Customized machined seals

Product range

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The SKF brand now stands for more than ever before, and means more to you as a valued customer.

While SKF maintains its leadership as a high-quality bearing manufacturer throughout the world, new dimensions in technical advances, product support and services have evolved SKF into a truly solutions-oriented supplier, creating greater value for customers.

These solutions enable customers to improve productivity, not only with breakthrough application-specific products, but also through leading-edge design simulation tools and consultancy services, plant asset efficiency maintenance programmes, and the industry's most advanced supply management techniques.

The SKF brand still stands for the very best in rolling bearings, but it now stands for much more.

SKF – the knowledge engineering company

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Machined seals from SKF – the flexible concept

SKF is market and technology leader for custom engineered machined seals offering a comprehensive range of high quality industrial seals for many industry segments.

SKF develops and produces ready-to-use CNC-controlled SKF SEAL JET production units which can manufacture virtually any kind of customized machined seals for almost any conceivable application in almost any dimension and profile. Thanks to the SKF SEAL JET system, the machined seals competence centres, spread world wide, provide a truly local service to customers. SKF supplies tailor-made machined seals in close partnership with customers from the design phase to serial production. SKF provides:

- Promptly manufactured seals up to 4 000 mm in diameter as one piece and even larger using a special welding technique
- More than 175 standard profiles as well as tailor-made solutions
- All seals in a wide range of materials covering tailor-made polyurethanes, standard and high performance elastomers as well as thermoplastics

This brochure refers only to the customized machined seals range. SKF offers a wide range of standard and customized moulded seals. Contact SKF for more information.

Sealing materials

Introduction

Increased requirements for sealing technology reinforces the importance of selecting the appropriate sealing materials. Sealing materials face demands for higher speeds, temperatures and pressures, and are often confronted with poor lubricating fluids. Fluids like HFA and HFB as well as biologically degradable hydraulic fluids (vegetable oils and synthetic esters) present many challenges for developers of sealing materials.

In the sealing technology, different groups of macromolecular (polymer) substances are used. Macromolecular substances are organic compounds whose molecules consist of several thousands, often even millions of atoms, known as macro, giant, string or chain molecules. They can be created either by modification of highly molecular natural materials (e.g. natural rubber) or by depositing low-molecular elements (so called monomers) through various chemical reactions (synthetic materials, plastics).

SKF acknowledged this with the transfer of R&D from a standard solution provider to becoming a developer of special, tailor-made solutions. Projects with close client co-operation succeed best in achieving the optimal sealing solution.

In this brochure, we feature 25 standard materials. All of these materials have been developed by SKF to meet standard customer requirements. Additionally, we supply special materials to meet specific application demands.

Thermoplastic elastomers – polyurethanes

The thermoplastic elastomers demonstrate the characteristic properties of elastomers over a wide temperature range, but with the processing behaviour of thermoplastics. They can be melted at high temperature and can be processed with traditional thermoplastic processing techniques. Thermoplastic elastomers are soluble and they generally swell less in comparison to their chemically cross-linked equivalents.

Elastomers

Elastomers are extremely flexible materials that can be expanded by exerting relatively little force. Because of their structure, elastomers have a high elasticity and resilience and usually offer a good compression set. The rubber materials are polymers, which are formed by chemically cross-linked macromolecules with various vulcanization additives. Due to their chemical bonds, they do not melt, but rather begin to decompose at high temperatures. The cross-linking also stops the rubber materials from dissolving or, depending on the medium, swelling or shrinking.

Thermoplastics

Thermoplastics can be melted. They are essentially harder and more rigid at their application temperature compared to elastomers. Depending on the chemical structure, the properties vary from hard, to stiff, to ductile and flexible. Due to the morphological structure, extensive stretching is non-reversible and moulded parts remain in the deformed state. Engineering thermoplastics are used for back-up rings and guide rings, bushings, etc.

Thermoplastic elastomers – Polyurethanes

ECOPUR

ECOPUR is a thermoplastic polyurethane elastomer (TPU) with an excellent abrasion resistance, low compression set, high physical properties and tear strength. ECOPUR is mostly used for U-cup seals, lip seals, wipers and chevron packings, but it may also be used for dampers and other machined parts. Products made from this material can be used in mineral oil, in water up to 40 °C and in bio-degradable hydraulic oils like vegetable oils and synthetic esters up to 60 °C (in these hydraulic fluids, the use of H-ECOPUR instead of ECOPUR is recommended). Depending on the seal design and the installation housing, seals made of ECOPUR can be used up to 400 bar (for higher pressure anti-extrusion-rings are required).

H-ECOPUR

H-ECOPUR is a hydrolysis-resistant thermoplastic polyurethane elastomer (TPU). It combines the engineering properties of ECOPUR with a high resistance to hydrolysis (degradation in water), which is exceptional for polyurethanes. E.g. it is stable in water up to +90 °C and has outstanding stability in mineral oil. Because of its resistance to hydrolysis, H-ECOPUR can be used for water hydraulics and for applications in mining, tunnelling and manufacturing of presses, when fire resistance is required. H-ECOPUR is particularly recommended for use in pure water and seawater, for HFA and HFB fluids, biologically degradable hydraulic fluids (vegetable oils and synthetic esters) and food articles. H-ECOPUR is approved for various food regulations.

G-ECOPUR

G-ECOPUR is a hydrolysis-resistant cast polyurethane elastomer (CPU) with similar properties to H-ECOPUR. Generally, G-ECOPUR is used for seals with a diameter range from 540 mm up to 4 000 mm as one piece and even larger when using a a special welding technique.

T-ECOPUR

T-ECOPUR is a thermoplastic polyurethane elastomer (TPU) for low temperature applications. The properties of T-ECOPUR are similar to those of ECOPUR, but the minimum service temperature is extended to –50 °C. For that reason, T-ECOPUR is most suitable for severe climatic conditions and processes for frozen goods.

S-ECOPUR

S-ECOPUR is a self-lubricated thermoplastic polyurethane elastomer (TPU) with solid lubricants optimized to reduce friction and improve wear resistance. This material is therefore best suited for most severe applications in water hydraulics as well as in non-lubricated pneumatics.

Thermoplastic elastomers – Hard grade polyurethanes

X-ECOPUR

X-ECOPUR is a hard grade thermoplastic polyurethane elastomer (TPU). This material provides outstanding friction reduction and wear resistance properties as well as high pressure resistance. Therefore, it is suitable for composite seals and for wipers working in heavy-duty applications.

Thanks to the exceptional extrusion resistance of this material, seals are working at higher pressure levels and larger clearances compared to those made of standard polyurethanes or PTFE compounds.

XH-ECOPUR

Compared to H-ECOPUR, XH-ECOPUR (TPU) has a significantly higher hardness. Thanks to an outstanding chemical and hydrolysis resistance, this material is recommended for applications with mineral oil, biodegradable hydraulic fluids (HETG and HEES, etc.) and water based fluids (HFA and HFB).

XS-ECOPUR

Compared to S-ECOPUR, XS-ECOPUR (TPU) is harder and has a better extrusion resistance. Therefore, this material can be used at higher pressures, assuming the same seal profiles are used.

XS-ECOPUR should be used instead of X-ECOPUR and XH-ECOPUR under poor lubricated working conditions. Depending on the overall service conditions, this material can also withstand dry-running.

Elastomers

SKF Ecorubber-1

SKF Ecorubber-1 is an elastomer based on acrylonitrile-butadiene rubber (NBR) and is used for U-cup seals, chevron packings, special seals and various components. This material has good resistance to mineral oils and greases and HFA, HFB and HFC pressure fluids. However, the material is not resistant to glycol-based brake fluids, HFD fluids, aromatic fluids (such as benzene), esters, ketones and amines or concentrated acids and bases.

SKF Ecorubber-H

SKF Ecorubber-H is a hydrogenated or saturated acrylonitrile-butadiene rubber (HNBR), suitable for applications with aliphatic hydrocarbons like propane or butane, mineral oils, greases (for short times up to 170 °C) and sulfonated crude oil. Furthermore, it can be used in many diluted acids, bases and salt solutions even at elevated temperatures and in glycol-water mixtures. SKF Ecorubber-H is not compatible with fuels that have a high content of aromatic hydrocarbons (premium blend petrol), gasolines (petrol/alcohol blends), ketones, esters, ethers and chlorinated hydrocarbons like trichloro-ethylene and tetrachloro-ethylene.

SKF Ecorubber-2

SKF Ecorubber-2 is an elastomer based on fluoro rubber (FKM) that can be used for U-rings, lip seals, chevron packings, wipers and special seals. Its outstanding properties are high resistance to heat, weathering, ozone and many other chemicals.

SKF Ecorubber-2 is compatible with mineral oils and greases containing sulphur, HFD pressure fluids (some phosphate esters and chlorinated hydrocarbons), crude oil and sour gas. SKF Ecorubber-2 is not resistant to anhydrous ammonia, amines, ketones, esters, hot water and low molecular weight organic acids.

SKF Ecorubber-3

SKF Ecorubber-3 is an elastomer based on ethylene-propylene rubber (EPDM) and can be used for U-cup seals, lip seals and chevron packings. SKF Ecorubber-3 has outstanding resistance to hot water, steam, washing agents and polar organic solvents. SKF Ecorubber-3 is not resistant to mineral oil and other unpolar media. Its resistance to weathering, ozone and ageing is good. When used in glycol-based brake fluids, governmental regulations have to be considered.

SKF Ecosil

SKF Ecosil is a silicone rubber (MVQ) and can be used for O-rings, gaskets and special seals. Due to its mechanical properties, it is mostly used for static applications. SKF Ecosil is highly resistant to weathering, ozone and ageing and it is compatible with mineral oil.

SKF Ecoflas

SKF Ecoflas is a unique fluoro elastomer based on an alternating copolymer of tetrafluoro-ethylene and propylene (TFE/P). Compared to fluoro rubber, it shows slightly higher tensile strength and a quite similar heat resistance. The resistance of SKF Ecoflas to mineral oils is similar to SKF Ecorubber-1/2/H. SKF Ecoflas has outstanding resistance to hot water and hot steam up to 230 °C as well as to sourgas and amines, brake fluids (based on glycol, mineral oil or silicon oil) and fire-resistant hydraulic fluids. In contrast to SKF Ecorubber-2, SKF Ecoflas has a good resistance to radiation.

Thermoplastics

SKF Ecoflon 1

SKF Ecoflon 1 is a thermoplastic material based on polytetrafluoro-ethylene (PTFE-virgin) that is used for back-up rings, chevron packings, O-rings, rotary seals and gaskets. SKF Ecoflon 1 has an outstanding chemical resistance and will only be attacked by molten alkali metals and elementary fluorine at high temperatures. Using PTFE seals, it should be noted that creeping occurs at relatively low loads (pressure). SKF Ecoflon 1 is suitable for the food industry.

SKF Ecoflon 2

SKF Ecoflon 2 (PTFE + 15% glass fibre + 5% MoS_2) has improved compression strength as well as improved sliding properties compared to SKF Ecoflon 1.

The chemical resistance is similar to SKF Ecoflon 1.

SKF Ecoflon 3 (3F)

SKF Ecoflon 3 (PTFE + 40% bronze) features improved compression strength, sliding properties and an improved thermal conductivity compared to SKF Ecoflon 1.

SKF Ecoflon 3F has, compared to SKF Ecoflon 3, improved wear and abrasion resistance and is green coloured.

SKF Ecoflon 4

SKF Ecoflon 4 (PTFE + 25% carbon) has improved mechanical strength, stiffness and hardness as well as improved sliding properties compared to SKF Ecoflon 1.

SKF Ecoflon 5

SKF Ecoflon 5 (PTFE modified) has improved wear and abrasion resistance compared to SKF Ecoflon 1. The material is suitable for the food and beverage industry.

SKF Ecotal

SKF Ecotal is a semi-crystalline polyacetal-copolymer (POM) which is used for anti-extrusion rings, guide rings, bushings, scrapers and for precision-machined parts with tight tolerances. SKF Ecotal has good mechanical properties, low water absorption and good chemical resistance. SKF Ecotal can be used in mineral oils and in water-based fire-resistant hydraulic fluids (HFA, HFB and HFC fluids). Concentrated acids and bases will attack and destroy it.

SKF Ecomid

SKF Ecomid is a cast polyamide (PA) with good sliding properties and is used for back-up rings, guide rings and bearing components instead of SKF Ecotal for diameters above 260 mm. SKF Ecomid can be used in mineral oils and some water-based fire-resistant hydraulic fluids. When designing parts of SKF Ecomid for an application in water or water-based fluids, the swelling of the material (SKF Ecomid absorbs water up to eight weight percent) must be taken into consideration.

SKF Ecopaek

SKF Ecopaek (PEEK) is a polymer with high tensile strength, stiffness, high heat distortion temperature and good sliding and friction behaviour. As far as strength and stiffness are concerned, SKF Ecopaek exceeds most technical plastics especially at high temperatures.

SKF Ecowear 1000

SKF Ecowear 1000 is a semi-crystalline thermoplastic material based on polyethylene (UHMWE-PE) with a molecular weight of about 4 500 000 g/mol. SKF Ecowear 1000 has a very low coefficient of friction, an excellent wear resistance and impact strength (also at low temperature down to –200 °C). Compared to SKF Ecoflon range, it has a very high creep resistance and is almost water repellent without any swelling.

SKF Ecowear 1000 is recommended where outstanding sliding properties are required and in case of wear- and dry-running due to bad lubrication and aqueous media.

Thermosets

SKF Ecotex

SKF Ecotex is a compound based on a thermoset polyester resin (light orange) and reinforced with fabric inlays. Due to the addition of graphite, the material shows very good characteristics in respect to the tribological requirements in gliding systems. SKF Ecotex shows high compressive strength and outstanding friction reduction and wear resistance properties. Therefore, it is very well-suited for guide rings and bushings. Thanks to the very low tendency of absorbing moisture, SKF Ecotex is particularly suitable for use in water and media containing water (swelling in water < 0,1 %).

Special materials

All standard materials can be modified to meet specific application requirements. Contact SKF for more information.

General remark for technical data

The stated operating parameters represent general conditions. It is recommended NOT to use all maximum values simultaneously. The specified pressure limits apply for use in mineral oil with a maximum temperature of 60 °C and a maximum metal extrusion gap of 0,25 mm. The speed limits apply for adequate lubrication and running surface finishes as recommended. SKF also recommends to test material / media compatibility and sealing function for targeted performance under real working conditions. These tests are provided as a service by SKF, upon customers' request. Depending on application details, higher pressures and speed limits can be attained in most cases. If any of the indicated limits do not meet specific requirements, please contact SKF.

Material data

			Polyurethanes							
Properties	**DIN**	**Unit**	**ECOPUR**	**H-ECOPUR** hydrolysis resistant	**G-ECOPUR** cast – hydrolysis resistant	**T-ECOPUR** low temperature grade	**S-ECOPUR** solid lubricants	**X-ECOPUR** hard grade	**XH-ECOPUR** hard grade hydrolysis resistant	**XS-ECOPUR** hard grade solid lubricants
			TPU	TPU	CPU	TPU	TPU	TPU	TPU	TPU
Standard colour			Green	Red	Red	Blue	Grey/ black	Dark green	Dark red	Dark grey
Hardness	53505	Shore A	95 ±2	95 ±2	95 ±2	95 ±2	95 ±2	97 ±2	97 ±2	97 ±2
Hardness	53505	Shore D	48 ±3	48 ±3	47 ±3	48 ±3	48 ±3	57 ±3	60 ±3	58 ±3
Density	EN ISO 1183	g/cm³	1,2	1,2	1,17	1,17	1,23	1,21	1,22	1,25
100% modulus	53504	N/mm²	12	≥ 13	≥ 11	≥ 12	17	21	25	25
Tensile strength/yield stress	53504/53455	N/mm²	≥ 40	≥ 50	≥ 45	≥ 50	50	50	50	43
Elongation at break	53504/53455	%	≥ 430	≥ 330	≥ 280	≥ 450	400	400	350	350
Modulus of elasticity – tensile test	53457	N/mm²	–	–	–	–	–	–	–	–
Compression set										
70 °C/24h 20% def.		%	≤ 30	≤ 27	≤ 30	20[3)]	25	24	26	30
100 °C/24h 20% def.		%	≤ 35	≤ 33	≤ 40	45[4)]	30	29	30	35
100 °C/22h	ISO 815	%	–	–	–	–	–	–	–	–
175 °C/22h	ISO 815	%	–	–	–	–	–	–	–	–
Rebound resilience	52512	%	42	29	43	50	–	–	–	–
Tear strength	ISO 34-1	N/mm	≥ 100	≥ 100	≥ 40	80	120	140	170	180
Abrasion	DIN ISO 4649	mm³	18	17	25	15	21	18	20	29
Minimum service temperature		°C	–30	–20	–30	–50	–20	–30	–20	–20
Maximum service temperature		°C	+110	+110	+110	+110	+110	+110	+110	+110

[1)] Rockwell hardness
[2)] DIN EN ISO 868
[3)] DIN ISO 815: 70 °C/70h, 10% def.
[4)] DIN ISO 815: at –40 °C
Data concerning other materials such as low temperature SKF Ecorubber-H 85A-b-LT, special food grade materials etc. are available on request.

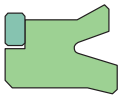
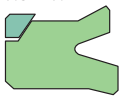
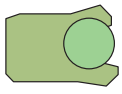
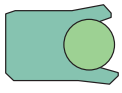
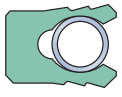
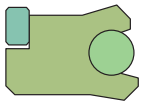
Elastomers						Thermoplastics										Thermoset
SKF Ecorubber-1	**SKF Ecorubber-H**	**SKF Ecorubber-2**	**SKF Ecorubber-3**	**SKF Ecosil**	**SKF Ecoflas**	**SKF Ecoflon 1**	**SKF Ecoflon 2** +15% GF + 5% MoS2	**SKF Ecoflon 3** +40% bronze	**SKF Ecoflon 3F** +40% bronze	**SKF Ecoflon 4** +25% Carbon	**SKF Ecoflon 5** modified	**SKF Exomid**	**SKF Ecotal**	**SKF Ecowear 1000**	**SKF Ecopaek**	**SKF Ecotex**
NBR	HNBR	FPM, FKM	EPDM	MVQ	TFE/P	PTFE virgin	PTFE	PTFE	PTFE	PTFE	PTFE	PA	POM	UHMWPE	PEEK	–
Black	Black	Brown	Black	Reddish brown	Black	White	Grey	Bronze	Green	Black	White	Black	Black	White	Cream	Light orange
85 ±5	85 ±5	85 ±5	85 ±5	85 ±5	83 ±5	–	–	–	–	–	–	–	–	–	–	–
36	34	34	34	34	31	57	60	64	64	65	59	77	82	61[2]	87	M98[1]
1,31	1,22	2,3	1,22	1,52	1,6	2,17	2,25	3	3,13	2,1	2,16	1,15	1,41	0,93	1,30	1,21
≥ 11	≥ 10	≥ 5	≥ 9	≥ 5	8	–	–	–	–	–	–	–	–	–	–	–
≥ 16	≥ 18	≥ 8	≥ 12	≥ 7	13	27	18	22	22	15	30	65	62	20	97	
≥ 130	≥ 180	≥ 200	≥ 110	≥ 130	220	300	200	280	300	180	360	120	40	≥ 350	≥ 45	–
–	–	–	–	–	–	–	–	–	–	–	–	1 800	2 600	600	3 700	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
≤ 15	≤ 22	–	≤ 15	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	≤ 20	–	≤ 15	29	–	–	–	–	–	–	–	–	–	–	–
28	29	7	38	44	–	–	–	–	–	–	–	–	–	–	–	–
20	30	21	15	8	19	–	–	–	–	–	–	–	–	–	–	–
90	90	150	120	–	110	–	–	–	–	–	–	–	–	–	–	–
–30	–25	–20	–50	–60	–10	–200	–200	–200	–200	–200	–200	–40	–50	–200	–60	–40
+100	+150	+200	+150	+200	+200	+260	+260	+260	+260	+260	+260	+100	+100	+90	+260	+120

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	Back-up ring
			°C		m/s	bar (*psi*)	–	
	K01-P	**Hydraulic, single acting** Asymmetric piston seal for standard applications. Design provides stable fit in the housing, ultimate sealing effect over a wide temperature range. Prevents extensive drag pressure. Back-to-back arrangement with guide ring in between for double-acting pistons or to separate different fluids.	–30 –20 –20 –50 –30	+110 +110 +110 +110 +110	0,5 0,5 0,7 0,5 0,5	400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*)	ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR	
	K01-PE	**Hydraulic, single acting** Asymmetric piston seal for standard applications as K01-P, but with increased contact force designed for single acting pistons.	–30 –20 –20 –50 –30	+110 +110 +110 +110 +110	0,5 0,5 0,7 0,5 0,5	400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*)	ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR	
	K01-R	**Hydraulic, single acting** As profile K01-P, but more easily adaptable to diverse temperatures and media by selection of suitable seal material.	–30 –20 –50 –25 –60 –10	+100 +200 +150 +150 +200 +200	0,5 0,5 0,5 0,5 – 0,5	160 (*2 300*) 160 (*2 300*) 160 (*2 300*) 160 (*2 300*) – 160 (*2 300*)	SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2] SKF Ecorubber-H SKF Ecosil[3] SKF Ecoflas	
	K01-RE	**Hydraulic, single acting** Asymmetric piston seal for standard applications as K01-R, but with increased contact force designed for single acting pistons.	–30 –20 –50 –25 –60 –10	+100 +200 +150 +150 +200 +200	0,5 0,5 0,5 0,5 – 0,5	160 (*2 300*) 160 (*2 300*) 160 (*2 300*) 160 (*2 300*) – 160 (*2 300*)	SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2] SKF Ecorubber-H SKF Ecosil[3] SKF Ecoflas	
	K02-P	**Hydraulic, single acting** Asymmetric piston seal for standard applications as K01-P, but thanks to design with active back-up ring, it is suitable for higher pressure range or larger extrusion gaps. K02-P for standard housing design.	–30 –20 –20 –40 –30	+100 +100 +100 +100 +100	0,5 0,5 0,7 0,5 0,5	700 (*10 000*) 700 (*10 000*) 700 (*10 000*) 700 (*10 000*) 700 (*10 000*)	**Seal** ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR	**Back-up ring** SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]
	K02-PD	**Hydraulic, single acting** Asymmetric piston seal for standard applications as K01-P, but thanks to design with active back-up ring, it is suitable for higher pressure or larger extrusion gaps. K02-PD for small housing design.	–30 –20 –20 –40 –30	+100 +100 +100 +100 +100	0,5 0,5 0,7 0,5 0,5	700 (*10 000*) 700 (*10 000*) 700 (*10 000*) 700 (*10 000*) 700 (*10 000*)	**Seal** ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR	**Back-up ring** SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]

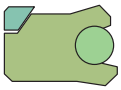
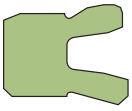
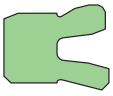
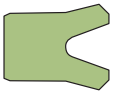
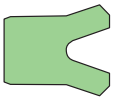
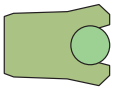
[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] NOTE: not suitable for mineral oils
[3] Only recommended for static or quasi-static applications. Contact SKF for more information

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°C		m/s	bar (*psi*)	–	
	K02-R	**Hydraulic, single-acting**					**Seal**	**Back-up ring**
		As profile K02-P, but more easily adaptable to diverse temperatures and media by selection of suitable seal material. K02-R for standard housing design.	–30	+100	0,5	250 (*3 600*)	SKF Ecorubber-1	SKF Ecotal[1]
			–20	+200	0,5	250 (*3 600*)	SKF Ecorubber-2	SKF Ecoflon 2
			–40	+100	0,5	250 (*3 600*)	SKF Ecorubber-3[2]	SKF Ecotal[1]
			–50	+150	0,5	250 (*3 600*)	SKF Ecorubber-3[2]	SKF Ecoflon 2
			–25	+100	0,5	250 (*3 600*)	SKF Ecorubber-H	SKF Ecotal[1]
			–25	+150	0,5	250 (*3 600*)	SKF Ecorubber-H	SKF Ecoflon 2
			–10	+200	0,5	250 (*3 600*)	SKF Ecoflas	SKF Ecopaek
	K02-RD	**Hydraulic, single-acting**					**Seal**	**Back-up ring**
		As profile K02-P, but more easily adaptable to diverse temperatures and media by selection of suitable seal material. K02-RD for small housing design.	–30	+100	0,5	250 (*3 600*)	SKF Ecorubber-1	SKF Ecotal[1]
			–20	+200	0,5	250 (*3 600*)	SKF Ecorubber-2	SKF Ecoflon 2
			–40	+100	0,5	250 (*3 600*)	SKF Ecorubber-3[2]	SKF Ecotal[1]
			–50	+150	0,5	250 (*3 600*)	SKF Ecorubber-3[2]	SKF Ecoflon 2
			–25	+100	0,5	250 (*3 600*)	SKF Ecorubber-H	SKF Ecotal[1]
			–25	+150	0,5	250 (*3 600*)	SKF Ecorubber-H	SKF Ecoflon 2
			–10	+200	0,5	250 (*3 600*)	SKF Ecoflas	SKF Ecopaek
	K03-P	**Hydraulic, single-acting**					**Seal**	**O-ring**
		O-ring activated, asymmetrical piston seal. Interference fit on inside diameter maintains stable fit in the housing. Design provides ultimate sealing effect. Especially suitable for short stroke applications (e.g. spindle seals, coupling actuators...)	–30	+100	0,5	400 (*5 800*)	ECOPUR	NBR 70
			–20	+100	0,5	400 (*5 800*)	H-ECOPUR	NBR 70
			–20	+100	0,7	400 (*5 800*)	S-ECOPUR	NBR 70
			–50	+110	0,5	400 (*5 800*)	T-ECOPUR	MVQ 70
	K03-F	**PTFE-piston seal, single-acting**					**Seal**	**O-ring**
		O-ring activated, asymmetrical PTFE piston seal, low friction and no stick-slip effect. Easily adaptable for diverse temperatures and media by selection of suitable O-ring material, almost no dead spots as required for applications in food and pharma industry.	–30	+100	1	200 (*2 900*)	SKF Ecoflon 1	NBR 70
			–55	+200	1	200 (*2 900*)	SKF Ecoflon 1	MVQ 70
			–30	+100	1	400 (*5 800*)	SKF Ecoflon 2,3,4	NBR 70
			–20	+200	1	400 (*5 800*)	SKF Ecoflon 2,3,4	FPM 75
			–50	+150	1	400 (*5 800*)	SKF Ecoflon 2,3,4	EPDM
			–55	+200	1	400 (*5 800*)	SKF Ecoflon 2,3,4	MVQ 70
			–30	+90	0,5	200 (*2 900*)	SKF Ecowear 1000	NBR 70
			–55	+90	0,5	200 (*2 900*)	SKF Ecowear 1000	MVQ 70
	K03-S	**PTFE-piston seal, single-acting**					**Seal**	**Spring**
		Helicoil spring activated, asymmetrical PTFE piston seal, low friction and no stick-slip effect, excellent chemical and thermal resistance, mainly used in chemical, pharma and food industry or for valves.	–200	+260	1	200 (*2 900*)	SKF Ecoflon 1	1.4310[3]
			–200	+260	1	400 (*5 800*)	SKF Ecoflon 2,3,4	1.4310[3]
			–200	+90	0,5	200 (*2 900*)	SKF Ecowear 1000	1.4310[3]
	K04-P	**Hydraulic, single-acting**					**Seal**	**Back-up ring** / **O-ring**
		Asymmetric piston seal for standard applications as K03-P, but thanks to design with active back-up ring, it is suitable for larger extrusion gaps or higher pressure. K04-P for standard housing design.	–30	+100	0,5	700 (*10 000*)	ECOPUR	SKF Ecotal[1] / NBR 70
			–20	+100	0,5	700 (*10 000*)	H-ECOPUR	SKF Ecotal[1] / NBR 70
			–40	+100	0,5	700 (*10 000*)	T-ECOPUR	SKF Ecotal[1] / MVQ 70
			–20	+100	0,7	700 (*10 000*)	S-ECOPUR	SKF Ecotal[1] / NBR 70

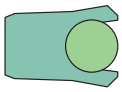
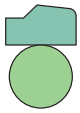
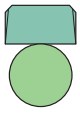
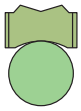
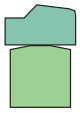
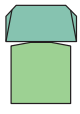
[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] NOTE: not suitable for mineral oils
[3] Spring steel material specification

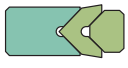
Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	Back-up ring	O-ring
			°C		m/s	bar (*psi*)	–		
	K04-PD 	**Hydraulic, single-acting** Asymmetric piston seal for standard applications as K03-P, but thanks to design with active back-up ring, it is suitable for larger extrusion gaps. K04-PD for small housing design.	–30 –20 –40 –20	+100 +100 +100 +100	0,5 0,5 0,5 0,7	700 (*10 000*) 700 (*10 000*) 700 (*10 000*) 700 (*10 000*)	**Seal** ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR	**Back-up ring** SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]	**O-ring** NBR 70 NBR 70 MVQ 70 NBR 70
	K05-P 	**Pneumatic, single-acting** Asymmetric piston seal, extremely wear resistant, for use in lubricated or dry pneumatic applications. Special design of sealing lip allows retention of initial lubricating film.	–30 –20 –20 –50 –30	+110 +110 +110 +110 +110	1 1 2 1 1	25 (*360*) 25 (*360*) 25 (*360*) 25 (*360*) 25 (*360*)	**Seal** ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR		
	K05-R 	**Pneumatic, single-acting** Asymmetric piston seal, good wear resistant, for use in lubricated or dry pneumatic applications. Easily adaptable for diverse temperatures and media by selection of suitable seal material. Special design of sealing lip allows retention of initial lubricating film.	–30 –20 –50 –25 –10	+100 +200 +150 +150 +200	1 1 1 1 1	25 (*360*) 25 (*360*) 25 (*360*) 25 (*360*) 25 (*360*)	SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2] SKF Ecorubber-H SKF Ecoflas		
	K06-P 	**Hydraulic, single-acting** Symmetric piston seal for simple standard applications, not recommended for new designs (profile K01-P preferred). Also, for larger cross section, easier to install.	–30 –20 –20 –50 –30	+110 +110 +110 +110 +110	0,5 0,5 0,7 0,5 0,5	400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*)	ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR		
	K06-R 	**Hydraulic, single-acting** As profile K06-P, but more easily adaptable for diverse temperatures and media by selection of suitable seal material. Also, for larger cross section, easier to install.	–30 –20 –50 –25 –60 –10	+100 +200 +150 +150 +200 +200	0,5 0,5 0,5 0,5 – 0,5	160 (*2 300*) 160 (*2 300*) 160 (*2 300*) 160 (*2 300*) – 160 (*2 300*)	SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2] SKF Ecorubber-H SKF Ecosil[3] SKF Ecoflas		
	K07-P 	**Hydraulic, single-acting** O-ring activated symmetric piston seal for simple standard applications, not recommended for new designs (profile K03-P preferred).	–30 –20 –20 –50	+100 +100 +100 +100	0,5 0,5 0,7 0,5	400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*)	**Seal** ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**O-ring** NBR 70 NBR 70 NBR 70 MVQ 70	

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] NOTE: not suitable for mineral oils
[3] Only recommended for static or quasi-static applications. Contact SKF for more information

Linear moving | Rotating | Oscillating | Spiral moving | Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°C		m/s	bar (*psi*)	–	
	K07-F	**PTFE piston seal, simple acting**					**Seal**	**O-ring**
		O-ring activated symmetric PTFE piston seal, low friction and no stick-slip effect for simple standard applications, not recommended for new designs (profile K03-F preferred)	–30	+100	1	200 (*2 900*)	SKF Ecoflon 1	NBR 70
			–55	+200	1	200 (*2 900*)	SKF Ecoflon 1	MVQ 70
			–30	+100	1	400 (*5 800*)	SKF Ecoflon 2,3,4	NBR 70
			–20	+200	1	400 (*5 800*)	SKF Ecoflon 2,3,4	FPM 75
			–50	+150	1	400 (*5 800*)	SKF Ecoflon 2,3,4	EPDM
			–55	+200	1	400 (*5 800*)	SKF Ecoflon 2,3,4	MVQ 70
			–30	+90	0,5	200 (*2 900*)	SKF Ecowear 1000	NBR 70
			–55	+90	0,5	200 (*2 900*)	SKF Ecowear 1000	MVQ 70
	K08-E	**Hydraulic, single-acting**					**Glide ring**	**O-ring**
		O-ring activated asymmetric PTFE piston seal, low friction. For extreme low or high speed. Suitable for positioning functions.	–30	+100	10	600 (*8 700*)	SKF Ecoflon 2,3,3F,4	NBR 70
			–20	+200	10	600 (*8 700*)	SKF Ecoflon 2,3,3F,4	FPM/FKM 75
			–30	+100	5	600 (*8 700*)	X-ECOPUR (X, XH, XS)	NBR 70
			–55	+110	5	600 (*8 700*)	X-ECOPUR (X, XH, XS)	MVQ 70
			–30	+90	5	400 (*5 800*)	SKF Ecowear 1000	NBR 70
			–55	+90	5	400 (*5 800*)	SKF Ecowear 1000	MVQ 70
	K08-D	**Hydraulic, double acting**					**Glide ring**	**O-ring**
		O-ring activated symmetric PTFE piston seal, low friction. For extreme low or high speed, suitable for positioning functions. For mobile hydraulics, machine tools, injection moulding machines, heavy hydraulics.	–30	+100	10	600 (*8 700*)	SKF Ecoflon 2,3,3F,4	NBR 70
			–20	+200	10	600 (*8 700*)	SKF Ecoflon 2,3,3F,4	FPM/FKM 75
			–30	+100	5	600 (*8 700*)	X-ECOPUR (X, XH, XS)	NBR 70
			–55	+110	5	600 (*8 700*)	X-ECOPUR (X, XH, XS)	MVQ 70
			–30	+90	5	400 (*5 800*)	SKF Ecowear 1000	NBR 70
			–55	+90	5	400 (*5 800*)	SKF Ecowear 1000	MVQ 70
	K08-P	**Hydraulic, double-acting**					**Glide ring**	**O-ring**
		O-ring activated symmetric PU piston seal with excellent static and dynamic sealing capacity, extremely wear resistant.	–30	+100	1	250 (*3 600*)	ECOPUR	NBR 70
			–20	+100	1	250 (*3 600*)	H-ECOPUR	NBR 70
			–20	+100	1,4	250 (*3 600*)	S-ECOPUR	NBR 70
			–50	+100	1	250 (*3 600*)	T-ECOPUR	MVQ 70
	K08-ES	**Hydraulic, single-acting**					**Glide ring**	**O-ring**
		Profile ring-activated asymmetric PTFE piston seal, similar to K08-E, but special heavy duty design. For heavy industry hydraulics or for special housing dimensions.	–30	+100	10	600 (*8 700*)	SKF Ecoflon 2,3,3F,4	SKF Ecorubber-1
			–20	+200	10	600 (*8 700*)	SKF Ecoflon 2,3,3F,4	SKF Ecorubber-2
			–30	+100	5	600 (*8 700*)	X-ECOPUR (X, XH, XS)	SKF Ecorubber-1
			–60	+100	5	600 (*8 700*)	X-ECOPUR (X, XH, XS)	SKF Ecosil
			–30	+90	5	400 (*5 800*)	SKF Ecowear 1000	SKF Ecorubber-1
			–60	+90	5	400 (*5 800*)	SKF Ecowear 1000	SKF Ecosil
	K08-DS	**Hydraulic, double-acting**					**Glide ring**	**O-ring**
		Profile ring-activated symmetric PTFE piston seal, similar to S09-D, but special heavy duty design. For heavy industry hydraulics or for special housing dimensions.	–30	+100	10	600 (*8 700*)	SKF Ecoflon 2,3,3F,4	SKF Ecorubber-1
			–20	+200	10	600 (*8 700*)	SKF Ecoflon 2,3,3F,4	SKF Ecorubber-2
			–30	+100	5	600 (*8 700*)	X-ECOPUR (X, XH, XS)	SKF Ecorubber-1
			–60	+100	5	600 (*8 700*)	X-ECOPUR (X, XH, XS)	SKF Ecosil
			–30	+90	5	400 (*5 800*)	SKF Ecowear 1000	SKF Ecorubber-1
			–60	+90	5	400 (*5 800*)	SKF Ecowear 1000	SKF Ecosil

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°C		m/s	bar (*psi*)	–		
	K09-N	**Hydraulic, double-acting**					**Seal**	**Energizer**	**Back-up**
		Profile ring-activated compact piston seal with integrated guiding elements. Excellent static sealing capacity. Commonly used in standard cylinders.	–30	+100	0,5	400 (*5 800*)	ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–20	+100	0,5	400 (*5 800*)	H-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–50	+100	0,5	400 (*5 800*)	T-ECOPUR	SKF Ecosil	SKF Ecotal[1]
			–20	+100	0,7	400 (*5 800*)	S-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
	K09-D	**Hydraulic, double-acting**					**Seal**	**Energizer**	**Back-up**
		Profile ring-activated compact piston seal with integrated guiding elements. Excellent static and dynamic sealing capacity.	–30	+100	0,5	400 (*5 800*)	ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–20	+100	0,5	400 (*5 800*)	H-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–50	+100	0,5	400 (*5 800*)	T-ECOPUR	SKF Ecosil	SKF Ecotal[1]
			–20	+100	0,7	400 (*5 800*)	S-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
	K09-H	**Hydraulic, double-acting**					**Seal**	**Energizer**	**Back-up**
		Profile ring-activated compact piston seal with integrated guiding elements. Design for high pressure range, excellent static sealing capacity. Mainly used in mining / tunneling industry.	–30	+100	0,3	1 500 (*21700*)	ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–20	+100	0,3	1 500 (*21700*)	H-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–50	+100	0,3	1 500 (*21700*)	T-ECOPUR	SKF Ecosil	SKF Ecotal[1]
			–20	+100	0,4	1 500 (*21700*)	S-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
	K09-F	**Hydraulic, double-acting**					**Seal**	**Energizer**	**Back–up ring**
		Profile ring–activated compact PTFE piston seal with integrated guiding elements. Low friction, good chemical and thermal resistance.	–30	+100	1,5	400 (*5 800*)	SKF Ecoflon 2,3,4	SKF Ecorubber-1	SKF Ecotal
			–20	+200	1,5	400 (*5 800*)	SKF Ecoflon 2,3,4	SKF Ecorubber-2	SKF Ecopaek
			–30	+100	1	400 (*5 800*)	X-ECOPUR	SKF Ecorubber-1	SKF Ecotal
			–30	+100	1	400 (*5 800*)	XH-ECOPUR	SKF Ecorubber-1	SKF Ecotal
			–30	+100	1,2	400 (*5 800*)	XS-ECOPUR	SKF Ecorubber-1	SKF Ecotal
	K1012-T	**Hydraulic, single-acting**					**K 10-A**	**K 11-T**	**K 12-T**
		Chevron sealing set, machined surface design. In back–to–back arrangement with one intermediate chevron for double sided pressure activation, in single-acting applications with more intermediate chevrons possible. For heavy industry hydraulics.	–30	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	ECOPUR	X-ECOPUR
			–20	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	H-ECOPUR	XH-ECOPUR
			–20	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	S-ECOPUR	XS-ECOPUR
			–30	+100	0,7	500 (*7 200*)	SKF Ecotal[1]	G-ECOPUR	XG-ECOPUR
			–30	+100	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-1	SKF Ecoflon 2
			–20	+200	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-2	SKF Ecoflon 2
			–50	+150	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-3	SKF Ecoflon 2
			–25	+150	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-H	SKF Ecoflon 2
	K1012-M	**Hydraulic, single-acting**					**K 10-A**	**K 11-M**	**K 12-M**
		Chevron sealing set, parted surface design. In back–to–back arrangement with one intermediate chevron for double sided pressure activation, in single-acting applications with more intermediate chevrons possible. For heavy industry hydraulics.	–30	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	ECOPUR	X-ECOPUR
			–20	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	H-ECOPUR	XH-ECOPUR
			–20	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	S-ECOPUR	XS-ECOPUR
			–30	+100	0,7	500 (*7 200*)	SKF Ecotal[1]	G-ECOPUR	XG-ECOPUR
			–30	+100	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-1	SKF Ecoflon 2
			–20	+200	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-2	SKF Ecoflon 2
			–50	+150	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-3	SKF Ecoflon 2
			–25	+150	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-H	SKF Ecoflon 2

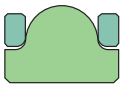
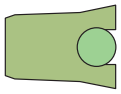
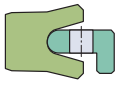
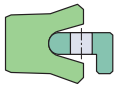
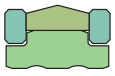
[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Application	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°C		m/s	bar (*psi*)	–		
	K1315-T	**Hydraulic, single-acting** Chevron sealing set, design with flexible sealing lips, good sealing ability in higher pressure range. For heavy industry hydraulics, water–hydraulic systems.					**K 13-T**	**K 14-T**	**K 15-T**
			–30	+100	0,5	600 (*8 700*)	SKF Ecotal[1)]	ECOPUR	X-ECOPUR
			–20	+100	0,5	600 (*8 700*)	SKF Ecotal[1)]	H-ECOPUR	XH-ECOPUR
			–20	+100	0,7	600 (*8 700*)	SKF Ecotal[1)]	S-ECOPUR	XS-ECOPUR
			–30	+100	0,5	600 (*8 700*)	SKF Ecotal[1)]	ECOPUR	SKF Ecotal
			–20	+100	0,5	600 (*8 700*)	SKF Ecotal[1)]	H-ECOPUR	SKF Ecotal
			–40	+100	0,5	600 (*8 700*)	SKF Ecotal[1)]	T-ECOPUR	SKF Ecotal
			–20	+100	0,7	600 (*8 700*)	SKF Ecotal[1)]	S-ECOPUR	SKF Ecotal
			–30	+100	0,5	600 (*8 700*)	SKF Ecotal[1)]	G-ECOPUR	SKF Ecotal
	K16-A	**Hydraulic/pneumatic, single-acting** Simple cup seal, usually fixed on the piston by means of a clamping plate. Mainly used for replacement in old hydraulic and pneumatic cylinders or for low–grade secondary applications. Also used for food filling / portioning equipment.							
			–30	+110	0,5	160 (*2 300*)	ECOPUR/G-ECOPUR		
			–20	+110	0,5	160 (*2 300*)	H-ECOPUR		
			–50	+110	0,5	160 (*2 300*)	T-ECOPUR		
			–20	+110	0,7	160 (*2 300*)	S-ECOPUR		
			–30	+100	0,5	160 (*2 300*)	SKF Ecorubber-1		
			–25	+150	0,5	160 (*2 300*)	SKF Ecorubber-H		
			–20	+200	0,5	160 (*2 300*)	SKF Ecorubber-2		
			–50	+150	0,5	160 (*2 300*)	SKF Ecorubber-3		
			–10	+200	0,5	160 (*2 300*)	SKF Ecoflas		
	K16-B	**Hydraulic/pneumatic, single-acting** Simple cup seal, usually fixed on the piston by means of a clamping plate. Mainly used for replacement in old hydraulic and pneumatic cylinders or for low–grade secondary applications. Also used for food filling / portioning equipment.							
			–30	+110	0,5	160 (*2 300*)	ECOPUR/G-ECOPUR		
			–20	+110	0,5	160 (*2 300*)	H-ECOPUR		
			–50	+110	0,5	160 (*2 300*)	T-ECOPUR		
			–20	+110	0,7	160 (*2 300*)	S-ECOPUR		
			–30	+100	0,5	160 (*2 300*)	SKF Ecorubber-1		
			–25	+150	0,5	160 (*2 300*)	SKF Ecorubber-H		
			–20	+200	0,5	160 (*2 300*)	SKF Ecorubber-2		
			–50	+150	0,5	160 (*2 300*)	SKF Ecorubber-3		
			–10	+200	0,5	160 (*2 300*)	SKF Ecoflas		
	K17-P	**Hydraulic, double-acting** Space saving, compact piston seal with integrated guiding elements. Excellent static sealing capacity, suitable for small housings.					**Seal**	**Back-up ring**	
			–30	+100	0,5	250 (*3 600*)	ECOPUR	SKF Ecotal[1)]	
			–20	+100	0,5	250 (*3 600*)	H-ECOPUR	SKF Ecotal[1)]	
			–40	+100	0,5	250 (*3 600*)	T-ECOPUR	SKF Ecotal[1)]	
			–20	+100	0,7	250 (*3 600*)	S-ECOPUR	SKF Ecotal[1)]	
	K17-R	**Hydraulic, double-acting** Space saving, compact piston seal with integrated guiding elements. Excellent static sealing capacity, easily adaptable for diverse temperatures and media by selection of suitable material. Suitable for small housings.					**Seal**	**Back-up ring**	
			–30	+100	0,5	250 (*3 600*)	SKF Ecorubber-1	SKF Ecotal[1)]	
			–25	+100	0,5	250 (*3 600*)	SKF Ecorubber-H	SKF Ecotal[1)]	
			–25	+150	0,5	250 (*3 600*)	SKF Ecorubber-H	SKF Ecoflon 2	
			–25	+150	0,5	250 (*3 600*)	SKF Ecorubber-H	SKF Ecopaek	
			–20	+200	0,5	250 (*3 600*)	SKF Ecorubber-2	SKF Ecoflon 2	
			–20	+200	0,5	250 (*3 600*)	SKF Ecorubber-2	SKF Ecopaek	
	K19-F	**PTFE piston seal, single-acting** Finger–spring activated, asymmetrical PTFE piston seal, low friction and good dry running properties, excellent chemical and thermal resistance, mainly used in chemical, pharma and food industry.					**Seal**	**Spring**	
			–200	+260	15	200 (*2 900*)	SKF Ecoflon 1	1.4310[2)]	
			–200	+260	15	400 (*5 800*)	SKF Ecoflon 2	1.4310[2)]	
			–200	+260	15	400 (*5 800*)	SKF Ecoflon 3	1.4310[2)]	
			–200	+260	15	400 (*5 800*)	SKF Ecoflon 4	1.4310[2)]	
			–200	+90	15	200 (*2 900*)	SKF Ecowear 1000	1.4310[2)]	

[1)] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2)] Spring steel material specification

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°C		m/s	bar (*psi*)	–	
	K20-R	**Hydraulic, double-acting**					**Seal**	**Back–up ring**
		Space saving, compact piston seal, suitable for standard O–Ring housings. Advantage compared to O–Ring: integrated active back–up rings for high pressure, designed with interference fit on outside diameter, prevents twisting in dynamic applications.	–30	+100	0,5	700 (*10 000*)	SKF Ecorubber-1	SKF Ecotal[1]
			–25	+100	0,5	700 (*10 000*)	SKF Ecorubber-H	SKF Ecotal[1]
			–25	+150	0,5	700 (*10 000*)	SKF Ecorubber-H	SKF Ecoflon 2
			–25	+150	0,5	700 (*10 000*)	SKF Ecorubber-H	SKF Ecopaek
			–20	+200	0,5	700 (*10 000*)	SKF Ecorubber-2	SKF Ecopaek
			–20	+200	0,5	700 (*10 000*)	SKF Ecorubber-2	SKF Ecoflon 2
	K21-P	**Hydraulic, single-acting**					**Seal**	**O–ring**
		O–Ring activated symmetric piston seal with sharp–edged sealing lips, good sealing effect for high viscosity fluids, not recommended for new designs (Profile S03–P preferred).	–30	+100	0,5	400 (*5 800*)	ECOPUR	NBR 70
			–20	+100	0,5	400 (*5 800*)	H-ECOPUR	NBR 70
			–50	+110	0,5	400 (*5 800*)	T-ECOPUR	MVQ 70
			–20	+100	0,7	400 (*5 800*)	S-ECOPUR	NBR 70
	K22-P	**Hydraulic, single-acting**					**Seal**	**Support ring**
		Symmetric piston seal with support ring for simple applications to serve repair purpose, not recommended for new designs (Profile K01–P preferred). Retainer ring in angled design possible.	–30	+100	0,5	400 (*5 800*)	ECOPUR	SKF Ecotal[1]
			–20	+100	0,5	400 (*5 800*)	H-ECOPUR	SKF Ecotal[1]
			–40	+100	0,5	400 (*5 800*)	T-ECOPUR	SKF Ecotal[1]
			–20	+100	0,7	400 (*5 800*)	S-ECOPUR	SKF Ecotal[1]
	K22-R	**Hydraulic, single-acting**					**Seal**	**Support ring**
		Symmetric piston seal as K22–P, but easily adaptable for diverse temperatures and media by selection of suitable seal material. Retainer (support) ring in angled design possible.	–30	+100	0,5	160 (*2 300*)	SKF Ecorubber-1	SKF Ecotal[1]
			–20	+200	0,5	160 (*2 300*)	SKF Ecorubber-2	SKF Ecoflon 2
			–40	+100	0,5	160 (*2 300*)	SKF Ecorubber-3[2]	SKF Ecotal[1]
			–50	+150	0,5	160 (*2 300*)	SKF Ecorubber-3[2]	SKF Ecoflon 2
			–25	+100	0,5	160 (*2 300*)	SKF Ecorubber-H	SKF Ecotal[1]
			–25	+150	0,5	160 (*2 300*)	SKF Ecorubber-H	SKF Ecoflon 2
			–10	+200	0,5	160 (*2 300*)	SKF Ecoflas	SKF Ecoflon
	K23-N	**Hydraulic, double-acting**					**Seal**	**Energizer** / **Back–up rings**
		Profile ring–activated compact piston seal with integrated back–up rings, excellent static sealing capacity. External guiding elements required.	–30	+100	0,5	400 (*5 800*)	ECOPUR	SKF Ecorubber-1 / SKF Ecotal[1]
			–20	+100	0,5	400 (*5 800*)	H-ECOPUR	SKF Ecorubber-1 / SKF Ecotal[1]
			–40	+100	0,5	400 (*5 800*)	T-ECOPUR	SKF Ecosil / SKF Ecotal[1]
			–20	+100	0,7	400 (*5 800*)	S-ECOPUR	SKF Ecorubber-1 / SKF Ecotal[1]
	K23–D	**Hydraulic, double-acting**					**Seal**	**Energizer** / **Back–up rings**
		Profile ring–activated compact piston seal with integrated back–up rings. Excellent static and dynamic sealing capacity. External guiding elements required.	–30	+100	0,5	400 (*5 800*)	ECOPUR	SKF Ecorubber-1 / SKF Ecotal[1]
			–20	+100	0,5	400 (*5 800*)	H-ECOPUR	SKF Ecorubber-1 / SKF Ecotal[1]
			–40	+100	0,5	400 (*5 800*)	T-ECOPUR	SKF Ecosil / SKF Ecotal[1]
			–20	+100	0,7	400 (*5 800*)	S-ECOPUR	SKF Ecorubber-1 / SKF Ecotal[1]

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] NOTE: not suitable for mineral oils

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Application	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°C		m/s	bar (*psi*)	–		
	K23-H	**Hydraulic, double-acting** Profile ring–activated compact piston seal with integrated back–up rings. Designed for high pressure range, excellent static sealing capacity. Mainly used in mining / tunneling industry. External guiding elements required.					**Seal**	**Energizer**	**Back–up rings**
			–30	+100	0,3	1 500 (*21 000*)	ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–20	+100	0,3	1 500 (*21 000*)	H-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–50	+100	0,3	1 500 (*21 000*)	T-ECOPUR	SKF Ecosil	SKF Ecotal[1]
			–20	+100	0,4	1 500 (*21 000*)	S-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
	K23-F	**Hydraulic, double-acting** Profile ring–activated compact PTFE piston seal with integrated back–up rings. Low friction, good chemical and thermal resistance. External guiding elements required.					**Seal**	**Energizer**	**Back–up rings**
			–30	+100	1,5	400 (*5 800*)	SKF Ecoflon 2,3,4	SKF Ecorubber-1	SKF Ecotal[1]
			–20	+200	1,5	400 (*5 800*)	SKF Ecoflon 2,3,4	SKF Ecorubber-2	SKF Ecopaek
			–30	+100	1	400 (*5 800*)	X-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–30	+100	1	400 (*5 800*)	XH-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–30	+100	1,2	400 (*5 800*)	XS-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
	K24-P	**Hydraulic, single-acting** Chevron ring with flexible lip design. Replacement part for standard commercial housings (male and female adapter mainly made of metal).					**Seal**		
			–30	+110	0,5	500 (*7 200*)	ECOPUR/G-ECOPUR		
			–20	+110	0,5	500 (*7 200*)	H-ECOPUR		
			–50	+110	0,5	500 (*7 200*)	T-ECOPUR		
			–20	+110	0,7	500 (*7 200*)	S-ECOPUR		
			–30	+100	0,5	250 (*3 600*)	SKF Ecorubber-1		
			–20	+200	0,5	250 (*3 600*)	SKF Ecorubber-2		
			–50	+150	0,5	250 (*3 600*)	SKF Ecorubber-3		
			–25	+150	0,5	250 (*3 600*)	SKF Ecorubber-H		
			–10	+200	0,5	250 (*3 600*)	SKF Ecoflas		
	K32-P	**Hydraulic, single-acting** Chevron sealing set, designed with extremely flexible sealing lips for difficult operating conditions like bad guiding, large tolerance range. Available as total chevron sealing set as well as intermediate chevrons only (in case of metal male and female adapters).					**Pressure ring**	**Seal**	**Support ring**
			–30	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	ECOPUR	SKF Ecotal[1]
			–20	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	H-ECOPUR	SKF Ecotal[1]
			–40	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	T-ECOPUR	SKF Ecotal[1]
			–20	+100	0,7	500 (*7 200*)	SKF Ecotal[1]	S-ECOPUR	SKF Ecotal[1]
			–30	+100	0,5	500 (*7 200*)	X-ECOPUR	ECOPUR	SKF Ecotal[1]
			–20	+100	0,5	500 (*7 200*)	XH-ECOPUR	H-ECOPUR	SKF Ecotal[1]
			–20	+100	0,7	500 (*7 200*)	XS-ECOPUR	S-ECOPUR	SKF Ecotal[1]
			–30	+100	0,5	500 (*7 200*)	XG-ECOPUR	G-ECOPUR	SKF Ecotal[1]
	K35-P	**Hydraulic, double-acting** Compact piston seal with almost no dead spots as required for applications in food and pharmaceutical industry. Also commonly used as O–Ring replacement because design with interference fit on outside diameter prevents twisting in dynamic applications.					**Seal**		
			–30	+110	0,4	400 (*5 800*)	ECOPUR		
			–20	+110	0,4	400 (*5 800*)	H-ECOPUR		
			–50	+110	0,4	400 (*5 800*)	T-ECOPUR		
			–20	+110	0,5	400 (*5 800*)	S-ECOPUR		
			–30	+110	0,4	400 (*5 800*)	G-ECOPUR		

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	Back–up ring
			°C		m/s	bar (*psi*)	–	
	S01-P	**Hydraulic, single-acting** Asymmetric rod seal for standard applications. Interference fit on outside diameter maintains stable fit in the housing. Design provides ultimate sealing effect over a wide temperature range and good backpumping ability. Also used as secondary seal in combination with PTFE seal type S09.	–30 –20 –20 –50 –30	+110 +110 +110 +110 +110	0,5 0,5 0,7 0,5 0,5	400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*)	ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR	
	S01-R	**Hydraulic, single-acting** As profile S01–P, but more easily adaptable for diverse temperatures and media by selection of suitable seal material.	–30 –20 –50 –25 –60 –10	+100 +200 +150 +150 +200 +200	0,5 0,5 0,5 0,5 – 0,5	160 (*2 300*) 160 (*2 300*) 160 (*2 300*) 160 (*2 300*) – 160 (*2 300*)	**Seal** SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2] SKF Ecorubber-H SKF Ecosil[3] SKF Ecoflas	
	S02-P	**Hydraulic, single-acting** Asymmetric rod seal for standard applications as S01–P, but thanks to design with active back–up ring, it is suitable for larger extrusion gaps or higher pressure range. S02–P for standard housing design.	–30 –20 –20 –40 –30	+100 +100 +100 +100 +100	0,5 0,5 0,7 0,5 0,5	700 (*10 000*) 700 (*10 000*) 700 (*10 000*) 700 (*10 000*) 700 (*10 000*)	**Seal** ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR	**Back–up ring** SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]
	S02-PD	**Hydraulic, single-acting** Asymmetric rod seal for standard applications as S01–P, but thanks to design with active back–up ring, it is suitable for larger extrusion gaps or higher pressure range. S02–PD for small housing design.	–30 –20 –20 –40 –30	+100 +100 +100 +100 +100	0,5 0,5 0,7 0,5 0,5	700 (*10 000*) 700 (*10 000*) 700 (*10 000*) 700 (*10 000*) 700 (*10 000*)	**Seal** ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR	**Back–up ring** SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]
	S02-R	**Hydraulic, single-acting** as profile S02–P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material. S02–R for standard housing design.	–30 –20 –40 –50 –25 –25 –10	+100 +200 +100 +150 +100 +150 +200	0,5 0,5 0,5 0,5 0,5 0,5 0,5	250 (*3 600*) 250 (*3 600*) 250 (*3 600*) 250 (*3 600*) 250 (*3 600*) 250 (*3 600*) 250 (*3 600*)	**Seal** SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2] SKF Ecorubber-3[2] SKF Ecorubber-H SKF Ecorubber-H SKF Ecoflas	**Back–up ring** SKF Ecotal[1] SKF Ecoflon 2 SKF Ecotal[1] SKF Ecoflon 2 SKF Ecotal[1] SKF Ecoflon 2 SKF Ecopaek
	S02-RD	**Hydraulic, single-acting** As profile S02–P, but more easily adaptable for diverse temperatures and media by selection of suitable seal material. S02–RD for small housing design.	–30 –20 –40 –50 –25 –25 –10	+100 +200 +100 +150 +100 +150 +200	0,5 0,5 0,5 0,5 0,5 0,5 0,5	250 (*3 600*) 250 (*3 600*) 250 (*3 600*) 250 (*3 600*) 250 (*3 600*) 250 (*3 600*) 250 (*3 600*)	**Seal** SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2] SKF Ecorubber-3[2] SKF Ecorubber-H SKF Ecorubber-H SKF Ecoflas	**Back–up ring** SKF Ecotal[1] SKF Ecoflon 2 SKF Ecotal[1] SKF Ecoflon 2 SKF Ecotal[1] SKF Ecoflon 2 SKF Ecopaek

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] NOTE: not suitable for mineral oils
[3] Only recommended for static or quasi-static applications. Contact SKF for more information

Linear moving | Rotating | Oscillating | Spiral moving | Static

Grey symbols: contact SKF for application limitations

Application	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°C		m/s	bar (*psi*)	–		
	S02-S	**Hydraulic, single-acting** Asymmetric rod seal, for special housings (DIN/ISO 7425 part 2) and for the use as a primary rod seal in sealing systems, thanks to design with active back–up ring, it is suitable for high pressure peaks or larger extrusion gaps.					**Seal**	**Back-up ring**	
			–30	+100	5	400 (*5 800*)	ECOPUR	SKF Ecotal[1)]	
			–20	+100	5	400 (*5 800*)	H-ECOPUR	SKF Ecotal[1)]	
			–40	+100	5	400 (*5 800*)	T-ECOPUR	SKF Ecotal[1)]	
			–20	+100	7	400 (*5 800*)	S-ECOPUR	SKF Ecotal[1)]	
	S03-P	**Hydraulic, single-acting** O–Ring activated, asymmetrical rod seal. Interference fit on outside diameter maintains stable fit in the housing. Design provides ultimate sealing effect. especially suitable for short stroke applications (e.g. spindle seals, coupling actuators...)					**Seal**	**O–ring**	
			–30	+100	0,5	400 (*5 800*)	ECOPUR	NBR 70	
			–20	+100	0,5	400 (*5 800*)	H-ECOPUR	NBR 70	
			–50	+110	0,5	400 (*5 800*)	T-ECOPUR	MVQ 70	
			–20	+100	0,7	400 (*5 800*)	S-ECOPUR	NBR 70	
			–30	+100	0,5	400 (*5 800*)	G-ECOPUR	NBR 70	
	S03-F	**PTFE rod seal, single-acting** O–Ring activated, asymmetrical PTFE rod seal, low friction, good dry running properties and adaptation possibilities for diverse temperatures and media by selection of suitable O–Ring material. Almost no dead spots as required for applications in food and pharma industry.					**Seal**	**O–ring**	
			–30	+100	1	200 (*2 900*)	SKF Ecoflon 1	NBR 70	
			–55	+200	1	200 (*2 900*)	SKF Ecoflon 1	MVQ 70	
			–30	+100	1	400 (*5 800*)	SKF Ecoflon 2,3,4	NBR 70	
			–20	+200	1	400 (*5 800*)	SKF Ecoflon 2,3,4	FPM 75	
			–50	+150	1	400 (*5 800*)	SKF Ecoflon 2,3,4	EPDM	
			–55	+200	1	400 (*5 800*)	SKF Ecoflon 2,3,4	MVQ 70	
			–30	+90	0,5	200 (*2 900*)	SKF Ecowear 1000	NBR 70	
			–55	+90	0,5	200 (*2 900*)	SKF Ecowear 1000	MVQ 70	
	S03-S	**PTFE rod seal, single-acting** Helicoil spring activated, asymmetrical PTFE rod seal, low friction and good dry running properties, excellent chemical and thermal resistance. Mainly used in chemical, pharma and food industry.					**Seal**	**Spring**	
			–200	+260	1	200 (*2 900*)	SKF Ecoflon 1	1.4310	
			–200	+260	1	400 (*5 800*)	SKF Ecoflon 2,3,4	1.4310	
			–200	+90	0,5	200 (*2 900*)	SKF Ecowear 1000	1.4310	
	S04-P	**Hydraulic, single-acting** Asymmetric rod seal for standard applications as S03–P, but thanks to design with active back–up ring, it is suitable for larger extrusion gaps or higher pressure range. S04–P for standard housing design.					**Seal**	**O–ring**	**Back–up**
			–30	+100	0,5	700 (*10 000*)	ECOPUR	NBR 70	SKF Ecotal[1)]
			–20	+100	0,5	700 (*10 000*)	H-ECOPUR	NBR 70	SKF Ecotal[1)]
			–40	+100	0,5	700 (*10 000*)	T-ECOPUR	MVQ 70	SKF Ecotal[1)]
			–20	+100	0,7	700 (*10 000*)	S-ECOPUR	NBR 70	SKF Ecotal[1)]
	S04-PD	**Hydraulic, single-acting** Asymmetric rod seal for standard applications as S03–P, but thanks to design with active back–up ring, it is suitable for larger extrusion gaps or higher pressure range. S04–PD for small housing design.					**Seal**	**O–ring**	**Back–up**
			–30	+100	0,5	700 (*10 000*)	ECOPUR	NBR 70	SKF Ecotal[1)]
			–20	+100	0,5	700 (*10 000*)	H-ECOPUR	NBR 70	SKF Ecotal[1)]
			–40	+100	0,5	700 (*10 000*)	T-ECOPUR	MVQ 70	SKF Ecotal[1)]
			–20	+100	0,7	700 (*10 000*)	S-ECOPUR	NBR 70	SKF Ecotal[1)]

[1)] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°C		m/s	bar (*psi*)	–	
	S05-P	**Pneumatic, single-acting** Asymmetric rod seal, extremely wear resistant, for use in lubricated or dry pneumatic applications. Special design of sealing lip allows retention of initial lubricating film.	–30 –20 –20 –50 –30	+110 +110 +110 +110 +110	1 1 2 1 1	25 (*360*) 25 (*360*) 25 (*360*) 25 (*360*) 25 (*360*)	ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR	
	S05-R	**Pneumatic, single-acting** As profile S05-P, good wear resistance and adaptation possibilities for diverse temperatures and media by selection of suitable seal material. Special design of sealing lip allows retention of initial lubricating film.	–30 –20 –50 –25 –10	+100 +200 +150 +150 +200	1 1 1 1 1	25 (*360*) 25 (*360*) 25 (*360*) 25 (*360*) 25 (*360*)	SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecorubber-H SKF Ecoflas	
	S06-P	**Hydraulic, single-acting** Symmetric rod seal for simple standard applications, not recommended for new designs (profile S01-P preferred).	–30 –20 –20 –50 –30	+110 +110 +110 +110 +110	0,5 0,5 0,7 0,5 0,5	400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*)	ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR	
	S06-R	**Hydraulic, single-acting** As profile S06-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	–30 –20 –50 –25 –60 –10	+100 +200 +150 +150 +200 +200	0,5 0,5 0,5 0,5 – 0,5	160 (*2 300*) 160 (*2 300*) 160 (*2 300*) 160 (*2 300*) – 160 (*2 300*)	SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecorubber-H SKF Ecosil[2] SKF Ecoflas	
	S07-P	**Hydraulic, single-acting** O-ring activated symmetric rod seal for simple standard applications, not recommended for new designs (profile S03-P preferred)	–30 –20 –20 –50	+100 +100 +100 +110	0,5 0,5 0,7 0,5	400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*)	**Seal** ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**O-ring** NBR 70 NBR 70 NBR 70 MVQ 70
	S07-F	**PTFE rod seal, single-acting** O-ring activated symmetric PTFE rod seal, low friction and no stick-slip effect for simple standard applications, not recommended for new designs (profile S03-P preferred)	–30 –55 –30 –20 –50 –55 –30 –55	+100 +200 +100 +200 +150 +200 +90 +90	1 1 1 1 1 1 0,5 0,5	200 (*2 900*) 200 (*2 900*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 200 (*2 900*) 200 (*2 900*)	**Seal** SKF Ecoflon 1 SKF Ecoflon 1 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	**O-ring** NBR 70 MVQ 70 NBR 70 FPM 75 EPDM MVQ 70 NBR 70 MVQ 70

[1] NOTE: not suitable for mineral oils

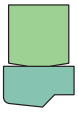
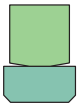
[2] Only recommended for static or quasi-static applications. Contact SKF for more information

Linear moving | Rotating | Oscillating | Spiral moving | Static

Grey symbols: contact SKF for application limitations

Application	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°C		m/s	bar *(psi)*	–	
	S08-P	**Hydraulic, single-acting** Asymmetric compact rod seal with stable fit in the housing. Compact design mainly used to seal high viscosity fluids or for extreme small housings, not suitable for high speed applications. S08-P compact design, no groove.	–30 –20 –20 –50	+110 +110 +110 +110	0,3 0,3 0,4 0,3	400 *(5 800)* 400 *(5 800)* 400 *(5 800)* 400 *(5 800)*	ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	
	S08-PE	**Hydraulic, single-acting** Asymmetric compact rod seal with stable fit in the housing. Compact design mainly used to seal high viscosity fluids or for extreme small housings, not suitable for high speed applications. S08-PE with small groove.	–30 –20 –20 –50 –30	+110 +110 +110 +110 +110	0,3 0,3 0,4 0,3 0,5	400 *(5 800)* 400 *(5 800)* 400 *(5 800)* 400 *(5 800)* 400 *(5 800)*	ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR	
	S08-R	**Hydraulic, single-acting** As profile S08-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	–30 –20 –50 –25 –10	+100 +200 +150 +150 +200	0,3 0,3 0,3 0,3 0,3	160 *(2 300)* 160 *(2 300)* 160 *(2 300)* 160 *(2 300)* 160 *(2 300)*	SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[1)] SKF Ecorubber-H SKF Ecoflas	
	S09-E	**Hydraulic, single-acting** O-ring activated asymmetric PTFE rod seal, low friction. In tandem design together with double-acting wipers for extremely low or high speed or positioning functions. As primary seal, in combination with secondary S01-P seal, with good resistance to pressure shocks used in mobile hydraulics, machine tools, injection moulding machines, heavy hydraulics.	–30 –20 –30 –55 –30 –55	+100 +200 +100 +110 +90 +90	10 10 5 5 5 5	600 *(8 700)* 600 *(8 700)* 600 *(8 700)* 600 *(8 700)* 400 *(5 800)* 400 *(5 800)*	**Glide ring** SKF Ecoflon 2,3,3F,4 SKF Ecoflon 2,3,3F,4 X-ECOPUR (X, XH, XS) X-ECOPUR (X, XH, XS) SKF Ecowear 1000 SKF Ecowear 1000	**O–ring** NBR 70 FPM/FKM 75 NBR 70 MVQ 70 NBR 70 MVQ 70
	S09-D	**Hydraulic, double-acting** O-ring activated symmetric PTFE rod seal, low friction. For extreme low or high speed, suitable for positioning functions.	–30 –20 –30 –55 –30 –55	+100 +200 +100 +110 +90 +90	10 10 5 5 5 5	600 *(8 700)* 600 *(8 700)* 600 *(8 700)* 600 *(8 700)* 400 *(5 800)* 400 *(5 800)*	**Glide ring** SKF Ecoflon 2,3,3F,4 SKF Ecoflon 2,3,3F,4 X-ECOPUR (X, XH, XS) X-ECOPUR (X, XH, XS) SKF Ecowear 1000 SKF Ecowear 1000	**O–ring** NBR 70 FPM/FKM 75 NBR 70 MVQ 70 NBR 70 MVQ 70
	S09-P	**Hydraulic, single-acting** O-ring activated asymmetric PU rod seal with excellent dynamic sealing capacity. Used as secondary seal in tandem design (together with primary S09-E) to minimize residual oil film. For mobile hydraulics, injection moulding machines, heavy hydraulics.	–30 –20 –50 –20 –30	+100 +100 +110 +100 +100	1 1 1 1,4 1	250 *(3 600)* 250 *(3 600)* 250 *(3 600)* 250 *(3 600)* 250 *(3 600)*	**Glide ring** ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR G-ECOPUR	**O–ring** NBR 70 NBR 70 MVQ 70 NBR 70 NBR 70

[1)] NOTE: not suitable for mineral oils

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°C		m/s	bar (*psi*)	–		
	S09-ES	**Hydraulic, single-acting**					**Glide ring**	**Energizer**	
		Profile ring-activated asymmetric PTFE rod seal, similar to S09-E, but special heavy duty design for heavy industry hydraulics or for special housing dimensions.	–30	+100	10	600 (*8 700*)	SKF Ecoflon 2,3,3F,4	SKF Ecorubber-1	
			–20	+200	10	600 (*8 700*)	SKF Ecoflon 2,3,3F,4	SKF Ecorubber-2	
			–30	+100	5	600 (*8 700*)	X-ECOPUR (X, XH, XS)	SKF Ecorubber-1	
			–60	+110	5	600 (*8 700*)	X-ECOPUR (X, XH, XS)	SKF Ecosil	
			–30	+90	5	400 (*5 800*)	SKF Ecowear 1000	SKF Ecorubber-1	
			–60	+90	5	400 (*5 800*)	SKF Ecowear 1000	SKF Ecosil	
	S09-DS	**Hydraulic, double-acting**					**Glide ring**	**Energizer**	
		Profile ring–activated symmetric PTFE rod seal, similar to S09–D, but special heavy duty design for heavy industry hydraulics or for special housing dimensions.	–30	+100	10	600 (*8 700*)	SKF Ecoflon 2,3,3F,4	SKF Ecorubber-1	
			–20	+200	10	600 (*8 700*)	SKF Ecoflon 2,3,3F,4	SKF Ecorubber-2	
			–30	+100	5	600 (*8 700*)	X-ECOPUR (X, XH, XS)	SKF Ecorubber-1	
			–60	+110	5	600 (*8 700*)	X-ECOPUR (X, XH, XS)	SKF Ecosil	
			–30	+90	5	400 (*5 800*)	SKF Ecowear 1000	SKF Ecorubber-1	
			–60	+90	5	400 (*5 800*)	SKF Ecowear 1000	SKF Ecosil	
	S1012-M	**Hydraulic, single-acting**					**S10–A**	**S11–M**	**S12–M**
		Chevron sealing set, parting surface design. For heavy industry hydraulics.	–30	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	ECOPUR	X-ECOPUR
			–20	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	H-ECOPUR	XH-ECOPUR
			–20	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	S-ECOPUR	XS-ECOPUR
			–30	+100	0,7	500 (*7 200*)	SKF Ecotal[1]	G-ECOPUR	XG-ECOPUR
			–30	+100	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-1	SKF Ecoflon 2
			–20	+200	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-2	SKF Ecoflon 2
			–50	+150	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-3	SKF Ecoflon 2
			–25	+150	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-H	SKF Ecoflon 2
			–25	+150	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-H	SKF Ecoflon 2
	S1012-T	**Hydraulic, single-acting**					**S10–A**	**S11–T**	**S12–T**
		Chevron sealing set, machined surface design. For heavy industry hydraulics.	–30	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	ECOPUR	X-ECOPUR
			–20	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	H-ECOPUR	XH-ECOPUR
			–20	+100	0,5	500 (*7 200*)	SKF Ecotal[1]	S-ECOPUR	XS-ECOPUR
			–30	+100	0,7	500 (*7 200*)	SKF Ecotal[1]	G-ECOPUR	XG-ECOPUR
			–30	+100	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-1	SKF Ecoflon 2
			–20	+200	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-2	SKF Ecoflon 2
			–50	+150	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-3	SKF Ecoflon 2
			–25	+150	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-H	SKF Ecoflon 2
			–25	+150	0,5	250 (*3 600*)	SKF Ecoflon 2	SKF Ecorubber-H	SKF Ecoflon 2
	S1315-T	**Hydraulic, single-acting**					**S13–A**	**S14–A**	**S15–A**
		Chevron sealing set, design with flexible sealing lips, good sealing ability in higher pressure range. For heavy industry hydraulics, water–hydraulic systems.	–30	+100	0,5	600 (*8 700*)	SKF Ecotal[1]	ECOPUR	X-ECOPUR
			–20	+100	0,5	600 (*8 700*)	SKF Ecotal[1]	H-ECOPUR	XH-ECOPUR
			–20	+100	0,7	600 (*8 700*)	SKF Ecotal[1]	S-ECOPUR	XS-ECOPUR
			–20	+100	0,7	600 (*8 700*)	SKF Ecotal[1]	S-ECOPUR	SKF Ecotal
			–30	+100	0,5	600 (*8 700*)	SKF Ecotal[1]	G-ECOPUR	SKF Ecotal
			–30	+100	0,5	600 (*8 700*)	SKF Ecotal[1]	ECOPUR	SKF Ecotal
			–20	+100	0,5	600 (*8 700*)	SKF Ecotal[1]	H-ECOPUR	SKF Ecotal
			–40	+100	0,5	600 (*8 700*)	SKF Ecotal[1]	T-ECOPUR	SKF Ecotal
	S16-A	**Hydraulic/pneumatic, single-acting**							
		Simple hat seal, usually fixed in housing with clamp flange. Mainly used for replacement in old hydraulic and pneumatic cylinders or for secondary applications.	–30	+110	0,5	160 (*2 300*)	ECOPUR/G-ECOPUR		
			–20	+110	0,5	160 (*2 300*)	H-ECOPUR		
			–50	+110	0,5	160 (*2 300*)	T-ECOPUR		
			–20	+110	0,7	160 (*2 300*)	S-ECOPUR		
			–30	+100	0,5	160 (*2 300*)	SKF Ecorubber-1		
			–25	+150	0,5	160 (*2 300*)	SKF Ecorubber-H		
			–20	+200	0,5	160 (*2 300*)	SKF Ecorubber-2		
			–50	+150	0,5	160 (*2 300*)	SKF Ecorubber-3[2]		
			–10	+200	0,5	160 (*2 300*)	SKF Ecoflas		

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] NOTE: not suitable for mineral oils

Linear moving | Rotating | Oscillating | Spiral moving | Static

Grey symbols: contact SKF for application limitations

Application	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°C		m/s	bar (*psi*)	–	
	S16-B	**Hydraulic/pneumatic, single-acting** Simple hat seal, usually fixed in housing with clamp flange. Mainly used for replacement in old hydraulic and pneumatic cylinders or for secondary applications.	–30	+110	0,5	160 (*2 300*)	ECOPUR/G-ECOPUR	
			–20	+110	0,5	160 (*2 300*)	H-ECOPUR	
			–50	+110	0,5	160 (*2 300*)	T-ECOPUR	
			–20	+110	0,7	160 (*2 300*)	S-ECOPUR	
			–30	+100	0,5	160 (*2 300*)	SKF Ecorubber-1	
			–25	+150	0,5	160 (*2 300*)	SKF Ecorubber-H	
			–20	+200	0,5	160 (*2 300*)	SKF Ecorubber-2	
			–50	+150	0,5	160 (*2 300*)	SKF Ecorubber-3[2]	
			–10	+200	0,5	160 (*2 300*)	SKF Ecoflas	
	S17-P	**Hydraulic, single-acting** Asymmetric rod seal with additional sealing respectively stabilizing lip. Interference fit on outside diameter maintains stable fit in the housing. Design mainly used for telescopic cylinders, mobile hydraulic or for special housing dimensions.	-30	+110	0,5	400(*5 800*)	ECOPUR	
			-20	+110	0,5	400(*5 800*)	H-ECOPUR	
			-20	+110	0,7	400(*5 800*)	S-ECOPUR	
			-50	+110	0,5	400(*5 800*)	T-ECOPUR	
	S17-R	**Hydraulic, single-acting** As profile S17–P, but easily adaptable for diverse temperatures and media by selection of suitable seal material.	–30	+100	0,5	160 (*2 300*)	SKF Ecorubber-1	
			–20	+200	0,5	160 (*2 300*)	SKF Ecorubber-2	
			–50	+150	0,5	160 (*2 300*)	SKF Ecorubber-3[2]	
			–25	+150	0,5	160 (*2 300*)	SKF Ecorubber-H	
			–10	+200	0,5	160 (*2 300*)	SKF Ecoflas	
	S18-P	**Hydraulic, single-acting** Asymmetric rod seal as S17–P, but thanks to design with active back–up ring, it is suitable for larger extrusion gaps or higher pressure range.					**Seal**	**Back–up ring**
			–30	+100	0,5	600 (*8 700*)	ECOPUR	SKF Ecotal[1]
			–20	+100	0,5	600 (*8 700*)	H-ECOPUR	SKF Ecotal[1]
			–20	+100	0,7	600 (*8 700*)	S-ECOPUR	SKF Ecotal[1]
			–40	+100	0,5	600 (*8 700*)	T-ECOPUR	SKF Ecotal[1]
	S18-R	**Hydraulic, single-acting** Asymmetric rod seal with additional sealing– respectively stabilizing lip and back ring. Easily adaptable for diverse temperatures and media by selection of suitable seal material, thanks to design with active back–up ring, it is suitable for larger extrusion gaps or higher pressure range.					**Seal**	**Back–up ring**
			–30	+100	0,5	250 (*3 600*)	SKF Ecorubber-1	SKF Ecotal
			–20	+200	0,5	250 (*3 600*)	SKF Ecorubber-2	SKF Ecoflon 2
			–40	+100	0,5	250 (*3 600*)	SKF Ecorubber-3	SKF Ecotal
			–50	+150	0,5	250 (*3 600*)	SKF Ecorubber-3	SKF Ecoflon 2
			–25	+100	0,5	250 (*3 600*)	SKF Ecorubber-H	SKF Ecotal
			–25	+150	0,5	250 (*3 600*)	SKF Ecorubber-H	SKF Ecoflon 2
			–10	+200	0,5	250 (*3 600*)	SKF Ecoflas	SKF Ecoflon 2
	S19-F	**PTFE rod seal, single-acting** Finger spring activated, asymmetrical PTFE rod seal, low friction and good dry running properties, excellent chemical and thermal resistance, mainly used in chemical, pharma and food industry.					**Seal**	**Spring**
			–200	+260	15	200 (*2 900*)	SKF Ecoflon 1	1.4310[3]
			–200	+260	15	400 (*5 800*)	SKF Ecoflon 2	1.4310[3]
			–200	+260	15	400 (*5 800*)	SKF Ecoflon 3	1.4310[3]
			–200	+260	15	400 (*5 800*)	SKF Ecoflon 4	1.4310[3]
			–200	+90	15	200 (*2 900*)	SKF ECOWAER 1000	1.4310[3]

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] NOTE: not suitable for mineral oils
[3] Spring metal material specification

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°C		m/s	bar (*psi*)	–		
	S20-R	**Hydraulic, double-acting** Space saving, compact rod seal, fits standard O–Ring housings. Advantage compared to O–Ring: integrated active back–up rings for high pressure, designed with interference fit on outside diameter prevents twisting in dynamic applications.					**Seal**	**Back–up ring**	
			–30	+100	0,5	700 (*10 000*)	SKF Ecorubber-1	SKF Ecotal[1]	
			–25	+100	0,5	700 (*10 000*)	SKF Ecorubber-H	SKF Ecotal[1]	
			–25	+150	0,5	700 (*10 000*)	SKF Ecorubber-H	SKF Ecoflon 2	
			–25	+150	0,5	700 (*10 000*)	SKF Ecorubber-H	SKF Ecopaek	
			–20	+200	0,5	700 (*10 000*)	SKF Ecorubber-2	SKF Ecopaek	
			–20	+200	0,5	700 (*10 000*)	SKF Ecorubber-2	SKF Ecoflon 2	
	S21-P	**Hydraulic, single-acting** O–Ring activated symmetric rod seal with sharp–edged sealing lips, good sealing effect for high viscosity fluids, not recommended for new designs (profile S03–P preferred).					**Seal**	**O–ring**	
			–30	+100	0,5	400 (*5 800*)	ECOPUR	NBR 70	
			–20	+100	0,5	400 (*5 800*)	H-ECOPUR	NBR 70	
			–50	+110	0,5	400 (*5 800*)	T-ECOPUR	MVQ 70	
			–20	+100	0,7	400 (*5 800*)	S-ECOPUR	NBR 70	
	S22-P	**Hydraulic, single-acting** Symmetric rod seal with support ring for simple applications to serve repair purpose, not recommended for new designs (profile S01–P preferred). Retainer ring in angled design possible.					**Seal**	**Support ring**	
			–30	+100	0,5	400 (*5 800*)	ECOPUR	SKF Ecotal[1]	
			–20	+100	0,5	400 (*5 800*)	H-ECOPUR	SKF Ecotal[1]	
			–20	+100	0,7	400 (*5 800*)	S-ECOPUR	SKF Ecotal[1]	
			–40	+100	0,5	400 (*5 800*)	T-ECOPUR	SKF Ecotal[1]	
	S22-R	**Hydraulic, single-acting** Symmetric rod seal as S22–P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material. Retainer ring in angled design possible.					**Seal**	**Support ring**	
			–30	+100	0,5	160 (*2 300*)	SKF Ecorubber-1	SKF Ecotal	
			–20	+200	0,5	160 (*2 300*)	SKF Ecorubber-2	SKF Ecoflon 2	
			–40	+100	0,5	160 (*2 300*)	SKF Ecorubber-3[2]	SKF Ecotal	
			–50	+150	0,5	160 (*2 300*)	SKF Ecorubber-3[2]	SKF Ecoflon 2	
			–25	+100	0,5	160 (*2 300*)	SKF Ecorubber-H	SKF Ecotal	
			–25	+150	0,5	160 (*2 300*)	SKF Ecorubber-H	SKF Ecoflon 2	
			–10	+200	0,5	160 (*2 300*)	SKF Ecoflas	SKF Ecoflon 2	
	S24-P	**Hydraulic, single-acting** O–Ring activated rod seal with additional stabilizing lips and integrated active back ring for larger extrusion gaps, mainly used in mining industry.					**Seal**	**O–ring**	**Back-up ring**
			–30	+100	0,5	700 (*10 000*)	ECOPUR	NBR 70	SKF Ecotal[1]
			–20	+100	0,5	700 (*10 000*)	H-ECOPUR	NBR 70	SKF Ecotal[1]
			–40	+100	0,5	700 (*10 000*)	T-ECOPUR	MVQ 70	SKF Ecotal[1]
			–20	+100	0,7	700 (*10 000*)	S-ECOPUR	NBR 70	SKF Ecotal[1]
			–30	+100	0,5	700 (*10 000*)	G-ECOPUR	NBR 70	SKF Ecotal[1]
	S2527-F	**PTFE chevron set, single-acting** Optimized for low pressure, unequal angled chevron design results in good contact pressure even in low pressure range. External spring pretension necessary. Mainly used in chemical, pharmaceutical and food industry.	–200	+260	1,5	100 (*1 450*)	**S25–F** SKF Ecoflon 2	**S26–F** SKF Ecoflon 1	**S27–F** SKF Ecoflon 2

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] NOTE: not suitable for mineral oils

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Application	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°C		m/s	bar (*psi*)	–		
	S2931-F	**PTFE chevron set, single-acting** Optimized for high pressure, equal angled chevron design suitable for high pressure range. External spring pretension necessary. Mainly used in chemical, pharmaceutical and food industry.	–200	+260	1,5	315 (*4 500*)	**S29-F** SKF Ecoflon 2	**S30-F** SKF Ecoflon 1	**S31-F** SKF Ecoflon 2
	S32-P	**Hydraulic, single-acting** Chevron set, design with extremely flexible sealing lips for difficult operating conditions (bad guiding, large tolerance range). Available as total chevron set as well as intermediate chevrons only (in case of metal male and female adaptors).	–30 –20 –40 –20 –30 –20 –20 –30	+100 +100 +100 +100 +100 +100 +100 +100	0,5 0,5 0,5 0,7 0,5 0,5 0,7 0,5	500 (*7 200*) 500 (*7 200*) 500 (*7 200*) 500 (*7 200*) 500 (*7 200*) 500 (*7 200*) 500 (*7 200*) 500 (*7 200*)	**Pressure ring** SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)] X-ECOPUR XH-ECOPUR XS-ECOPUR XG-ECOPUR	**Seal** ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR ECOPUR H-ECOPUR S-ECOPUR G-ECOPUR	**Support ring** SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)]
	S35-P	**Hydraulic, double-acting** Compact rod seal with almost no dead spots as required for applications in food and pharmaceutical industry. Also commonly used as O–Ring replacement because design with interference fit on outside diameter prevents twisting in dynamic applications.	–30 –20 –20 –50 –30	+110 +110 +110 +110 +110	0,4 0,4 0,5 0,4 0,4	400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*) 400 (*5 800*)	ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR G-ECOPUR		

[1)] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Material	
			°C		m/s	–	
	A01-A	**Hydraulic, single-acting** Wiper with interference fit on outside diameter, providing a technically accurate closure at the cylinder. Wiping edge provides reliable protection against penetration of dust and dirt whilst allowing backflow of residual oil film. Back support area prevents tilting of wiper. For housings compliant with ISO 6195–Type A.	–30 –20 –50 –30 –30 –25 –20 –50 –10	+110 +110 +110 +110 +100 +150 +200 +150 +200	4 4 4 4 4 4 4 4 4	ECOPUR (X-ECOPUR)[2] H-ECOPUR /S-ECOPUR T-ECOPUR G-ECOPUR (XG-ECOPUR) [2] SKF Ecorubber-1 SKF Ecorubber-H SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecoflas	(XH-ECOPUR, XS-ECOPUR)[2]
	A01-B	**Hydraulic, single-acting** As profile A01–A, but without back support area. For housings according ISO 6195–TypeA.	–30 –20 –50 –30 –25 –20 –50 –10	+110 +110 +110 +100 +150 +200 +150 +200	4 4 4 4 4 4 4 4	ECOPUR (X-ECOPUR)[2] H-ECOPUR /S-ECOPUR T-ECOPUR SKF Ecorubber-1 SKF Ecorubber-H SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecoflas	(XH-ECOPUR, XS-ECOPUR)[2]
	A02-A	**Hydraulic, single-acting** Wiper with interference fit on outside diameter. Wiping edge provides a reliable protection against penetration of dust and dirt whilst allowing backflow of residual oil film. Back support area prevents tilting of wiper.	–30 –20 –50 –30 –30 –25 –20 –50 –10	+110 +110 +110 +110 +100 +150 +200 +150 +200	4 4 4 4 4 4 4 4 4	ECOPUR (X-ECOPUR)[2] H-ECOPUR /S-ECOPUR T-ECOPUR G-ECOPUR (XG-ECOPUR)[2] SKF Ecorubber-1 SKF Ecorubber-H SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecoflas	(XH-ECOPUR, XS-ECOPUR)[2]
	A02-B	**Hydraulic, single-acting** Wiper with interference fit on outside diameter. Wiping edge provides a reliable protection against penetration of dust and dirt whilst allowing backflow of residual oil film.	–30 –20 –50 –30 –30 –25 –20 –50 –10	+110 +110 +110 +110 +100 +150 +200 +150 +200	4 4 4 4 4 4 4 4 4	ECOPUR (X-ECOPUR)[2] H-ECOPUR /S-ECOPUR T-ECOPUR G-ECOPUR (XG-ECOPUR)[2] SKF Ecorubber-1 SKF Ecorubber-H SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecoflas	(XH-ECOPUR, XS-ECOPUR)[2]
	A02-I	**Hydraulic, single-acting** As profile A02–A, but without back support area. Special housing design according ISO 6195–Type C.	–30 –20 –50 –30 –30 –25 –20 –50 –10	+110 +110 +110 +110 +100 +150 +200 +150 +200	4 4 4 4 4 4 4 4 4	ECOPUR (X-ECOPUR)[2] H-ECOPUR /S-ECOPUR T-ECOPUR G-ECOPUR (XG-ECOPUR)[2] SKF Ecorubber-1 SKF Ecorubber-H SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecoflas	(XH-ECOPUR, XS-ECOPUR)[2]

[1] NOTE: not suitable for mineral oils
[2] For hard grade polyurethanes, refer to material data on **page 8**

Linear moving Rotating Oscillating Spiral moving Static
Grey symbols: contact SKF for application limitations

Application	Profile	Description	Temperature min.	Temperature max.	Speed max.	Material	
			°C		m/s	–	
	A03-A	**Hydraulic, single-acting** Wiper with mounting cage for press–fit installation into axially open housings. Wiping edge provides a reliable protection against penetration of dust and dirt, the use of plastic mounting cages avoids corrosion in the press–fit. For housings according ISO 6195–Type B.				**Seal**	**Housing**
			–30	+80	4	ECOPUR (X-ECOPUR)[3]	SKF Ecotal[1]
			–20	+80	4	H-ECOPUR (XH-ECOPUR[3]	SKF Ecotal[1]
			–40	+80	4	T-ECOPUR	SKF Ecotal[1]
			–20	+80	5	S-ECOPUR (XS-ECOPUR)[3]	SKF Ecotal[1]
			–30	+80	4	SKF Ecorubber-1	SKF Ecotal[1]
			–25	+80	4	SKF Ecorubber-H	SKF Ecotal[1]
			–20	+200	4	SKF Ecorubber-2	SKF Ecopaek
			–50	+150	4	SKF Ecorubber-3[2]	SKF Ecopaek
			–10	+200	4	SKF Ecoflas	SKF Ecopaek
	A04-A	**Pneumatic, single-acting** Wiper with interference fit on outside diameter, providing a technically accurate closure at the cylinder. Special design of wiping lip allows retention of initial lubricating film. Back support area prevents tilting of wiper. For housings according ISO 6195–Type A.					
			–30	+110	4	ECOPUR (X-ECOPUR)[2]	
			–20	+110	4	H-ECOPUR /S-ECOPUR	(XH-ECOPUR, XS-ECOPUR)[3]
			–50	+110	4	T-ECOPUR	
			–30	+100	4	SKF Ecorubber-1	
			–25	+150	4	SKF Ecorubber-H	
			–20	+200	4	SKF Ecorubber-2	
			–50	+150	4	SKF Ecorubber-3[2]	
			–10	+200	4	SKF Ecoflas	
	A04-B	**Pneumatic, single-acting** As profile A04–A, but without back support area. For housings according ISO 6195–Type A.					
			–30	+110	4	ECOPUR (X-ECOPUR)[3]	
			–20	+110	4	H-ECOPUR /S-ECOPUR	(XH-ECOPUR, XS-ECOPUR)[3]
			–50	+110	4	T-ECOPUR	
			–30	+100	4	SKF Ecorubber-1	
			–25	+150	4	SKF Ecorubber-H	
			–20	+200	4	SKF Ecorubber-2	
			–50	+150	4	SKF Ecorubber-3[2]	
			–10	+200	4	SKF Ecoflas	
	A05–A	**Pneumatic, single-acting** Wiper with interference fit on outside diameter. Special design of wiping lip allows retention of initial lubricating film. Back support area prevents tilting of wiper.					
			–30	+110	4	ECOPUR (X-ECOPUR)[3]	
			–20	+110	4	H-ECOPUR /S-ECOPUR	(XH-ECOPUR, XS-ECOPUR)[3]
			–50	+110	4	T-ECOPUR	
			–30	+100	4	SKF Ecorubber-1	
			–25	+150	4	SKF Ecorubber-H	
			–20	+200	4	SKF Ecorubber-2	
			–50	+150	4	SKF Ecorubber-3[2]	
			–10	+200	4	SKF Ecoflas	
	A05-B	**Pneumatic, single-acting** Wiper with interference fit on outside diameter. Special design of wiping lip allows retention of initial lubricating film.					
			–30	+110	4	ECOPUR (X-ECOPUR)[3]	
			–20	+110	4	H-ECOPUR /S-ECOPUR	(XH-ECOPUR, XS-ECOPUR)[3]
			–50	+110	4	T-ECOPUR	
			–30	+100	4	SKF Ecorubber-1	
			–25	+150	4	SKF Ecorubber-H	
			–20	+200	4	SKF Ecorubber-2	
			–50	+150	4	SKF Ecorubber-3[2]	
			–10	+200	4	SKF Ecoflas	

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] NOTE: not suitable for mineral oils
[3] For hard grade polyurethanes, refer to material data on **page 8**

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Application	Profile	Description	Temperature min.	Temperature max.	Speed max.	Material	
			°C		m/s	–	
	A05-I	**Pneumatic, single-acting** As profile A05-A, but without back support area. Special housing design according ISO 6195-Type C.	–30	+110	4	ECOPUR (X-ECOPUR)[3]	
			–20	+110	4	H-ECOPUR /S-ECOPUR	(XH-ECOPUR, XS-ECOPUR)[3]
			–50	+110	4	T-ECOPUR	
			–30	+100	4	SKF Ecorubber-1	
			–25	+150	4	SKF Ecorubber-H	
			–20	+200	4	SKF Ecorubber-2	
			–50	+150	4	SKF Ecorubber-3[2]	
			–10	+200	4	SKF Ecoflas	
	A06-A	**Pneumatic, single-acting** Wiper with mounting cage for press-fit installation into axially open housings. Special design of wiping lip allows retention of initial lubricating film, the use of plastic mounting cages avoids corrosion at the press-fit. For housings according ISO 6195-Type B.				**Seal**	**Housing**
			–30	+80	4	ECOPUR (X-ECOPUR)[3]	SKF Ecotal[1]
			–20	+80	4	H-ECOPUR (XH-ECOPUR[3]	SKF Ecotal[1]
			–40	+80	4	T-ECOPUR	SKF Ecotal[1]
			–20	+80	5	S-ECOPUR (XS-ECOPUR)[3]	SKF Ecotal[1]
			–30	+80	4	SKF Ecorubber-1	SKF Ecotal[1]
			–25	+80	4	SKF Ecorubber-H	SKF Ecotal[1]
			–20	+200	4	SKF Ecorubber-2	SKF Ecopaek
			–50	+150	4	SKF Ecorubber-3[2]	SKF Ecopaek
			–10	+200	4	SKF Ecoflas	SKF Ecopaek
	A07-A	**Hydraulic, single-acting** Wiper to fit in angled housings (30° angle).	–30	+110	4	ECOPUR (X-ECOPUR)[2]	
			–20	+110	4	H-ECOPUR /S-ECOPUR	(XH-ECOPUR, XS-ECOPUR)[3]
			–50	+110	4	T-ECOPUR	
			–30	+100	4	SKF Ecorubber-1	
			–25	+150	4	SKF Ecorubber-H	
			–20	+200	4	SKF Ecorubber-2	
			–50	+150	4	SKF Ecorubber-3[1]	
			–10	+200	4	SKF Ecoflas	
	A08-A	**Hydraulic/pneumatic, single-acting** Wiper usually fixed in housing with clamp flange. Mainly used for replacement in old hydraulic and pneumatic cylinders or for secondary applications.	–30	+110	4	ECOPUR (X-ECOPUR)[3]	
			–20	+110	4	H-ECOPUR /S-ECOPUR	(XH-ECOPUR, XS-ECOPUR)[3]
			–50	+110	4	T-ECOPUR	
			–30	+100	4	SKF Ecorubber-1	
			–25	+150	4	SKF Ecorubber-H	
			–20	+200	4	SKF Ecorubber-2	
			–50	+150	4	SKF Ecorubber-3[2]	
			–10	+200	4	SKF Ecoflas	
	A08-B	**Hydraulic/pneumatic, single-acting** Wiper usually fixed in housing with clamp flange. Mainly used for replacement in old hydraulic and pneumatic cylinders or for secondary applications.	–30	+110	4	ECOPUR (X-ECOPUR)[3]	
			–20	+110	4	H-ECOPUR /S-ECOPUR	(XH-ECOPUR, XS-ECOPUR)[3]
			–50	+110	4	T-ECOPUR	
			–30	+100	4	SKF Ecorubber-1	
			–25	+150	4	SKF Ecorubber-H	
			–20	+200	4	SKF Ecorubber-2	
			–50	+150	4	SKF Ecorubber-3[2]	
			–10	+200	4	SKF Ecoflas	

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] NOTE: not suitable for mineral oils
[3] For hard grade polyurethanes, refer to material data on **page 8**

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Application	Profile	Description	Temperature min.	Temperature max.	Speed max.	Material	
			°C		m/s	–	
	A09-A	**Hydraulic, single-acting** Wiper with dimensioning according to common types used in USA. For housings according AN 6231, ANSI/B93.35.	–30 –20 –50 –30 –25 –20 –50 –10	+110 +110 +110 +100 +150 +200 +150 +200	4 4 4 4 4 4 4 4	ECOPUR (X-ECOPUR)[2] H-ECOPUR /S-ECOPUR T-ECOPUR SKF Ecorubber-1 SKF Ecorubber-H SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecoflas	(XH-ECOPUR, XS-ECOPUR)[2]
	A10-A	**Hydraulic, single-acting** Wiper with dimensioning according to common types used in USA. Fixed relation between cross-section and height of wiper. For housings according AN 6231, ANSI/B93.35.	–30 –20 –50 –30 –25 –20 –50 –10	+110 +110 +110 +100 +150 +200 +150 +200	4 4 4 4 4 4 4 4	ECOPUR (X-ECOPUR)[2] H-ECOPUR /S-ECOPUR T-ECOPUR SKF Ecorubber-1 SKF Ecorubber-H SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecoflas	(XH-ECOPUR, XS-ECOPUR)[2]
	A11-A	**Hydraulic/pneumatic, double-acting** Wiper including additional sealing lip, used in combination with O-ring activated PTFE seals (tandem) to reduce residual oil film. Also used as complete solution for pneumatic applications in small diameter range. max. allowed pressure load: 16 bar *(230 psi)*.	–30 –20 –50 –30 –30 –25 –20 –50 –10	+110 +110 +110 +110 +100 +150 +200 +150 +200	4 4 4 4 4 4 4 4 4	ECOPUR H-ECOPUR /S-ECOPUR[3] T-ECOPUR G-ECOPUR SKF Ecorubber-1 SKF Ecorubber-H SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecoflas	
	A11-I	**Hydraulic/pneumatic, double-acting** As profile A11-A, special housing design according ISO 6195-Type C	–30 –20 –50 –30 –30 –25 –20 –50 –10	+110 +110 +110 +110 +100 +150 +200 +150 +200	4 4 4 4 4 4 4 4 4	ECOPUR H-ECOPUR /S-ECOPUR[3] T-ECOPUR G-ECOPUR SKF Ecorubber-1 SKF Ecorubber-H SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecoflas	
	A12-A	**Hydraulic, single-acting** Wiper with secondary lip, the technically accurate closure at the cylinder is providing reliable protection, even for heavy contamination.	–30 –20 –50 –20	+110 +110 +110 +110	4 4 4 5	ECOPUR (X-ECOPUR)[2] H-ECOPUR (XH-ECOPUR[2]) T-ECOPUR S-ECOPUR (XS-ECOPUR)[2]	

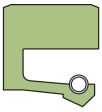
[1] NOTE: not suitable for mineral oils
[2] For hard grade polyurethanes, refer to material data on **page 8**
[3] Speed max. 5 m/s for S-ECOPUR

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Application	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°C		m/s	bar (*psi*)	–	
	A12-B	**Hydraulic, double-acting**						
		Wiper including additional sealing lip and secondary lip. Used in combination with tandem seal systems to reduce residual oil film. Also used as complete solution for pneumatic applications in small diameter range (max. 16 bar or *230 psi*). The technically accurate closure at the cylinder is providing reliable protection, even for heavy contamination.	–30	+110	4	16 (*230*)	ECOPUR	
			–20	+110	4	16 (*230*)	H-ECOPUR	
			–50	+110	4	16 (*230*)	T-ECOPUR	
			–20	+110	5	16 (*230*)	S-ECOPUR	
	A13-A	**Hydraulic/pneumatic, single-acting**						
		Scraper ring, mainly used in combination with wiper A02 or A01. Firmly clinging dirt and extremely heavy soiling (mud, tar, ice) is wiped off, following elastomeric wiper is protected from damage. Recommended materials provide good dry running properties, high stiffness and breaking strength.	–50	+80	1	–	SKF Ecotal[1)]	
			–100	+260	1	–	SKF Ecopaek	
			–200	+90	1	–	SKF Ecowear 1000	
			–30	+110	1	–	X-ECOPUR	
			–20	+110	1	–	XH-ECOPUR	
			–20	+110	1	–	XS-ECOPUR	
	A25-F	**Hydraulic/pneumatic, single-acting**					**Glide ring**	**Energizer**
		PTFE- or X-ECOPUR-wiper with O-ring as preloading element. PTFE part takes over wiping function, O-ring maintains equal contact pressure. Good dry running properties, no "stick-slip". Excellent chemical and thermal resistance (depends on O-ring).	–30	+100	10	–	SKF Ecoflon 2,3,4	NBR 70
			–20	+200	10	–	SKF Ecoflon 2,3,4	FPM 75
			–30	+100	5	–	X-ECOPUR	NBR 70
			–20	+100	5	–	XH-ECOPUR	NBR 70
			–20	+100	5	–	XS-ECOPUR	NBR 70
			–30	+90	10	–	SKF Ecowear 1000	NBR 70
			–55	+90	10	–	SKF Ecowear 1000	MVQ 70
	A26-F	**Hydraulic/pneumatic, double-acting**					**Glide ring**	**Energizer**
		PTFE- or X-ECOPUR-double wiper with two O-rings as preloading elements. Wiping edge provides a reliable protection against penetration of dust and dirt. Additional sealing lip for reduction of residual oil film if used in combination with O-ring activated PTFE seals type S09 (tandem). Excellent chemical and thermal resistance (depends on O-ring).	–30	+100	10	16 (*230*)	SKF Ecoflon 2,3,4	NBR 70
			–20	+200	10	16 (*230*)	SKF Ecoflon 2,3,4	FPM 75
			–30	+100	5	16 (*230*)	X-ECOPUR	NBR 70
			–20	+100	5	16 (*230*)	XH-ECOPUR	NBR 70
			–20	+100	5	16 (*230*)	XS-ECOPUR	NBR 70
			–30	+100	5	16 (*230*)	G-ECOPUR	NBR 70
			–30	+90	10	16 (*230*)	SKF Ecowear 1000	NBR 70
			–55	+90	10	16 (*230*)	SKF Ecowear 1000	MVQ 70
	A27-F	**Hydraulic/pneumatic, double-acting**					**Glide ring**	**Energizer**
		PTFE- or X-ECOPUR-double wiper with O-ring as preloading element. Wiping edge provides a reliable protection against penetration of dust and dirt. Additional sealing lip for reduction of residual oil film if used in combination with O-ring activated PTFE seals type S09 (tandem). Excellent chemical and thermal resistance (depends on O-ring).	–30	+100	10	16 (*230*)	SKF Ecoflon 2,3,4	NBR 70
			–20	+200	10	16 (*230*)	SKF Ecoflon 2,3,4	FPM 75
			–30	+100	5	16 (*230*)	X-ECOPUR	NBR 70
			–20	+100	5	16 (*230*)	XH-ECOPUR	NBR 70
			–20	+100	5	16 (*230*)	XS-ECOPUR	NBR 70
			–30	+100	5	16 (*230*)	G-ECOPUR	NBR 70
			–30	+90	10	16 (*230*)	SKF Ecowear 1000	NBR 70
			–55	+90	10	16 (*230*)	SKF Ecowear 1000	MVQ 70

[1)] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°C		m/s	bar (*psi*)	–	
	R01-P	**Single-acting rotary shaft seal**					**Seal**	**Energizer**
		Spring loaded lip seal with retainer ring for press-fit installation into axially open housings. Wide range of applications in every sector of industry, mainly as protecting element for bearings.	–30	+80	5	0,5 (*7*)	ECOPUR	SKF Ecotal[1]
			–20	+80	5	0,5 (*7*)	H-ECOPUR	SKF Ecotal[1]
			–40	+80	5	0,5 (*7*)	T-ECOPUR	SKF Ecotal[1]
			–20	+80	6	0,5 (*7*)	S-ECOPUR	SKF Ecotal[1]
			–30	+80	5	0,5 (*7*)	G-ECOPUR	SKF Ecotal[1]
	R01-R	**Single-acting rotary shaft seal**					**Seal**	**Energizer**
		Spring loaded lip seal with retainer ring for press-fit installation into axially open housings. Easily adaptable for diverse temperatures and media by selection of suitable seal material. Wide range of applications in every sector of industry, mainly as protecting element for bearings.	–30	+80	10	0,5 (*7*)	SKF Ecorubber-1	SKF Ecotal[1]
			–25	+80	10	0,5 (*7*)	SKF Ecorubber-H	SKF Ecotal[1]
			–20	+200	15	0,5 (*7*)	SKF Ecorubber-2	Metal
			–50	+80	10	0,5 (*7*)	SKF Ecorubber-3[2]	SKF Ecotal
			–50	+150	10	0,5 (*7*)	SKF Ecorubber-3[2]	Metal
			–50	+80	5	0,2 (*3*)	SKF Ecosil	SKF Ecotal
			–60	+200	5	0,2 (*3*)	SKF Ecosil	Metal
			–10	+200	10	0,5 (*7*)	SKF Ecoflas	Metal
	R01-AF	**Single-acting rotary shaft seal**						
		Spring loaded lip seal with solid outer section for axially open housings with clamping plate fixation. Mainly used for rolling mills, large gear mechanisms in heavy duty machinery, for shipbuilding industry and civil engineering.	–30	+110	5	0,5 (*7*)	ECOPUR/G-ECOPUR	
			–20	+110	5	0,5 (*7*)	H-ECOPUR	
			–50	+110	5	0,5 (*7*)	T-ECOPUR	
			–20	+110	6	0,5 (*7*)	S-ECOPUR	
			–30	+100	10	0,5 (*7*)	SKF Ecorubber-1	
			–25	+150	10	0,5 (*7*)	SKF Ecorubber-H	
			–20	+200	15	0,5 (*7*)	SKF Ecorubber-2	
			–50	+150	10	0,2 (*3*)	SKF Ecorubber-3[2]	
			–60	+200	5	0,2 (*3*)	SKF Ecosil	
			–10	+200	10	0,5 (*7*)	SKF Ecoflas	
	R01-AS	**Single-acting rotary shaft seal**						
		Split version of a spring loaded lip seal with solid outer section for axially open housings with clamping plate fixation. Mainly used for repair purpose on rolling mills, large gear machanisms in heavy duty machinery, for shipbuilding industry and civil engineering.	–30	+110	5	0,5 (*7*)	ECOPUR/G-ECOPUR	
			–20	+110	5	0,5 (*7*)	H-ECOPUR	
			–50	+110	5	0,5 (*7*)	T-ECOPUR	
			–20	+110	6	0,5 (*7*)	S-ECOPUR	
			–30	+100	10	0,5 (*7*)	SKF Ecorubber-1	
			–25	+150	10	0,5 (*7*)	SKF Ecorubber-H	
			–20	+200	15	0,5 (*7*)	SKF Ecorubber-2	
			–50	+150	10	0,2 (*3*)	SKF Ecorubber-3[2]	
			–60	+200	5	0,2 (*3*)	SKF Ecosil	
			–10	+200	10	0,5 (*7*)	SKF Ecoflas	
	R01-F	**Single-acting rotary shaft seal**					**Seal**	**O-Ring**
		Spring loaded PTFE-lip seal for axially open housings with clamping plate fixation, elastic secondary seal or integrated O-ring necessary for static sealing in the housing. Excellent chemical and thermal resistance, allowable pressure and speed depend on each other, it is not recommended to use all maximum values simultaneously.	–30	+100	10	15 (*210*)	SKF Ecoflon 2,3,4	NBR 70
			–20	+200	10	15 (*210*)	SKF Ecoflon 2,3,4	FPM/FKM 75

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] NOTE: not suitable for mineral oils

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°C		m/s	bar (*psi*)	–	
	R02-P	**Single-acting rotary shaft seal**					**Seal**	**Energizer**
		As profile R01-P, but with additional dust lip to avoid ingress of dust and dirt.	–30	+80	5	0,5 (*7*)	ECOPUR	SKF Ecotal[1]
			–20	+80	5	0,5 (*7*)	H-ECOPUR	SKF Ecotal[1]
			–40	+80	5	0,5 (*7*)	T-ECOPUR	SKF Ecotal[1]
			–20	+80	6	0,5 (*7*)	S-ECOPUR	SKF Ecotal[1]
			–30	+80	5	0,5 (*7*)	G-ECOPUR	SKF Ecotal[1]
	R02-R	**Single-acting rotary shaft seal**					**Seal**	**Energizer**
		As profile R01-R, but with additional dust lip to avoid ingress of dust and dirt.	–30	+80	10	0,5 (*7*)	SKF Ecorubber-1	SKF Ecotal[1]
			–25	+80	10	0,5 (*7*)	SKF Ecorubber-H	SKF Ecotal[1]
			–20	+200	15	0,5 (*7*)	SKF Ecorubber-2	Metal
			–50	+80	10	0,5 (*7*)	SKF Ecorubber-3[2]	SKF Ecotal
			–50	+150	10	0,5 (*7*)	SKF Ecorubber-3[2]	Metal
			–50	+80	5	0,2 (*3*)	SKF Ecosil	SKF Ecotal
			–60	+200	5	0,2 (*3*)	SKF Ecosil	Metal
			–10	+200	10	0,5 (*7*)	SKF Ecoflas	Metal
	R03-P	**Double-acting rotary seal**					**Seal**	**Back-up rings**
		Rotary seal with integrated backup rings for pivoting motion in hydraulic systems. Interference fit on outside diameter maintains stable fit in the housing, back-up rings permit larger extrusion gap / higher pressure. Mainly used for rotary pivots on excavators, grabs.	–30	+100	0,2	400 (*5 800*)	ECOPUR	SKF Ecotal[1]
			–20	+100	0,2	400 (*5 800*)	H-ECOPUR	SKF Ecotal[1]
			–40	+100	0,2	400 (*5 800*)	T-ECOPUR	SKF Ecotal[1]
			–20	+100	0,3	400 (*5 800*)	S-ECOPUR	SKF Ecotal[1]
	R03-R	**Double-acting rotary seal**					**Seal**	**Back-up rings**
		As profile R03-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	–30	+100	0,2	250 (*3 600*)	SKF Ecorubber-1	SKF Ecotal[1]
			–25	+100	0,2	250 (*3 600*)	SKF Ecorubber-H	SKF Ecotal[1]
			–20	+200	0,2	250 (*3 600*)	SKF Ecorubber-2	SKF Ecoflon 2
			–40	+100	0,2	250 (*3 600*)	SKF Ecorubber-3	SKF Ecotal
			–50	+150	0,2	250 (*3 600*)	SKF Ecorubber-3	SKF Ecoflon 2
			–10	+200	0,2	250 (*3 600*)	SKF Ecoflas	SKF Ecopaek
	R04-A	**Double-acting rotary seal**						
		Space saving rotary seal for pivoting motion in hydraulic systems. Interference fit on outside diameter maintains stable fit in the housing, dynamic sealing lips on inside diameter.	–30	+110	0,2	160 (*2 300*)	ECOPUR	
			–20	+110	0,2	160 (*2 300*)	H-ECOPUR	
			–50	+110	0,2	160 (*2 300*)	T-ECOPUR	
			–20	+110	0,3	160 (*2 300*)	S-ECOPUR	
			–30	+100	0,2	100 (*1 450*)	SKF Ecorubber-1	
			–25	+150	0,2	100 (*1 450*)	SKF Ecorubber-H	
			–20	+200	0,2	100 (*1 450*)	SKF Ecorubber-2	
			–50	+150	0,2	100 (*1 450*)	SKF Ecorubber-3[2]	
			–10	+200	0,2	100 (*1 450*)	SKF Ecoflas	
	R05-A	**Double-acting rotary seal**						
		Space saving rotary seal for pivoting motion in hydraulic systems. Interference fit on inside diameter maintains stable fit in the housing, dynamic sealing lips on outside diameter.	–30	+110	0,2	160 (*2 300*)	ECOPUR	
			–20	+110	0,2	160 (*2 300*)	H-ECOPUR	
			–50	+110	0,2	160 (*2 300*)	T-ECOPUR	
			–20	+110	0,3	160 (*2 300*)	S-ECOPUR	
			–30	+100	0,2	100 (*1 450*)	SKF Ecorubber-1	
			–25	+150	0,2	100 (*1 450*)	SKF Ecorubber-H	
			–20	+200	0,2	100 (*1 450*)	SKF Ecorubber-2	
			–50	+150	0,2	100 (*1 450*)	SKF Ecorubber-3[2]	
			–10	+200	0,2	100 (*1 450*)	SKF Ecoflas	

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] NOTE: not suitable for mineral oils

Linear moving · Rotating · Oscillating · Spiral moving · Static
Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°C		m/s	bar (*psi*)	–	
	R06-P	**Axially acting rotary seal** Elastic, excellent wear resistant V-Ring with interference fit on the shaft, rotates with the shaft, sealing axially against shaft collars, thrust blocks or the outer race of roller bearings, protecting the bearing against dust, dirt, oilsplash, watersplash and similar media. Acting as a seal and slinger ring.	–30 –20 –50 –20 –30	+110 +110 +110 +110 +110	25 25 25 25 25	– – – – –	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR G-ECOPUR	
	R06-R	**Axially acting rotary seal** Elastic, good wear resistant V-Ring as profile R06-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	–30 –20 –50 –25 –10	+100 +200 +150 +150 +200	25 25 25 25 25	– – – – –	SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecorubber-H SKF Ecoflas	
	R07-P	**Axially acting rotary seal** Elastic, excellent wear resistant V-Ring with interference fit on the shaft, rotates with the shaft, sealing axially against shaft collars, thrust blocks or the outer race of roller bearings, protecting the bearing against dust, dirt, oilsplash, watersplash and similar media. Acting as a seal- and slingerring.	–30 –20 –50 –20 –30	+110 +110 +110 +110 +110	25 25 25 25 25	– – – – –	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR G-ECOPUR	
	R07-R	**Axially acting rotary seal** Elastic, good wear resistant V-Ring as profile R07-P, but easily adaptable for diverse temperatures and media by selection of suitable seal material.	–30 –20 –50 –25 –10	+100 +200 +150 +150 +200	25 25 25 25 25	– – – – –	SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecorubber-H SKF Ecoflas	
	R08-A	**Single-acting rotary seal** Springless rotary lip seal with arbitrary preload on inside and outside diameter in order to design the seal to different specific needs.	[2]		[2]	[2]	[2]	
	R09-F	**Double-acting rotary seal** O-ring activated, low friction PTFE rotary seal. Mainly used in applications with alternating pressure from one side of the seal to the other, such as hose reels, swivel joints, rotating track rings and machine tool hydraulics. Good chemical and thermal resistance achievable by selection of suitable O-ring material.	–30	+100	0,4	350 (*5 000*)	**Glide ring** SKF Ecoflon 2,3,4	**Energizer** NBR 70

[1] NOTE: not suitable for mineral oils
[2] Depending on the application. Contact SKF for more information.

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Application	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°C		m/s	bar (*psi*)	–	
	R09-FS	**Double-acting rotary seal** As profile R09-F, but with a profile ring energizer instead of the O-ring. For heavy duty applications and non-standard housings.	–30	+100	0,4	350 (*5 000*)	**Glide ring** SKF Ecoflon 2,3,4	**Energizer** SKF Ecorubber-1
	R10-F	**Double-acting rotary seal** O-ring activated, low friction PTFE rotary seal. Mainly used in applications with alternating pressure from one side of the seal to the other, such as hose reels, swivel joints, rotating track rings and machine tool hydraulics. Good chemical and thermal resistance achievable by selection of suitable O-ring material.	–30	+100	0,4	350 (*5 000*)	**Glide ring** SKF Ecoflon 2,3,4	**Energizer** NBR 70
	R10-FS	**Double-acting rotary seal** As profile R10-F, but with a profile ring energizer instead of the O-ring. For heavy duty applications and non-standard housings.	–30	+100	0,4	350 (*5 000*)	**Glide ring** SKF Ecoflon 2,3,4	**Energizer** SKF Ecorubber-1
	R11-F	**Single-acting PTFE rotary seal** Space saving rotary seal, deformed sealing lip acts self-adjusting on increasing temperature. For axially open housings with clamping plate fixation, elastic secondary seal or integrated O-ring necessary for static sealing in the housing. Excellent chemical and thermal resistance, suitable for high speed applications.	–200	+260	20	5 (*70*)	SKF Ecoflon 2,3,4	
	R12-F	**Single-acting PTFE flange seal** Fingerspring activated flange seal, excellent chemical and thermal resistance, mainly used on flanges, fittings or pivoting joints in chemical industry.	–200	+260	1	300 (*4 300*)	**Seal** SKF Ecoflon 2,3,4	**Spring** 1.4310[2]
	R13	**O-ring** Well known, simple O-ring with proven reliability in multiple applications in every sector of industry. Excellent adaptation possibilities for diverse temperatures and media by selection of suitable seal material. Mainly used as static seal or as preloading element for PTFE-seals. For most dynamic applications, we recommend to use S20/K20 or S35/K35.	–30 –20 –50 –30 –20 –50 –25 –200 –60 –10	+110 +110 +110 +100 +200 +150 +150 +260 +200 +200	– – – – – – – – – –	600 (*8 700*) 600 (*8 700*) 600 (*8 700*) 160 (*2 300*) 160 (*2 300*) 160 (*2 300*) 160 (*2 300*) 160 (*2 300*) 160 (*2 300*) 160 (*2 300*)	ECOPUR/G-ECOPUR H-ECOPUR/S-ECOPUR T-ECOPUR SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecorubber-H SKF Ecoflon 1 SKF Ecosil SKF Ecoflas	

[1] NOTE: not suitable for mineral oils
[2] Spring metal material specification

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°C		m/s	bar (*psi*)	–		
	R14	**Square ring** Well-known, simple square ring, mainly used for static applications or as gaskets. Excellent adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	[2]		[2]	[2]	[2]		
	R15-P	**Double-acting static seal** For static applications as an O-ring replacement to avoid drilling in the housing, simple installation and higher extrusion resistance.	–30 –20 –50 –20	+110 +110 +110 +110	– – – –	400 (*5800*) 400 (*5800*) 400 (*5800*) 400 (*5800*)	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR		
	R16	**Double-acting static seal** For static and dynamic applications as an O-ring replacement in radial and axial grooves.	–30 –20 –50 –25 –10	+110 +200 +150 +150 +200	– – – – –	50 (*3600*) 50 (*3600*) 50 (*3600*) 50 (*3600*) 50 (*3600*)	SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecorubber-H SKF Ecoflas		
	R19-F	**Single-acting PTFE rotary seal** Fingerspring activated PTFE seal with integrated clamping flange on the back of seal for clamping fixation, acting as anti-twist device. Excellent chemical and thermal resistance. Suitable for relatively high pressure and high speed, however, allowable pressure and speed depend on each other. It is not recommended to use all maximum values simultaneously.	–200	+260	2	150 (*2100*)	**Seal** SKF Ecoflon 1,2,3,4	**Spring** 1.4310[4]	
	R20-P	**Single-acting flange seal** Flange seal for static applications, suitable for high pressure range. Direction of pressurization (from inside or outside) must be indicated when ordering the seal.	–30 –20 –50 –20	+110 +110 +110 +110	– – – –	800 (*11 600*) 800 (*11 600*) 800 (*11 600*) 800 (*11 600*)	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR		
	R30-A	**Valve stem seal with PTFE jacket** For low friction, rubber energizer automatically increases preload as it senses leakage. Mainly used as valve seal in oil industry/offshore applications.	–20 –25 –20 –25	+100 +100 +200 +200	0,5 0,5 0,5 0,5	500 (*7200*) 500 (*7200*) 1 000 (*14 500*) 1 000 (*14 500*)	**Seal** SKF Ecorubber-2 SKF Ecorubber-H SKF Ecorubber-2 SKF Ecorubber-H	**Cover** SKF Ecoflon[3] SKF Ecoflon[3] SKF Ecoflon[3] SKF Ecoflon[3]	**Back-up ring** SKF Ecotal[5] SKF Ecotal[5] SKF Ecopaek SKF Ecopaek

[1] NOTE: not suitable for mineral oils
[2] Depending on the application. Contact SKF for more information
[3] For all types of SKF Ecoflon, refer to materials data on **page 8**
[4] Spring metal material specification
[5] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm

Linear moving | Rotating | Oscillating | Spiral moving | Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material
			°C		m/s	bar (*psi*)	–
	R35-A	**Single-acting flange seal**					
		Flange seal for static applications, suitable for high pressure range. Direction of pressurization (from inside or outside) must be indicated when ordering the seal.	–30	+110	–	800 (*11 600*)	ECOPUR/G-ECOPUR
			–20	+110	–	800 (*11 600*)	H-ECOPUR
			–50	+110	–	800 (*11 600*)	T-ECOPUR
			–20	+110	–	800 (*11 600*)	S-ECOPUR
			–30	+100	–	250 (*3 600*)	SKF Ecorubber-1
			–20	+200	–	250 (*3 600*)	SKF Ecorubber-2
			–50	+150	–	250 (*3 600*)	SKF Ecorubber-3[1)]
			–25	+150	–	250 (*3 600*)	SKF Ecorubber-H
			–60	+200	–	250 (*3 600*)	SKF Ecosil
			–10	+200	–	250 (*3 600*)	SKF Ecoflas

[1)] NOTE: not suitable for mineral oils

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Specific load[3] max.	Material
			°C		m/s	N/mm²	–
	F01	**Guide ring F01** Most common guide ring for rod or piston application. Used in many standard cylinders, majority of applications require split version for installation into closed housings, non split design available (bushings).	–50 –200 –200 –200 –40	+100 +200 +200 +200 +130	4 4 5 5 1	25 3 4,5 7,5 90	SKF Ecotal[1] SKF Ecoflon 2 SKF Ecoflon 3 SKF Ecoflon[4] SKF Ecotex[2]
	F02	**Guide ring F02** For rod or piston application, split and non split design available. Not only used as guide ring, also as plain washer or spacer.	–50 –200 –200 –200 –40	+100 +200 +200 +200 +130	4 4 5 5 1	25 3 4,5 7,5 90	SKF Ecotal[1] SKF Ecoflon 2 SKF Ecoflon 3 SKF Ecoflon[4] SKF Ecotex[2]
	F03	**Guide ring F03** For piston application. Angled design combines guide ring and back-up ring function. Split and non split design available.	–50 –200 –200 –200 –40	+100 +200 +200 +200 +130	4 4 5 5 1	25 3 4,5 7,5 90	SKF Ecotal[1] SKF Ecoflon 2 SKF Ecoflon 3 SKF Ecoflon[4] SKF Ecotex[2]
	F04	**Guide ring F04** Same as profile F03 but for rod application.	–50 –200 –200 –200 –40	+100 +200 +200 +200 +130	4 4 5 5 1	25 3 4,5 7,5 90	SKF Ecotal[1] SKF Ecoflon 2 SKF Ecoflon 3 SKF Ecoflon[4] SKF Ecotex[2]
	F05	**Guide ring F05** With integrated collar on inside diameter, for piston application. Split and non split design available.	–50 –200 –200 –200 –40	+100 +200 +200 +200 +130	4 4 5 5 1	25 3 4,5 7,5 90	SKF Ecotal[1] SKF Ecoflon 2 SKF Ecoflon 3 SKF Ecoflon[4] SKF Ecotex[2]
	F06	**Guide ring F06** With integrated collar on outside diameter, for rod application. Split and non split design available.	–50 –200 –200 –200 –40	+100 +200 +200 +200 +130	4 4 5 5 1	25 3 4,5 7,5 90	SKF Ecotal[1] SKF Ecoflon 2 SKF Ecoflon 3 SKF Ecoflon[4] SKF Ecotex[2]

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] SKF Ecotex: Special fabric reinforced material
[3] Depending on temperature and allowable compression. Contact SKF for more information
[4] SKF Ecoflon 60% bronze filled

Linear moving Rotating Oscillating Spiral moving Static
Grey symbols: contact SKF for application limitations

Application	Profile	Description	Temperature min.	Temperature max.	Speed max.	Specific load[3] max.	Material
			°C		m/s	N/mm²	–
	F07	**Guide ring F07** With groove on inside diameter, for piston application. Split and non split design available.	–50 –200 –200 –200 –40	+100 +200 +200 +200 +130	4 4 5 5 1	25 3 4,5 7,5 90	SKF Ecotal[1] SKF Ecoflon 2 SKF Ecoflon 3 SKF Ecoflon[4] SKF Ecotex[2]
	F08	**Guide ring F08** With groove on outside diameter, for rod application. Split and non split design available.	–50 –200 –200 –200 –40	+100 +200 +200 +200 +130	4 4 5 5 1	25 3 4,5 7,5 90	SKF Ecotal[1] SKF Ecoflon 2 SKF Ecoflon 3 SKF Ecoflon[4] SKF Ecotex[2]

[1] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm
[2] SKF Ecotex: Special fabric reinforced material
[3] Depending on temperature and allowable compression. Contact SKF for more information
[4] SKF Ecoflon 60% bronze filled

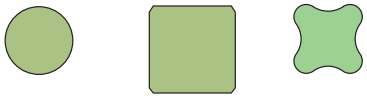
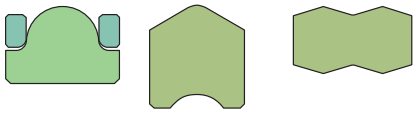
Linear moving | Rotating | Oscillating | Spiral moving | Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Material
			°C		–
	ST08	**Back-up ring** Common inactive back-up ring, mainly used with O-rings to avoid gap extrusion. Split and non split design available.	–50 –200 –200 –30 –20 –50 –30 –30	+100 +260 +260 +110 +110 +110 +110 +110	SKF Ecotal[1)] SKF Ecoflon 1 SKF Ecoflon 2 ECOPUR H-ECOPUR T-ECOPUR G-ECOPUR X-ECOPUR
	ST09	**Back-up ring** Common inactive back-up ring especially for O-rings to avoid gap extrusion. Split and non split design available.	–200 –30 –20 –50 –30 –30	+260 +110 +110 +110 +110 +110	SKF Ecoflon 1 ECOPUR H-ECOPUR T-ECOPUR G-ECOPUR X-ECOPUR
	ST10	**Back-up ring** Standard active back-up ring for piston seal type PD. Normally already included in PD-type seal profiles, designed for automatic pressure activation. Split and non split design available.	–50 –200 –40 –100	+100 +260 +100 +260	SKF Ecotal[1)] SKF Ecoflon 2 SKF Ecomid SKF Ecopaek
	ST11	**Back-up ring** Standard active back-up ring for rod seal type PD. Normally already included in PD-type seal profiles, designed for automatic pressure activation. Split and non split design available.	–50 –200 –40 –100	+100 +260 +100 +260	SKF Ecotal[1)] SKF Ecoflon 2 SKF Ecomid SKF Ecopaek
	ST12	**Back-up ring** Triangular back-up ring for rod applications, fits in special shaped housings (see seal data sheets). Also used as integrated active back-up ring in special high pressure or low friction seal profiles. Split and non split design available.	–50 –200 –40 –100	+100 +260 +100 +260	SKF Ecotal[1)] SKF Ecoflon 2 SKF Ecomid SKF Ecopaek
	ST13	**Back-up ring** Triangular back-up ring for piston applications, fits in special shaped housings (see seal data sheets). Also used as integrated active back-up ring in special high pressure or low friction seal profiles. Split and non split design available.	–50 –200 –40 –100	+100 +260 +100 +260	SKF Ecotal[1)] SKF Ecoflon 2 SKF Ecomid SKF Ecopaek

[1)] SKF Ecotal up to ∅ 260 mm, SKF Ecomid above ∅ 260 mm

Beside the conventional O-rings and square-rings, SKF offers a standard range of specialized seals for static applications. Most of profiles listed below fit in standard O-ring-grooves (housings) and can be substituted easily without any rework of housing dimensions.

Appli-cation	Profile	Description
	R13 R14 R16-R 	**Universal type** Most common and simple seal profiles with proven reliability in a wide range of different applications and industries.
	S20-R S35-P R15-P 	**Inside sealing type** Interference fit on outside diameter provides stable fit in the housing and reliable performance at all pressures.
	K20-R K35-P R15-P 	**Outside sealing type** Interference fit on inside diameter provides stable fit in the housing and reliable performance at all pressures.
	R35-A R20-P R15-P 	**Axial sealing type** Robust profiles mainly used as flange seals, inside or outside pressurizsation possible. Direction of pressurization (from inside or outside) must be indicated when ordering the seal.

Tailor-made solutions

In addition to the standard range of static seals, SKF offers special tailor-made static seal profiles to satisfy the very specific needs of every customer in every industry.

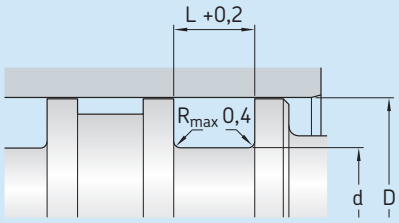
Appli-cation	Profile	Description
		**Tailor-made solutions** These special profiles are just some examples of SKF's wide and flexible machining capabilities.

Piston seal housing details and recommendations

The table on the right shows an example of standard housing measurements for piston seals.

Please note that SKF can produce these profiles to application specific requirements or any non-standard housing.

Suggested standard housing dimension

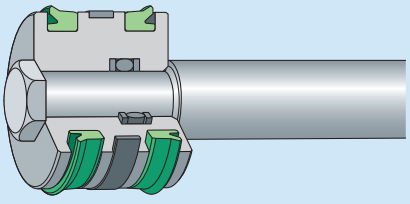


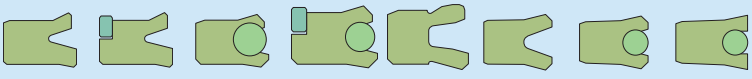
Indicated dimensions are required to process an order
D bore diameter
d housing groove diameter
L housing groove length
c/s cross section

	Surface properties $R_{t\,max}$	R_a
	µm	
Sliding surface for		
TPU/rubber seals	≤ 2,5	≤ 0,1–0,5
PTFE seals	≤ 2	≤ 0,05–0,3
Groove bottom	≤ 6,3	≤ 1,6
Groove face	≤ 15	≤ 3
Bearing area T_p	50–95%[1)]	

Seal housing tolerances
D H9
d h10

[1)] at a cutting depth of 0,5 R_z based on C_{ref} = 0%





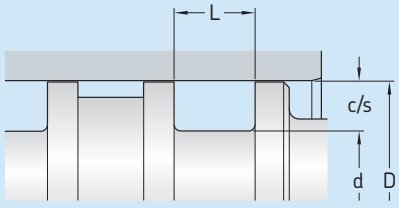
K01 K02 K03 K04 K05 K06 K07 K21

Main function
Single-acting piston seals lip type (U-cup) seals compact seals.

Main applications
Support and retaining cylinders, standard cylinders.

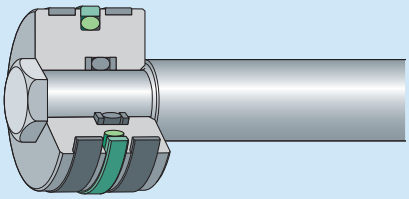
Advantages
Stable fit in the housing, ultimate sealing effect, wide temperature range.

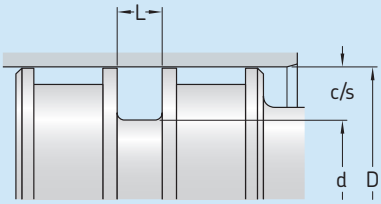
Standard materials
ECOPUR, SKF Ecorubber (all types).



Bore diameter D over	incl.	Housing groove diameter d	Housing groove length L	Cross section c/s
mm		mm	mm	mm
14	25	D – 8	6	4
25	50	D – 10	7	5
50	75	D – 12	8	6
75	150	D – 15	10	7,5
150	300	D – 20	12	10
300	500	D – 25	18	12,5
500	750[1)]	D – 30	20	15
750[1)]		D – 40	26	20

[1)] Not all profiles are available above 600 mm





K08-D K08-P K08-E

Main function
Single/double-acting piston seals, o-ring activated PTFE (TPU) seals.

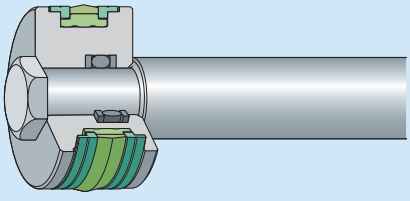
Main applications
Standard cylinders for positioning functions, mobile hydraulics, etc.

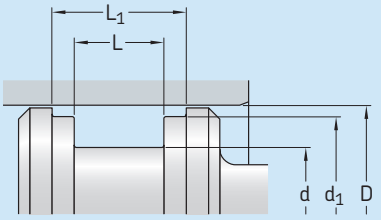
Advantages
Low friction, no stick-slip, excellent resistance against pressure shocks.

Standard materials
SKF Ecoflon/NBR
SKF Ecoflon/FKM
X-ECOPUR/NBR.

Bore diameter D over	incl.	Housing groove diameter d	Housing groove length L	Cross section c/s
mm		mm	mm	mm
8	15	D – 4,9	2,2	2,45
15	40	D – 7,5	3,2	3,75
40	80	D – 11	4,2	5,5
80	133	D – 15,5	6,3	7,75
133	330	D – 21	8,1	10,5
330	670	D – 24,5	8,1	12,25
670	1 000	D – 28	9,5	14[1)]
1 000		D – 38	9,5	19[1)]

[1)] Only profiles K08-D and K08-E, not for profile K08-P





K09

Main function
Double-acting piston seal, compact type.

Main applications
Support and retaining cylinders, standard cylinders.

Advantages
Excellent static and dynamic sealing capacity, integrated back-up rings.

Standard materials
ECOPUR / SKF Ecorubber / SKF Ecotal.

Bore diameter D over	incl.	Housing groove diameter d	d_1	Housing groove length L[1)]	L_1[1)]
mm		mm		mm	
20	50	10	3	12,5	20,5
50	80	15	4	20	28
80	150	20	5	25	36
150	400	25	6	32	46
400		30	8	36	50

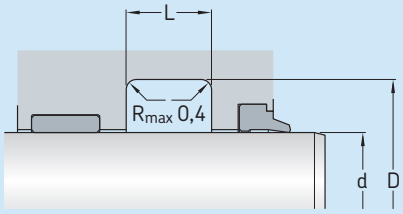
[1)] Not valid for profile K09-H

Rod seal housing details and recommendations

The table on the right shows an example of standard housing measurements for rod seals.

Please note that SKF can produce these profiles to application specific requirements or any non-standard housing.

Suggested standard housing dimension

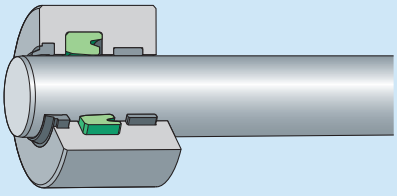


Indicated dimensions are required to process an order
D housing groove diameter
d rod diameter
L housing groove length
c/s cross section

	Surface properties $R_{t\,max}$	R_a
	µm	
Sliding surface for		
TPU/rubber seals	≤ 2,5	≤ 0,1–0,5
PTFE seals	≤ 2	≤ 0,05–0,3
Groove bottom	≤ 6,3	≤ 1,6
Groove face	≤ 15	≤ 3
Bearing area T_p	50–95%[1]	

Seal housing tolerances
D H10
d f8

[1] at a cutting depth of 0,5 R_z based on C_{ref} = 0%



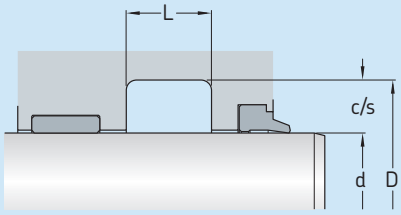
S01 S02[1] S03 S04[1] S05 S06 S07 S08 S24[1]

Main function
Single-acting rod seals
lip type (U-cup) seals
compact seals.

Main applications
Standard cylinders, light and standard hydraulic applications.

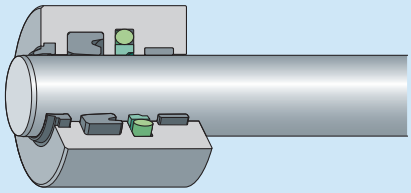
Advantages
Stable fit in the housing, ultimate sealing effect, wide temperature range, good backpumping ability.

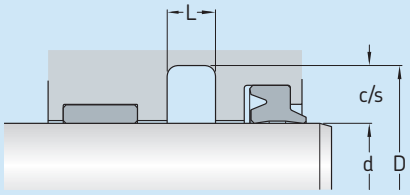
Standard materials
ECOPUR, SKF Ecorubber



Rod diameter d over	incl.	Housing groove diameter D	Housing groove length L	Cross section c/s
mm		mm	mm	mm
5	25[1]	d + 8	6,3	4
25	50	d + 10	8	5
50	150	d + 15	10	7,5
150	300	d + 20	14	10
300	500	d + 25	17	12,5
500	700[2]	d + 30	25	15
700	1 000[2]	d + 40	32	20
1 000		d + 40	32	20

[1] Restrictions in minimum diameter for profiles with back-up rings. Please consult our technical department for exact limitations.
[2] Not all profiles available above 600 mm





S09-E S09-P S09-D

Main function
Single/double-acting rod seals, O-ring activated PTFE (TPU) seals.

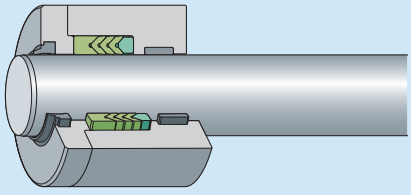
Main applications
Earth moving equipment, heavy hydraulics.

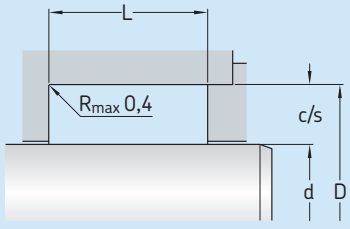
Advantages
Excellent resistance against pressure shocks, long lifetime.

Standard materials
S09: SKF Ecoflon/NBR or SKF Ecoflon/FKM, X-ECOPUR/NBR
S01: ECOPUR or SKF Ecorubber.

Rod diameter d over	incl.	Housing groove diameter D	Housing groove length L	Cross section c/s
mm		mm	mm	mm
5	8	d + 4,9	2,2	2,45
8	19	d + 7,3	3,2	3,65
19	38	d + 10,7	4,2	5,35
38	200	d + 15,1	6,3	7,55
200	256	d + 20,5	8,1	10,25
256	650[1)]	d + 24	8,1	12
650	1 000[1)]	d + 27,3	9,5	13,65
1 000		d + 27,3	9,5	13,65

[1)] Not all profiles available above 600 mm





S1012 S1315

Main function
Single-acting rod seals, chevron packings.

Main applications
Heavy industry hydraulics, presses.

Advantages
Suitable for old, worn rods, split version for easy installation available.

Standard materials
ECOPUR / SKF Ecotal.

Rod diameter d over	incl.	Housing groove diameter D	Housing groove length L	Cross section c/s
mm		mm	mm	
10	40	d + 10	16	5
40	75	d + 15	25	7,5
75	150	d + 20	32	10
150	200	d + 25	40	12,5
200	300	d + 30	50	15
300		d + 40	63	20

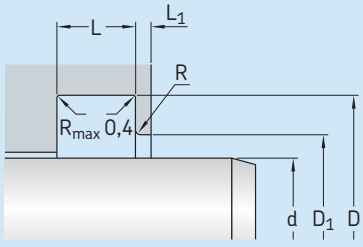
[1)] Not valid for profile K09-H

Wiper housing details and recommendations

The table on the right shows an example of standard housing measurements for wipers.

Please note that SKF can produce these profiles to application specific requirements or any non-standard housing.

Suggested standard housing dimension

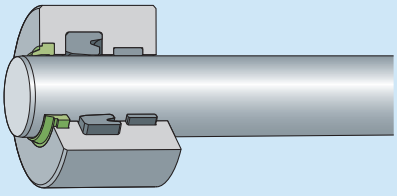


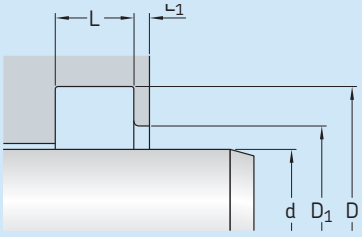
Indicated dimensions are required to process an order

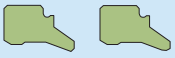
D housing groove diameter
d rod diameter
L housing groove width
H total wiper height

	Surface properties $R_{t\,max}$	R_a
	µm	
Sliding surface for		
TPU/rubber seals	≤ 2,5	≤ 0,1–0,5
PTFE seals	≤ 2	≤ 0,05–0,3
Groove bottom	≤ 6,3	≤ 1,6
Groove face	≤ 15	≤ 3
Bearing area T_p	50–95%[1)]	
Seal housing tolerances		
D_1 H11	L < 10 mm +0,2	
D H11	L > 10 mm +0,3	

[1)] at a cutting depth of 0,5 R_z based on C_{ref} = 0%







A01 **A04**

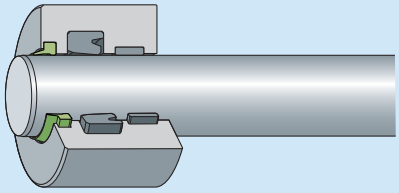
Main function
Single-acting wipers.

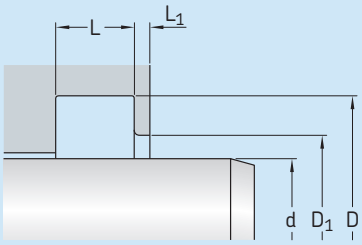
Main applications
Standard wiper for hydraulics.

Advantages
Easy installation (snap-in), excellent wear resistance, technically accurate closure.

Standard materials
ECOPUR (X-ECOPUR) / SKF Ecorubber.

Rod diameter d		Housing groove diameter D	D_1	Housing groove width L	L_1	Total wiper height H
over	incl.					
mm		mm		mm		mm
6	100	d + 8	d + 6	4	1	7
100	150	d + 12	d + 9	5,5	1,5	10
150		d + 15	d + 11	6,5	2	13





A02 A05 A11

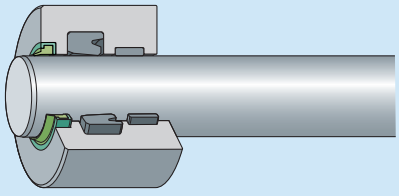
Main function
Single/double-acting wipers.

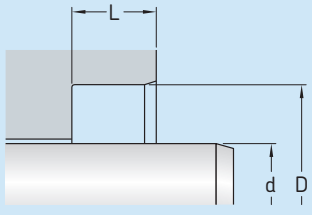
Main applications
In combination with O-ring activated PTFE rod seals (S09).

Advantages
Excellent wear resistance, double-acting function.

Standard materials
ECOPUR (X-ECOPUR) / SKF Ecorubber.

Rod diameter d over	incl.	Housing groove diameter D	D_1	Housing groove width L	L_1 min	Total wiper height H
mm		mm		mm		mm
6	50	d +8	d + 4	5	2	8
50	100	d + 10	d + 5	6	2	9,7
100		d + 15	d + 7	8,5	2	13





A03 A06

Main function
Single-acting wipers.

Main applications
Standard hydraulic applications, pressfit for axially open housings.

Advantages
Excellent wear resistance, plastic retainer ring, no oxidation problem between retainer and housing.

Standard materials
ECOPUR (X-ECOPUR) + SKF Ecotal / SKF Ecorubber + SKF Ecotal.

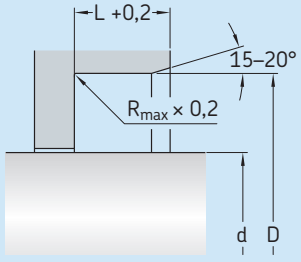
Rod diameter d over	incl.	Housing groove diameter D	Housing groove width L	Total wiper height H
mm		mm	mm	
6	10	d + 8	5	8
10	100	d + 10	7	10
100	200	d + 15	9	12
200		d + 20	12	16

Rotary seal housing details and recommendations

The table on the right shows an example of standard housing measurements for rotary seals.

Please note that SKF can produce these profiles to application specific requirements or any non-standard housing.

Suggested standard housing dimension

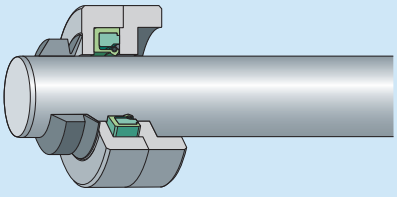


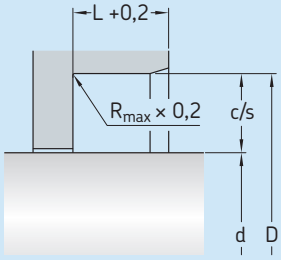
Indicated dimensions are required to process an order

D housing groove diameter
d shaft diameter
L housing groove length
c/s cross section

	Surface properties $R_{t\,max}$	R_a
	µm	
Sliding surface for		
TPU/rubber seals	≤ 2,5	≤ 0,1–0,5
PTFE seals	≤ 2	≤ 0,05–0,3
Groove bottom	≤ 6,3	≤ 1,6
Groove face	≤ 15	≤ 3
Bearing area T_p	50–95%[1)]	
Seal housing tolerances depending on seal profile		

[1)] at a cutting depth of 0,5 R_z based on C_{ref} = 0%






R01


R02

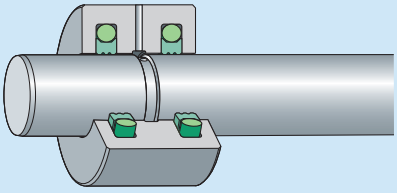
Main function
Single-acting rotary seals, oil seals, radial shaft seals.

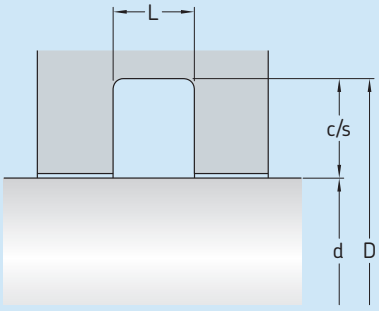
Main applications
Bearing protection.

Advantages
Easily adaptable for diverse temperatures and media.

Standard materials
ECOPUR, SKF Ecorubber/SKF Ecotal, Aluminium.

Shaft diameter d over	incl.	Housing groove diameter D	Housing groove length L	Cross section c/s
mm		mm	mm	mm
6	60	d + 12	7	6
60	140	d + 15	8	7,5
140	300	d + 20	10	10
300	500	d + 30	12	15
500	800	d + 40	20	20
800		d + 50	22	25





R09

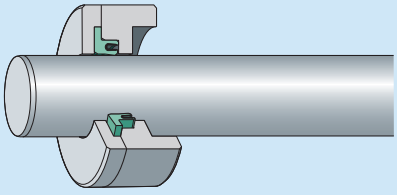
Main function
Double-acting rotary seal, O-ring activated PTFE seal.

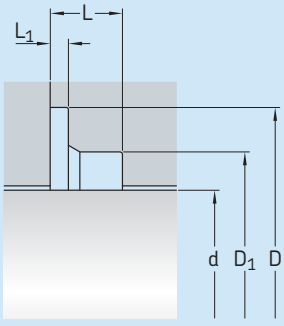
Main applications
Rotary pivots.

Advantages
For high pressure.

Standard materials
SKF Ecoflon + NBR or FKM.

Shaft diameter		Housing groove diameter	Housing groove length	Cross section
d		D	L	c/s
over	incl.			
mm		mm	mm	mm
6	19	d + 4,9	2,2	2,45
19	38	d + 7,5	3,2	3,75
38	200	d + 11	4,2	5,5
200	256	d + 15,5	6,3	7,75
256	650	d + 21	8,1	10,5
650		d + 28	9,5	14





R19

Main function
Single-acting rotary seal, spring activated PTFE seal.

Main applications
Bearing protection for chemical and pharma industries.

Advantages
Low friction, good chemical and thermal resistance, suitable for high speed.

Standard materials
SKF Ecoflon, stainless steel spring.

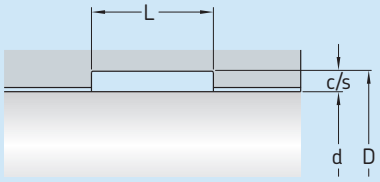
Shaft diameter		Housing groove diameter		Housing groove length	
d		D	D_1	L	L_1
over	incl.				
mm		mm		mm	
5	20	d + 9	d + 5	3,6	0,85
20	40	d + 12,5	d + 7	4,8	1,35
40	400	d + 17,5	d + 10,5	7,1	1,8
400		d + 22	d + 14	9,5	2,8

Guide ring housing details and recommendations

Guide ring housing details and recommendations for dynamic applications. SKF standard guide rings are available as 45° split versions. Those can be ordered as well as endless, 90° split versions or yard ware.

Seal housing tolerances

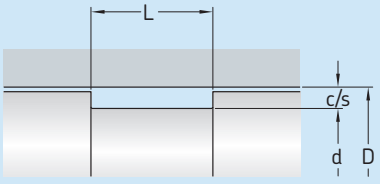
D H9
d f8
L +0,2



F01

Main function
Rod guide rings

Rod diameter d over	incl.	**Housing groove diameter** D	**Housing groove length** L	**Cross section** c/s
mm		mm	mm	mm
6	30	d + 3	4	1,5
30	50	d + 3	5,6	1,5
50	100	d + 5	9,7	2,5
100	800	d + 5	15	2,5
800	1 000	d + 8	25	4
1 000		d + 8	25	4



F01

Main function
Piston guide rings

Bore diameter D over	incl.	**Housing groove diameter** d	**Housing groove length** L	**Cross section** c/s
mm		mm	mm	mm
6	30	D – 3	4	1,5
30	50	D – 3	5,6	1,5
50	100	D – 5	9,7	2,5
100	800	D – 5	15	2,5
800	1 000	D – 8	25	4
1 000		D – 8	25	4

O-ring housing details and recommendations

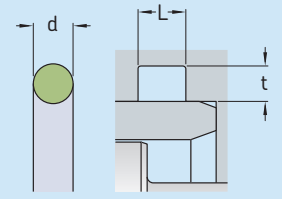
Housing tolerances
f7 / H8

Bearing area
50–95% at a cutting depth of 0,5 R_z
based on C_{ref} = 0%

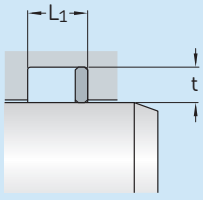
Surface	Surface roughness Pressure constant R_{tmax}	R_a	pulsating R_{tmax}	R_a
–	µm		µm	
Sliding surface[1]	12,5	3,2	6,3	1,6
Bottom of groove[2]	12,5	3,2	6,3	1,6
Groove face	12,5	3,2	6,3	1,6

[1] R_{tmax} / R_a for dynamic application 1,6 µm / 0,4 µm
[2] R_{tmax} / R_a for dynamic application 6,3 µm / 1,6 µm

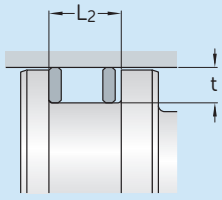
O-ring housing recommendations for static applications



Direction of pressure



Direction of pressure



Direction of pressure

Cord	Groove	Without back-up ring	One back-up ring	Two back-up rings	Recommended back-up ring width
d	t +0,05	L +0,25	L_1 +0,25	L_2 +0,25	
mm	mm	mm	mm	mm	mm
1,5	1,10	2,1	3,1	4,1	1,0
1,78	1,35	2,5	3,5	4,5	1,0
2,00	1,56	2,7	4,2	5,7	1,5
2,50	2,05	3,3	4,8	6,3	1,5
2,62	2,18	3,5	5,0	6,5	1,5
3,00	2,52	3,9	5,4	6,9	1,5
3,50	3,00	4,4	5,9	7,4	1,5
3,53	3,00	4,4	5,9	7,4	1,5
4,00	3,40	5,0	6,7	8,4	1,7
5,00	4,25	6,3	8,0	9,7	1,7
5,33	4,53	6,7	8,4	10,1	1,7
5,70	4,85	7,1	9,1	11,1	2,0
6,00	5,10	7,5	9,5	11,5	2,0
6,99	5,94	8,8	10,8	12,8	2,0
7,00	5,95	8,8	10,8	12,8	2,0
8,00	6,80	10,0	12,5	15,0	2,5
10,00	8,50	12,5	15,0	17,5	2,5

SKF – the knowledge engineering company

From the company that invented the self-aligning ball bearing more than 100 years ago, SKF has evolved into a knowledge engineering company that is able to draw on five technology platforms to create unique solutions for its customers. These platforms include bearings, bearing units and seals, of course, but extend to other areas including: lubricants and lubrication systems, critical for long bearing life in many applications; mechatronics that combine mechanical and electronics knowledge into systems for more effective linear motion and sensorized solutions; and a full range of services, from design and logistics support to condition monitoring and reliability systems.

Though the scope has broadened, SKF continues to maintain the world's leadership in the design, manufacture and marketing of rolling bearings, as well as complementary products such as radial seals. SKF also holds an increasingly important position in the market for linear motion products, high-precision aerospace bearings, machine tool spindles and plant maintenance services.

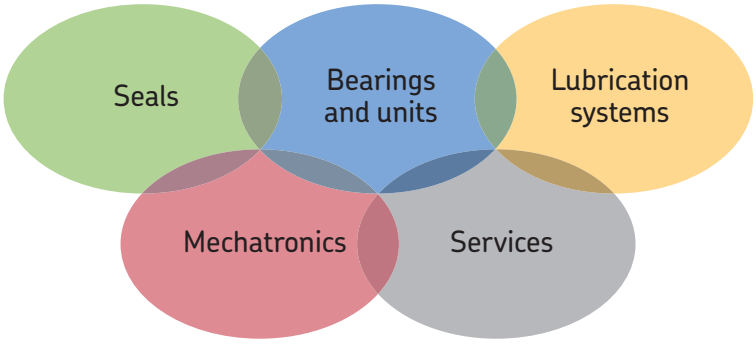
The SKF Group is globally certified to ISO 14001, the international standard for environmental management, as well as OHSAS 18001, the health and safety management standard. Individual divisions have been approved for quality certification in accordance with ISO 9001 and other customer specific requirements.

With over 120 manufacturing sites worldwide and sales companies in 70 countries, SKF is a truly international corporation. In addition, our distributors and dealers in some 15 000 locations around the world, an e-business marketplace and a 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 customers need them. Overall, the SKF brand and the corporation are stronger than ever. As the knowledge engineering company, we stand ready to serve you with world-class product competencies, intellectual resources, and the vision to help you succeed.

© Airbus – photo: e*m company, H. Goussé

Evolving by-wire technology
SKF has a unique expertise in the fast-growing by-wire technology, from fly-by-wire, to drive-by-wire, to work-by-wire. SKF pioneered practical fly-by-wire technology and is a close working partner with all aerospace industry leaders. As an example, virtually all aircraft of the Airbus design use SKF by-wire systems for cockpit flight control.

SKF is also a leader in automotive by-wire technology, and has partnered with automotive engineers to develop two concept cars, which employ SKF mechatronics for steering and braking. Further by-wire development has led SKF to produce an all-electric forklift truck, which uses mechatronics rather than hydraulics for all controls.



Harnessing wind power
The growing industry of wind-generated electric power provides a source of clean, green electricity. SKF is working closely with global industry leaders to develop efficient and trouble-free turbines, providing a wide range of large, highly specialized bearings and condition monitoring systems to extend equipment life of wind farms located in even the most remote and inhospitable environments.

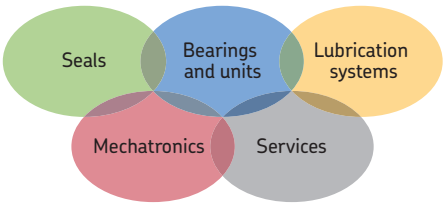
Working in extreme environments
In frigid winters, especially in northern countries, extreme sub-zero temperatures can cause bearings in railway axleboxes to seize due to lubrication starvation. SKF created a new family of synthetic lubricants formulated to retain their lubrication viscosity even at these extreme temperatures. SKF knowledge enables manufacturers and end user customers to overcome the performance issues resulting from extreme temperatures, whether hot or cold. For example, SKF products are at work in diverse environments such as baking ovens and instant freezing in food processing plants.

Developing a cleaner cleaner
The electric motor and its bearings are the heart of many household appliances. SKF works closely with appliance manufacturers to improve their products' performance, cut costs, reduce weight, and reduce energy consumption. A recent example of this cooperation is a new generation of vacuum cleaners with substantially more suction. SKF knowledge in the area of small bearing technology is also applied to manufacturers of power tools and office equipment.

Maintaining a 350 km/h R&D lab
In addition to SKF's renowned research and development facilities in Europe and the United States, Formula One car racing provides a unique environment for SKF to push the limits of bearing technology. For over 60 years, SKF products, engineering and knowledge have helped make Scuderia Ferrari a formidable force in F1 racing. (The average racing Ferrari utilizes around 150 SKF components.) Lessons learned here are applied to the products we provide to automakers and the aftermarket worldwide.

Delivering Asset Efficiency Optimization
Through SKF Reliability Systems, SKF provides a comprehensive range of asset efficiency products and services, from condition monitoring hardware and software to maintenance strategies, engineering assistance and machine reliability programmes. To optimize efficiency and boost productivity, some industrial facilities opt for an Integrated Maintenance Solution, in which SKF delivers all services under one fixed-fee, performance-based contract.

Planning for sustainable growth
By their very nature, bearings make a positive contribution to the natural environment, enabling machinery to operate more efficiently, consume less power, and require less lubrication. By raising the performance bar for our own products, SKF is enabling a new generation of high-efficiency products and equipment. With an eye to the future and the world we will leave to our children, the SKF Group policy on environment, health and safety, as well as the manufacturing techniques, are planned and implemented to help protect and preserve the earth's limited natural resources. We remain committed to sustainable, environmentally responsible growth.



The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry worldwide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and worldwide product availability.

This brochure was presented by:

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