

# Machined seals

Product range





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# SKF – the knowledge engineering company

From one simple but inspired solution to a misalignment problem in a textile mill in Sweden, and fifteen employees in 1907, SKF has grown to become a global industrial knowledge leader.



Over the years, we have built on our expertise in bearings, extending it to seals, mechatronics, services and lubrication systems. Our knowledge network includes 46 000 employees, 15 000 distributor partners, offices in more than 130 countries, and a growing number of SKF Solution Factory sites around the world.

## Research and development

We have hands-on experience in over forty industries based on our employees' knowledge of real life conditions. In addition, our world-leading experts and university partners pioneer advanced theoretical research and development in areas including tribology, condition monitoring, asset management and bearing life theory. Our ongoing commitment to research and development helps us keep our customers at the forefront of their industries.

## Meeting the toughest challenges

Our network of knowledge and experience, along with our understanding of how our core technologies can be combined, helps us create innovative solutions that meet the toughest of challenges. We work closely with our customers throughout the asset life cycle, helping them to profitably and responsibly grow their businesses.



## Working for a sustainable future

Since 2005, SKF has worked to reduce the negative environmental impact from our operations and those of our suppliers. Our continuing technology development resulted in the introduction of the SKF BeyondZero portfolio of products and services which improve efficiency and reduce energy losses, as well as enable new technologies harnessing wind, solar and ocean power. This combined approach helps reduce the environmental impact both in our operations and our customers' operations.

*SKF Solution Factory makes SKF knowledge and manufacturing expertise available locally to provide unique solutions and services to our customers.*

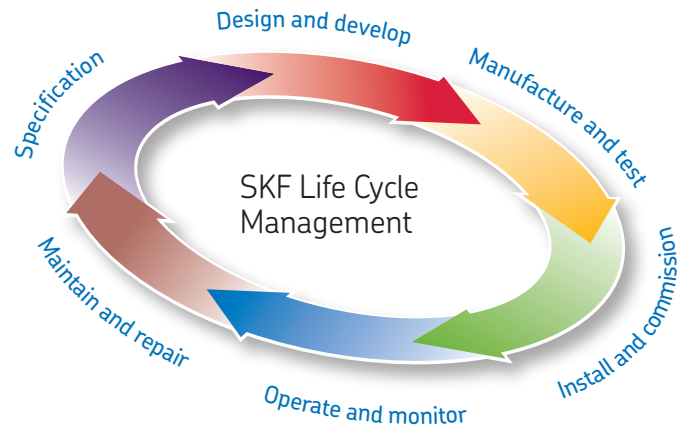


*Working with SKF IT and logistics systems and application experts, SKF Authorized Distributors deliver a valuable mix of product and application knowledge to customers worldwide.*



## Our knowledge – your success

**SKF Life Cycle Management is how we combine our technology platforms and advanced services, and apply them at each stage of the asset life cycle, to help our customers to be more successful, sustainable and profitable.**



### Working closely with you

Our objective is to help our customers improve productivity, minimize maintenance, achieve higher energy and resource efficiency, and optimize designs for long service life and reliability.

### Innovative solutions

Whether the application is linear or rotary or a combination, SKF engineers can work with you at each stage of the asset life cycle to improve machine performance by looking at the entire application. This approach doesn't just focus on individual components like bearings or seals. It looks at the whole application to see how each component interacts with each other.

### Design optimization and verification

SKF can work with you to optimize current or new designs with proprietary 3-D modelling software that can also be used as a virtual test rig to confirm the integrity of the design.



#### Bearings

SKF is the world leader in the design, development and manufacture of high performance rolling bearings, plain bearings, bearing units and housings.



#### Machinery maintenance

Condition monitoring technologies and maintenance services from SKF can help minimize unplanned downtime, improve operational efficiency and reduce maintenance costs.



#### Sealing solutions

SKF offers standard seals and custom engineered sealing solutions to increase uptime, improve machine reliability, reduce friction and power losses, and extend lubricant life.



#### Mechatronics

SKF fly-by-wire systems for aircraft and drive-by-wire systems for off-road, agricultural and forklift applications replace heavy, grease or oil consuming mechanical and hydraulic systems.



#### Lubrication solutions

From specialized lubricants to state-of-the-art lubrication systems and lubrication management services, lubrication solutions from SKF can help to reduce lubrication related downtime and lubricant consumption.



#### Actuation and motion control

With a wide assortment of products – from actuators and ball screws to profile rail guides – SKF can work with you to solve your most pressing linear system challenges.



# Machined seals concept

## Meeting unique sealing demands, on-demand

The machined seals concept provides a fast, flexible alternative to moulded seal production. With a unique combination of capabilities, we can deliver polymer seals in a very short time, in virtually any dimension and any design, for virtually any industrial application.

The machined seals concept combines several SKF strengths, including extensive application engineering support, a wide selection of seal profiles and materials, and worldwide availability.

Together, these capabilities enable on-demand manufacturing for everything from a single seal to a low-volume series, for fluid power, fluid handling and power transmission applications.

## Application engineering support

We begin with a consultative process through which our engineers gain an understanding of your particular sealing application challenges. Once we determine your unique requirements, we can develop a solution, choosing from the most appropriate seal profiles and materials.

## Profile and materials selection

We select your seal profiles from an array of designs that are pre-programmed in our proprietary machining system, or we can work with you to design a fully customized profile. Our engineers will also determine the optimum sealing material.

Our world-class range of standard and special-grade machinable sealing materials includes many that comply with FDA, NSF, NORSOK, NACE and other key industry standards and government regulations.

## CNC manufacturing process

Featuring proprietary software and high-precision cutting tools, the SKF SEAL JET manufacturing system uses Computer Numerical Control (CNC) technology to machine polymer seals quickly. The system machines a seal from a semi-finished tube of our specially selected materials.

## Rapid delivery worldwide

The machined seals concept and related services are available globally at selected SKF Solution Factories and machined seals centres. Strategically positioned throughout the world's major industrial markets, these facilities enable rapid manufacturing and delivery.

Promptly manufactured seals up to 4 000 mm in diameter as one piece and even larger using a special welding technique.





# 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).

## ECOPUR LD

ECOPUR LD is a cast polyurethane elastomer (CPU) with similar properties to ECOPUR. Generally, ECOPUR LD is the standard polyurethane material used for seals in the diameter range between 600 mm and 1 200 mm.

## 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 special welding technique.

## 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.

## 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.

## 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.

# 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.

## X-ECOPUR H

Compared to H-ECOPUR, X-ECOPUR H (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).

## X-ECOPUR S

Compared to S-ECOPUR, X-ECOPUR S (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.

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

## Elastomers

### 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.

### 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-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-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.



## 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.

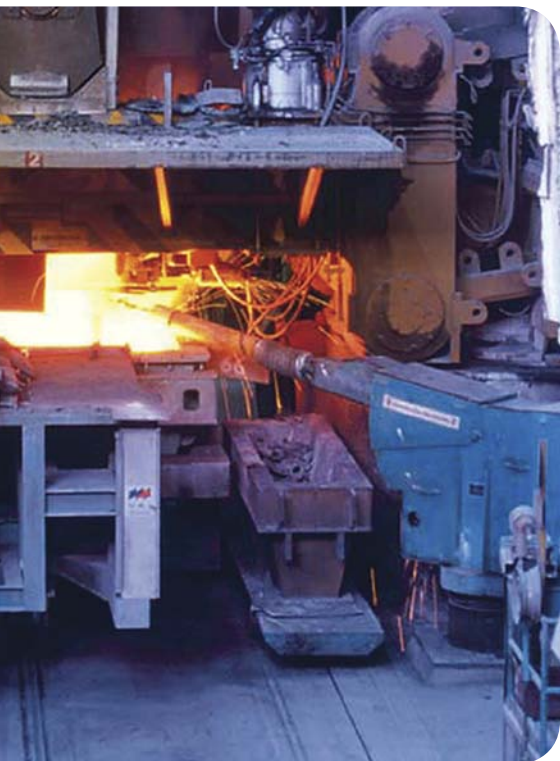
### SKF Ecoflon 2

SKF Ecoflon 2 (PTFE + 15% glass fibre + 5% MoS<sub>2</sub>) 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

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



### 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 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 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 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 properties

## Polyurethanes

Properties	Standard	Unit	ECOPUR	ECOPUR LD	G-ECOPUR cast – hydrolysis resistant	H-ECOPUR hydrolysis resistant	S-ECOPUR solid lubricants	T-ECOPUR low temperature grade	X-ECOPUR hard grade	X-ECOPUR H hard grade hydrolysis resistant	X-ECOPUR S hard grade solid lubricants
			TPU	CPU	CPU	TPU	TPU	TPU	TPU	TPU	TPU
Standard colour			Green	Green	Red	Red	Grey/ black	Blue	Dark green	Dark red	Dark grey
Hardness	DIN ISO 7619	Shore A	95 ±2 <sup>1)</sup>	95 ±2 <sup>1)</sup>	95 ±2 <sup>1)</sup>	95 ±2 <sup>1)</sup>	95 ±2 <sup>1)</sup>	95 ±2 <sup>1)</sup>	97 ±2 <sup>1)</sup>	97 ±2 <sup>1)</sup>	97 ±2 <sup>1)</sup>
Hardness	DIN ISO 7619	Shore D	48 ±3 <sup>1)</sup>	48 ±3 <sup>1)</sup>	47 ±3 <sup>1)</sup>	48 ±3 <sup>1)</sup>	48 ±3 <sup>1)</sup>	48 ±3 <sup>1)</sup>	57 ±3 <sup>1)</sup>	60 ±3 <sup>1)</sup>	58 ±3 <sup>1)</sup>
Density	DIN EN ISO 1183	g/cm <sup>3</sup>	1,2	1,19	1,17	1,2	1,23	1,17	1,21	1,22	1,23
100% modulus	DIN 53504	MPa	12	≥ 10	≥ 11	≥ 13	≥ 17	≥ 12	≥ 16	≥ 22	≥ 22
Tensile strength/yield stress	DIN 53504	MPa	≥ 50	≥ 45	≥ 45	≥ 50	≥ 45	≥ 50	≥ 45	≥ 45	≥ 38
Elongation at break	DIN 53504	%	≥ 430	≥ 380	≥ 330	≥ 330	≥ 380	≥ 450	≥ 400	≥ 350	≥ 300
Modulus of elasticity – tensile test	ISO 527-1/2	MPa	–	–	–	–	–	–	–	–	–
Compression set											
70 °C/24h 20% compression	DIN ISO 815	%	≤ 27	≤ 30	≤ 30	≤ 27	≤ 30	≤ 27	≤ 30	≤ 30	≤ 33
100 °C/24h 20% compression	DIN ISO 815	%	≤ 33	≤ 40	≤ 40	≤ 33	≤ 35	45 <sup>3)</sup>	≤ 35	≤ 35	≤ 39
100 °C/24h	DIN ISO 815	%	–	–	–	–	–	–	–	–	–
175 °C/24h	DIN ISO 815	%	–	–	–	–	–	–	–	–	–
Tear strength	DIN ISO 34-1	N/mm	100	–	–	100	120	80	130	160	160
Abrasion	DIN ISO 4649	mm <sup>3</sup>	18	22	18	17	21	15	18	20	29
Minimum service temperature <sup>7)</sup>		°C	–30	–35	–30	–20	–20	–50	–30	–20	–20
Maximum service temperature <sup>7)</sup>		°C	+110	+110	+110	+110	+110	+110	+110	+110	+110

<sup>1)</sup> Testing time 3 s only valid for polyurethanes

<sup>2)</sup> DIN EN ISO 868

<sup>3)</sup> DIN ISO 815 at –40 °C/24h 20% compression

<sup>4)</sup> ASTM D4894

<sup>5)</sup> ASTM 4745


<sup>6)</sup> ISO 527-1/2

<sup>7)</sup> Minimum and maximum service temperatures are material properties only. Deviations due to varying application parameters are mentioned/stated at each seal profile at the following pages.





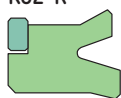









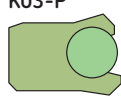




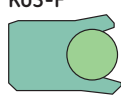









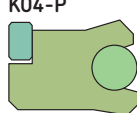
Data concerning special materials based on the here mentioned standard grades are available on request.



Elastomers						Thermoplastics					Thermoset				
SKF Ecoflas	SKF Ecorubber-H	SKF Ecorubber-1	SKF Ecorubber-2	SKF Ecorubber-3	SKF Ecosil	SKF Ecoflon 1	SKF Ecoflon 2 +15% GF + 5% MoS <sub>2</sub>	SKF Ecoflon 3 +40% bronze	SKF Ecoflon 4 +25% Carbon	SKF Ecoflon 5 modified	SKF Ecomid	SKF Ecopaek	SKF Ecotal	SKF Ecowear 1000	SKF Ecotex
TFE/P	HNBR	NBR	FPM, FKM	EPDM	MVQ	PTFE virgin	PTFE	PTFE	PTFE	PTFE	PA	PEEK	POM	UHMWPE	–
Black	Black	Black	Brown	Black	Reddish brown	White	Grey	Bronze	Black	White	Black	Cream	Black	White	Light orange
83 ±5	85 ±5	85 ±5	85 ±5	85 ±5	85 ±5	– 57 <sup>2)</sup>	– 62 <sup>2)</sup>	– 65 <sup>2)</sup>	– 65 <sup>2)</sup>	– 65 <sup>2)</sup>	– 77 <sup>2)</sup>	– 87 <sup>2)</sup>	– 82 <sup>2)</sup>	– 61 <sup>2)</sup>	– 67–77
1,73	1,23	1,31	2,33	1,22	1,52	2,16	2,25	3,05	2,1	2,16	1,15	1,30	1,41	0,93	1,21
8	≥ 10	≥ 11	≥ 5	≥ 8	≥ 5	–	–	–	–	–	–	–	–	–	–
13	≥ 18	≥ 16	≥ 7	≥ 12	≥ 7	27 <sup>4)</sup>	20 <sup>5)</sup>	23 <sup>5)</sup>	15 <sup>5)</sup>	30 <sup>4)</sup>	55 <sup>6)</sup>	100 <sup>6)</sup>	65 <sup>6)</sup>	20 <sup>6)</sup>	55
220	≥ 180	≥ 130	≥ 200	≥ 110	≥ 130	300 <sup>4)</sup>	220 <sup>5)</sup>	240 <sup>5)</sup>	150 <sup>5)</sup>	360 <sup>4)</sup>	100 <sup>6)</sup>	≥ 45 <sup>6)</sup>	25 <sup>6)</sup>	≥ 350 <sup>6)</sup>	–
–	–	–	–	–	–	–	–	–	–	–	1 800 <sup>6)</sup>	3 700 <sup>6)</sup>	2 900 <sup>6)</sup>	600 <sup>6)</sup>	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	≤ 22	≤ 15	–	≤ 15	–	–	–	–	–	–	–	–	–	–	–
29	–	–	≤ 20	–	≤ 15	–	–	–	–	–	–	–	–	–	–
19	24	20	21	15	8	–	–	–	–	–	–	–	–	–	–
110	90	90	150	120	–	–	–	–	–	–	–	–	–	–	–
–10	–25	–30	–20	–50	–60	–200	–200	–200	–200	–200	–40	–100	–50	–200	–40
+200	+150	+100	+200	+150	+200	+260	+260	+260	+260	+260	+110	+260	+100	+90	+120

Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material	
			min.	max.				
			°C		m/s	bar (psi)	–	
   		<b>Hydraulic, single acting</b> 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	+110	0,5	400 (5 800)	ECOPUR	
			–35	+110	0,5	400 (5 800)	ECOPUR LD	
			–30	+110	0,5	400 (5 800)	G-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	
   		<b>Hydraulic, single acting</b> Asymmetric piston seal for standard applications as K01-P, but with increased contact force designed for single acting pistons.	–30	+110	0,5	400 (5 800)	ECOPUR	
			–35	+110	0,5	400 (5 800)	ECOPUR LD	
			–30	+110	0,5	400 (5 800)	G-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	
   		<b>Hydraulic, single acting</b> As profile K01-P, but more easily adaptable to diverse temperatures and media by selection of suitable seal material.	–10	+200	0,5	160 (2 300)	SKF Ecoflas	
			–25	+150	0,5	160 (2 300)	SKF Ecorubber-H	
			–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 <sup>2)</sup>	
			–60	+200	–	–	SKF Ecosil <sup>3)</sup>	
   		<b>Hydraulic, single acting</b> Asymmetric piston seal for standard applications as K01-R, but with increased contact force designed for single acting pistons.	–10	+200	0,5	160 (2 300)	SKF Ecoflas	
			–25	+150	0,5	160 (2 300)	SKF Ecorubber-H	
			–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 <sup>2)</sup>	
			–60	+200	–	–	SKF Ecosil <sup>3)</sup>	
   		<b>Hydraulic, single acting</b> 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	+100	0,5	700 (10 000)	<b>Seal</b> ECOPUR	<b>Back-up ring</b> SKF Ecotal <sup>1)</sup>
			–35	+100	0,5	700 (10 000)	ECOPUR LD	SKF Ecomid
			–30	+100	0,5	700 (10 000)	G-ECOPUR	SKF Ecomid
			–20	+100	0,5	700 (10 000)	H-ECOPUR	SKF Ecotal <sup>1)</sup>
			–20	+100	0,7	700 (10 000)	S-ECOPUR	SKF Ecotal <sup>1)</sup>
			–40	+100	0,5	700 (10 000)	T-ECOPUR	SKF Ecotal <sup>1)</sup>
   		<b>Hydraulic, single acting</b> 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	+100	0,5	700 (10 000)	<b>Seal</b> ECOPUR	<b>Back-up ring</b> SKF Ecotal <sup>1)</sup>
			–35	+100	0,5	700 (10 000)	ECOPUR LD	SKF Ecomid
			–30	+100	0,5	700 (10 000)	G-ECOPUR	SKF Ecomid
			–20	+100	0,5	700 (10 000)	H-ECOPUR	SKF Ecotal <sup>1)</sup>
			–20	+100	0,7	700 (10 000)	S-ECOPUR	SKF Ecotal <sup>1)</sup>
			–40	+100	0,5	700 (10 000)	T-ECOPUR	SKF Ecotal <sup>1)</sup>

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm<sup>2)</sup> Not suitable for mineral oils<sup>3)</sup> Only recommended for static or quasi-static applications. Contact SKF for more information

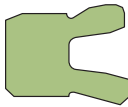



Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material		
			min.	max.					
			°C		m/s	bar (psi)	–		
   		<b>Hydraulic, single-acting</b> As profile K02-P, but more easily adaptable to diverse temperatures and media by selection of suitable seal material. K02-R for standard housing design.	–25	+150	0,5	250 (3 600)	<b>Seal</b> SKF Ecorubber-H SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3 <sup>2)</sup> SKF Ecorubber-3 <sup>2)</sup> SKF Ecoflas	<b>Back-up ring</b> SKF Ecoflon 2 SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecoflon 2 SKF Ecotal <sup>1)</sup> SKF Ecoflon 2 SKF Ecopaek	
			–25	+100	0,5	250 (3 600)			
			–30	+100	0,5	250 (3 600)			
			–20	+200	0,5	250 (3 600)			
			–40	+100	0,5	250 (3 600)			
			–50	+150	0,5	250 (3 600)			
			–10	+200	0,5	250 (3 600)			
   		<b>Hydraulic, single-acting</b> 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.	–25	+150	0,5	250 (3 600)	<b>Seal</b> SKF Ecorubber-H SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3 <sup>2)</sup> SKF Ecorubber-3 <sup>2)</sup> SKF Ecoflas	<b>Back-up ring</b> SKF Ecoflon 2 SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecoflon 2 SKF Ecotal <sup>1)</sup> SKF Ecoflon 2 SKF Ecopaek	
			–25	+100	0,5	250 (3 600)			
			–30	+100	0,5	250 (3 600)			
			–20	+200	0,5	250 (3 600)			
			–40	+100	0,5	250 (3 600)			
			–50	+150	0,5	250 (3 600)			
			–10	+200	0,5	250 (3 600)			
   		<b>Hydraulic, single-acting</b> 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)	<b>Seal</b> ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	<b>O-ring</b> NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70	
			–30	+100	0,5	400 (5 800)			
			–30	+100	0,5	400 (5 800)			
			–20	+100	0,5	400 (5 800)			
			–20	+100	0,7	400 (5 800)			
			–50	+110	0,5	400 (5 800)			
			   		<b>PTFE-piston seal, single-acting</b> 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.	–55			+200
–30	+100	1				200 (2 900)			
–50	+150	1				400 (5 800)			
–20	+200	1				400 (5 800)			
–55	+200	1				400 (5 800)			
–30	+100	1				400 (5 800)			
–55	+90	0,5				200 (2 900)			
–30	+90	0,5	200 (2 900)						
   		<b>PTFE-piston seal, single-acting</b> 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)	<b>Seal</b> SKF Ecoflon 1 SKF Ecoflon 2,3,4 SKF Ecowear 1000	<b>Spring</b> 1.4310 <sup>3)</sup> 1.4310 <sup>3)</sup> 1.4310 <sup>3)</sup>	
			–200	+260	1	400 (5 800)			
			–200	+90	0,5	200 (2 900)			
			   		<b>Hydraulic, single-acting</b> 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
–30	+100	0,5				700 (10 000)			
–30	+100	0,5				700 (10 000)			
–20	+100	0,5				700 (10 000)			
–20	+100	0,7				700 (10 000)			
–40	+100	0,5				700 (10 000)			

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm

<sup>2)</sup> Not suitable for mineral oils

<sup>3)</sup> Spring steel material specification


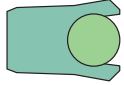



















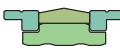
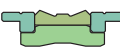

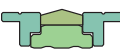


Appli- Profile cation	Description	Temperature		Speed max.	Pressure max.	Material		
		min.	max.			min.	max.	max.
		°C		m/s	bar (psi)			
 	<b>K04-PD</b> <b>Hydraulic, single-acting</b> Asymmetric piston seal for standard applications as K03-P, but thanks to design with active back-up ring, it is suitable for larger extrusion gaps. K04-PD for small housing design.	-30	+100	0,5	700 (10 000)	Seal	Back-up ring	O-ring
		-30	+100	0,5	700 (10 000)	ECOPUR	SKF Ecotal <sup>1)</sup>	NBR 70
		-30	+100	0,5	700 (10 000)	ECOPUR LD	SKF Ecomid	NBR 70
		-30	+100	0,5	700 (10 000)	G-ECOPUR	SKF Ecomid	NBR 70
		-20	+100	0,5	700 (10 000)	H-ECOPUR	SKF Ecotal <sup>1)</sup>	NBR 70
		-20	+100	0,7	700 (10 000)	S-ECOPUR	SKF Ecotal <sup>1)</sup>	NBR 70
		-40	+100	0,5	700 (10 000)	T-ECOPUR	SKF Ecotal <sup>1)</sup>	MVQ 70
 	<b>K05-P</b> <b>Pneumatic, single-acting</b> 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	+110	1	25 (360)	Seal		
		-35	+110	1	25 (360)	ECOPUR		
		-30	+110	1	25 (360)	ECOPUR LD		
		-20	+110	1	25 (360)	G-ECOPUR		
		-20	+110	1	25 (360)	H-ECOPUR		
		-20	+110	2	25 (360)	S-ECOPUR		
		-50	+110	1	25 (360)	T-ECOPUR		
 	<b>K05-R</b> <b>Pneumatic, single-acting</b> 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.	-10	+200	1	25 (360)	SKF Ecoflas		
		-25	+150	1	25 (360)	SKF Ecorubber-H		
		-30	+100	1	25 (360)	SKF Ecorubber-1		
		-20	+200	1	25 (360)	SKF Ecorubber-2		
		-50	+150	1	25 (360)	SKF Ecorubber-3 <sup>2)</sup>		
 	<b>K06-P</b> <b>Hydraulic, single-acting</b> 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	+110	0,5	400 (5 800)	ECOPUR		
		-35	+110	0,5	400 (5 800)	ECOPUR LD		
		-30	+110	0,5	400 (5 800)	G-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		
 	<b>K06-R</b> <b>Hydraulic, single-acting</b> 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.	-10	+200	0,5	160 (2 300)	SKF Ecoflas		
		-25	+150	0,5	160 (2 300)	SKF Ecorubber-H		
		-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 <sup>2)</sup>		
		-60	+200	-	-	SKF Ecosil <sup>3)</sup>		
 	<b>K07-P</b> <b>Hydraulic, single-acting</b> O-ring activated symmetric piston seal for simple standard applications, not recommended for new designs (profile K03-P preferred).	-30	+100	0,5	400 (5 800)	Seal	O-ring	
		-30	+100	0,5	400 (5 800)	ECOPUR	NBR 70	
		-30	+100	0,5	400 (5 800)	ECOPUR LD	NBR 70	
		-30	+100	0,5	400 (5 800)	G-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	+100	0,5	400 (5 800)	T-ECOPUR	MVQ 70	

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm








































































































































<sup>2)</sup> Not suitable for mineral oils

<sup>3)</sup> Only recommended for static or quasi-static applications. Contact SKF for more information












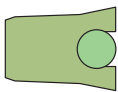





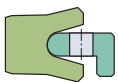





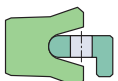





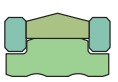




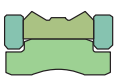
Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material	
			min.	max.				
			°C		m/s	bar (psi)	–	
  	K07-F	<b>PTFE piston seal, single-acting</b> O-ring activated symmetric PTFE piston seal, low friction and no stick-slip effect for simple standard applications, not recommended for new designs (profile K03-F preferred)	–30	+100	1	200 (2 900)	<b>Seal</b> SKF Ecoflon 1	<b>O-ring</b> NBR 70
			–55	+200	1	200 (2 900)	SKF Ecoflon 1	MQV 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	MQV 70
			–30	+90	0,5	200 (2 900)	SKF Ecowear 1000	NBR 70
			–55	+90	0,5	200 (2 900)	SKF Ecowear 1000	MQV 70
  	K08-E	<b>Hydraulic, single-acting</b> O-ring activated asymmetric PTFE piston seal, low friction. For extreme low or high speed. Suitable for positioning functions.	–55	+110	5	600 (8 700)	<b>Glide ring</b> G-ECOPUR 54D	<b>O-ring</b> MQV 70
			–30	+100	5	600 (8 700)	G-ECOPUR 54D	NBR 70
			–55	+110	5	600 (8 700)	X-ECOPUR, H, S	MQV 70
			–30	+100	5	600 (8 700)	X-ECOPUR, H, S	NBR 70
			–20	+200	10	600 (8 700)	SKF Ecoflon 2,3,4	FPM 75
			–30	+100	10	600 (8 700)	SKF Ecoflon 2,3,4	NBR 70
			–55	+90	5	400 (5 800)	SKF Ecowear 1000	MQV 70
			–30	+90	5	400 (5 800)	SKF Ecowear 1000	NBR 70
  	K08-D	<b>Hydraulic, double acting</b> 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.	–55	+110	5	600 (8 700)	<b>Glide ring</b> G-ECOPUR 54D	<b>O-ring</b> MQV 70
			–30	+100	5	600 (8 700)	G-ECOPUR 54D	NBR 70
			–55	+110	5	600 (8 700)	X-ECOPUR, H, S	MQV 70
			–30	+100	5	600 (8 700)	X-ECOPUR, H, S	NBR 70
			–20	+200	10	600 (8 700)	SKF Ecoflon 2,3,4	FPM 75
			–30	+100	10	600 (8 700)	SKF Ecoflon 2,3,4	NBR 70
			–55	+90	5	400 (5 800)	SKF Ecowear 1000	MQV 70
			–30	+90	5	400 (5 800)	SKF Ecowear 1000	NBR 70
  	K08-P	<b>Hydraulic, double-acting</b> O-ring activated symmetric PU piston seal with excellent static and dynamic sealing capacity, extremely wear resistant.	–30	+100	1	250 (3 600)	<b>Glide ring</b> ECOPUR	<b>O-ring</b> NBR 70
			–30	+100	1	250 (3 600)	ECOPUR LD	NBR 70
			–30	+100	1	250 (3 600)	G-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	MQV 70
  	K08-ES	<b>Hydraulic, single-acting</b> 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	5	600 (8 700)	<b>Glide ring</b> G-ECOPUR 54D	<b>O-ring</b> SKF Ecorubber-1
			–60	+110	5	600 (8 700)	G-ECOPUR 54D	SKF Ecosil
			–30	+100	5	600 (8 700)	X-ECOPUR, H, S	SKF Ecorubber-1
			–60	+100	5	600 (8 700)	X-ECOPUR, H, S	SKF Ecosil
			–30	+100	10	600 (8 700)	SKF Ecoflon 2,3,4	SKF Ecorubber-1
			–20	+200	10	600 (8 700)	SKF Ecoflon 2,3,4	SKF Ecorubber-2
			–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	<b>Hydraulic, double-acting</b> 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	5	600 (8 700)	<b>Glide ring</b> G-ECOPUR 54D	<b>O-ring</b> SKF Ecorubber-1
			–60	+110	5	600 (8 700)	G-ECOPUR 54D	SKF Ecosil
			–30	+100	5	600 (8 700)	X-ECOPUR, H, S	SKF Ecorubber-1
			–60	+100	5	600 (8 700)	X-ECOPUR, H, S	SKF Ecosil
			–30	+100	10	600 (8 700)	SKF Ecoflon 2,3,4	SKF Ecorubber-1
			–20	+200	10	600 (8 700)	SKF Ecoflon 2,3,4	SKF Ecorubber-2
			–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		Speed	Pressure		Material			
			min.	max.	max.	max.	max.				
			°C		m/s	bar (psi)			–		
		<b>K09-N</b> <b>Hydraulic, double-acting</b> 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	Seal	Energizer	Back-up	
			–20	+100	0,5	400 (5 800)	H-ECOPUR		SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
			–20	+100	0,7	400 (5 800)	S-ECOPUR		SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
			–50	+100	0,5	400 (5 800)	T-ECOPUR		SKF Ecosil	SKF Ecotal <sup>(1)</sup>	
		<b>K09-D</b> <b>Hydraulic, double-acting</b> Profile ring-activated compact piston seal with integrated guiding elements. Excellent static and dynamic sealing capacity.	–30	+100	0,5	400 (5 800)	ECOPUR	Seal	Energizer	Back-up	
			–20	+100	0,5	400 (5 800)	H-ECOPUR		SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
			–20	+100	0,7	400 (5 800)	S-ECOPUR		SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
			–50	+100	0,5	400 (5 800)	T-ECOPUR		SKF Ecosil	SKF Ecotal <sup>(1)</sup>	
		<b>K09-H</b> <b>Hydraulic, double-acting</b> 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 (21 700)	ECOPUR	Seal	Energizer	Back-up	
			–20	+100	0,3	1 500 (21 700)	H-ECOPUR		SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
			–20	+100	0,4	1 500 (21 700)	S-ECOPUR		SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
			–50	+100	0,3	1 500 (21 700)	T-ECOPUR		SKF Ecosil	SKF Ecotal <sup>(1)</sup>	
		<b>K09-F</b> <b>Hydraulic, double-acting</b> Profile ring-activated compact PTFE piston seal with integrated guiding elements. Low friction, good chemical and thermal resistance.	–30	+100	1	400 (5 800)	X-ECOPUR	Seal	Energizer	Back-up ring	
			–30	+100	1	400 (5 800)	X-ECOPUR H		SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
			–30	+100	1,2	400 (5 800)	X-ECOPUR S		SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
			–30	+100	1,5	400 (5 800)	SKF Ecoflon 2,3,4		SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
			–20	+200	1,5	400 (5 800)	SKF Ecoflon 2,3,4		SKF Ecorubber-2	SKF Ecopaek	
		<b>K1012-T</b> <b>Hydraulic, single-acting</b> 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 <sup>(1)</sup>	<b>K 10-A</b>	<b>K 11-T</b>	<b>K 12-T</b>	
			–35	+100	0,5	500 (7 200)	SKF Ecomid	SKF Ecotal <sup>(1)</sup>	ECOPUR	X-ECOPUR <sup>(2)</sup>	
			–30	+100	0,7	500 (7 200)	SKF Ecomid	SKF Ecomid	ECOPUR LD	SKF Ecomid	
			–20	+100	0,5	500 (7 200)	SKF Ecotal <sup>(1)</sup>	G-ECOPUR	H-ECOPUR	G-ECOPUR 54D <sup>(3)</sup>	
			–20	+100	0,5	500 (7 200)	SKF Ecotal <sup>(1)</sup>	H-ECOPUR	X-ECOPUR	X-ECOPUR H <sup>(2)</sup>	
			–25	+150	0,5	250 (3 600)	SKF Ecoflon 2	S-ECOPUR	S-ECOPUR	X-ECOPUR S <sup>(2)</sup>	
			–30	+100	0,5	250 (3 600)	SKF Ecoflon 2	SKF Ecorubber-H	SKF Ecorubber-H	SKF Ecoflon 2	
			–20	+200	0,5	250 (3 600)	SKF Ecoflon 2	SKF Ecorubber-1	SKF Ecorubber-1	SKF Ecoflon 2	
			–50	+150	0,5	250 (3 600)	SKF Ecoflon 2	SKF Ecorubber-2	SKF Ecorubber-2	SKF Ecoflon 2	
							SKF Ecoflon 2	SKF Ecorubber-3	SKF Ecorubber-3	SKF Ecoflon 2	
		<b>K1012-M</b> <b>Hydraulic, single-acting</b> 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 <sup>(1)</sup>	<b>K 10-A</b>	<b>K 11-M</b>	<b>K 12-M</b>	
			–35	+100	0,5	500 (7 200)	SKF Ecomid	SKF Ecotal <sup>(1)</sup>	ECOPUR	X-ECOPUR <sup>(2)</sup>	
			–30	+100	0,7	500 (7 200)	SKF Ecomid	SKF Ecomid	ECOPUR LD	SKF Ecomid	
			–20	+100	0,5	500 (7 200)	SKF Ecotal <sup>(1)</sup>	G-ECOPUR	H-ECOPUR	G-ECOPUR 54D <sup>(3)</sup>	
			–20	+100	0,5	500 (7 200)	SKF Ecotal <sup>(1)</sup>	H-ECOPUR	X-ECOPUR	X-ECOPUR H <sup>(2)</sup>	
			–25	+150	0,5	250 (3 600)	SKF Ecoflon 2	S-ECOPUR	S-ECOPUR	X-ECOPUR S <sup>(2)</sup>	
			–30	+100	0,5	250 (3 600)	SKF Ecoflon 2	SKF Ecorubber-H	SKF Ecorubber-H	SKF Ecoflon 2	
			–20	+200	0,5	250 (3 600)	SKF Ecoflon 2	SKF Ecorubber-1	SKF Ecorubber-1	SKF Ecoflon 2	
			–50	+150	0,5	250 (3 600)	SKF Ecoflon 2	SKF Ecorubber-2	SKF Ecorubber-2	SKF Ecoflon 2	
							SKF Ecoflon 2	SKF Ecorubber-3	SKF Ecorubber-3	SKF Ecoflon 2	














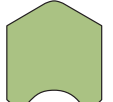

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm  
<sup>2)</sup> Alternative SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm  
<sup>3)</sup> Alternative SKF Ecomid

Appli- cation	Profile	Description	Temperature		Speed	Pressure		Material	
			min.	max.		max.	max.		
			°C		m/s	bar	(psi)	–	
         	K1315-T	<b>Hydraulic, single-acting</b> 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)	K 13-T	K 14-T	K 15-T
			–30	+100	0,5	600 (8 700)	SKF Ecotal <sup>1)</sup>	ECOPUR	X-ECOPUR
			–35	+100	0,5	600 (8 700)	SKF Ecotal <sup>1)</sup>	ECOPUR	SKF Ecotal <sup>1)</sup>
			–30	+100	0,5	600 (8 700)	SKF Ecomid	ECOPUR LD	SKF Ecomid
			–20	+100	0,5	600 (8 700)	SKF Ecomid	G-ECOPUR	SKF Ecomid
			–20	+100	0,5	600 (8 700)	SKF Ecotal <sup>1)</sup>	H-ECOPUR	X-ECOPUR H
			–20	+100	0,5	600 (8 700)	SKF Ecotal <sup>1)</sup>	H-ECOPUR	SKF Ecotal <sup>1)</sup>
			–20	+100	0,7	600 (8 700)	SKF Ecotal <sup>1)</sup>	S-ECOPUR	X-ECOPUR S
			–20	+100	0,7	600 (8 700)	SKF Ecotal <sup>1)</sup>	S-ECOPUR	SKF Ecotal <sup>1)</sup>
			–40	+100	0,5	600 (8 700)	SKF Ecotal <sup>1)</sup>	T-ECOPUR	SKF Ecotal <sup>1)</sup>
                                           	K16-A	<b>Hydraulic/pneumatic, single-acting</b> 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		
			–35	+110	0,5	160 (2 300)	ECOPUR LD		
			–30	+110	0,5	160 (2 300)	G-ECOPUR		
			–20	+110	0,5	160 (2 300)	H-ECOPUR		
			–20	+110	0,7	160 (2 300)	S-ECOPUR		
			–50	+110	0,5	160 (2 300)	T-ECOPUR		
			–10	+200	0,5	160 (2 300)	SKF Ecoflas		
			–25	+150	0,5	160 (2 300)	SKF Ecorubber-H		
			–30	+100	0,5	160 (2 300)	SKF Ecorubber-1		
			–20	+200	0,5	160 (2 300)	SKF Ecorubber-2		
                                	K16-B	<b>Hydraulic/pneumatic, single-acting</b> 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		
			–35	+110	0,5	160 (2 300)	ECOPUR LD		
			–30	+110	0,5	160 (2 300)	G-ECOPUR		
			–20	+110	0,5	160 (2 300)	H-ECOPUR		
			–20	+110	0,7	160 (2 300)	S-ECOPUR		
			–50	+110	0,5	160 (2 300)	T-ECOPUR		
			–10	+200	0,5	160 (2 300)	SKF Ecoflas		
			–25	+150	0,5	160 (2 300)	SKF Ecorubber-H		
			–30	+100	0,5	160 (2 300)	SKF Ecorubber-1		
			–20	+200	0,5	160 (2 300)	SKF Ecorubber-2		
                       	K17-P	<b>Hydraulic, double-acting</b> Space saving, compact piston seal with integrated guiding elements. Excellent static sealing capacity, suitable for small housings.	–30	+100	0,5	250 (3 600)	Seal	Back-up ring	
			–20	+100	0,5	250 (3 600)	ECOPUR	SKF Ecotal <sup>1)</sup>	
			–20	+100	0,5	250 (3 600)	H-ECOPUR	SKF Ecotal <sup>1)</sup>	
			–20	+100	0,7	250 (3 600)	S-ECOPUR	SKF Ecotal <sup>1)</sup>	
			–40	+100	0,5	250 (3 600)	T-ECOPUR	SKF Ecotal <sup>1)</sup>	
                     	K17-R	<b>Hydraulic, double-acting</b> 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.	–25	+150	0,5	250 (3 600)	Seal	Back-up ring	
			–25	+150	0,5	250 (3 600)	SKF Ecorubber-H	SKF Ecoflon 2	
			–25	+100	0,5	250 (3 600)	SKF Ecorubber-H	SKF Ecopaek	
			–30	+100	0,5	250 (3 600)	SKF Ecorubber-H	SKF Ecotal <sup>1)</sup>	
			–30	+100	0,5	250 (3 600)	SKF Ecorubber-1	SKF Ecotal <sup>1)</sup>	
			–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	<b>PTFE piston seal, single-acting</b> 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.	–200	+260	15	200 (2 900)	Seal	Spring	
			–200	+260	15	400 (5 800)	SKF Ecoflon 1	1.4310 <sup>2)</sup>	
			–200	+260	15	400 (5 800)	SKF Ecoflon 2	1.4310 <sup>2)</sup>	
			–200	+260	15	400 (5 800)	SKF Ecoflon 3	1.4310 <sup>2)</sup>	
			–200	+260	15	400 (5 800)	SKF Ecoflon 4	1.4310 <sup>2)</sup>	
			–200	+90	15	200 (2 900)	SKF Ecowear 1000	1.4310 <sup>2)</sup>	

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm  
<sup>2)</sup> Spring steel material specification




















Appli- cation	Profile	Description	Temperature		Speed	Pressure	Material		
			min.	max.	max.	max.			
			°C		m/s	bar (psi)	–		
    		<b>K20-R</b> <b>Hydraulic, double-acting</b> 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.	–25	+150	0,5	700 (10 000)	<b>Seal</b> SKF Ecorubber-H	<b>Back-up ring</b> SKF Ecoflon 2	
		–25	+150	0,5	700 (10 000)	SKF Ecorubber-H	SKF Ecopaek		
		–25	+100	0,5	700 (10 000)	SKF Ecorubber-H	SKF Ecotal <sup>(1)</sup>		
		–30	+100	0,5	700 (10 000)	SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>		
		–20	+200	0,5	700 (10 000)	SKF Ecorubber-2	SKF Ecoflon 2		
–20	+200	0,5	700 (10 000)	SKF Ecorubber-2	SKF Ecopaek				
    		<b>K21-P</b> <b>Hydraulic, single-acting</b> 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)	<b>Seal</b> ECOPUR	<b>O-ring</b> 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	VMQ 70		
    		<b>K22-P</b> <b>Hydraulic, single-acting</b> Symmetric piston seal with support ring for simple applications to serve repair purpose, not recommended for new designs (Profile K01–P preferred). Retainer ring can be designed straight or as an angled ring.	–30	+100	0,5	400 (5 800)	<b>Seal</b> ECOPUR	<b>Support ring</b> SKF Ecotal <sup>(1)</sup>	
		–35	+100	0,5	400 (5 800)	ECOPUR LD	SKF Ecomid		
		–30	+100	0,5	400 (5 800)	G-ECOPUR	SKF Ecomid		
		–20	+100	0,5	400 (5 800)	H-ECOPUR	SKF Ecotal <sup>(1)</sup>		
		–20	+100	0,7	400 (5 800)	S-ECOPUR	SKF Ecotal <sup>(1)</sup>		
–40	+100	0,5	400 (5 800)	T-ECOPUR	SKF Ecotal <sup>(1)</sup>				
    		<b>K22-R</b> <b>Hydraulic, single-acting</b> Symmetric piston seal as K22–P, but easily adaptable for diverse temperatures and media by selection of suitable seal material. Retainer ring can be designed straight or as an angled ring.	–10	+200	0,5	160 (2 300)	<b>Seal</b> SKF Ecoflas	<b>Support ring</b> SKF Ecoflon	
		–25	+150	0,5	160 (2 300)	SKF Ecorubber-H	SKF Ecoflon 2		
		–25	+100	0,5	160 (2 300)	SKF Ecorubber-H	SKF Ecotal <sup>(1)</sup>		
		–30	+100	0,5	160 (2 300)	SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>		
		–20	+200	0,5	160 (2 300)	SKF Ecorubber-2	SKF Ecoflon 2		
–50	+150	0,5	160 (2 300)	SKF Ecorubber-3 <sup>(2)</sup>	SKF Ecoflon 2				
–40	+100	0,5	160 (2 300)	SKF Ecorubber-3 <sup>(2)</sup>	SKF Ecotal <sup>(1)</sup>				
    		<b>K23-N</b> <b>Hydraulic, double-acting</b> 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)	<b>Seal</b> ECOPUR	<b>Energizer</b> SKF Ecorubber-1	<b>Back-up rings</b> SKF Ecotal <sup>(1)</sup>
		–20	+100	0,5	400 (5 800)	H-ECOPUR	SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
		–20	+100	0,7	400 (5 800)	S-ECOPUR	SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
		–40	+100	0,5	400 (5 800)	T-ECOPUR	SKF Ecosil	SKF Ecotal <sup>(1)</sup>	
    		<b>K23-D</b> <b>Hydraulic, double-acting</b> 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)	<b>Seal</b> ECOPUR	<b>Energizer</b> SKF Ecorubber-1	<b>Back-up rings</b> SKF Ecotal <sup>(1)</sup>
		–20	+100	0,5	400 (5 800)	H-ECOPUR	SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
		–20	+100	0,7	400 (5 800)	S-ECOPUR	SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
		–40	+100	0,5	400 (5 800)	T-ECOPUR	SKF Ecosil	SKF Ecotal <sup>(1)</sup>	

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm  
<sup>2)</sup> Not suitable for mineral oils

Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material		
			min.	max.					
			°C		m/s	bar (psi)	–		
  	K23-H	<b>Hydraulic, double-acting</b> 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.	–30	+100	0,3	1 500 (21 000)	<b>Seal</b> ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	<b>Energizer</b> SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecosil	<b>Back-up rings</b> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup>
			–20	+100	0,3	1 500 (21 000)			
			–20	+100	0,4	1 500 (21 000)			
			–50	+100	0,3	1 500 (21 000)			
  	K23-F	<b>Hydraulic, double-acting</b> Profile ring-activated compact PTFE piston seal with integrated back-up rings. Low friction, good chemical and thermal resistance. External guiding elements required.	–30	+100	1	400 (5 800)	<b>Seal</b> X-ECOPUR X-ECOPUR H X-ECOPUR S SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4	<b>Energizer</b> SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecorubber-2	<b>Back-up rings</b> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecopaek
			–30	+100	1	400 (5 800)			
			–30	+100	1,2	400 (5 800)			
			–30	+100	1,5	400 (5 800)			
			–20	+200	1,5	400 (5 800)			
  	K24-P	<b>Hydraulic, single-acting</b> Chevron ring with flexible lip design. Replacement part for standard commercial housings (male and female adapter mainly made of metal).	–30	+110	0,5	500 (7 200)	<b>Seal</b> ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3		
			–35	+110	0,5	500 (7 200)			
			–30	+110	0,5	500 (7 200)			
			–20	+110	0,5	500 (7 200)			
			–20	+110	0,7	500 (7 200)			
			–50	+110	0,5	500 (7 200)			
			–10	+200	0,5	250 (3 600)			
			–25	+150	0,5	250 (3 600)			
			–30	+100	0,5	250 (3 600)			
			–20	+200	0,5	250 (3 600)			
			–50	+150	0,5	250 (3 600)			
  	K32-P	<b>Hydraulic, single-acting</b> 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).	–30	+100	0,5	500 (7 200)	<b>Pressure ring</b> SKF Ecotal <sup>1)</sup> X-ECOPUR SKF Ecomid G-ECOPUR 54D SKF Ecomid X-ECOPUR H SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> X-ECOPUR S SKF Ecotal <sup>1)</sup>	<b>Seal</b> ECOPUR ECOPUR ECOPUR LD G-ECOPUR G-ECOPUR H-ECOPUR H-ECOPUR S-ECOPUR S-ECOPUR T-ECOPUR	<b>Support ring</b> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecomid SKF Ecomid SKF Ecomid SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup>
			–30	+100	0,5	500 (7 200)			
			–35	+100	0,5	500 (7 200)			
			–30	+100	0,5	500 (7 200)			
			–30	+100	0,5	500 (7 200)			
			–20	+100	0,5	500 (7 200)			
			–20	+100	0,5	500 (7 200)			
			–20	+100	0,7	500 (7 200)			
			–20	+100	0,7	500 (7 200)			
			–40	+100	0,5	500 (7 200)			
  	K35-P	<b>Hydraulic, double-acting</b> 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.	–30	+110	0,4	400 (5 800)	<b>Seal</b> ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR		
			–35	+110	0,4	400 (5 800)			
			–30	+110	0,4	400 (5 800)			
			–20	+110	0,4	400 (5 800)			
			–20	+110	0,5	400 (5 800)			
			–50	+110	0,4	400 (5 800)			

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm








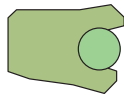


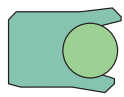


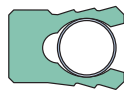


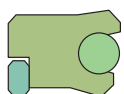




Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material	
			min.	max.				
			°C		m/s	bar (psi)	–	
   	S01-P	<b>Hydraulic, single-acting</b> Asymmetric rod seal for standard applications. Interference fit on outside diameter maintains stable fit in the housing. Design provides 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	+110	0,5	400 (5 800)	ECOPUR	
			–35	+110	0,5	400 (5 800)	ECOPUR LD	
			–30	+110	0,5	400 (5 800)	G-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	
   	S01-R	<b>Hydraulic, single-acting</b> As profile S01–P, but more easily adaptable for diverse temperatures and media by selection of suitable seal material.	–10	+200	0,5	160 (2 300)	Seal SKF Ecoflas	
			–25	+150	0,5	160 (2 300)	SKF Ecorubber-H	
			–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 <sup>2)</sup>	
			–60	+200	–	–	SKF Ecosil <sup>3)</sup>	
   	S02-P	<b>Hydraulic, single-acting</b> 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	+100	0,5	700 (10 000)	Seal ECOPUR	Back-up ring SKF Ecotal <sup>1)</sup>
			–35	+100	0,5	700 (10 000)	ECOPUR LD	
			–30	+100	0,5	700 (10 000)	G-ECOPUR	
			–20	+100	0,5	700 (10 000)	H-ECOPUR	
			–20	+100	0,7	700 (10 000)	S-ECOPUR	
			–40	+100	0,5	700 (10 000)	T-ECOPUR	
   	S02-PD	<b>Hydraulic, single-acting</b> 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	+100	0,5	700 (10 000)	Seal ECOPUR	Back-up ring SKF Ecotal <sup>1)</sup>
			–35	+100	0,5	700 (10 000)	ECOPUR LD	
			–30	+100	0,5	700 (10 000)	G-ECOPUR	
			–20	+100	0,5	700 (10 000)	H-ECOPUR	
			–20	+100	0,7	700 (10 000)	S-ECOPUR	
			–40	+100	0,5	700 (10 000)	T-ECOPUR	
   	S02-R	<b>Hydraulic, single-acting</b> 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.	–10	+200	0,5	250 (3 600)	Seal SKF Ecoflas	Back-up ring SKF Ecopaek
			–25	+150	0,5	250 (3 600)	SKF Ecorubber-H	
			–25	+100	0,5	250 (3 600)	SKF Ecorubber-H	
			–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 <sup>2)</sup>	
			–40	+100	0,5	250 (3 600)	SKF Ecorubber-3 <sup>2)</sup>	
   	S02-RD	<b>Hydraulic, single-acting</b> 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.	–10	+200	0,5	250 (3 600)	Seal SKF Ecoflas	Back-up ring SKF Ecopaek
			–25	+150	0,5	250 (3 600)	SKF Ecorubber-H	
			–25	+100	0,5	250 (3 600)	SKF Ecorubber-H	
			–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 <sup>2)</sup>	
			–40	+100	0,5	250 (3 600)	SKF Ecorubber-3 <sup>2)</sup>	

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm


<sup>2)</sup> Not suitable for mineral oils

<sup>3)</sup> Only recommended for static or quasi-static applications. Contact SKF for more information















Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material		
			min.	max.					
			°C		m/s	bar (psi)	–		
   	S02-S	<b>Hydraulic, single-acting</b> 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.	–30	+100	5	400 (5 800)	<b>Seal</b> ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	<b>Back-up ring</b> SKF Ecotal <sup>(1)</sup> SKF Ecotal <sup>(1)</sup> SKF Ecotal <sup>(1)</sup> SKF Ecotal <sup>(1)</sup>	
			–20	+100	5	400 (5 800)			
			–20	+100	7	400 (5 800)			
			–40	+100	5	400 (5 800)			
  	S03-P	<b>Hydraulic, single-acting</b> 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...)	–30	+100	0,5	400 (5 800)	<b>Seal</b> ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	<b>O-ring</b> NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70	
			–35	+110	0,5	400 (5 800)			
			–30	+100	0,5	400 (5 800)			
			–20	+100	0,5	400 (5 800)			
			–20	+100	0,7	400 (5 800)			
			–50	+110	0,5	400 (5 800)			
  	S03-F	<b>PTFE rod seal, single-acting</b> 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.	–55	+200	1	200 (2 900)	<b>Seal</b> 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 Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	<b>O-ring</b> MVQ 70 NBR 70 EPDM FPM 75 MVQ 70 NBR 70 MVQ 70 NBR 70	
			–30	+100	1	200 (2 900)			
			–50	+150	1	400 (5 800)			
			–20	+200	1	400 (5 800)			
			–55	+200	1	400 (5 800)			
			–30	+100	1	400 (5 800)			
			–55	+90	0,5	200 (2 900)			
			–30	+90	0,5	200 (2 900)			
  	S03-S	<b>PTFE rod seal, single-acting</b> 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.	–200	+260	1	200 (2 900)	<b>Seal</b> SKF Ecoflon 1 SKF Ecoflon 2,3,4 SKF Ecowear 1000	<b>Spring</b> 1.4310 1.4310 1.4310	
			–200	+260	1	400 (5 800)			
			–200	+90	0,5	200 (2 900)			
  	S04-P	<b>Hydraulic, single-acting</b> 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.	–30	+100	0,5	700 (10 000)	<b>Seal</b> ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	<b>O-ring</b> NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70	<b>Back-up</b> SKF Ecotal <sup>(1)</sup> SKF Ecomid SKF Ecomid SKF Ecotal <sup>(1)</sup> SKF Ecotal <sup>(1)</sup> SKF Ecotal <sup>(1)</sup>
			–30	+100	0,5	700 (10 000)			
			–30	+100	0,5	700 (10 000)			
			–20	+100	0,5	700 (10 000)			
			–20	+100	0,7	700 (10 000)			
			–40	+100	0,5	700 (10 000)			
  	S04-PD	<b>Hydraulic, single-acting</b> 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.	–30	+100	0,5	700 (10 000)	<b>Seal</b> ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	<b>O-ring</b> NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70	<b>Back-up</b> SKF Ecotal <sup>(1)</sup> SKF Ecomid SKF Ecomid SKF Ecotal <sup>(1)</sup> SKF Ecotal <sup>(1)</sup> SKF Ecotal <sup>(1)</sup>
			–30	+100	0,5	700 (10 000)			
			–30	+100	0,5	700 (10 000)			
			–20	+100	0,5	700 (10 000)			
			–20	+100	0,7	700 (10 000)			
			–40	+100	0,5	700 (10 000)			


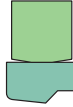



















<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm

Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material	
			min.	max.				
			°C		m/s	bar (psi)	–	
		<b>Pneumatic, single-acting</b> 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	+110	1	25 (360)	ECOPUR	
			–35	+110	1	25 (360)	ECOPUR LD	
			–30	+110	1	25 (360)	G-ECOPUR	
			–20	+110	1	25 (360)	H-ECOPUR	
			–20	+110	2	25 (360)	S-ECOPUR	
			–50	+110	1	25 (360)	T-ECOPUR	
		<b>Pneumatic, single-acting</b> 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.	–10	+200	1	25 (360)	SKF Ecoflas	
			–25	+150	1	25 (360)	SKF Ecorubber-H	
			–30	+100	1	25 (360)	SKF Ecorubber-1	
			–20	+200	1	25 (360)	SKF Ecorubber-2	
			–50	+150	1	25 (360)	SKF Ecorubber-3 <sup>1)</sup>	
		<b>Hydraulic, single-acting</b> Symmetric rod seal for simple standard applications, not recommended for new designs (profile S01-P preferred).	–30	+110	0,5	400 (5 800)	ECOPUR	
			–35	+110	0,5	400 (5 800)	ECOPUR LD	
			–30	+110	0,5	400 (5 800)	G-ECOPUR	
			–20	+110	0,5	400 (5 800)	H-ECOPUR	
			–50	+110	0,5	400 (5 800)	T-ECOPUR	
			–20	+110	0,7	400 (5 800)	S-ECOPUR	
		<b>Hydraulic, single-acting</b> As profile S06-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	–10	+200	0,5	160 (2 300)	SKF Ecoflas	
			–25	+150	0,5	160 (2 300)	SKF Ecorubber-H	
			–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 <sup>1)</sup>	
			–60	+200	–	–	SKF Ecosil <sup>2)</sup>	
		<b>Hydraulic, single-acting</b> O-ring activated symmetric rod seal for simple standard applications, not recommended for new designs (profile S03-P preferred)	–30	+100	0,5	400 (5 800)	<b>Seal</b> ECOPUR	<b>O-ring</b> NBR 70
			–30	+100	0,5	400 (5 800)	ECOPUR LD	NBR 70
			–30	+100	0,5	400 (5 800)	G-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
		<b>PTFE rod seal, single-acting</b> 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)	–55	+200	1	200 (2 900)	<b>Seal</b> SKF Ecoflon 1	<b>O-ring</b> MVQ 70
			–30	+100	1	200 (2 900)	SKF Ecoflon 1	NBR 70
			–50	+150	1	400 (5 800)	SKF Ecoflon 2,3,4	EPDM
			–20	+200	1	400 (5 800)	SKF Ecoflon 2,3,4	FPM 75
			–55	+200	1	400 (5 800)	SKF Ecoflon 2,3,4	MVQ 70
			–30	+100	1	400 (5 800)	SKF Ecoflon 2,3,4	NBR 70
			–55	+90	0,5	200 (2 900)	SKF Ecowear 1000	MVQ 70
			–30	+90	0,5	200 (2 900)	SKF Ecowear 1000	NBR 70

<sup>1)</sup> Not suitable for mineral oils<sup>2)</sup> Only recommended for static or quasi-static applications. Contact SKF for more information

Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material	
			min.	max.				
			°C		m/s	bar (psi)	–	
		<b>Hydraulic, single-acting</b> 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	+110	0,3	400 (5 800)	ECOPUR	
			–20	+110	0,3	400 (5 800)	H-ECOPUR	
			–20	+110	0,4	400 (5 800)	S-ECOPUR	
			–50	+110	0,3	400 (5 800)	T-ECOPUR	
		<b>Hydraulic, single-acting</b> 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	+110	0,3	400 (5 800)	ECOPUR	
			–20	+110	0,3	400 (5 800)	H-ECOPUR	
			–20	+110	0,4	400 (5 800)	S-ECOPUR	
			–50	+110	0,3	400 (5 800)	T-ECOPUR	
		<b>Hydraulic, single-acting</b> As profile S08-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	–10	+200	0,3	160 (2 300)	SKF Ecoflas	
			–25	+150	0,3	160 (2 300)	SKF Ecorubber-H	
			–30	+100	0,3	160 (2 300)	SKF Ecorubber-1	
			–20	+200	0,3	160 (2 300)	SKF Ecorubber-2	
			–50	+150	0,3	160 (2 300)	SKF Ecorubber-3 <sup>1)</sup>	
		<b>Hydraulic, single-acting</b> 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.	–55	+110	5	600 (8 700)	<b>Glide ring</b> G-ECOPUR 54D	<b>O-ring</b> MVQ 70
			–30	+100	5	600 (8 700)		
			–55	+110	5	600 (8 700)		
			–30	+100	5	600 (8 700)		
			–20	+200	10	600 (8 700)		
			–30	+100	10	600 (8 700)	SKF Ecoflon 2,3,4	FPM 75
			–55	+90	5	400 (5 800)		
			–30	+90	5	400 (5 800)		
		<b>Hydraulic, double-acting</b> O-ring activated symmetric PTFE rod seal, low friction. For extreme low or high speed, suitable for positioning functions.	–55	+110	5	600 (8 700)	<b>Glide ring</b> G-ECOPUR 54D	<b>O-ring</b> MVQ 70
			–30	+100	5	600 (8 700)		
			–55	+110	5	600 (8 700)		
			–30	+100	5	600 (8 700)		
			–20	+200	10	600 (8 700)	SKF Ecoflon 2,3,4	FPM 75
			–30	+100	10	600 (8 700)		
			–55	+90	5	400 (5 800)		
			–30	+90	5	400 (5 800)		
		<b>Hydraulic, single-acting</b> 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	+100	1	250 (3 600)	<b>Glide ring</b> ECOPUR	<b>O-ring</b> NBR 70
			–30	+100	1	250 (3 600)		
			–30	+100	1	250 (3 600)		
			–20	+100	1	250 (3 600)		
			–20	+100	1,4	250 (3 600)	S-ECOPUR	NBR 70
			–50	+110	1	250 (3 600)		

<sup>1)</sup> Not suitable for mineral oils






























Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material		
			min.	max.					
			°C		m/s	bar (psi)	–		
 	S09-ES	Hydraulic, single-acting 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	5	600 (8 700)	Glide ring	Energizer	
							G-ECOPUR 54D	SKF Ecorubber-1	
							G-ECOPUR 54D	SKF Ecosil	
							X-ECOPUR, H, S	SKF Ecorubber-1	
							X-ECOPUR, H, S	SKF Ecosil	
							SKF Ecoflon 2,3,4	SKF Ecorubber-1	
							SKF Ecoflon 2,3,4	SKF Ecorubber-2	
							SKF Ecowear 1000	SKF Ecorubber-1	
				SKF Ecowear 1000	SKF Ecosil				
 	S09-DS	Hydraulic, double-acting 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	5	600 (8 700)	Glide ring	Energizer	
							G-ECOPUR 54D	SKF Ecorubber-1	
							G-ECOPUR 54D	SKF Ecosil	
							X-ECOPUR, H, S	SKF Ecorubber-1	
							X-ECOPUR, H, S	SKF Ecosil	
							SKF Ecoflon 2,3,4	SKF Ecorubber-1	
							SKF Ecoflon 2,3,4	SKF Ecorubber-2	
							SKF Ecowear 1000	SKF Ecorubber-1	
				SKF Ecowear 1000	SKF Ecosil				
   	S1012-M	Hydraulic, single-acting Chevron sealing set, parting surface design. For heavy industry hydraulics.	–30	+100	0,5	500 (7 200)	S10-A	S11-M	S12-M
							SKF Ecotal <sup>1)</sup>	ECOPUR	X-ECOPUR <sup>3)</sup>
							SKF Ecomid	ECOPUR LD	SKF Ecomid
							SKF Ecomid	G-ECOPUR	G-ECOPUR 54D <sup>4)</sup>
							SKF Ecotal <sup>1)</sup>	H-ECOPUR	X-ECOPUR H <sup>3)</sup>
							SKF Ecotal <sup>1)</sup>	S-ECOPUR	X-ECOPUR S <sup>3)</sup>
							SKF Ecoflon 2	SKF Ecorubber-H	SKF Ecoflon 2
							SKF Ecoflon 2	SKF Ecorubber-1	SKF Ecoflon 2
							SKF Ecoflon 2	SKF Ecorubber-2	SKF Ecoflon 2
							SKF Ecoflon 2	SKF Ecorubber-3	SKF Ecoflon 2
   	S1012-T	Hydraulic, single-acting Chevron sealing set, machined surface design. For heavy industry hydraulics.	–30	+100	0,5	500 (7 200)	S10-A	S11-T	S12-T
							SKF Ecotal <sup>1)</sup>	ECOPUR	X-ECOPUR <sup>3)</sup>
							SKF Ecomid	ECOPUR LD	SKF Ecomid
							SKF Ecotal <sup>1)</sup>	G-ECOPUR	G-ECOPUR 54D <sup>4)</sup>
							SKF Ecotal <sup>1)</sup>	H-ECOPUR	X-ECOPUR H <sup>3)</sup>
							SKF Ecotal <sup>1)</sup>	S-ECOPUR	X-ECOPUR S <sup>3)</sup>
							SKF Ecoflon 2	SKF Ecorubber-H	SKF Ecoflon 2
							SKF Ecoflon 2	SKF Ecorubber-1	SKF Ecoflon 2
   	S1315-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.	–30	+100	0,5	600 (8 700)	S13-A	S14-A	S15-A
							SKF Ecotal <sup>1)</sup>	ECOPUR	X-ECOPUR
							SKF Ecotal <sup>1)</sup>	ECOPUR	SKF Ecotal <sup>1)</sup>
							SKF Ecomid	ECOPUR LD	SKF Ecomid
							SKF Ecomid	G-ECOPUR	SKF Ecomid
							SKF Ecotal <sup>1)</sup>	H-ECOPUR	X-ECOPUR H
							SKF Ecotal <sup>1)</sup>	H-ECOPUR	SKF Ecotal <sup>1)</sup>
							SKF Ecotal <sup>1)</sup>	S-ECOPUR	X-ECOPUR S
    	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		
							ECOPUR LD		
							G-ECOPUR		
							H-ECOPUR		
							S-ECOPUR		
							T-ECOPUR		
							SKF Ecoflas		
							SKF Ecorubber-H		
				SKF Ecorubber-1					
				SKF Ecorubber-2					
				SKF Ecorubber-3 <sup>2)</sup>					

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm

<sup>2)</sup> Not suitable for mineral oils

<sup>3)</sup> Alternative SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm

<sup>4)</sup> Alternative SKF Ecomid

Appli- cation	Profile	Description	Temperature		Speed	Pressure	Material	
			min.	max.	max.	max.		
			°C		m/s	bar (psi)	–	
   	<b>S16-B</b> 	<b>Hydraulic/pneumatic, single-acting</b> 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 –35 –30 –20 –20 –50 –10 –25 –30 –20 –50	+110 +110 +110 +110 +110 +110 +200 +150 +100 +200 +150	0,5 0,5 0,5 0,5 0,7 0,5 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) 160 (2 300) 160 (2 300) 160 (2 300) 160 (2 300) 160 (2 300) 160 (2 300)	ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3 <sup>2)</sup>	
   	<b>S17-P</b> 	<b>Hydraulic, single-acting</b> 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 –35 –30 –20 –20 –50	+110 +110 +110 +110 +110 +110	0,5 0,5 0,5 0,5 0,7 0,5	400(5 800) 400(5 800) 400(5 800) 400(5 800) 400(5 800) 400(5 800)	ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	
   	<b>S17-R</b> 	<b>Hydraulic, single-acting</b> As profile S17–P, but easily adaptable for diverse temperatures and media by selection of suitable seal material.	–10 –25 –30 –20 –50	+200 +150 +100 +200 +150	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 Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3 <sup>2)</sup>	
   	<b>S18-P</b> 	<b>Hydraulic, single-acting</b> 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.	–30 –35 –30 –20 –20 –40	+100 +100 +100 +100 +100 +100	0,5 0,5 0,5 0,5 0,7 0,5	600 (8 700) 600 (8 700) 600 (8 700) 600 (8 700) 600 (8 700) 600 (8 700)	<b>Seal</b> ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	<b>Back-up ring</b> SKF Ecotal <sup>1)</sup> SKF Ecomid SKF Ecomid SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup>
   	<b>S18-R</b> 	<b>Hydraulic, single-acting</b> 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.	–10 –25 –25 –30 –20 –50 –40	+200 +150 +100 +100 +200 +150 +100	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)	<b>Seal</b> SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3 SKF Ecorubber-3	<b>Back-up ring</b> SKF Ecoflon 2 SKF Ecoflon 2 SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecoflon 2 SKF Ecoflon 2 SKF Ecotal <sup>1)</sup>
   	<b>S19-F</b> 	<b>PTFE rod seal, single-acting</b> 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.	–200 –200 –200 –200 –200	+260 +260 +260 +260 +90	15 15 15 15 15	200 (2 900) 400 (5 800) 400 (5 800) 400 (5 800) 200 (2 900)	<b>Seal</b> SKF Ecoflon 1 SKF Ecoflon 2 SKF Ecoflon 3 SKF Ecoflon 4 SKF ECOWAER 1000	<b>Spring</b> 1.4310 <sup>3)</sup> 1.4310 <sup>3)</sup> 1.4310 <sup>3)</sup> 1.4310 <sup>3)</sup> 1.4310 <sup>3)</sup>

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm















<sup>2)</sup> Not suitable for mineral oils

<sup>3)</sup> Spring metal material specification

Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material		
			min.	max.					
			°C		m/s	bar (psi)	–		
   	<b>S20-R</b> 	<b>Hydraulic, double-acting</b>	–25	+150	0,5	700 (10 000)	<b>Seal</b>	<b>Back-up ring</b>	
		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.	–25	+150	0,5	700 (10 000)	SKF Ecorubber-H	SKF Ecoflon 2	
			–25	+100	0,5	700 (10 000)	SKF Ecorubber-H	SKF Ecopaek	
			–30	+100	0,5	700 (10 000)	SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
			–20	+200	0,5	700 (10 000)	SKF Ecorubber-2	SKF Ecoflon 2	
			–20	+200	0,5	700 (10 000)	SKF Ecorubber-2	SKF Ecopaek	
   	<b>S21-P</b> 	<b>Hydraulic, single-acting</b>	–30	+100	0,5	400 (5 800)	<b>Seal</b>	<b>O-ring</b>	
		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).	–20	+100	0,5	400 (5 800)	ECOPUR	NBR 70	
			–20	+100	0,7	400 (5 800)	H-ECOPUR	NBR 70	
			–50	+110	0,5	400 (5 800)	S-ECOPUR	NBR 70	
							T-ECOPUR	MVQ 70	
   	<b>S22-P</b> 	<b>Hydraulic, single-acting</b>	–30	+100	0,5	400 (5 800)	<b>Seal</b>	<b>Support ring</b>	
		Symmetric rod seal with support ring for simple applications to serve repair purpose, not recommended for new designs (profile S01-P preferred). Retainer ring can be designed straight or as an angled ring.	–35	+100	0,5	400 (5 800)	ECOPUR	SKF Ecotal <sup>(1)</sup>	
			–30	+100	0,5	400 (5 800)	ECOPUR LD	SKF Ecomid	
			–20	+100	0,5	400 (5 800)	G-ECOPUR	SKF Ecomid	
			–20	+100	0,5	400 (5 800)	H-ECOPUR	SKF Ecotal <sup>(1)</sup>	
			–20	+100	0,7	400 (5 800)	S-ECOPUR	SKF Ecotal <sup>(1)</sup>	
	–40	+100	0,5	400 (5 800)	T-ECOPUR	SKF Ecotal <sup>(1)</sup>			
   	<b>S22-R</b> 	<b>Hydraulic, single-acting</b>	–10	+200	0,5	160 (2 300)	<b>Seal</b>	<b>Support ring</b>	
		Symmetric rod seal as S22-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material. Retainer ring can be designed straight or as an angled ring.	–25	+150	0,5	160 (2 300)	SKF Ecoflas	SKF Ecoflon 2	
			–25	+100	0,5	160 (2 300)	SKF Ecorubber-H	SKF Ecoflon 2	
			–30	+100	0,5	160 (2 300)	SKF Ecorubber-H	SKF Ecotal <sup>(1)</sup>	
			–20	+200	0,5	160 (2 300)	SKF Ecorubber-1	SKF Ecotal <sup>(1)</sup>	
			–50	+150	0,5	160 (2 300)	SKF Ecorubber-2	SKF Ecoflon 2	
	–40	+100	0,5	160 (2 300)	SKF Ecorubber-3 <sup>(2)</sup>	SKF Ecoflon 2			
   	<b>S24-P</b> 	<b>Hydraulic, single-acting</b>	–30	+100	0,5	700 (10 000)	<b>Seal</b>	<b>O-ring</b>	<b>Back-up ring</b>
		O-Ring activated rod seal with additional stabilizing lips and integrated active back ring for larger extrusion gaps, mainly used in mining industry.	–20	+100	0,5	700 (10 000)	ECOPUR	NBR 70	SKF Ecotal <sup>(1)</sup>
			–20	+100	0,5	700 (10 000)	H-ECOPUR	NBR 70	SKF Ecotal <sup>(1)</sup>
			–20	+100	0,7	700 (10 000)	S-ECOPUR	NBR 70	SKF Ecotal <sup>(1)</sup>
			–40	+100	0,5	700 (10 000)	T-ECOPUR	MVQ 70	SKF Ecotal <sup>(1)</sup>
   	<b>S2527-F</b> 	<b>PTFE chevron set, single-acting</b>	–200	+260	1,5	100 (1 450)	<b>S25-F</b>	<b>S26-F</b>	<b>S27-F</b>
		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.					SKF Ecoflon 2	SKF Ecoflon 1	SKF Ecoflon 2

























<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm  
<sup>2)</sup> Not suitable for mineral oils



Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material		
			min.	max.					
			°C		m/s	bar (psi)	–		
  	 <b>S2931-F</b>	<b>PTFE chevron set, single-acting</b> 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)	<b>S29-F</b> SKF Ecoflon 2	<b>S30-F</b> SKF Ecoflon 1	<b>S31-F</b> SKF Ecoflon 2
  	 <b>S32-P</b>	<b>Hydraulic, single-acting</b> 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	+100	0,5	500 (7 200)	<b>Pressure ring</b> SKF Ecotal <sup>(1)</sup>	<b>Seal</b> ECOPUR	<b>Support ring</b> SKF Ecotal <sup>(1)</sup>
			–30	+100	0,5	500 (7 200)	X-ECOPUR	ECOPUR	SKF Ecotal <sup>(1)</sup>
			–35	+100	0,5	500 (7 200)	SKF Ecomid	ECOPUR LD	SKF Ecomid
			–30	+100	0,5	500 (7 200)	G-ECOPUR 54D	G-ECOPUR	SKF Ecomid
			–30	+100	0,5	500 (7 200)	SKF Ecomid	G-ECOPUR	SKF Ecomid
			–20	+100	0,5	500 (7 200)	X-ECOPUR H	H-ECOPUR	SKF Ecotal <sup>(1)</sup>
			–20	+100	0,5	500 (7 200)	SKF Ecotal <sup>(1)</sup>	H-ECOPUR	SKF Ecotal <sup>(1)</sup>
			–20	+100	0,7	500 (7 200)	SKF Ecotal <sup>(1)</sup>	S-ECOPUR	SKF Ecotal <sup>(1)</sup>
			–20	+100	0,7	500 (7 200)	X-ECOPUR S	S-ECOPUR	SKF Ecotal <sup>(1)</sup>
			–40	+100	0,5	500 (7 200)	SKF Ecotal <sup>(1)</sup>	T-ECOPUR	SKF Ecotal <sup>(1)</sup>
    	 <b>S35-P</b>	<b>Hydraulic, double-acting</b> 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	+110	0,4	400 (5 800)	ECOPUR		
			–35	+110	0,4	400 (5 800)	ECOPUR LD		
			–30	+110	0,4	400 (5 800)	G-ECOPUR		
			–20	+110	0,4	400 (5 800)	H-ECOPUR		
			–20	+110	0,5	400 (5 800)	S-ECOPUR		
			–50	+110	0,4	400 (5 800)	T-ECOPUR		





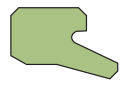




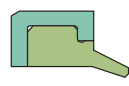









<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm



Appli- cation	Profile	Description	Temperature		Speed max.	Material
			min.	max.		
			°C		m/s	–
    		<b>A01-A</b> <b>Hydraulic, single-acting</b> 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	+110	4	ECOPUR
			–35	+110	4	ECOPUR LD
			–30	+110	4	G-ECOPUR
			–30	+110	4	G-ECOPUR 54D <sup>2)</sup>
			–20	+110	4	H-ECOPUR
			–20	+110	4	S-ECOPUR
			–50	+110	4	T-ECOPUR
			–30	+110	4	X-ECOPUR <sup>2)</sup>
			–20	+110	4	X-ECOPUR H <sup>2)</sup>
			–20	+110	4	X-ECOPUR S <sup>2)</sup>
			–10	+200	4	SKF Ecoflas
			–25	+150	4	SKF Ecorubber-H
			–30	+100	4	SKF Ecorubber-1
			–20	+200	4	SKF Ecorubber-2
			–50	+150	4	SKF Ecorubber-3 <sup>1)</sup>
    		<b>A01-B</b> <b>Hydraulic, single-acting</b> As profile A01–A, but without back support area. For housings according ISO 6195–Type A.	–30	+110	4	ECOPUR
			–35	+110	4	ECOPUR LD
			–30	+110	4	G-ECOPUR
			–30	+110	4	G-ECOPUR 54D <sup>2)</sup>
			–20	+110	4	H-ECOPUR
			–20	+110	4	S-ECOPUR
			–50	+110	4	T-ECOPUR
			–30	+110	4	X-ECOPUR <sup>2)</sup>
			–20	+110	4	X-ECOPUR H <sup>2)</sup>
			–20	+110	4	X-ECOPUR S <sup>2)</sup>
			–10	+200	4	SKF Ecoflas
			–25	+150	4	SKF Ecorubber-H
			–30	+100	4	SKF Ecorubber-1
			–20	+200	4	SKF Ecorubber-2
			–50	+150	4	SKF Ecorubber-3 <sup>1)</sup>
    		<b>A02-A</b> <b>Hydraulic, single-acting</b> 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	+110	4	ECOPUR
			–35	+110	4	ECOPUR LD
			–30	+110	4	G-ECOPUR
			–30	+110	4	G-ECOPUR 54D <sup>2)</sup>
			–20	+110	4	H-ECOPUR
			–20	+110	4	S-ECOPUR
			–50	+110	4	T-ECOPUR
			–30	+110	4	X-ECOPUR <sup>2)</sup>
			–20	+110	4	X-ECOPUR H <sup>2)</sup>
			–20	+110	4	X-ECOPUR S <sup>2)</sup>
			–10	+200	4	SKF Ecoflas
			–25	+150	4	SKF Ecorubber-H
			–30	+100	4	SKF Ecorubber-1
			–20	+200	4	SKF Ecorubber-2
			–50	+150	4	SKF Ecorubber-3 <sup>1)</sup>
    		<b>A02-B</b> <b>Hydraulic, single-acting</b> 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	+110	4	ECOPUR
			–35	+110	4	ECOPUR LD
			–30	+110	4	G-ECOPUR
			–30	+110	4	G-ECOPUR 54D <sup>2)</sup>
			–20	+110	4	H-ECOPUR
			–20	+110	4	S-ECOPUR
			–50	+110	4	T-ECOPUR
			–30	+110	4	X-ECOPUR <sup>2)</sup>
			–20	+110	4	X-ECOPUR H <sup>2)</sup>
			–20	+110	4	X-ECOPUR S <sup>2)</sup>
			–10	+200	4	SKF Ecoflas
			–25	+150	4	SKF Ecorubber-H
			–30	+100	4	SKF Ecorubber-1
			–20	+200	4	SKF Ecorubber-2
			–50	+150	4	SKF Ecorubber-3 <sup>1)</sup>

<sup>1)</sup> Not suitable for mineral oils

















<sup>2)</sup> For hard grade polyurethanes, refer to material properties on page 12

Appli- cation	Profile	Description	Temperature		Speed max.	Material	
			min.	max.			
			°C		m/s	–	
   	<b>A02-I</b> 	<b>Hydraulic, single-acting</b> As profile A02-A, but without back support area. Special housing design according ISO 6195–Type C.	–30	+110	4	ECOPUR	
			–20	+110	4	H-ECOPUR	
			–20	+110	4	S-ECOPUR	
			–50	+110	4	T-ECOPUR	
			–30	+110	4	X-ECOPUR <sup>3)</sup>	
			–20	+110	4	X-ECOPUR H <sup>2)</sup>	
			–20	+110	4	X-ECOPUR S <sup>3)</sup>	
			–10	+200	4	SKF Ecoflas	
			–25	+150	4	SKF Ecorubber-H	
			–30	+100	4	SKF Ecorubber-1	
			–20	+200	4	SKF Ecorubber-2	
			–50	+150	4	SKF Ecorubber-3 <sup>2)</sup>	
   	<b>A03-A</b> 	<b>Hydraulic, single-acting</b> 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.	–30	+80	4	<b>Seal</b> ECOPUR	<b>Housing</b> SKF Ecotal <sup>1)</sup>
			–20	+80	4	H-ECOPUR	SKF Ecotal <sup>1)</sup>
			–20	+80	5	S-ECOPUR	SKF Ecotal <sup>1)</sup>
			–40	+80	4	T-ECOPUR	SKF Ecotal <sup>1)</sup>
			–30	+80	4	X-ECOPUR <sup>3)</sup>	SKF Ecotal <sup>1)</sup>
			–20	+80	4	X-ECOPUR H <sup>3)</sup>	SKF Ecotal <sup>1)</sup>
			–20	+80	5	X-ECOPUR S <sup>3)</sup>	SKF Ecotal <sup>1)</sup>
			–10	+200	4	SKF Ecoflas	SKF Ecopaek
			–25	+80	4	SKF Ecorubber-H	SKF Ecotal <sup>1)</sup>
			–30	+80	4	SKF Ecorubber-1	SKF Ecotal <sup>1)</sup>
			–20	+200	4	SKF Ecorubber-2	SKF Ecopaek
			–50	+150	4	SKF Ecorubber-3 <sup>2)</sup>	SKF Ecopaek
   	<b>A04-A</b> 	<b>Pneumatic, single-acting</b> 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	
			–35	+110	4	ECOPUR LD	
			–30	+110	4	G-ECOPUR	
			–30	+110	4	G-ECOPUR 54D <sup>3)</sup>	
			–20	+110	4	H-ECOPUR	
			–20	+110	4	S-ECOPUR	
			–50	+110	4	T-ECOPUR	
			–30	+110	4	X-ECOPUR <sup>3)</sup>	
			–20	+110	4	X-ECOPUR H <sup>3)</sup>	
			–20	+110	4	X-ECOPUR S <sup>3)</sup>	
			–10	+200	4	SKF Ecoflas	
			–25	+150	4	SKF Ecorubber-H	
  	<b>A04-B</b> 	<b>Pneumatic, single-acting</b> As profile A04-A, but without back support area. For housings according ISO 6195–Type A.	–30	+110	4	ECOPUR	
			–35	+110	4	ECOPUR LD	
			–30	+110	4	G-ECOPUR	
			–30	+110	4	G-ECOPUR 54D <sup>3)</sup>	
			–20	+110	4	H-ECOPUR	
			–20	+110	4	S-ECOPUR	
			–50	+110	4	T-ECOPUR	
			–30	+110	4	X-ECOPUR <sup>3)</sup>	
			–20	+110	4	X-ECOPUR H <sup>3)</sup>	
			–20	+110	4	X-ECOPUR S <sup>3)</sup>	
			–10	+200	4	SKF Ecoflas	
			–25	+150	4	SKF Ecorubber-H	
			–30	+100	4	SKF Ecorubber-1	
			–20	+200	4	SKF Ecorubber-2	
			–50	+150	4	SKF Ecorubber-3 <sup>2)</sup>	

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm

<sup>2)</sup> Not suitable for mineral oils




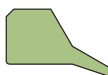












<sup>3)</sup> For hard grade polyurethanes, refer to material properties on page 12

Appli- cation	Profile	Description	Temperature		Speed max.	Material				
			min.	max.						
			°C		m/s	–				
  	<b>A05-A</b> 	<b>Pneumatic, single-acting</b> 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				
			–35	+110	4	ECOPUR LD				
			–30	+110	4	G-ECOPUR				
			–30	+110	4	G-ECOPUR 54D <sup>3)</sup>				
			–20	+110	4	H-ECOPUR				
			–20	+110	4	S-ECOPUR				
			–50	+110	4	T-ECOPUR				
			–30	+110	4	X-ECOPUR <sup>3)</sup>				
			–20	+110	4	X-ECOPUR H <sup>3)</sup>				
			–20	+110	4	X-ECOPUR S <sup>3)</sup>				
			–10	+200	4	SKF Ecoflas				
			–25	+150	4	SKF Ecorubber-H				
			–30	+100	4	SKF Ecorubber-1				
			–20	+200	4	SKF Ecorubber-2				
			–50	+150	4	SKF Ecorubber-3 <sup>2)</sup>				
  	<b>A05-B</b> 	<b>Pneumatic, single-acting</b> Wiper with interference fit on outside diameter. Special design of wiping lip allows retention of initial lubricating film.	–30	+110	4	ECOPUR				
			–20	+110	4	H-ECOPUR				
			–20	+110	4	S-ECOPUR				
			–50	+110	4	T-ECOPUR				
			–30	+110	4	X-ECOPUR <sup>3)</sup>				
			–20	+110	4	X-ECOPUR H <sup>3)</sup>				
			–20	+110	4	X-ECOPUR S <sup>3)</sup>				
			–10	+200	4	SKF Ecoflas				
			–25	+150	4	SKF Ecorubber-H				
			–30	+100	4	SKF Ecorubber-1				
			–20	+200	4	SKF Ecorubber-2				
			–50	+150	4	SKF Ecorubber-3 <sup>2)</sup>				
			  	<b>A05-I</b> 	<b>Pneumatic, single-acting</b> As profile A05-A, but without back support area. Special housing design according ISO 6195-Type C.	–30	+110	4	ECOPUR	
						–20	+110	4	H-ECOPUR	
						–20	+110	4	S-ECOPUR	
–50	+110	4				T-ECOPUR				
–30	+110	4				X-ECOPUR <sup>3)</sup>				
–20	+110	4				X-ECOPUR H <sup>3)</sup>				
–20	+110	4				X-ECOPUR S <sup>3)</sup>				
–10	+200	4				SKF Ecoflas				
–25	+150	4				SKF Ecorubber-H				
–30	+100	4				SKF Ecorubber-1				
–20	+200	4				SKF Ecorubber-2				
–50	+150	4				SKF Ecorubber-3 <sup>2)</sup>				
  	<b>A06-A</b> 	<b>Pneumatic, single-acting</b> 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.				–30	+80	4	<b>Seal</b> ECOPUR	<b>Housing</b> SKF Ecotal <sup>1)</sup>
						–20	+80	4	H-ECOPUR	SKF Ecotal <sup>1)</sup>
						–20	+80	5	S-ECOPUR	SKF Ecotal <sup>1)</sup>
			–40	+80	4	T-ECOPUR	SKF Ecotal <sup>1)</sup>			
			–30	+80	4	X-ECOPUR <sup>3)</sup>	SKF Ecotal <sup>1)</sup>			
			–20	+80	4	X-ECOPUR H <sup>3)</sup>	SKF Ecotal <sup>1)</sup>			
			–20	+80	4	X-ECOPUR S <sup>3)</sup>	SKF Ecotal <sup>1)</sup>			
			–10	+200	4	SKF Ecoflas	SKF Ecopaek			
			–25	+80	4	SKF Ecorubber-H	SKF Ecotal <sup>1)</sup>			
			–30	+80	4	SKF Ecorubber-1	SKF Ecotal <sup>1)</sup>			
			–20	+200	4	SKF Ecorubber-2	SKF Ecopaek			
			–50	+150	4	SKF Ecorubber-3 <sup>2)</sup>	SKF Ecopaek			

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm

















<sup>2)</sup> Not suitable for mineral oils

<sup>3)</sup> For hard grade polyurethanes, refer to material properties on page 12

Appli- cation	Profile	Description	Temperature		Speed max.	Material
			min.	max.		
			°C		m/s	–
  		<b>A07-A</b> <b>Hydraulic, single-acting</b> Wiper to fit in angled housings (30° angle).	–30	+110	4	ECOPUR
			–20	+110	4	H-ECOPUR
			–20	+110	4	S-ECOPUR
			–50	+110	4	T-ECOPUR
			–30	+110	4	X-ECOPUR <sup>2)</sup>
			–20	+110	4	X-ECOPUR H <sup>2)</sup>
			–20	+110	4	X-ECOPUR S <sup>2)</sup>
			–10	+200	4	SKF Ecoflas
			–25	+150	4	SKF Ecorubber-H
			–30	+100	4	SKF Ecorubber-1
			–20	+200	4	SKF Ecorubber-2
			–50	+150	4	SKF Ecorubber-3 <sup>1)</sup>
  		<b>A08-A</b> <b>Hydraulic/pneumatic, single-acting</b> 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
			–35	+110	4	ECOPUR LD
			–30	+110	4	G-ECOPUR
			–30	+110	4	G-ECOPUR 54D <sup>2)</sup>
			–20	+110	4	H-ECOPUR
			–20	+110	4	S-ECOPUR
			–50	+110	4	T-ECOPUR
			–30	+110	4	X-ECOPUR <sup>2)</sup>
			–20	+110	4	X-ECOPUR H <sup>2)</sup>
			–20	+110	4	X-ECOPUR S <sup>2)</sup>
			–10	+200	4	SKF Ecoflas
			–25	+150	4	SKF Ecorubber-H
			–30	+100	4	SKF Ecorubber-1
			–20	+200	4	SKF Ecorubber-2
			–50	+150	4	SKF Ecorubber-3 <sup>1)</sup>
  		<b>A08-B</b> 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
			–35	+110	4	ECOPUR LD
			–30	+110	4	G-ECOPUR
			–30	+110	4	G-ECOPUR 54D <sup>2)</sup>
			–20	+110	4	H-ECOPUR
			–20	+110	4	S-ECOPUR
			–50	+110	4	T-ECOPUR
			–30	+110	4	X-ECOPUR <sup>2)</sup>
			–20	+110	4	X-ECOPUR H <sup>2)</sup>
			–20	+110	4	X-ECOPUR S <sup>2)</sup>
			–10	+200	4	SKF Ecoflas
			–25	+150	4	SKF Ecorubber-H
			–30	+100	4	SKF Ecorubber-1
			–20	+200	4	SKF Ecorubber-2
			–50	+150	4	SKF Ecorubber-3 <sup>1)</sup>
  		<b>A09-A</b> <b>Hydraulic, single-acting</b> Wiper with dimensioning according to common types used in USA. For housings according AN 6231, ANSI/B93.35.	–30	+110	4	ECOPUR
			–20	+110	4	H-ECOPUR
			–20	+110	4	S-ECOPUR
			–50	+110	4	T-ECOPUR
			–30	+110	4	X-ECOPUR <sup>2)</sup>
			–20	+110	4	X-ECOPUR H <sup>2)</sup>
			–20	+110	4	X-ECOPUR S <sup>2)</sup>
			–10	+200	4	SKF Ecoflas
			–25	+150	4	SKF Ecorubber-H
			–30	+100	4	SKF Ecorubber-1
			–20	+200	4	SKF Ecorubber-2
			–50	+150	4	SKF Ecorubber-3 <sup>1)</sup>






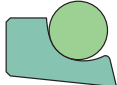




<sup>1)</sup> Not suitable for mineral oils

<sup>2)</sup> For hard grade polyurethanes, refer to material properties on page 12

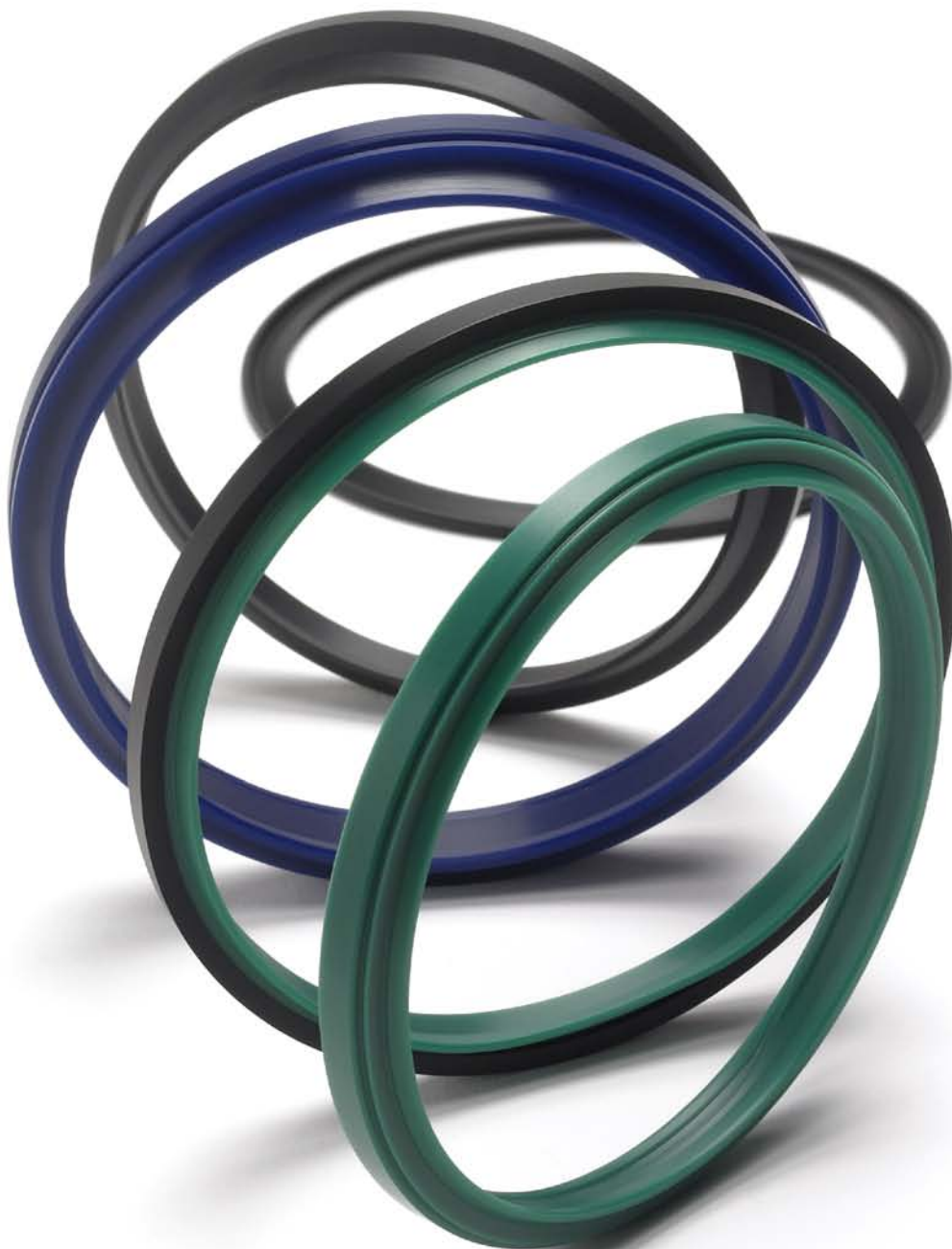
Appli- cation	Profile	Description	Temperature		Speed max.	Material
			min.	max.		
			°C		m/s	–
  	<b>A10-A</b> 	<b>Hydraulic, single-acting</b> Wiper with dimensioning according to common types used in USA. Fixed relation between cross-section and height of wiper. For housings according AN 6231, ANSI/B93.35.	–30	+110	4	ECOPUR
			–20	+110	4	H-ECOPUR
			–20	+110	4	S-ECOPUR
			–50	+110	4	T-ECOPUR
			–30	+110	4	X-ECOPUR <sup>2)</sup>
			–20	+110	4	X-ECOPUR H <sup>2)</sup>
			–20	+110	4	X-ECOPUR S <sup>2)</sup>
			–10	+200	4	SKF Ecoflas
			–25	+150	4	SKF Ecorubber-H
			–30	+100	4	SKF Ecorubber-1
			–20	+200	4	SKF Ecorubber-2
			–50	+150	4	SKF Ecorubber-3 <sup>1)</sup>
  	<b>A11-A</b> 	<b>Hydraulic/pneumatic, double-acting</b> 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	+110	4	ECOPUR
			–35	+110	4	ECOPUR LD
			–30	+110	4	G-ECOPUR
			–20	+110	4	H-ECOPUR
			–20	+110	5	S-ECOPUR
			–50	+110	4	T-ECOPUR
			–10	+200	4	SKF Ecoflas
			–25	+150	4	SKF Ecorubber-H
			–30	+100	4	SKF Ecorubber-1
			–20	+200	4	SKF Ecorubber-2
			–50	+150	4	SKF Ecorubber-3 <sup>1)</sup>
  	<b>A11-I</b> 	<b>Hydraulic/pneumatic, double-acting</b> As profile A11-A, special housing design according ISO 6195-Type C	–30	+110	4	ECOPUR
			–20	+110	4	H-ECOPUR
			–50	+110	4	T-ECOPUR
			–20	+110	5	S-ECOPUR
			–10	+200	4	SKF Ecoflas
			–25	+150	4	SKF Ecorubber-H
			–30	+100	4	SKF Ecorubber-1
			–20	+200	4	SKF Ecorubber-2
			–50	+150	4	SKF Ecorubber-3 <sup>1)</sup>
  	<b>A12-A</b> 	<b>Hydraulic, single-acting</b> Wiper with secondary lip, the technically accurate closure at the cylinder is providing reliable protection, even for heavy contamination.	–30	+110	4	ECOPUR
			–35	+110	4	ECOPUR LD
			–30	+110	4	G-ECOPUR
			–30	+110	4	G-ECOPUR 54D <sup>2)</sup>
			–20	+110	4	H-ECOPUR
			–20	+110	5	S-ECOPUR
			–50	+110	4	T-ECOPUR
			–30	+110	4	X-ECOPUR <sup>2)</sup>
			–20	+110	4	X-ECOPUR H <sup>2)</sup>
			–20	+110	5	X-ECOPUR S <sup>2)</sup>

<sup>1)</sup> Not suitable for mineral oils

<sup>2)</sup> For hard grade polyurethanes, refer to material properties on page 12

Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material	
			min.	max.				
			°C		m/s	bar (psi)	–	
		<b>Hydraulic, double-acting</b> 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	
			–35	+110	4	16 (230)	ECOPUR LD	
			–30	+110	4	16 (230)	G-ECOPUR	
			–20	+110	4	16 (230)	H-ECOPUR	
			–20	+110	5	16 (230)	S-ECOPUR	
			–50	+110	4	16 (230)	T-ECOPUR	
		<b>Hydraulic/pneumatic, single-acting</b> 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.	–70	+110	1	–	X-ECOPUR	
			–70	+110	1	–	X-ECOPUR H	
			–70	+110	1	–	X-ECOPUR S	
			–50	+80	1	–	SKF Ecotal <sup>1)</sup>	
			–200	+90	1	–	SKF Ecowear 1000	
		<b>Hydraulic/pneumatic, single-acting</b> 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	5	–	<b>Glide ring</b> X-ECOPUR X-ECOPUR H X-ECOPUR S SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	<b>Energizer</b> NBR 70 NBR 70 NBR 70 FPM 75 NBR 70 NBR 70 NBR 70
			–20	+100	5	–		
			–20	+100	5	–		
			–20	+200	10	–		
			–30	+100	10	–		
		<b>Hydraulic/pneumatic, double-acting</b> 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	5	16 (230)	<b>Glide ring</b> G-ECOPUR 54D X-ECOPUR X-ECOPUR H X-ECOPUR S SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	<b>Energizer</b> NBR 70 NBR 70 NBR 70 NBR 70 FPM 75 NBR 70 MVQ 70 NBR 70
			–30	+100	5	16 (230)		
			–20	+100	5	16 (230)		
			–20	+100	5	16 (230)		
			–20	+200	10	16 (230)		
		<b>Hydraulic/pneumatic, double-acting</b> 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	5	16 (230)	<b>Glide ring</b> G-ECOPUR 54D X-ECOPUR X-ECOPUR H X-ECOPUR S SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	<b>Energizer</b> NBR 70 NBR 70 NBR 70 NBR 70 FPM 75 NBR 70 MVQ 70 NBR 70
			–30	+100	5	16 (230)		
			–20	+100	5	16 (230)		
			–20	+100	5	16 (230)		
			–20	+200	10	16 (230)		

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm





Appli- cation	Profile	Description	Temperature		Speed max	Pressure max.	Material	
			min.	max.				
			°C		m/s	bar (psi)	–	
		<b>R01-P</b> <b>Single-acting rotary shaft seal</b> 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 <sup>3)</sup>	0,5 (7)	<b>Seal</b> ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	<b>Energizer</b> SKF Ecotal <sup>1)</sup> SKF Ecomid SKF Ecomid SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup>
			–35	+80	5 <sup>3)</sup>	0,5 (7)		
			–30	+80	5 <sup>3)</sup>	0,5 (7)		
			–20	+80	5 <sup>3)</sup>	0,5 (7)		
			–20	+80	5 <sup>3)</sup>	0,5 (7)		
			–40	+80	5 <sup>3)</sup>	0,5 (7)		
		<b>R01-R</b> <b>Single-acting rotary shaft seal</b> 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.	–10	+200	10 <sup>3)</sup>	0,5 (7)	<b>Seal</b> SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3 <sup>2)</sup> SKF Ecorubber-3 <sup>2)</sup> SKF Ecosil SKF Ecosil	<b>Energizer</b> Metal SKF Ecotal <sup>1)</sup> SKF Ecotal <sup>1)</sup> Metal SKF Ecotal <sup>1)</sup> Metal SKF Ecotal <sup>1)</sup> Metal
			–25	+80	10 <sup>3)</sup>	0,5 (7)		
			–30	+80	10 <sup>3)</sup>	0,5 (7)		
			–20	+200	15 <sup>3)</sup>	0,5 (7)		
			–50	+80	10 <sup>3)</sup>	0,5 (7)		
			–50	+150	10 <sup>3)</sup>	0,5 (7)		
			–50	+80	5 <sup>3)</sup>	0,2 (3)		
			–60	+200	5 <sup>3)</sup>	0,2 (3)		
		<b>R01-AF</b> <b>Single-acting rotary shaft seal</b> 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 <sup>3)</sup>	0,5 (7)	<b>Seal</b> ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3 <sup>2)</sup> SKF Ecosil	
			–35	+110	5 <sup>3)</sup>	0,5 (7)		
			–30	+110	5 <sup>3)</sup>	0,5 (7)		
			–20	+110	5 <sup>3)</sup>	0,5 (7)		
			–20	+110	5 <sup>3)</sup>	0,5 (7)		
			–20	+110	5 <sup>3)</sup>	0,5 (7)		
			–50	+110	5 <sup>3)</sup>	0,5 (7)		
			–10	+200	10 <sup>3)</sup>	0,5 (7)		
			–25	+150	10 <sup>3)</sup>	0,5 (7)		
			–30	+100	10 <sup>3)</sup>	0,5 (7)		
			–20	+200	15 <sup>3)</sup>	0,5 (7)		
			–50	+150	10 <sup>3)</sup>	0,2 (3)		
			–60	+200	5 <sup>3)</sup>	0,2 (3)		
		<b>R01-AS</b> <b>Single-acting rotary shaft seal</b> 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 mechanisms in heavy duty machinery, for shipbuilding industry and civil engineering.	–30	+110	5 <sup>3)</sup>	0,5 (7)	<b>Seal</b> ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3 <sup>2)</sup> SKF Ecosil	
			–35	+110	5 <sup>3)</sup>	0,5 (7)		
			–30	+110	5 <sup>3)</sup>	0,5 (7)		
			–20	+110	5 <sup>3)</sup>	0,5 (7)		
			–20	+110	5 <sup>3)</sup>	0,5 (7)		
			–20	+110	5 <sup>3)</sup>	0,5 (7)		
			–50	+110	5 <sup>3)</sup>	0,5 (7)		
			–10	+200	10 <sup>3)</sup>	0,5 (7)		
			–25	+150	10 <sup>3)</sup>	0,5 (7)		
			–30	+100	10 <sup>3)</sup>	0,5 (7)		
			–20	+200	15 <sup>3)</sup>	0,5 (7)		
			–50	+150	10 <sup>3)</sup>	0,2 (3)		
			–60	+200	5 <sup>3)</sup>	0,2 (3)		
		<b>R01-F</b> <b>Single-acting rotary shaft seal</b> 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 maximums values simultaneously.	–20	+200	10 <sup>3)</sup>	15 (210)	<b>Seal</b> SKF Ecoflon 4 SKF Ecoflon 4	<b>O-Ring</b> FPM 75 NBR 70
			–30	+100	10 <sup>3)</sup>	15 (210)		

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm

<sup>2)</sup> Not suitable for mineral oils













<sup>3)</sup> Surface speed limit values are depending on heat dissipation ability of the sealing system (shaft diameter, lubrication, ...)

Appli- cation	Profile	Description	Temperature min. max.	Speed max.	Pressure max.	Material		
			°C	m/s	bar (psi)	–		
	R02-P	Single-acting rotary shaft seal As profile R01-P, but with additional dust lip to avoid ingress of dust and dirt.	–30	+80	5 <sup>3)</sup>	0,5 (7)	Seal	Energizer
			–35	+80	5 <sup>3)</sup>	0,5 (7)	ECOPUR	SKF Ecotal <sup>1)</sup>
			–30	+80	5 <sup>3)</sup>	0,5 (7)	ECOPUR LD	SKF Ecomid
			–20	+80	5 <sup>3)</sup>	0,5 (7)	G-ECOPUR	SKF Ecomid
			–20	+80	5 <sup>3)</sup>	0,5 (7)	H-ECOPUR	SKF Ecotal <sup>1)</sup>
			–20	+80	5 <sup>3)</sup>	0,5 (7)	S-ECOPUR	SKF Ecotal <sup>1)</sup>
–40	+80	5 <sup>3)</sup>	0,5 (7)	T-ECOPUR	SKF Ecotal <sup>1)</sup>			
	R02-R	Single-acting rotary shaft seal As profile R01-R, but with additional dust lip to avoid ingress of dust and dirt.	–10	+200	10 <sup>3)</sup>	0,5 (7)	Seal	Energizer
			–25	+80	10 <sup>3)</sup>	0,5 (7)	SKF Ecoflas	Metal
			–30	+80	10 <sup>3)</sup>	0,5 (7)	SKF Ecorubber-H	SKF Ecotal <sup>1)</sup>
			–20	+200	15 <sup>3)</sup>	0,5 (7)	SKF Ecorubber-1	SKF Ecotal <sup>1)</sup>
			–50	+80	10 <sup>3)</sup>	0,5 (7)	SKF Ecorubber-2	Metal
			–50	+80	10 <sup>3)</sup>	0,5 (7)	SKF Ecorubber-3 <sup>2)</sup>	SKF Ecotal <sup>1)</sup>
			–50	+150	10 <sup>3)</sup>	0,5 (7)	SKF Ecorubber-3 <sup>2)</sup>	Metal
			–50	+80	5 <sup>3)</sup>	0,2 (3)	SKF Ecosil	SKF Ecotal <sup>1)</sup>
			–60	+200	5 <sup>3)</sup>	0,2 (3)	SKF Ecosil	Metal
	R03-P	Double-acting rotary seal 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)	Seal	Back-up rings
			–20	+100	0,2	400 (5 800)	ECOPUR	SKF Ecotal <sup>1)</sup>
			–20	+100	0,3	400 (5 800)	H-ECOPUR	SKF Ecotal <sup>1)</sup>
			–40	+100	0,2	400 (5 800)	S-ECOPUR	SKF Ecotal <sup>1)</sup>
							T-ECOPUR	SKF Ecotal <sup>1)</sup>
	R03-R	Double-acting rotary seal As profile R03-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	–10	+200	0,2	250 (3 600)	Seal	Back-up rings
			–25	+100	0,2	250 (3 600)	SKF Ecoflas	SKF Ecopaek
			–30	+100	0,2	250 (3 600)	SKF Ecorubber-H	SKF Ecotal <sup>1)</sup>
			–20	+200	0,2	250 (3 600)	SKF Ecorubber-1	SKF Ecotal <sup>1)</sup>
			–50	+150	0,2	250 (3 600)	SKF Ecorubber-2	SKF Ecoflon 2
			–40	+100	0,2	250 (3 600)	SKF Ecorubber-3	SKF Ecoflon 2
							SKF Ecorubber-3	SKF Ecotal <sup>1)</sup>
	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	
			–20	+110	0,3	160 (2 300)	S-ECOPUR	
			–50	+110	0,2	160 (2 300)	T-ECOPUR	
			–10	+200	0,2	100 (1 450)	SKF Ecoflas	
			–25	+150	0,2	100 (1 450)	SKF Ecorubber-H	
			–30	+100	0,2	100 (1 450)	SKF Ecorubber-1	
			–20	+200	0,2	100 (1 450)	SKF Ecorubber-2	
			–50	+150	0,2	100 (1 450)	SKF Ecorubber-3 <sup>2)</sup>	
	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	
			–20	+110	0,3	160 (2 300)	S-ECOPUR	
			–50	+110	0,2	160 (2 300)	T-ECOPUR	
			–10	+200	0,2	100 (1 450)	SKF Ecoflas	
			–25	+150	0,2	100 (1 450)	SKF Ecorubber-H	
			–30	+100	0,2	100 (1 450)	SKF Ecorubber-1	
			–20	+200	0,2	100 (1 450)	SKF Ecorubber-2	
			–50	+150	0,2	100 (1 450)	SKF Ecorubber-3 <sup>2)</sup>	
















<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm

<sup>2)</sup> Not suitable for mineral oils

<sup>3)</sup> Surface speed limit values are depending on heat dissipation ability of the sealing system (shaft diameter, lubrication, ...)

Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material	
			min.	max.				
			°C		m/s	bar (psi)	–	
		<b>Axially acting rotary seal</b> 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, oil splash, watersplash and similar media. Acting as a seal and slinger ring.	–30	+110	25	–	ECOPUR	
			–35	+110	25	–	ECOPUR LD	
			–30	+110	25	–	G-ECOPUR	
			–20	+110	25	–	H-ECOPUR	
			–20	+110	25	–	S-ECOPUR	
			–50	+110	25	–	T-ECOPUR	
		<b>Axially acting rotary seal</b> 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.	–10	+200	25	–	SKF Ecoflas	
			–25	+150	25	–	SKF Ecorubber-H	
			–30	+100	25	–	SKF Ecorubber-1	
			–20	+200	25	–	SKF Ecorubber-2	
			–50	+150	25	–	SKF Ecorubber-3 <sup>1)</sup>	
		<b>Axially acting rotary seal</b> 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, oil splash, watersplash and similar media. Acting as a seal- and slingerring.	–30	+110	25	–	ECOPUR	
			–35	+110	25	–	ECOPUR LD	
			–30	+110	25	–	G-ECOPUR	
			–20	+110	25	–	H-ECOPUR	
			–20	+110	25	–	S-ECOPUR	
			–50	+110	25	–	T-ECOPUR	
		<b>Axially acting rotary seal</b> Elastic, good wear resistant V-Ring as profile R07-P, but easily adaptable for diverse temperatures and media by selection of suitable seal material.	–10	+200	25	–	SKF Ecoflas	
			–25	+150	25	–	SKF Ecorubber-H	
			–30	+100	25	–	SKF Ecorubber-1	
			–20	+200	25	–	SKF Ecorubber-2	
			–50	+150	25	–	SKF Ecorubber-3 <sup>1)</sup>	
		<b>Single-acting rotary seal</b> 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)	
		<b>Double-acting rotary seal</b> 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.	–20	+200	0,4	350 (5 000)	<b>Glide ring</b> SKF Ecoflon 4	<b>Energizer</b> FPM 75 NBR 70
			–30	+100	0,4	350 (5 000)	SKF Ecoflon 4	

<sup>1)</sup> Not suitable for mineral oils




Appli- Profile cation	Description	Temperature		Speed max.	Pressure max.	Material	
		min.	max.				
		°C		m/s	bar (psi)	–	
  	<b>R09-FS</b>	<b>Double-acting rotary seal</b>				<b>Glide ring</b>	<b>Energizer</b>
	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)	SKF Ecoflon 4	SKF Ecorubber-1
		–20	+200	0,4	350 (5 000)	SKF Ecoflon 4	SKF Ecorubber-2
  	<b>R10-F</b>	<b>Double-acting rotary seal</b>				<b>Glide ring</b>	<b>Energizer</b>
	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.	–20	+200	0,4	350 (5 000)	SKF Ecoflon 4	FPM 75
		–30	+100	0,4	350 (5 000)	SKF Ecoflon 4	NBR 70
  	<b>R10-FS</b>	<b>Double-acting rotary seal</b>				<b>Glide ring</b>	<b>Energizer</b>
	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)	SKF Ecoflon 4	SKF Ecorubber-1
		–20	+200	0,4	350 (5 000)	SKF Ecoflon 4	SKF Ecorubber-2
  	<b>R11-F</b>	<b>Single-acting PTFE rotary seal</b>				SKF Ecoflon 2,3,4	
	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)		
 	<b>R12-F</b>	<b>Single-acting PTFE flange seal</b>				<b>Seal</b>	<b>Spring</b>
	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)	SKF Ecoflon 1,2,3,4	1.4310 <sup>2)</sup>
	<b>R13</b>	<b>O-ring</b>					
	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	+110	–	600 (8 700)	ECOPUR	
		–35	+110	–	600 (8 700)	ECOPUR LD	
		–30	+110	–	600 (8 700)	G-ECOPUR	
		–20	+110	–	600 (8 700)	H-ECOPUR	
		–20	+110	–	600 (8 700)	S-ECOPUR	
		–50	+110	–	600 (8 700)	T-ECOPUR	
		–10	+200	–	160 (2 300)	SKF Ecoflas	
		–25	+150	–	160 (2 300)	SKF Ecorubber-H	
		–30	+100	–	160 (2 300)	SKF Ecorubber-1	
		–20	+200	–	160 (2 300)	SKF Ecorubber-2	
		–50	+150	–	160 (2 300)	SKF Ecorubber-3 <sup>1)</sup>	
		–60	+200	–	160 (2 300)	SKF Ecosil	
		–200	+260	–	160 (2 300)	SKF Ecoflon 1	

<sup>1)</sup> Not suitable for mineral oils

<sup>2)</sup> Depending on the application. Contact SKF for more information.

























B

5) SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm

Appli- cation	Profile	Description	Temperature		Speed max.	Pressure max.	Material
			min.	max.			
			°C		m/s	bar (psi)	–
  	<b>R35-A</b> 	<b>Single-acting flange seal</b> 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
			–35	+110	–	800 (11 600)	ECOPUR LD
			–30	+110	–	800 (11 600)	G-ECOPUR
			–20	+110	–	800 (11 600)	H-ECOPUR
			–20	+110	–	800 (11 600)	S-ECOPUR
			–50	+110	–	800 (11 600)	T-ECOPUR
			–10	+200	–	250 (3 600)	SKF Ecoflas
			–25	+150	–	250 (3 600)	SKF Ecorubber-H
			–30	+100	–	250 (3 600)	SKF Ecorubber-1
			–20	+200	–	250 (3 600)	SKF Ecorubber-2
			–50	+150	–	250 (3 600)	SKF Ecorubber-3 <sup>1)</sup>
			–60	+200	–	250 (3 600)	SKF Ecosil

<sup>1)</sup> Not suitable for mineral oils








Appli- cation	Profile	Description	Temperature		Speed max.	Specific load <sup>3)</sup> max.	Material
			min.	max.			
			°C		m/s	N/mm <sup>2</sup>	–
  		<b>Guide ring F01</b>					
		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).	–200	+200	4	3	SKF Ecoflon 2
			–200	+200	5	4,5	SKF Ecoflon 3
			–50	+100	4	25	SKF Ecotal <sup>1)</sup>
			–40	+120	1	90	SKF Ecotex <sup>2)</sup>
  		<b>Guide ring F02</b>					
		For rod or piston application, split and non split design available. Not only used as guide ring, also as plain washer or spacer.	–200	+200	4	3	SKF Ecoflon 2
			–200	+200	5	4,5	SKF Ecoflon 3
			–50	+100	4	25	SKF Ecotal <sup>1)</sup>
  		<b>Guide ring F03</b>					
		For piston application. Angled design combines guide ring and back-up ring function. Split and non split design available.	–200	+200	4	3	SKF Ecoflon 2
			–200	+200	5	4,5	SKF Ecoflon 3
			–50	+100	4	25	SKF Ecotal <sup>1)</sup>
  		<b>Guide ring F04</b>					
		Same as profile F03 but for rod application.	–200	+200	4	3	SKF Ecoflon 2
			–200	+200	5	4,5	SKF Ecoflon 3
			–50	+100	4	25	SKF Ecotal <sup>1)</sup>
  		<b>Guide ring F05</b>					
		With integrated collar on inside diameter, for piston application. Split and non split design available.	–200	+200	4	3	SKF Ecoflon 2
			–200	+200	5	4,5	SKF Ecoflon 3
			–50	+100	4	25	SKF Ecotal <sup>1)</sup>
  		<b>Guide ring F06</b>					
		With integrated collar on outside diameter, for rod application. Split and non split design available.	–200	+200	4	3	SKF Ecoflon 2
			–200	+200	5	4,5	SKF Ecoflon 3
			–50	+100	4	25	SKF Ecotal <sup>1)</sup>

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm









<sup>2)</sup> Special fabric reinforced material, available as a guide tape only

<sup>3)</sup> Depending on temperature and allowable compression. Contact SKF for more information

## Guide rings

 Linear moving
  Rotating
  Oscillating
  Spiral moving
  Static
















Grey symbols: contact SKF for application limitations

Appli- cation	Profile	Description	Temperature		Speed max.	Specific load <sup>2)</sup> max.	Material
			min.	max.			
			°C		m/s	N/mm <sup>2</sup>	–
  	<b>F07</b> 	<b>Guide ring F07</b> With groove on inside diameter, for piston application. Split and non split design available.	–200	+200	4	3	SKF Ecoflon 2
			–200	+200	5	4,5	SKF Ecoflon 3
			–50	+100	4	25	SKF Ecotal <sup>1)</sup>
  	<b>F08</b> 	<b>Guide ring F08</b> With groove on outside diameter, for rod application. Split and non split design available.	–200	+200	4	3	SKF Ecoflon 2
			–200	+200	5	4,5	SKF Ecoflon 3
			–50	+100	4	25	SKF Ecotal <sup>1)</sup>

<sup>1)</sup> SKF Ecotal up to Ø 260 mm, SKF Ecomid above Ø 260 mm

<sup>2)</sup> Depending on temperature and allowable compression. Contact SKF for more information





Appli- Profile cation	Description	Temperature		Material
		min.	max.	
		°C		–
  	<b>Back-up ring</b> Common inactive back-up ring, mainly used with O-rings to avoid gap extrusion. Split and non split design available.	–70	+110	ECOPUR
		–70	+110	ECOPUR LD
		–70	+110	G-ECOPUR
		–70	+110	G-ECOPUR 54D
		–70	+110	H-ECOPUR
		–70	+110	S-ECOPUR
		–70	+110	T-ECOPUR
		–70	+110	X-ECOPUR
		–70	+110	X-ECOPUR H
		–70	+110	X-ECOPUR S
		–200	+260	SKF Ecoflon 1
		–200	+260	SKF Ecoflon 2
		–40	+100	SKF Ecomid <sup>2)</sup>
		–100	+260	SKF Ecopaek
		–50	+100	SKF Ecotal <sup>1)</sup>
  	<b>Back-up ring</b> Common inactive back-up ring especially for O-rings to avoid gap extrusion. Split and non split design available.	–70	+110	ECOPUR
		–70	+110	ECOPUR LD
		–70	+110	G-ECOPUR
		–70	+110	G-ECOPUR 54D
		–70	+110	H-ECOPUR
		–70	+110	S-ECOPUR
		–70	+110	T-ECOPUR
		–70	+110	X-ECOPUR
		–70	+110	X-ECOPUR H
		–70	+110	X-ECOPUR S
		–200	+260	SKF Ecoflon 1
		–200	+260	SKF Ecoflon 2
		–40	+100	SKF Ecomid <sup>2)</sup>
		–100	+260	SKF Ecopaek
		–50	+100	SKF Ecotal <sup>1)</sup>
  	<b>Back-up ring</b> 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.	–200	+260	SKF Ecoflon 2
		–40	+100	SKF Ecomid <sup>2)</sup>
		–100	+260	SKF Ecopaek
		–50	+100	SKF Ecotal <sup>1)</sup>
  	<b>Back-up ring</b> 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.	–200	+260	SKF Ecoflon 2
		–40	+100	SKF Ecomid <sup>2)</sup>
		–100	+260	SKF Ecopaek
		–50	+100	SKF Ecotal <sup>1)</sup>
  	<b>Back-up ring</b> 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.	–200	+260	SKF Ecoflon 2
		–40	+100	SKF Ecomid <sup>2)</sup>
		–100	+260	SKF Ecopaek
		–50	+100	SKF Ecotal <sup>1)</sup>




<sup>1)</sup> Up to Ø 260 mm

<sup>2)</sup> Above Ø 260 mm

## Back-up rings

 Linear moving
  Rotating
  Oscillating
  Spiral moving
  Static

Grey symbols: contact SKF for application limitations

Appli- Profile cation	Description	Temperature		Material
		min.	max.	
		°C		–
 <b>ST13</b> 	<b>Back-up ring</b> 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.	–200 –40 –100 –50	+260 +100 +260 +100	SKF Ecoflon 2 SKF Ecomid <sup>2)</sup> SKF Ecopaek SKF Ecotal <sup>1)</sup>
				





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<sup>1)</sup> Up to Ø 260 mm  
<sup>2)</sup> Above Ø 260 mm

Static seals






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- Profile cation	Description		
<div></div> <div></div>	<b>Universal type</b> Most common and simple seal profiles with proven reliability in a wide range of different applications and industries.		
<div></div> <div></div>	<b>Inside sealing type</b> Interference fit on outside diameter provides stable fit in the housing and reliable performance at all pressures.		
<div></div> <div></div>	<b>Outside sealing type</b> Interference fit on inside diameter provides stable fit in the housing and reliable performance at all pressures.		
<div></div> <div></div>	<b>Axial sealing type</b> Robust profiles mainly used as flange seals, inside or outside pressurization 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- Profile cation	Description		
<div></div> <div></div>	<b>Tailor-made solutions</b> These special profiles are just some examples of SKF's wide and flexible machining capabilities.		



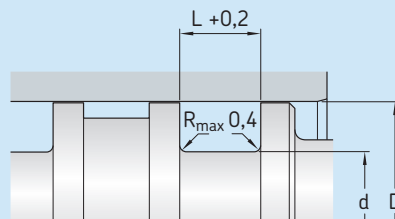


# Piston seal housing details and recommendations

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

$R_{t\max}$   $R_a$

$\mu\text{m}$

### Sliding surface for

TPU/rubber seals

PTFE seals

$\leq 2,5$   $\leq 0,1-0,5$   
 $\leq 2$   $\leq 0,05-0,3$

Groove bottom

Groove face

$\leq 6,3$   $\leq 1,6$   
 $\leq 15$   $\leq 3$

Bearing area  $T_p$

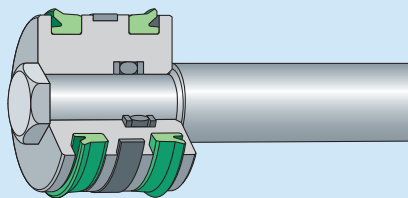
50–95%<sup>1)</sup>

### Seal housing tolerances

D H9

d h10

<sup>1)</sup> 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.

mm

Housing groove diameter d

mm

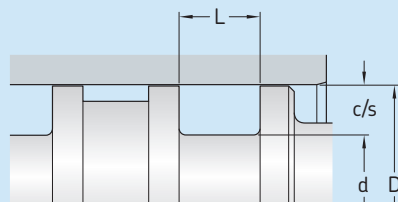
Housing groove length L

mm

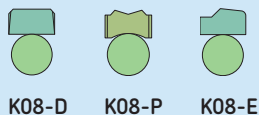
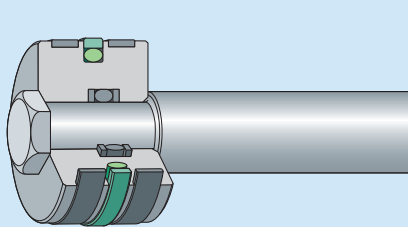
Cross section c/s

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 <sup>1)</sup>	D – 30	20	15
750 <sup>1)</sup>		D – 40	26	20



<sup>1)</sup> Not all profiles are available above 600 mm

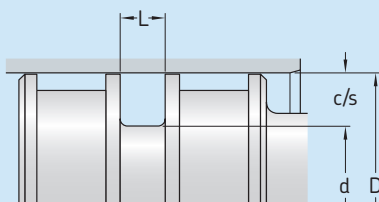


**Main function**  
Single/double-acting piston seals,  
o-ring activated PTFE (TPU) seals.

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

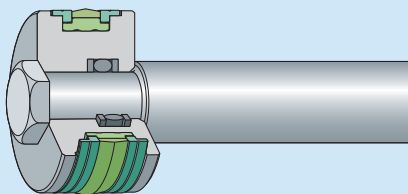
**Advantages**  
Low friction, no stick-slip, excellent  
resistance against pressure shocks.

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



Bore diameter		Housing groove diameter	Housing groove length	Cross section
D over	incl.	d	L	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 <sup>1)</sup>
1 000		D – 38	9,5	19 <sup>1)</sup>

<sup>1)</sup> Only profiles K08-D and K08-E, not for profile K08-P



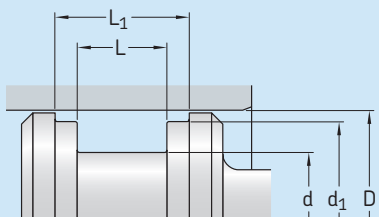
**K09**

**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.

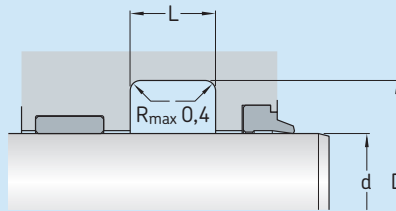


Bore diameter		Housing groove diameter		Housing groove length	
D over	incl.	d	d <sub>1</sub>	L <sup>1)</sup>	L <sub>1</sub> <sup>1)</sup>
mm		mm		mm	
20	50	10	3	12,5	20,5
50	80	15	4	20	28
80	150	20	5	25	36
150	400	25	6	32	46
400		30	8	36	50

<sup>1)</sup> Not valid for profile K09-H

# Rod seal housing details and recommendations

## 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

$R_{t\max}$   $R_a$

$\mu\text{m}$

### Sliding surface for

TPU/rubber seals  
PTFE seals

$\leq 2,5$   $\leq 0,1-0,5$   
 $\leq 2$   $\leq 0,05-0,3$

Groove bottom

$\leq 6,3$   $\leq 1,6$

Groove face

$\leq 15$   $\leq 3$

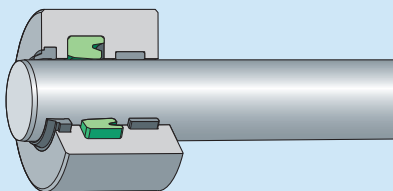
Bearing area  $T_p$

50–95%<sup>1)</sup>

### Seal housing tolerances

D H10  
d f8

<sup>1)</sup> at a cutting depth of 0,5  $R_z$  based on  $C_{ref} = 0\%$



### 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 (all types)

### Rod diameter

d over incl.

mm

### Housing groove diameter D

mm

### Housing groove length L

mm

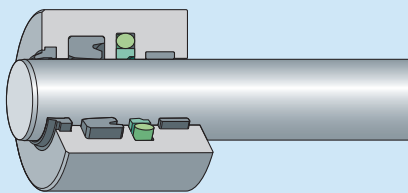
### Cross section c/s

mm

5	25 <sup>1)</sup>	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 <sup>2)</sup>	d + 30	25	15
700	1 000 <sup>2)</sup>	d + 40	32	20
1 000		d + 40	32	20

<sup>1)</sup> Restrictions in minimum diameter for profiles with back-up rings.  
Please consult our technical department for exact limitations.

<sup>2)</sup> Not all profiles available above 600 mm

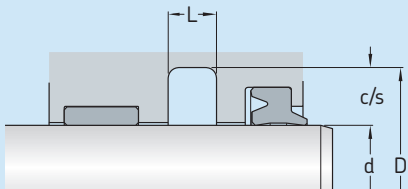


**Main function**  
Single/double-acting rod seals,  
O-ring activated PTFE (TPU) seals.

**Main applications**  
Earth moving equipment,  
heavy hydraulics.

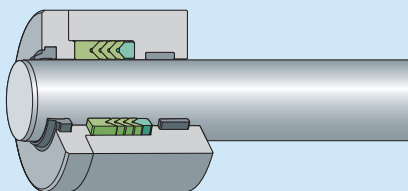
**Advantages**  
Excellent resistance against pressure  
shocks, long lifetime.

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



Rod diameter		Housing groove diameter D	Housing groove length L	Cross section c/s
d over	incl.			
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 <sup>1)</sup>	d + 24	8,1	12
650	1 000 <sup>1)</sup>	d + 27,3	9,5	13,65
1 000		d + 27,3	9,5	13,65

<sup>1)</sup> Not all profiles available above 600 mm



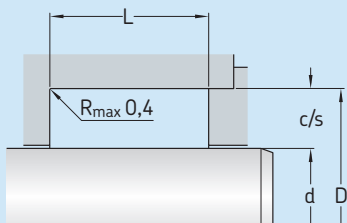
**S1012 S1315**

**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.



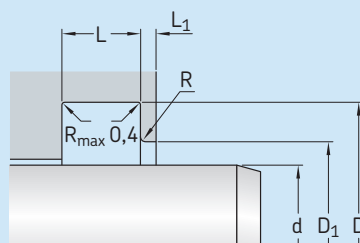
Rod diameter		Housing groove diameter D	Housing groove length L	Cross section c/s
d over	incl.			
mm		mm	mm	
10	40	d + 10	16	5
40	75	d + 15	25	7,5
75	150	d + 20	32	10
150	200	d + 25	40	12,5
200	300	d + 30	50	15
300		d + 40	63	20

# 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

$R_{tmax}$   $R_a$

$\mu m$

### Sliding surface for

TPU/rubber seals  
PTFE seals

$\leq 2,5$   $\leq 0,1-0,5$   
 $\leq 2$   $\leq 0,05-0,3$

Groove bottom

$\leq 6,3$   $\leq 1,6$

Groove face

$\leq 15$   $\leq 3$

Bearing area  $T_p$

50–95%<sup>1)</sup>

### Seal housing tolerances

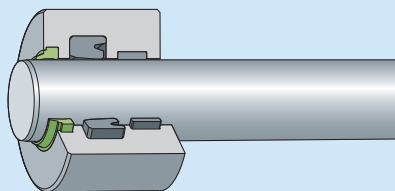
$D_1$  H11

$L < 10 \text{ mm}$  +0,2

D H11

$L > 10 \text{ mm}$  +0,3

<sup>1)</sup> at a cutting depth of 0,5  $R_z$  based on  $C_{ref} = 0\%$



A01

A04

### Main function

Single-acting wipers.

### Main applications

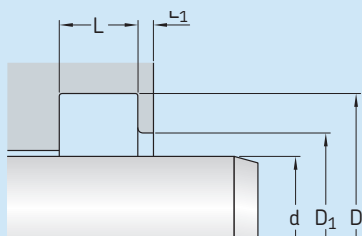
Standard wiper for hydraulics.

### Advantages

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

### Standard materials

ECOPUR (X-ECOPUR) /  
SKF Ecorubber.



Rod  
diameter

d over incl.

mm

Housing  
groove  
diameter  
D D<sub>1</sub>

d + 8 d + 6

mm

Housing  
groove  
width  
L L<sub>1</sub>

4 1

mm

Total  
wiper  
height  
H

7 10 13

mm

6

100

d + 12

d + 9

5,5

1,5

10

100

150

d + 15

d + 11

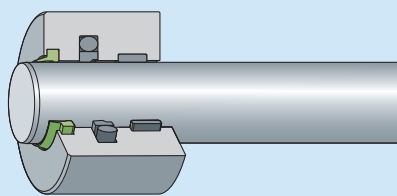
6,5

2

13

150





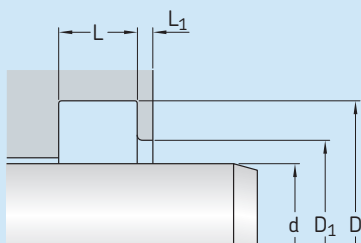
**A02 A05 A11**

**Main function**  
Single/double-acting wipers.

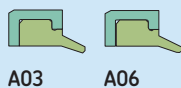
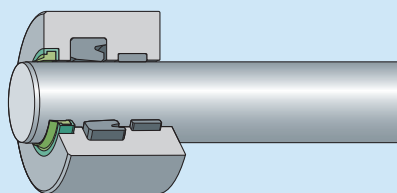
**Main applications**  
In combination with O-ring activated PTFE rod seals (S09).

**Advantages**  
Excellent wear resistance, double-acting function.

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



Rod diameter		Housing groove diameter		Housing groove width		Total wiper height
d over	incl.	D	D <sub>1</sub>	L	L <sub>1</sub> min	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



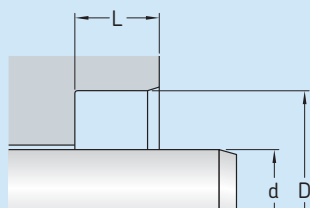
**A03 A06**

**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.



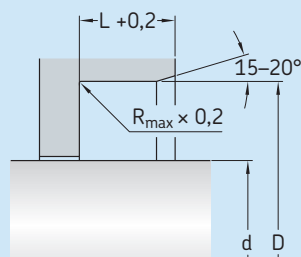
Rod diameter		Housing groove diameter	Housing groove width	Total wiper height
d over	incl.	D	L	H
mm		mm	mm	
6	10	d + 8	5	8
10	100	d + 10	7	10
100	200	d + 15	9	12
200		d + 20	12	16

# 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

$R_{t\max}$   $R_a$

$\mu\text{m}$

### Sliding surface for

TPU/rubber seals  
PTFE seals

$\leq 2,5$   $\leq 0,1-0,5$   
 $\leq 2$   $\leq 0,05-0,3$

Groove bottom

$\leq 6,3$   $\leq 1,6$

Groove face

$\leq 15$   $\leq 3$

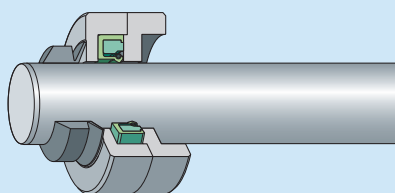
Bearing area  $T_p$

50–95%<sup>1)</sup>

### Seal housing tolerances

depending on seal profile

<sup>1)</sup> 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.

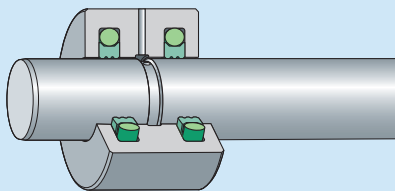
### Advantages

Easily adaptable for diverse  
temperatures and media.

### Standard materials

ECOPUR, SKF Ecorubber/SKF Ecotal,  
Aluminium.

Shaft diameter		Housing groove diameter D	Housing groove length L	Cross section c/s
d over	incl.			
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



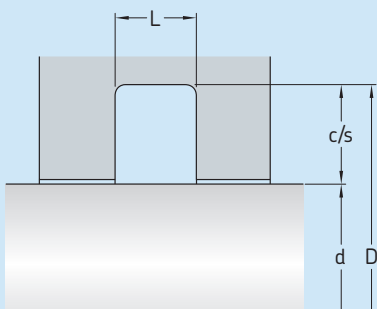
#### R09

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

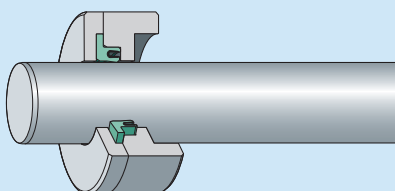
**Main applications**  
Rotary pivots.

**Advantages**  
For high pressure.

**Standard materials**  
SKF Ecoflon NBR or FKM.



Shaft diameter		Housing groove diameter	Housing groove length	Cross section
d over	incl.	D	L	c/s
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



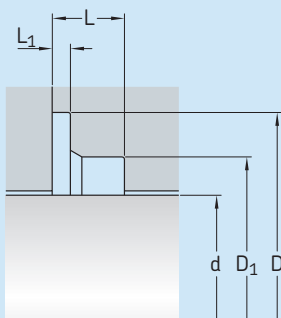
#### R19

**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 over	incl.	D	D <sub>1</sub>	L	L <sub>1</sub>
mm		mm	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		Housing groove diameter	Housing groove length	Cross section
d over	incl.	D	L	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		Housing groove diameter	Housing groove length	Cross section
D over	incl.	d	L	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  $R_z$

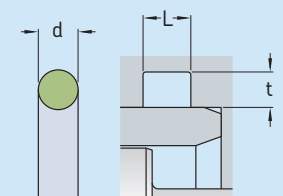
based on  $C_{ref} = 0\%$

Surface	Surface roughness			
	Pressure constant		pulsating	
	$R_{tmax}$	$R_a$	$R_{tmax}$	$R_a$
	$\mu m$		$\mu m$	
Sliding surface <sup>1)</sup>	12,5	3,2	6,3	1,6
Bottom of groove <sup>2)</sup>	12,5	3,2	6,3	1,6
Groove face	12,5	3,2	6,3	1,6

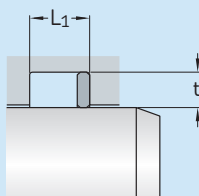
<sup>1)</sup>  $R_{tmax} / R_a$  for dynamic application 1,6  $\mu m / 0,4 \mu m$

<sup>2)</sup>  $R_{tmax} / R_a$  for dynamic application 6,3  $\mu m / 1,6 \mu m$

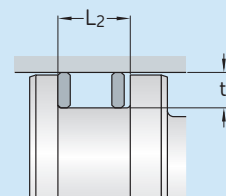
## O-ring housing recommendations for static applications



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 <sub>1</sub> +0,25	L <sub>2</sub> +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

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