR	2 394	–30 / +100 –22 / +212
SCB	NBR	2 394	–30 / +100 –22 / +212
	FPM	2 394	–20 / +150 –4 / +302

SEALPOOL HYDRAULIC SEALS

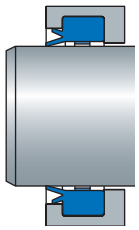
Wiper seals

NON-REINFORCED WIPER SEALS

PWY

Type PWY is a wiper seal of polyurethane to be assembled into closed housings.

Type PWY has an outwards-directed sealing lip to provide better static sealing ability in the housing. The wiper body is also equipped with radial ridges to prevent the wiper seal section tendency to be distorted



INSTALLATION EXAMPLE

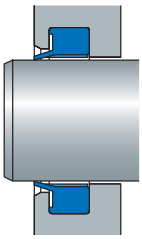
SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
PWY	PU	2 394	–30 / +90 –22 / +194

PWY

PWB

Type PWB is a wiper seal of polyurethane to be assembled into closed housings.

Type PWB has an axial static sealing edge on the front to provide fixation in the housing and axial ridges on the inside diameter to prevent the wiper seal section tendency to be distorted.



INSTALLATION EXAMPLE

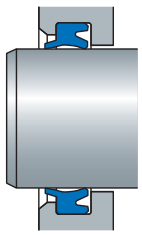
PWB

SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
PWB	PU	2 394	–30 / +90 –22 / +194

PWD

Type PWD is a double-acting wiper seal of polyurethane to be assembled into closed housings.

Type PWD is designed for use in light or medium duty hydraulic applications.



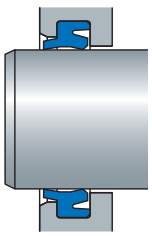
INSTALLATION EXAMPLE

PWD

SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
PWD	PU	2 394	–30 / +90 –22 / +194

RSW

Type RSW is a double-acting wiper seal of polyurethane to be assembled into closed housings.



INSTALLATION EXAMPLE

RSW

SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
RSW	PU	2 394	–30 / +90 –22 / +194

SEALPOOL HYDRAULIC SEALS

Wiper seals

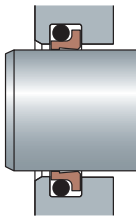
NON-REINFORCED WIPER SEALS

PO2

Type PO2 is a PTFE wiper seal with an energizing O-ring of nitrile rubber providing the static sealing function.

The O-ring is also available in other rubber materials, e.g. fluorocarbon rubber.

Type PO2 is designed to be used in applications with aggressive media, high temperatures or specific demands for low friction.



INSTALLATION EXAMPLE

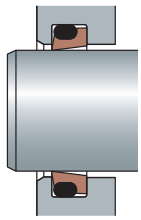
PO2

SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
PO2	PTFE, NBR	15 2953	–40 / +110 –40 / +230
	PTFE, FPM	15 2953	–30 / +150 –22 / +302

PO

Type PO is a PTFE wiper seal with an energizing O-ring of nitrile rubber providing the static sealing function. The O-ring is also available in other rubber materials, e.g. fluorocarbon rubber.

Type PO is designed to be used in applications with aggressive media, high temperatures or specific demands for low friction.



INSTALLATION EXAMPLE

PO

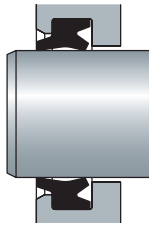
SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
PO	PTFE, NBR	15 2953	–40 / +110 –40 / +230
	PTFE, FPM	15 2953	–30 / +150 –22 / +302

SDR

Type SDR is a double-acting wiper seal of nitrile rubber for assembly into closed housings.

Type SDR is designed for light duty hydraulic applications.

Type SDR can also be manufactured of fluorocarbon rubber at request.



INSTALLATION EXAMPLE

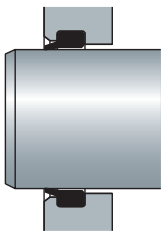
SDR

SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
SDR	NBR	2 394	–30 / +100 –22 / +212
	FPM	2 394	–20 / +150 –4 / +302

SER

Type SER is a mini wiper seal of nitrile rubber for assembly into closed housings.

Type SER can also be manufactured of fluorocarbon rubber at request.



INSTALLATION EXAMPLE

SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
SER	NBR	2 394	–30 / +100 –22 / +212
	FPM	2 394	–20 / +150 –4 / +302

SER

SEALPOOL HYDRAULIC SEALS

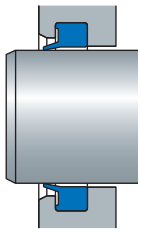
Wiper seals

NON-REINFORCED WIPER SEALS

PW

Type PW is a wiper seal of polyurethane for assembly into closed housings.

Type PW can also be manufactured of fluorocarbon rubber at request.



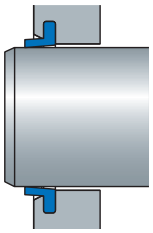
INSTALLATION EXAMPLE

SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
PW	PU	2 394	–30 / +100 –22 / +212

PW

DK

Type DK is a wiper seal of polyurethane for assembly into closed housing.



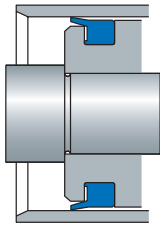
INSTALLATION EXAMPLE

SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
DK	PU	2 394	–30 / +100 –22 / +212

DK

PPUA

Type PPUA is a wiper seal of polyurethane with an axial static sealing edge on the front corner of the wiper body. To be used on pistons in single-acting cylinders.



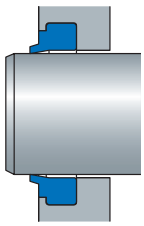
INSTALLATION EXAMPLE

PPUA

SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
PPUA	PU	2 394	–30 / +90 –22 / +194

PWF

Type PWF is a wiper seal of polyurethane for assembly into closed housing.



INSTALLATION EXAMPLE

PWF

SEAL TYPE	SEAL MATERIAL	MAX. LINEAR VELOCITY m/s ft/min	TEMPERATURE RANGE °C °F
PWF	PU	2 394	–30 / +90 –22 / +194

HYDRAULIC SEALS

Wiper seals, selection factor matrix

Please select your most important decisive factors when choosing wiper seal design and installation and mark possible solutions. Then study further factors, installation instructions and dimension tables in our technical catalogue, "SEALPOOL Hydraulic Seals", SKF publication 5397.

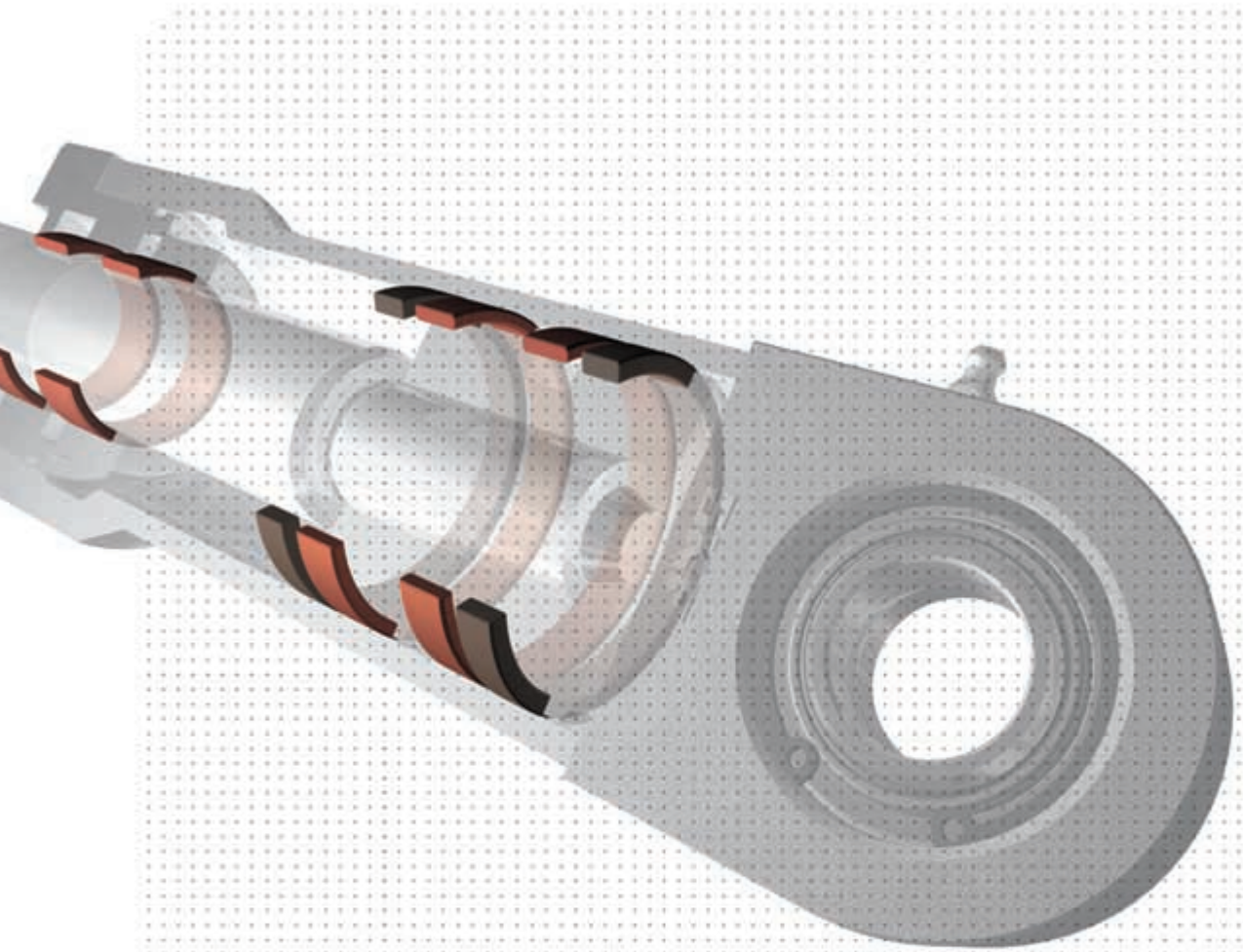
Figure 5 in the matrix represents the most appropriate design and figure 0 is the least appropriate.

Type/series	 **PA**	 **PAK**	 **PAD**	 **GA**	 **SCB**	 **PWY**	 **PWD**
Material	PU	PU	PU	NBR	NBR FPM	PU	PU
High temperature (+110 °C, +230 °F)	4	4	4	4	4	4	4
Low temperature (–40 °C, –40 °F)	5	5	5	4	4	5	5
Friction	3	4	3	4	4	4	4
Surfaces, sensitivity	5	5	5	3	3	5	5
Tolerances, sensitivity	4	4	4	4	4	4	4
Service life	5	5	5	3	3	4	4
Assembly	5	5	5	5	5	4	4
Fixation in the housing	5	5	5	4	5	4	4
Cost of installation	5	5	5	5	5	4	3
Wiping ability	5	4	5	3	4	4	4
Static sealing in the housing	5	5	5	5	5	5	5
Preferred in new designs	X	X	X	X		X	X

										
	PWB	**RSW**	**PO2**	**PO**	**SDR**	**SER**	**PW**	**DK**	**PPUA**	**PWF**
	PU	PU	PTFE FPM NBR	PTFE FPM NBR	NBR FPM	NBR FPM	PU	PU	PU	PU
	4	3	5	5	4	4	3	4	3	3
	5	4	3	3	4	4	3	2	3	3
	4	4	5	5	4	5	4	5	4	4
	5	4	3	3	4	4	4	3	4	4
	4	4	3	3	4	4	3	2	3	3
	4	4	2	2	4	4	4	2	4	4
	4	4	3	3	4	4	4	4	4	4
	4	3	4	4	4	4	4	4	4	3
	3	3	3	3	3	3	3	3	3	3
	4	4	4	3	3	3	3	2	3	4
	4	4	3	4	3	3	2	1	3	2
	X		X							
										

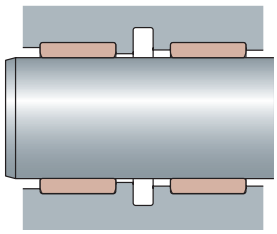
SEALPOOL HYDRAULIC SEALS

Guides

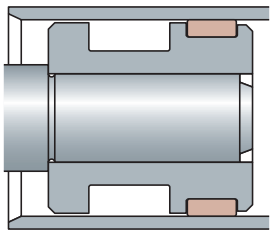


PGR> SB >>

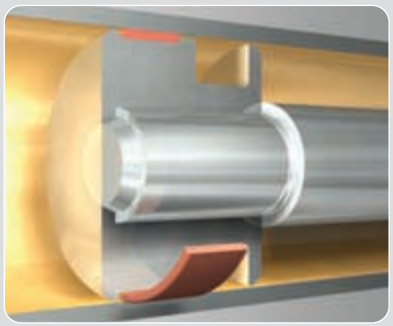
GUIDES



Installation example for rods



Installation example for pistons



The purpose of guide rings and guide strips of plastic materials is to guide the piston in the cylinder bore and the rod in the cylinder head in a working hydraulic cylinder as well as to withstand arising side loads and prevent metallic contact between these axially mobile parts.

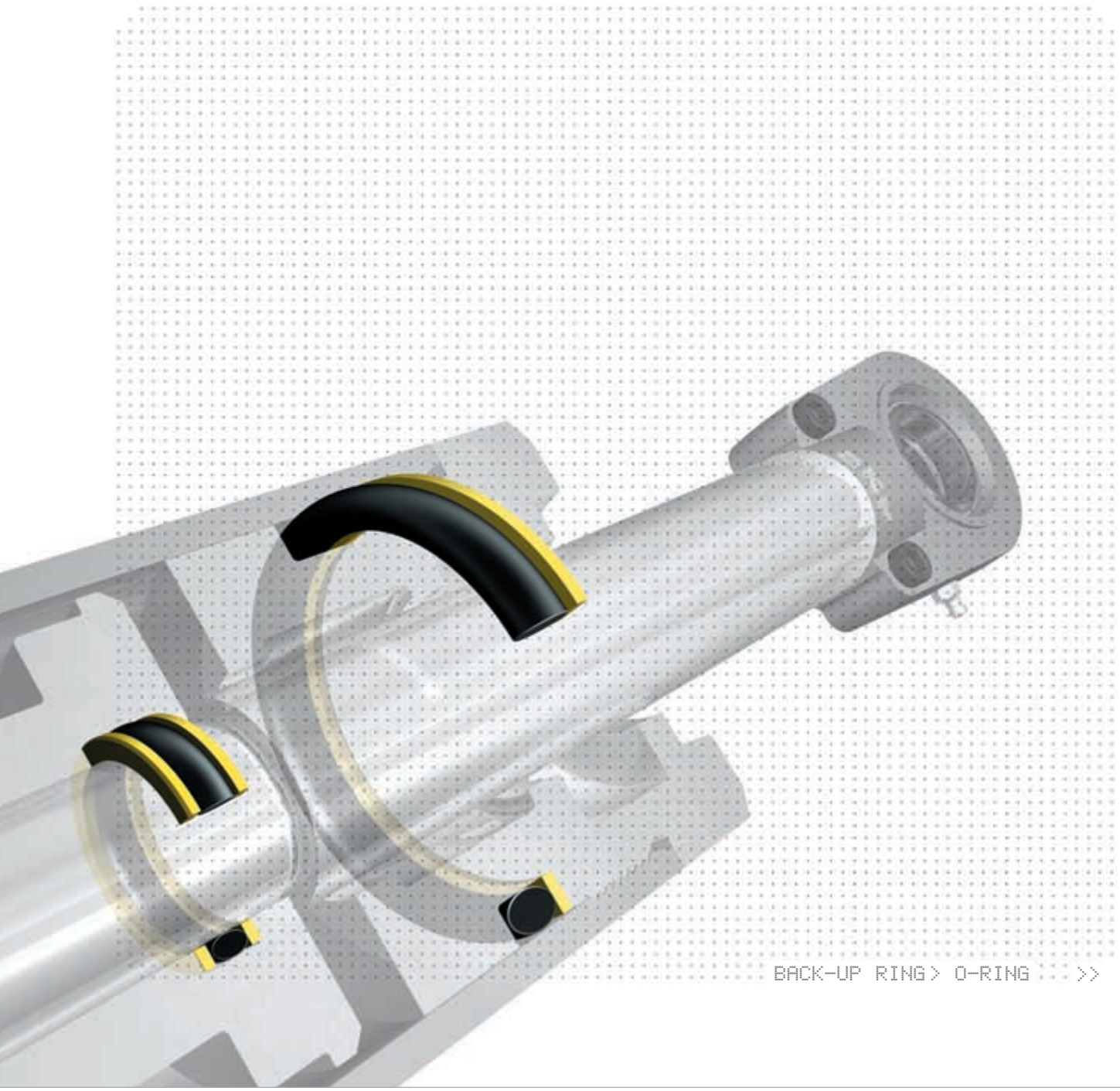
We recommend the materials phenolic/fabric, acetal resin or PTFE for guides depending on the field of application.

	GUIDE TYPES FOR ROD	GUIDE TYPES FOR PISTON
PHENOLIC/FABRIC	RGR-PF	PGR-PF
ACETAL RESIN	RGR-A	PGR-A
PTFE	SB, SB/C	SB, SB/C

APPLICATION FIELD	PHENOLIC / FABRIC	ACETAL RESIN	PTFE
Mobile hydraulics	x		
Farming hydraulics		x	
Industrial hydraulics	x	x	x
Process hydraulics			x
Water hydraulics			x
Food industry hydraulics			x
Pneumatics		x	x

SEALPOOL HYDRAULIC SEALS

Static seals



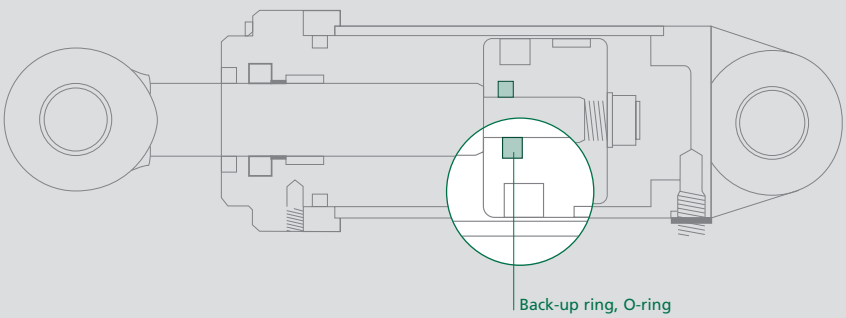
O-RINGS AND BACK-UP RINGS

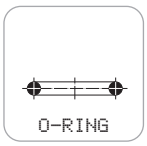
The O-ring is one of the most common sealing devices and is used in the most different applications. The design is unique with its genius simplicity.

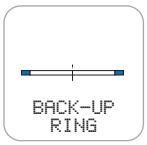
The O-ring seals through its deformation between the surfaces against which it is supposed to seal. The working pressure at which the O-ring can be used is dependent on, among others, the installation mode, fitting clearance, the O-ring material, sealed medium and temperature. O-rings of a hard material generally provide an inferior sealing ability at low pressures due to large permanent deformation.

O-rings are often used as static sealing elements in hydraulic systems. However, they tend to extrude into the clearance already at low pressures and are thereby destroyed. A common solution is to use O-rings of a material with increased hardness, e.g. 90° IRH.

This provides a certain improvement, but a better solution for hydraulic applications is instead to combine O-rings for static functions with back-up rings.







SEALPOOL HYDRAULIC SEALS

Static seals

O-RINGS


O-RINGS


ECOR

Material: We normally stock O-rings of nitrile rubber (N) 70° IRH. When necessary, the alternative hardness 90° can be delivered at request. It is, however, better to choose 70° IRH and combine the O-ring with a back-up ring.

For applications with temperatures over +100 °C (+212 °F) fluorocarbon rubber (FPM) or silicone rubber (Q) can be appropriate, depending on the medium.

In our catalogue SEALPOOL Hydraulic Seals, SKF publication 5397, you will find a wide range of O-ring sizes and fundamental technical information. Detailed information about O-ring sizes and tolerances, installation instructions and in some cases material properties you will find in common national and international standards, e.g. SMS 1586 and ISO 3601. We will be pleased to inform you about them.

PTFE encapsulated O-rings, type ECOR: FEP encapsulated O-ring of silicone or Viton®, type ECOR, can be delivered in PFA, which withstands high temperatures.

ECOR is an O-ring consisting of a seamless and uniform Teflon™ FEP encapsulation which completely enclose the core material of either silicone or Viton® in order to protect it from media and air.

The function is the same as for a normal O-ring that is compressed in the groove and is working statically. ECOR is not appropriate for continuously dynamic applications due to its thin and soft case.

Advantages:
- Chemically resistant to aggressive media thanks to the Teflon™ FEP encapsulation
- Wide temperature range, –60 to +205 °C (PFA +260 °C, –76 to +140 °F, PFA 500 °F)
- Anti-adhesive, no stick-slip effects
- Sterilisable, FDA approved
- Low steam permeability and low water absorption
- Low compression set solution.

BACK-UP RINGS

Back-up rings should be used when the fitting clearance between the surfaces that the O-ring should seal is large enough to allow the O-ring to extrude at certain working pressures. In installations with normal and standardized dimensions and tolerances the O-ring normally must be completed with back-up ring(s) if the working pressure exceeds 10 to 16 MPa (1450 to 2321 psi), depending on the temperature.

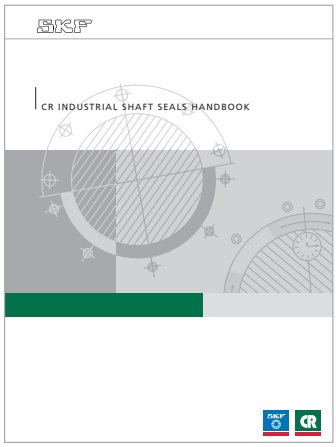
In applications where the O-ring is exposed to pressure from one side only, the back-up ring is installed at the zero pressure side. For an O-ring exposed to pressure from both sides a back-up ring is assembled on either side.

Our back-up rings are kept in stock with a basic design and are produced of polyurethane 95° Shore A and a polyester elastomer, 95° Shore A. This enables the use of back-up rings in most of applications with normal pressure media and temperatures.

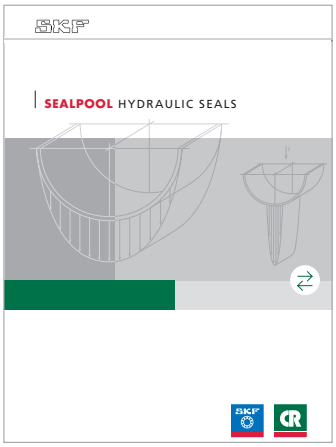
In applications with high temperatures or aggressive media back-up rings of a PTFE material are suitable, either unfilled or with an appropriate filler. We keep a large number of sizes of unfilled back-up rings of PTFE in stock. These are machine finished and can therefore be delivered within short notice.

PRODUCT SUMMARY

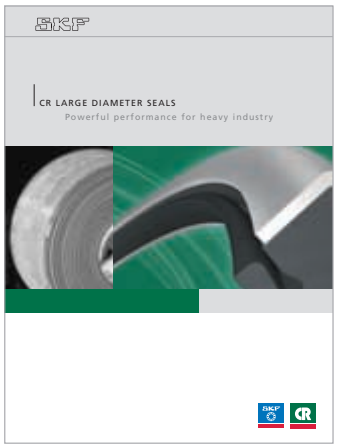
Publications, CD-Rom, Online



Publication 5300
CR Industrial Shaft Seals Handbook

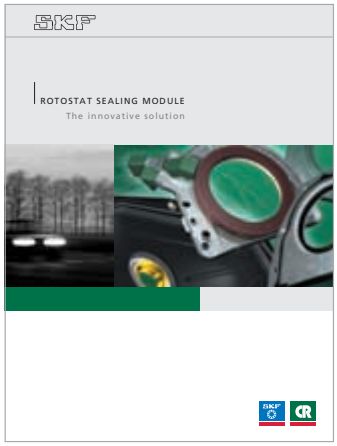


Publication 5397
SEALPOOL Hydraulic Seals



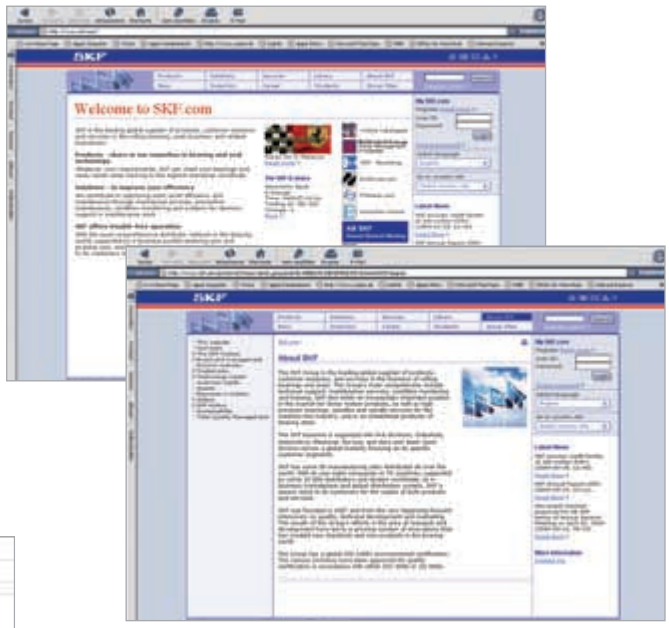
Publication 5399
CR Large Diameter Seals

Publication 5149
Speedi-Sleeve



Publication 5046
Rotosat Sealing Module

Publication 5311, CD-Rom
SEALPOOL Hydraulic Application Tool



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