Machined seals

Product range

Contents

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

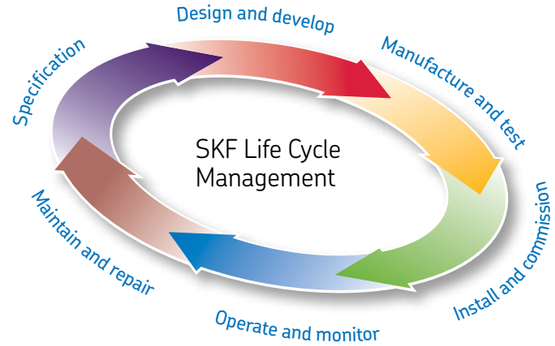
Since 2005, SKF has worked to reduce the negative environmental impact from our operations and those of our suppliers. Our continuing technology development resulted in the introduction of the SKF BeyondZero portfolio of products and services which improve efficiency and reduce energy losses, as well 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 molded 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 157.5 inches 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 behavior 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 104 °F and in bio-degradable hydraulic oils like vegetable oils and synthetic esters up to 140 °F (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 5,800 psi (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 23.6 inches and 47.2 inches.

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 21.3 inches up to 157.5 inches 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 +194 °F 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 –58 °F. 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 tetra-fluoro-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 446 °F 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 338 °F) 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_2) has improved compression strength as well as improved sliding properties compared to SKF Ecoflon 1.

The chemical resistance is similar to SKF Ecoflon 1.

SKF Ecoflon 3

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 10.2 inches. 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 8% of weight) 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 behavior. 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 9,920 lbs./mol. SKF Ecowear 1000 has a very low coefficient of friction, an excellent wear resistance and impact strength (also at low temperature down to –328 °F). 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 140 °F and a maximum metal extrusion gap of 0.010 inches. 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									Elastomers						Thermoplastics									Thermoset
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	**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% MoS2	**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**
			TPU	CPU	CPU	TPU	TPU	TPU	TPU	TPU	TPU	TFE/P	HNBR	NBR	FPM, FKM	EPDM	MVQ	PTFE virgin	PTFE	PTFE	PTFE	PTFE	PA	PEEK	POM	UHMWPE	–
Standard color			Green	Green	Red	Red	Grey/ black	Blue	Dark green	Dark red	Dark grey	Black	Black	Black	Brown	Black	Reddish brown	White	Grey	Bronze	Black	White	Black	Cream	Black	White	Light orange
Hardness	DIN ISO 7619	Shore A	95 ±2[1]	95 ±2[1]	95 ±2[1]	95 ±2[1]	95 ±2[1]	95 ±2[1]	97 ±2[1]	97 ±2[1]	97 ±2[1]	83 ±5	85 ±5	85 ±5	85 ±5	85 ±5	85 ±5	–	–	–	–	–	–	–	–	–	–
Hardness	DIN ISO 7619	Shore D	48 ±3[1]	48 ±3[1]	47 ±3[1]	48 ±3[1]	48 ±3[1]	48 ±3[1]	57 ±3[1]	60 ±3[1]	58 ±3[1]							57[2]	62[2]	65[2]	65[2]	65[2]	77[2]	87[2]	82[2]	61[2]	67–77
Density	DIN EN ISO 1183	lb/in³	0.043	0.043	0.042	0.043	0.044	0.042	0.044	0.044	0.044	0.062	0.044	0.047	0.084	0.044	0.055	0.078	0.081	0.110	0.076	0.078	0.042	0.047	0.051	0.034	0.044
100% modulus	DIN 53504	PSI	1740.5	1450.4	1595.4	1885.5	2465.6	1740.5	2320.6	3190.8	3190.8	1160.3	1450.4	1595.4	725.2	1160.3	725.2	–	–	–	–	–	–	–	–	–	–
Tensile strength/yield stress	DIN 53504	PSI	7251.9	6526.7	6526.7	7251.9	6526.7	7251.9	6526.7	6526.7	5511.4	1885.5	2610.7	2320.6	1015.3	1740.5	1015.3	3916.0[4]	2900.8[5]	3335.9[5]	2175.6[5]	4351.1[4]	7977.1[6]	14503.8[6]	9427.5[6]	2900.8[6]	7977.1
Elongation at break	DIN 53504	%	430	380	330	330	380	450	400	350	300	220	180	130	200	110	130	300[4]	220[5]	240[5]	150[5]	360[4]	100[6]	45[6]	25[6]	350[6]	–
Modulus of elasticity – tensile test	ISO 527-1/2	KPSI	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	261.1[6]	536.6[6]	420.6[6]	87.0[6]	–
Compression set																											
158 °F/24h 20% compression	DIN ISO 815	%	≤ 27	≤ 30	≤ 30	≤ 27	≤ 30	≤ 27	≤ 30	≤ 30	≤ 33	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
212 °F/24h 20% compression	DIN ISO 815	%	≤ 33	≤ 40	≤ 40	≤ 33	≤ 35	45[3]	≤ 35	≤ 35	≤ 39	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
212 °F/24h	DIN ISO 815	%	–	–	–	–	–	–	–	–	–	–	≤ 22	≤ 15	–	≤ 15	–	–	–	–	–	–	–	–	–	–	–
347 °F/24h	DIN ISO 815	%	–	–	–	–	–	–	–	–	–	29	–	–	≤ 20	–	≤ 15	–	–	–	–	–	–	–	–	–	–
Tear strength	DIN ISO 34-1	lb/in	571.0	–	–	571.0	685.2	456.8	742.3	913.6	913.6	108.5	137.0	114.2	119.9	85.7	45.7	–	–	–	–	–	–	–	–	–	–
Abrasion	DIN ISO 4649	in³	0.0011	0.0013	0.0011	0.0010	0.0013	0.0009	0.0011	0.0012	0.0018	0.0067	0.0055	0.0055	0.0092	0.0073	–	–	–	–	–	–	–	–	–	–	–
Minimum service temperature[7]		°F	–22	–31	–22	–4	–4	–58	–22	–4	–4	+14	–13	–22	–4	–58	–76	–328	–328	–328	–328	–328	–40	–148	–58	–328	–40
Maximum service temperature[7]		°F	+230	+230	+230	+230	+230	+230	+230	+230	+230	+392	+302	+212	+392	+302	+392	+500	+500	+500	+500	+500	+230	+500	+212	+194	+248

[1] Testing time 3 s only valid for polyurethanes
[2] DIN EN ISO 868
[3] DIN ISO 815 at –40 °F/24h 20% compression
[4] ASTM D4894
[5] ASTM 4745
[6] ISO 527-1/2
[7] 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.

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material
			°F		ft/s	psi	–
	K01-P	**Hydraulic, single acting** Asymmetric piston seal for standard applications. Design provides stable fit in the housing, ultimate sealing effect over a wide temperature range. Prevents extensive drag pressure. Back-to-back arrangement with guide ring in between for double-acting pistons or to separate different fluids.	–22 –31 –22 –4 –4 –58	+230 +230 +230 +230 +230 +230	1.64 1.64 1.64 1.64 2.30 1.64	5,800 5,800 5,800 5,800 5,800 5,800	ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR
	K01-PE	**Hydraulic, single acting** Asymmetric piston seal for standard applications as K01-P, but with increased contact force designed for single acting pistons.	–22 –31 –22 –4 –4 –58	+230 +230 +230 +230 +230 +230	1.64 1.64 1.64 1.64 2.30 1.64	5,800 5,800 5,800 5,800 5,800 5,800	ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR
	K01-R	**Hydraulic, single acting** As profile K01-P, but more easily adaptable to diverse temperatures and media by selection of suitable seal material.	+14 –13 –22 –4 –58 –76	+392 +302 +212 +392 +302 +392	1.64 1.64 1.64 1.64 1.64 –	2,300 2,300 2,300 2,300 2,300 –	SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2] SKF Ecosil[3]
	K01-RE	**Hydraulic, single acting** Asymmetric piston seal for standard applications as K01-R, but with increased contact force designed for single acting pistons.	+14 –13 –22 –4 –58 –76	+392 +302 +212 +392 +302 +392	1.64 1.64 1.64 1.64 1.64 –	2,300 2,300 2,300 2,300 2,300 –	SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2] SKF Ecosil[3]

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°F		ft/s	psi	–	
	K02-P	**Hydraulic, single acting** Asymmetric piston seal for standard applications as K01-P, but thanks to design with active back-up ring, it is suitable for higher pressure range or larger extrusion gaps. K02-P for standard housing design.	–22 –31 –22 –4 –4 –40	+212 +212 +212 +212 +212 +212	1.64 1.64 1.64 1.64 2.30 1.64	10,000 10,000 10,000 10,000 10,000 10,000	**Seal** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**Back-up ring** SKF Ecotal[1] SKF Ecomid SKF Ecomid SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]
	K02-PD	**Hydraulic, single acting** Asymmetric piston seal for standard applications as K01-P, but thanks to design with active back-up ring, it is suitable for higher pressure or larger extrusion gaps. K02-PD for small housing design.	–22 –31 –22 –4 –4 –40	+212 +212 +212 +212 +212 +212	1.64 1.64 1.64 1.64 2.30 1.64	10,000 10,000 10,000 10,000 10,000 10,000	**Seal** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**Back-up ring** SKF Ecotal[1] SKF Ecomid SKF Ecomid SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]

1) SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
2) Not suitable for mineral oils
3) Only recommended for static or quasi-static applications. Contact SKF for more information

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°F		ft/s	psi	–	
	K02-R	**Hydraulic, single-acting** 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.	–13 –13 –22 –4 –40 –58 +14	+302 +212 +212 +392 +212 +302 +392	1.64 1.64 1.64 1.64 1.64 1.64 1.64	3,600 3,600 3,600 3,600 3,600 3,600 3,600	**Seal** SKF Ecorubber-H SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2] SKF Ecorubber-3[2] SKF Ecoflas	**Back-up ring** SKF Ecoflon 2 SKF Ecotal[1] SKF Ecotal[1] SKF Ecoflon 2 SKF Ecotal[1] SKF Ecoflon 2 SKF Ecopaek
	K02-RD	**Hydraulic, single-acting** 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.	–13 –13 –22 –4 –40 –58 +14	+302 +212 +212 +392 +212 +302 +392	1.64 1.64 1.64 1.64 1.64 1.64 1.64	3,600 3,600 3,600 3,600 3,600 3,600 3,600	**Seal** SKF Ecorubber-H SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2] SKF Ecorubber-3[2] SKF Ecoflas	**Back-up ring** SKF Ecoflon 2 SKF Ecotal[1] SKF Ecotal[1] SKF Ecoflon 2 SKF Ecotal[1] SKF Ecoflon 2 SKF Ecopaek
	K03-P	**Hydraulic, single-acting** 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...)	–22 –22 –22 –4 –4 –58	+212 +212 +212 +212 +212 +230	1.64 1.64 1.64 1.64 2.30 1.64	5,800 5,800 5,800 5,800 5,800 5,800	**Seal** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**O-ring** NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70
	K03-F	**PTFE-piston seal, single-acting** 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.	–67 –22 –58 –4 –67 –22 –67 –22	+392 +212 +302 +392 +392 +212 +194 +194	3.28 3.28 3.28 3.28 3.28 3.28 1.64 1.64	2,900 2,900 5,800 5,800 5,800 5,800 2,900 2,900	**Seal** SKF Ecoflon 1 SKF Ecoflon 1 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	**O-ring** MVQ 70 NBR 70 EPDM FPM 75 MVQ 70 NBR 70 MVQ 70 NBR 70
	K03-S	**PTFE-piston seal, single-acting** 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.	–328 –328 –328	+500 +500 +194	3.28 3.28 1.64	2,900 5,800 2,900	**Seal** SKF Ecoflon 1 SKF Ecoflon 2,3,4 SKF Ecowear 1000	**Spring** 1.4310[3] 1.4310[3] 1.4310[3]
	K04-P	**Hydraulic, single-acting** Asymmetric piston seal for standard applications as K03-P, but thanks to design with active back-up ring, it is suitable for larger extrusion gaps or higher pressure. K04-P for standard housing design.	–22 –22 –22 –4 –4 –40	+212 +212 +212 +212 +212 +212	1.64 1.64 1.64 1.64 2.30 1.64	10,000 10,000 10,000 10,000 10,000 10,000	**Seal** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**Back-up ring** SKF Ecotal[1] SKF Ecomid SKF Ecomid SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]	**O-ring** NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70

1) SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
2) Not suitable for mineral oils
3) Spring steel material specification

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

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°F		ft/s	psi	–		
	K04-PD	**Hydraulic, single-acting** Asymmetric piston seal for standard applications as K03-P, but thanks to design with active back-up ring, it is suitable for larger extrusion gaps. K04-PD for small housing design.	–22 –22 –22 –4 –4 –40	+212 +212 +212 +212 +212 +212	1.64 1.64 1.64 1.64 2.30 1.64	10,000 10,000 10,000 10,000 10,000 10,000	**Seal** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**Back-up ring** SKF Ecotal[1)] SKF Ecomid SKF Ecomid SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)]	**O-ring** NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70
	K05-P	**Pneumatic, single-acting** Asymmetric piston seal, extremely wear resistant, for use in lubricated or dry pneumatic applications. Special design of sealing lip allows retention of initial lubricating film.	–22 –31 –22 –4 –4 –58	+230 +230 +230 +230 +230 +230	3.28 3.28 3.28 3.28 6.56 3.28	360 360 360 360 360 360	**Seal** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR		
	K05-R	**Pneumatic, single-acting** Asymmetric piston seal, good wear resistant, for use in lubricated or dry pneumatic applications. Easily adaptable for diverse temperatures and media by selection of suitable seal material. Special design of sealing lip allows retention of initial lubricating film.	+14 –13 –22 –4 –58	+392 +302 +212 +392 +302	3.28 3.28 3.28 3.28 3.28	360 360 360 360 360	SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2)]		
	K06-P	**Hydraulic, single-acting** Symmetric piston seal for simple standard applications, not recommended for new designs (profile K01-P preferred). Also, for larger cross section, easier to install.	–22 –31 –22 –4 –4 –58	+230 +230 +230 +230 +230 +230	1.64 1.64 1.64 1.64 2.30 1.64	5,800 5,800 5,800 5,800 5,800 5,800	ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR		
	K06-R	**Hydraulic, single-acting** As profile K06-P, but more easily adaptable for diverse temperatures and media by selection of suitable seal material. Also, for larger cross section, easier to install.	+14 –13 –22 –4 –58 –76	+392 +302 +212 +392 +302 +392	1.64 1.64 1.64 1.64 1.64 –	2,300 2,300 2,300 2,300 2,300 –	SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2)] SKF Ecosil[3)]		
	K07-P	**Hydraulic, single-acting** O-ring activated symmetric piston seal for simple standard applications, not recommended for new designs (profile K03-P preferred).	–22 –22 –22 –4 –4 –58	+212 +212 +212 +212 +212 +212	1.64 1.64 1.64 1.64 2.30 1.64	5,800 5,800 5,800 5,800 5,800 5,800	**Seal** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**O-ring** NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70	

1) SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
2) Not suitable for mineral oils
3) Only recommended for static or quasi-static applications. Contact SKF for more information

Piston seals

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

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°F		ft/s	psi	–	
	K07-F	**PTFE piston seal, single-acting** 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)	–22 –67 –22 –4 –58 –67 –22 –67	+212 +392 +212 +392 +302 +392 +194 +194	3.28 3.28 3.28 3.28 3.28 3.28 1.64 1.64	2,900 2,900 5,800 5,800 5,800 5,800 2,900 2,900	**Seal** SKF Ecoflon 1 SKF Ecoflon 1 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	**O-ring** NBR 70 MVQ 70 NBR 70 FPM 75 EPDM MVQ 70 NBR 70 MVQ 70
	K08-E	**Hydraulic, single-acting** O-ring activated asymmetric PTFE piston seal, low friction. For extreme low or high speed. Suitable for positioning functions.	–67 –22 –67 –22 –4 –22 –67 –22	+230 +212 +230 +212 +392 +212 +194 +194	16.40 16.40 16.40 16.40 32.81 32.81 16.40 16.40	8,700 8,700 8,700 8,700 8,700 8,700 5,800 5,800	**Glide ring** G-ECOPUR 54D G-ECOPUR 54D X-ECOPUR, H, S X-ECOPUR, H, S SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	**O-ring** MVQ 70 NBR 70 MVQ 70 NBR 70 FPM 75 NBR 70 MVQ 70 NBR 70
	K08-D	**Hydraulic, double acting** 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.	–67 –22 –67 –22 –4 –22 –67 –22	+230 +212 +230 +212 +392 +212 +194 +194	16.40 16.40 16.40 16.40 32.81 32.81 16.40 16.40	8,700 8,700 8,700 8,700 8,700 8,700 5,800 5,800	**Glide ring** G-ECOPUR 54D G-ECOPUR 54D X-ECOPUR, H, S X-ECOPUR, H, S SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	**O-ring** MVQ 70 NBR 70 MVQ 70 NBR 70 FPM 75 NBR 70 MVQ 70 NBR 70
	K08-P	**Hydraulic, double-acting** O-ring activated symmetric PU piston seal with excellent static and dynamic sealing capacity, extremely wear resistant.	–22 –22 –22 –4 –4 –58	+212 +212 +212 +212 +212 +212	3.28 3.28 3.28 3.28 4.59 3.28	3,600 3,600 3,600 3,600 3,600 3,600	**Glide ring** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**O-ring** NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70
	K08-ES	**Hydraulic, single-acting** 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.	–22 –76 –22 –76 –22 –4 –22 –76	+212 +230 +212 +212 +212 +392 +194 +194	16.40 16.40 16.40 16.40 32.81 32.81 16.40 16.40	8,700 8,700 8,700 8,700 8,700 8,700 5,800 5,800	**Glide ring** G-ECOPUR 54D G-ECOPUR 54D X-ECOPUR, H, S X-ECOPUR, H, S SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	**O-ring** SKF Ecorubber-1 SKF Ecosil SKF Ecorubber-1 SKF Ecosil SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-1 SKF Ecosil
	K08-DS	**Hydraulic, double-acting** 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.	–22 –76 –22 –76 –22 –4 –22 –76	+212 +230 +212 +212 +212 +392 +194 +194	16.40 16.40 16.40 16.40 32.81 32.81 16.40 16.40	8,700 8,700 8,700 8,700 8,700 8,700 5,800 5,800	**Glide ring** G-ECOPUR 54D G-ECOPUR 54D X-ECOPUR, H, S X-ECOPUR, H, S SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	**O-ring** SKF Ecorubber-1 SKF Ecosil SKF Ecorubber-1 SKF Ecosil SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-1 SKF Ecosil

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°F		ft/s	psi	–		
	K09-N	**Hydraulic, double-acting** Profile ring-activated compact piston seal with integrated guiding elements. Excellent static sealing capacity. Commonly used in standard cylinders.	–22 –4 –4 –58	+212 +212 +212 +212	1.64 1.64 2.30 1.64	5,800 5,800 5,800 5,800	**Seal** ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**Energizer** SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecosil	**Back-up** SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]
	K09-D	**Hydraulic, double-acting** Profile ring-activated compact piston seal with integrated guiding elements. Excellent static and dynamic sealing capacity.	–22 –4 –4 –58	+212 +212 +212 +212	1.64 1.64 2.30 1.64	5,800 5,800 5,800 5,800	**Seal** ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**Energizer** SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecosil	**Back-up** SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]
	K09-H	**Hydraulic, double-acting** 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.	–22 –4 –4 –58	+212 +212 +212 +212	0.98 0.98 1.31 0.98	21,700 21,700 21,700 21,700	**Seal** ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**Energizer** SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecosil	**Back-up** SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]
	K09-F	**Hydraulic, double-acting** Profile ring–activated compact PTFE piston seal with guiding elements. Low friction, good chemical and thermal resistance.	–22 –22 –22 –22 –4	+212 +212 +212 +212 +392	3.28 3.28 3.94 4.92 4.92	5,800 5,800 5,800 5,800 5,800	**Seal** X-ECOPUR X-ECOPUR H X-ECOPUR S SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4	**Energizer** SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecorubber-1 SKF Ecorubber-2	**Back–up ring** SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecopaek
	K1012-T	**Hydraulic, single-acting** 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.	–22 –31 –22 –4 –4 –13 –22 –4 –58	+212 +212 +212 +212 +212 +302 +212 +392 +302	1.64 1.64 2.30 1.64 1.64 1.64 1.64 1.64 1.64	7,200 7,200 7,200 7,200 7,200 3,600 3,600 3,600 3,600	**K 10-A** SKF Ecotal[1] SKF Ecomid SKF Ecomid SKF Ecotal[1] SKF Ecotal[1] SKF Ecoflon 2 SKF Ecoflon 2 SKF Ecoflon 2 SKF Ecoflon 2	**K 11-T** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3	**K 12-T** X-ECOPUR[2] SKF Ecomid G-ECOPUR 54D[3] X-ECOPUR H[2] X-ECOPUR S[2] SKF Ecoflon 2 SKF Ecoflon 2 SKF Ecoflon 2 SKF Ecoflon 2
	K1012-M	**Hydraulic, single-acting** 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.	–22 –31 –22 –4 –4 –13 –22 –4 –58	+212 +212 +212 +212 +212 +302 +212 +392 +302	1.64 1.64 2.30 1.64 1.64 1.64 1.64 1.64 1.64	7,200 7,200 7,200 7,200 7,200 3,600 3,600 3,600 3,600	**K 10-A** SKF Ecotal[1] SKF Ecomid SKF Ecomid SKF Ecotal[1] SKF Ecotal[1] SKF Ecoflon 2 SKF Ecoflon 2 SKF Ecoflon 2 SKF Ecoflon 2	**K 11-M** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3	**K 12-M** X-ECOPUR[2] SKF Ecomid G-ECOPUR 54D[3] X-ECOPUR H[2] X-ECOPUR S[2] SKF Ecoflon 2 SKF Ecoflon 2 SKF Ecoflon 2 SKF Ecoflon 2

[1] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[2] Alternative SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[3] Alternative SKF Ecomid

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°F		ft/s	psi	–		
	K1315-T	**Hydraulic, single-acting** Chevron sealing set, design with flexible sealing lips, good sealing ability in higher pressure range. For heavy industry hydraulics, water–hydraulic systems.	–22 –22 –31 –22 –4 –4 –4 –4 –40	+212 +212 +212 +212 +212 +212 +212 +212 +212	1.64 1.64 1.64 1.64 1.64 1.64 2.30 2.30 1.64	8,700 8,700 8,700 8,700 8,700 8,700 8,700 8,700 8,700	**K 13-T** SKF Ecotal[1] SKF Ecotal[1] SKF Ecomid SKF Ecomid SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]	**K 14-T** ECOPUR ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR H-ECOPUR S-ECOPUR S-ECOPUR T-ECOPUR	**K 15-T** X-ECOPUR SKF Ecotal[1] SKF Ecomid SKF Ecomid X-ECOPUR H SKF Ecotal[1] X-ECOPUR S SKF Ecotal[1] SKF Ecotal[1]
	K16-A	**Hydraulic/pneumatic, single-acting** Simple cup seal, usually fixed on the piston by means of a clamping plate. Mainly used for replacement in old hydraulic and pneumatic cylinders or for low–grade secondary applications. Also used for food filling / portioning equipment.	–22 –31 –22 –4 –4 –58 +14 –13 –22 –4 –58	+230 +230 +230 +230 +230 +230 +392 +302 +212 +392 +302	1.64 1.64 1.64 1.64 2.30 1.64 1.64 1.64 1.64 1.64 1.64	2,300 2,300 2,300 2,300 2,300 2,300 2,300 2,300 2,300 2,300 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	
	K16-B	**Hydraulic/pneumatic, single-acting** Simple cup seal, usually fixed on the piston by means of a clamping plate. Mainly used for replacement in old hydraulic and pneumatic cylinders or for low–grade secondary applications. Also used for food filling / portioning equipment.	–22 –31 –22 –4 –4 –58 +14 –13 –22 –4 –58	+230 +230 +230 +230 +230 +230 +392 +302 +212 +392 +302	1.64 1.64 1.64 1.64 2.30 1.64 1.64 1.64 1.64 1.64 1.64	2,300 2,300 2,300 2,300 2,300 2,300 2,300 2,300 2,300 2,300 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	
	K17-P	**Hydraulic, double-acting** Space saving, compact piston seal with integrated guiding elements. Excellent static sealing capacity, suitable for small housings.	–22 –4 –4 –40	+212 +212 +212 +212	1.64 1.64 2.30 1.64	3,600 3,600 3,600 3,600	**Seal** ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**Back-up ring** SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1] SKF Ecotal[1]	
	K17-R	**Hydraulic, double-acting** Space saving, compact piston seal with integrated guiding elements. Excellent static sealing capacity, easily adaptable for diverse temperatures and media by selection of suitable material. Suitable for small housings.	–13 –13 –13 –22 –4 –4	+302 +302 +212 +212 +392 +392	1.64 1.64 1.64 1.64 1.64 1.64	3,600 3,600 3,600 3,600 3,600 3,600	**Seal** SKF Ecorubber-H SKF Ecorubber-H SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-2	**Back-up ring** SKF Ecoflon 2 SKF Ecopaek SKF Ecotal[1] SKF Ecotal[1] SKF Ecoflon 2 SKF Ecopaek	
	K19-F	**PTFE piston seal, single-acting** Finger–spring activated, asymmetrical PTFE piston seal, low friction and good dry running properties, excellent chemical and thermal resistance, mainly used in chemical, pharma and food industry.	–328 –328 –328 –328 –328	+500 +500 +500 +500 +194	49.21 49.21 49.21 49.21 49.21	2,900 5,800 5,800 5,800 2,900	**Seal** SKF Ecoflon 1 SKF Ecoflon 2 SKF Ecoflon 3 SKF Ecoflon 4 SKF Ecowear 1000	**Spring** 1.4310[2] 1.4310[2] 1.4310[2] 1.4310[2] 1.4310[2]	

[1] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[2] Spring steel material specification

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°F		ft/s	psi	–		
	K20-R	**Hydraulic, double-acting**					**Seal**	**Back–up ring**	
		Space saving, compact piston seal, suitable for standard O–Ring housings. Advantage compared to O–Ring: integrated active back–up rings for high pressure, designed with interference fit on outside diameter, prevents twisting in dynamic applications.	–13	+302	1.64	10,000	SKF Ecorubber-H	SKF Ecoflon 2
			–13	+302	1.64	10,000	SKF Ecorubber-H	SKF Ecopaek
			–13	+212	1.64	10,000	SKF Ecorubber-H	SKF Ecotal[1]
			–22	+212	1.64	10,000	SKF Ecorubber-1	SKF Ecotal[1]
			–4	+392	1.64	10,000	SKF Ecorubber-2	SKF Ecoflon 2
			–4	+392	1.64	10,000	SKF Ecorubber-2	SKF Ecopaek
	K21-P	**Hydraulic, single-acting**					**Seal**	**O–ring**	
		O–Ring activated symmetric piston seal with sharp–edged sealing lips, good sealing effect for high viscosity fluids, not recommended for new designs (Profile K03–P preferred).	–22	+212	1.64	5,800	ECOPUR	NBR 70	
			–4	+212	1.64	5,800	H-ECOPUR	NBR 70	
			–4	+212	2.30	5,800	S-ECOPUR	NBR 70	
			–58	+230	1.64	5,800	T-ECOPUR	MVQ 70	
	K22-P	**Hydraulic, single-acting**					**Seal**	**Support ring**	
		Symmetric piston seal with support ring for simple applications to serve repair purpose, not recommended for new designs (Profile K01–P preferred). Retainer ring can be designed straight or as an angled ring.	–22	+212	1.64	5,800	ECOPUR	SKF Ecotal[1]	
			–31	+212	1.64	5,800	ECOPUR LD	SKF Ecomid	
			–22	+212	1.64	5,800	G-ECOPUR	SKF Ecomid	
			–4	+212	1.64	5,800	H-ECOPUR	SKF Ecotal[1]	
			–4	+212	2.30	5,800	S-ECOPUR	SKF Ecotal[1]	
			–40	+212	1.64	5,800	T-ECOPUR	SKF Ecotal[1]	
	K22-R	**Hydraulic, single-acting**					**Seal**	**Support ring**	
		Symmetric piston seal as K22–P, but easily adaptable for diverse temperatures and media by selection of suitable seal material. Retainer ring can be designed straight or as an angled ring.	+14	+392	1.64	2,300	SKF Ecoflas	SKF Ecoflon	
			–13	+302	1.64	2,300	SKF Ecorubber-H	SKF Ecoflon 2	
			–13	+212	1.64	2,300	SKF Ecorubber-H	SKF Ecotal[1]	
			–22	+212	1.64	2,300	SKF Ecorubber-1	SKF Ecotal[1]	
			–4	+392	1.64	2,300	SKF Ecorubber-2	SKF Ecoflon 2	
			–58	+302	1.64	2,300	SKF Ecorubber-3[2]	SKF Ecoflon 2	
			–40	+212	1.64	2,300	SKF Ecorubber-3[2]	SKF Ecotal[1]	
	K23-N	**Hydraulic, double-acting**					**Seal**	**Energizer**	**Back–up rings**
		Profile ring–activated compact piston seal with integrated back–up rings, excellent static sealing capacity. External guiding elements required.	–22	+212	1.64	5,800	ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–4	+212	1.64	5,800	H-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–4	+212	2.30	5,800	S-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–40	+212	1.64	5,800	T-ECOPUR	SKF Ecosil	SKF Ecotal[1]
	K23–D	**Hydraulic, double-acting**					**Seal**	**Energizer**	**Back–up rings**
		Profile ring–activated compact piston seal with integrated back–up rings. Excellent static and dynamic sealing capacity. External guiding elements required.	–22	+212	1.64	5,800	ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–4	+212	1.64	5,800	H-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–4	+212	2.30	5,800	S-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–40	+212	1.64	5,800	T-ECOPUR	SKF Ecosil	SKF Ecotal[1]

[1] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[2] Not suitable for mineral oils

Piston seals

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

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°F		ft/s	psi	–		
	K23-H	**Hydraulic, double-acting**					**Seal**	**Energizer**	**Back–up rings**
		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.	–22	+212	0.98	21,000	ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–4	+212	0.98	21,000	H-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–4	+212	1.31	21,000	S-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–58	+212	0.98	21,000	T-ECOPUR	SKF Ecosil	SKF Ecotal[1]
	K23-F	**Hydraulic, double-acting**					**Seal**	**Energizer**	**Back–up rings**
		Profile ring–activated compact PTFE piston seal with integrated back–up rings. Low friction, good chemical and thermal resistance. External guiding elements required.	–22	+212	3.28	5,800	X-ECOPUR	SKF Ecorubber-1	SKF Ecotal[1]
			–22	+212	3.28	5,800	X-ECOPUR H	SKF Ecorubber-1	SKF Ecotal[1]
			–22	+212	3.94	5,800	X-ECOPUR S	SKF Ecorubber-1	SKF Ecotal[1]
			–22	+212	4.92	5,800	SKF Ecoflon 2,3,4	SKF Ecorubber-1	SKF Ecotal[1]
			–4	+392	4.92	5,800	SKF Ecoflon 2,3,4	SKF Ecorubber-2	SKF Ecopaek
	K24-P	**Hydraulic, single-acting**					**Seal**		
		Chevron ring with flexible lip design. Replacement part for standard commercial housings (male and female adapter mainly made of metal).	–22	+230	1.64	7,200	ECOPUR		
			–31	+230	1.64	7,200	ECOPUR LD		
			–22	+230	1.64	7,200	G-ECOPUR		
			–4	+230	1.64	7,200	H-ECOPUR		
			–4	+230	2.30	7,200	S-ECOPUR		
			–58	+230	1.64	7,200	T-ECOPUR		
			+14	+392	1.64	3,600	SKF Ecoflas		
			–13	+302	1.64	3,600	SKF Ecorubber-H		
			–22	+212	1.64	3,600	SKF Ecorubber-1		
			–4	+392	1.64	3,600	SKF Ecorubber-2		
			–58	+302	1.64	3,600	SKF Ecorubber-3		
	K32-P	**Hydraulic, single-acting**					**Pressure ring**	**Seal**	**Support ring**
		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).	–22	+212	1.64	7,200	SKF Ecotal[1]	ECOPUR	SKF Ecotal[1]
			–22	+212	1.64	7,200	X-ECOPUR	ECOPUR	SKF Ecotal[1]
			–31	+212	1.64	7,200	SKF Ecomid	ECOPUR LD	SKF Ecomid
			–22	+212	1.64	7,200	G-ECOPUR 54D	G-ECOPUR	SKF Ecomid
			–22	+212	1.64	7,200	SKF Ecomid	G-ECOPUR	SKF Ecomid
			–4	+212	1.64	7,200	X-ECOPUR H	H-ECOPUR	SKF Ecotal[1]
			–4	+212	1.64	7,200	SKF Ecotal[1]	H-ECOPUR	SKF Ecotal[1]
			–4	+212	2.30	7,200	SKF Ecotal[1]	S-ECOPUR	SKF Ecotal[1]
			–4	+212	2.30	7,200	X-ECOPUR S	S-ECOPUR	SKF Ecotal[1]
			–40	+212	1.64	7,200	SKF Ecotal[1]	T-ECOPUR	SKF Ecotal[1]
	K35-P	**Hydraulic, double-acting**					**Seal**		
		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.	–22	+230	1.31	5,800	ECOPUR		
			–31	+230	1.31	5,800	ECOPUR LD		
			–22	+230	1.31	5,800	G-ECOPUR		
			–4	+230	1.31	5,800	H-ECOPUR		
			–4	+230	1.64	5,800	S-ECOPUR		
			–58	+230	1.31	5,800	T-ECOPUR		

[1] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°F		ft/s	psi	–		
	S01-P	**Hydraulic, single-acting** Asymmetric rod seal for standard applications. Interference fit on outside diameter maintains stable fit in the housing. Design provides ultimate sealing effect over a wide temperature range and good backpumping ability. Also used as secondary seal in combination with PTFE seal type S09.	–22 –31 –22 –4 –4 –58	+230 +230 +230 +230 +230 +230	1.64 1.64 1.64 1.64 2.30 1.64	5,800 5,800 5,800 5,800 5,800 5,800	ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR		
	S01-R	**Hydraulic, single-acting** As profile S01–P, but more easily adaptable for diverse temperatures and media by selection of suitable seal material.	+14 –13 –22 –4 –58 –76	+392 +302 +212 +392 +302 +392	1.64 1.64 1.64 1.64 1.64 –	2,300 2,300 2,300 2,300 2,300 –	**Seal** SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2)] SKF Ecosil[3)]		
	S02-P	**Hydraulic, single-acting** Asymmetric rod seal for standard applications as S01–P, but thanks to design with active back–up ring, it is suitable for larger extrusion gaps or higher pressure range. S02–P for standard housing design.	–22 –31 –22 –4 –4 –40	+212 +212 +212 +212 +212 +212	1.64 1.64 1.64 1.64 2.30 1.64	10,000 10,000 10,000 10,000 10,000 10,000	**Seal** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**Back–up ring** SKF Ecotal[1)] SKF Ecomid SKF Ecomid SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)]	
	S02-PD	**Hydraulic, single-acting** Asymmetric rod seal for standard applications as S01–P, but thanks to design with active back–up ring, it is suitable for larger extrusion gaps or higher pressure range. S02–PD for small housing design.	–22 –31 –22 –4 –4 –40	+212 +212 +212 +212 +212 +212	1.64 1.64 1.64 1.64 2.30 1.64	10,000 10,000 10,000 10,000 10,000 10,000	**Seal** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**Back–up ring** SKF Ecotal[1)] SKF Ecomid SKF Ecomid SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)]	
	S02-R	**Hydraulic, single-acting** as profile S02–P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material. S02–R for standard housing design.	+14 –13 –13 –22 –4 –58 –40	+392 +302 +212 +212 +392 +302 +212	1.64 1.64 1.64 1.64 1.64 1.64 1.64	3,600 3,600 3,600 3,600 3,600 3,600 3,600	**Seal** SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2)] SKF Ecorubber-3[2)]	**Back–up ring** SKF Ecopaek SKF Ecoflon 2 SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecoflon 2 SKF Ecoflon 2 SKF Ecotal[1)]	
	S02-RD	**Hydraulic, single-acting** As profile S02–P, but more easily adaptable for diverse temperatures and media by selection of suitable seal material. S02–RD for small housing design.	+14 –13 –13 –22 –4 –58 –40	+392 +302 +212 +212 +392 +302 +212	1.64 1.64 1.64 1.64 1.64 1.64 1.64	3,600 3,600 3,600 3,600 3,600 3,600 3,600	**Seal** SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[2)] SKF Ecorubber-3[2)]	**Back–up ring** SKF Ecopaek SKF Ecoflon 2 SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecoflon 2 SKF Ecoflon 2 SKF Ecotal[1)]	

[1)] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[2)] Not suitable for mineral oils
[3)] Only recommended for static or quasi-static applications. Contact SKF for more information

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°F		ft/s	psi	–	
	S02-S	**Hydraulic, single-acting** Asymmetric rod seal, for special housings (DIN/ISO 7425 part 2) and for the use as a primary rod seal in sealing systems, thanks to design with active back–up ring, it is suitable for high pressure peaks or larger extrusion gaps.	–22 –4 –4 –40	+212 +212 +212 +212	16.40 16.40 22.97 16.40	5,800 5,800 5,800 5,800	**Seal** ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**Back-up ring** SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)]
	S03-P	**Hydraulic, single-acting** O–Ring activated, asymmetrical rod seal. Interference fit on outside diameter maintains stable fit in the housing. Design provides ultimate sealing effect. Especially suitable for short stroke applications (e.g. spindle seals, coupling actuators...)	–22 –31 –22 –4 –4 –58	+212 +230 +212 +212 +212 +230	1.64 1.64 1.64 1.64 2.30 1.64	5,800 5,800 5,800 5,800 5,800 5,800	**Seal** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**O–ring** NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70
	S03-F	**PTFE rod seal, single-acting** O–Ring activated, asymmetrical PTFE rod seal, low friction, good dry running properties and adaptation possibilities for diverse temperatures and media by selection of suitable O–Ring material. Almost no dead spots as required for applications in food and pharma industry.	–67 –22 –58 –4 –67 –22 –67 –22	+392 +212 +302 +392 +392 +212 +194 +194	3.28 3.28 3.28 3.28 3.28 3.28 1.64 1.64	2,900 2,900 5,800 5,800 5,800 5,800 2,900 2,900	**Seal** SKF Ecoflon 1 SKF Ecoflon 1 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	**O–ring** MVQ 70 NBR 70 EPDM FPM 75 MVQ 70 NBR 70 MVQ 70 NBR 70
	S03-S	**PTFE rod seal, single-acting** Helicoil spring activated, asymmetrical PTFE rod seal, low friction and good dry running properties, excellent chemical and thermal resistance. Mainly used in chemical, pharma and food industry.	–328 –328 –328	+500 +500 +194	3.28 3.28 1.64	2,900 5,800 2,900	**Seal** SKF Ecoflon 1 SKF Ecoflon 2,3,4 SKF Ecowear 1000	**Spring** 1.4310 1.4310 1.4310
	S04-P	**Hydraulic, single-acting** Asymmetric rod seal for standard applications as S03–P, but thanks to design with active back–up ring, it is suitable for larger extrusion gaps or higher pressure range. S04–P for standard housing design.	–22 –22 –22 –4 –4 –40	+212 +212 +212 +212 +212 +212	1.64 1.64 1.64 1.64 2.30 1.64	10,000 10,000 10,000 10,000 10,000 10,000	**Seal** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**O–ring** NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70	**Back–up** SKF Ecotal[1)] SKF Ecomid SKF Ecomid SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)]
	S04-PD	**Hydraulic, single-acting** Asymmetric rod seal for standard applications as S03–P, but thanks to design with active back–up ring, it is suitable for larger extrusion gaps or higher pressure range. S04–PD for small housing design.	–22 –22 –22 –4 –4 –40	+212 +212 +212 +212 +212 +212	1.64 1.64 1.64 1.64 2.30 1.64	10,000 10,000 10,000 10,000 10,000 10,000	**Seal** ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	**O–ring** NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70	**Back–up** SKF Ecotal[1)] SKF Ecomid SKF Ecomid SKF Ecotal[1)] SKF Ecotal[1)] SKF Ecotal[1)]

[1)] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material
			°F		ft/s	psi	–
	S05-P	**Pneumatic, single-acting** Asymmetric rod seal, extremely wear resistant, for use in lubricated or dry pneumatic applications. Special design of sealing lip allows retention of initial lubricating film.	–22 –31 –22 –4 –4 –58	+230 +230 +230 +230 +230 +230	3.28 3.28 3.28 3.28 6.56 3.28	360 360 360 360 360 360	ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR
	S05-R	**Pneumatic, single-acting** As profile S05-P, good wear resistance and adaptation possibilities for diverse temperatures and media by selection of suitable seal material. Special design of sealing lip allows retention of initial lubricating film.	+14 –13 –22 –4 –58	+392 +302 +212 +392 +302	3.28 3.28 3.28 3.28 3.28	360 360 360 360 360	SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[1]
	S06-P	**Hydraulic, single-acting** Symmetric rod seal for simple standard applications, not recommended for new designs (profile S01-P preferred).	–22 –31 –22 –4 –58 –4	+230 +230 +230 +230 +230 +230	1.64 1.64 1.64 1.64 1.64 2.30	5,800 5,800 5,800 5,800 5,800 5,800	ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR
	S06-R	**Hydraulic, single-acting** As profile S06-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	+14 –13 –22 –4 –58 –76	+392 +302 +212 +392 +302 +392	1.64 1.64 1.64 1.64 1.64 –	2,300 2,300 2,300 2,300 2,300 –	SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[1] SKF Ecosil[2]

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Seal	O-ring
			°F		ft/s	psi	–	–
	S07-P	**Hydraulic, single-acting** O-ring activated symmetric rod seal for simple standard applications, not recommended for new designs (profile S03-P preferred)	–22 –22 –22 –4 –58 –4	+212 +212 +212 +212 +230 +212	1.64 1.64 1.64 1.64 1.64 2.30	5,800 5,800 5,800 5,800 5,800 5,800	ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR	NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70 NBR 70
	S07-F	**PTFE rod seal, single-acting** O-ring activated symmetric PTFE rod seal, low friction and no stick-slip effect for simple standard applications, not recommended for new designs (profile S03-P preferred)	–67 –22 –58 –4 –67 –22 –67 –22	+392 +212 +302 +392 +392 +212 +194 +194	3.28 3.28 3.28 3.28 3.28 3.28 1.64 1.64	2,900 2,900 5,800 5,800 5,800 5,800 2,900 2,900	SKF Ecoflon 1 SKF Ecoflon 1 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	MVQ 70 NBR 70 EPDM FPM 75 MVQ 70 NBR 70 MVQ 70 NBR 70

[1] Not suitable for mineral oils
[2] Only recommended for static or quasi-static applications. Contact SKF for more information

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material
			°F		ft/s	psi	–
	S08-P	**Hydraulic, single-acting** Asymmetric compact rod seal with stable fit in the housing. Compact design mainly used to seal high viscosity fluids or for extreme small housings, not suitable for high speed applications. S08-P compact design, no groove.	–22 –4 –4 –58	+230 +230 +230 +230	0.98 0.98 1.31 0.98	5,800 5,800 5,800 5,800	ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR
	S08-PE	**Hydraulic, single-acting** Asymmetric compact rod seal with stable fit in the housing. Compact design mainly used to seal high viscosity fluids or for extreme small housings, not suitable for high speed applications. S08-PE with small groove.	–22 –4 –4 –58	+230 +230 +230 +230	0.98 0.98 1.31 0.98	5,800 5,800 5,800 5,800	ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR
	S08-R	**Hydraulic, single-acting** As profile S08-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	+14 –13 –22 –4 –58	+392 +302 +212 +392 +302	0.98 0.98 0.98 0.98 0.98	2,300 2,300 2,300 2,300 2,300	SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[1]

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Glide ring	O-ring
			°F		ft/s	psi	–	–
	S09-E	**Hydraulic, single-acting** O-ring activated asymmetric PTFE rod seal, low friction. In tandem design together with double-acting wipers for extremely low or high speed or positioning functions. As primary seal, in combination with secondary S01-P seal, with good resistance to pressure shocks used in mobile hydraulics, machine tools, injection moulding machines, heavy hydraulics.	–67 –22 –67 –22 –4 –22 –67 –22	+230 +212 +230 +212 +392 +212 +194 +194	16.40 16.40 16.40 16.40 32.81 32.81 16.40 16.40	8,700 8,700 8,700 8,700 8,700 8,700 5,800 5,800	G-ECOPUR 54D G-ECOPUR 54D X-ECOPUR, H, S X-ECOPUR, H, S SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	MVQ 70 NBR 70 MVQ 70 NBR 70 FPM 75 NBR 70 MVQ 70 NBR 70
	S09-D	**Hydraulic, double-acting** O-ring activated symmetric PTFE rod seal, low friction. For extreme low or high speed, suitable for positioning functions.	–67 –22 –67 –22 –4 –22 –67 –22	+230 +212 +230 +212 +392 +212 +194 +194	16.40 16.40 16.40 16.40 32.81 32.81 16.40 16.40	8,700 8,700 8,700 8,700 8,700 8,700 5,800 5,800	G-ECOPUR 54D G-ECOPUR 54D X-ECOPUR, H, S X-ECOPUR, H, S SKF Ecoflon 2,3,4 SKF Ecoflon 2,3,4 SKF Ecowear 1000 SKF Ecowear 1000	MVQ 70 NBR 70 MVQ 70 NBR 70 FPM 75 NBR 70 MVQ 70 NBR 70
	S09-P	**Hydraulic, single-acting** O-ring activated asymmetric PU rod seal with excellent dynamic sealing capacity. Used as secondary seal in tandem design (together with primary S09-E) to minimize residual oil film. For mobile hydraulics, injection moulding machines, heavy hydraulics.	–22 –22 –22 –4 –4 –58	+212 +212 +212 +212 +212 +230	3.28 3.28 3.28 3.28 4.59 3.28	3,600 3,600 3,600 3,600 3,600 3,600	ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	NBR 70 NBR 70 NBR 70 NBR 70 NBR 70 MVQ 70

[1] Not suitable for mineral oils

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°F		ft/s	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.					**Glide ring**	**Energizer**
			–22	+212	16.40	8,700	G-ECOPUR 54D	SKF Ecorubber-1
			–76	+230	16.40	8,700	G-ECOPUR 54D	SKF Ecosil
			–22	+212	16.40	8,700	X-ECOPUR, H, S	SKF Ecorubber-1
			–76	+230	16.40	8,700	X-ECOPUR, H, S	SKF Ecosil
			–22	+212	32.81	8,700	SKF Ecoflon 2,3,4	SKF Ecorubber-1
			–4	+392	32.81	8,700	SKF Ecoflon 2,3,4	SKF Ecorubber-2
			–22	+194	16.40	5,800	SKF Ecowear 1000	SKF Ecorubber-1
			–76	+194	16.40	5,800	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.					**Glide ring**	**Energizer**
			–22	+212	16.40	8,700	G-ECOPUR 54D	SKF Ecorubber-1
			–76	+230	16.40	8,700	G-ECOPUR 54D	SKF Ecosil
			–22	+212	16.40	8,700	X-ECOPUR, H, S	SKF Ecorubber-1
			–76	+230	16.40	8,700	X-ECOPUR, H, S	SKF Ecosil
			–22	+212	32.81	8,700	SKF Ecoflon 2,3,4	SKF Ecorubber-1
			–4	+392	32.81	8,700	SKF Ecoflon 2,3,4	SKF Ecorubber-2
			–22	+194	16.40	5,800	SKF Ecowear 1000	SKF Ecorubber-1
			–76	+194	16.40	5,800	SKF Ecowear 1000	SKF Ecosil
	S1012-M	**Hydraulic, single-acting** Chevron sealing set, parting surface design. For heavy industry hydraulics.					**S10–A**	**S11–M** / **S12–M**
			–22	+212	1.64	7,200	SKF Ecotal[1]	ECOPUR / X-ECOPUR[3]
			–31	+212	1.64	7,200	SKF Ecomid	ECOPUR LD / SKF Ecomid
			–22	+212	2.30	7,200	SKF Ecomid	G-ECOPUR / G-ECOPUR 54D[4]
			–4	+212	1.64	7,200	SKF Ecotal[1]	H-ECOPUR / X-ECOPUR H[3]
			–4	+212	1.64	7,200	SKF Ecotal[1]	S-ECOPUR / X-ECOPUR S[3]
			–13	+302	1.64	3,600	SKF Ecoflon 2	SKF Ecorubber-H / SKF Ecoflon 2
			–22	+212	1.64	3,600	SKF Ecoflon 2	SKF Ecorubber-1 / SKF Ecoflon 2
			–4	+392	1.64	3,600	SKF Ecoflon 2	SKF Ecorubber-2 / SKF Ecoflon 2
			–58	+302	1.64	3,600	SKF Ecoflon 2	SKF Ecorubber-3 / SKF Ecoflon 2
	S1012-T	**Hydraulic, single-acting** Chevron sealing set, machined surface design. For heavy industry hydraulics.					**S10–A**	**S11–T** / **S12–T**
			–22	+212	1.64	7,200	SKF Ecotal[1]	ECOPUR / X-ECOPUR[3]
			–31	+212	1.64	7,200	SKF Ecomid	ECOPUR LD / SKF Ecomid
			–22	+212	2.30	7,200	SKF Ecotal[1]	G-ECOPUR / G-ECOPUR 54D[4]
			–4	+212	1.64	7,200	SKF Ecotal[1]	H-ECOPUR / X-ECOPUR H[3]
			–4	+212	1.64	7,200	SKF Ecotal[1]	S-ECOPUR / X-ECOPUR S[3]
			–13	+302	1.64	3,600	SKF Ecoflon 2	SKF Ecorubber-H / SKF Ecoflon 2
			–22	+212	1.64	3,600	SKF Ecoflon 2	SKF Ecorubber-1 / SKF Ecoflon 2
			–4	+392	1.64	3,600	SKF Ecoflon 2	SKF Ecorubber-2 / SKF Ecoflon 2
			–58	+302	1.64	3,600	SKF Ecoflon 2	SKF Ecorubber-3 / 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.					**S13–A**	**S14–A** / **S15–A**
			–22	+212	1.64	8,700	SKF Ecotal[1]	ECOPUR / X-ECOPUR
			–22	+212	1.64	8,700	SKF Ecotal[1]	ECOPUR / SKF Ecotal[1]
			–31	+212	1.64	8,700	SKF Ecomid	ECOPUR LD / SKF Ecomid
			–22	+212	1.64	8,700	SKF Ecomid	G-ECOPUR / SKF Ecomid
			–4	+212	1.64	8,700	SKF Ecotal[1]	H-ECOPUR / X-ECOPUR H
			–4	+212	1.64	8,700	SKF Ecotal[1]	H-ECOPUR / SKF Ecotal[1]
			–4	+212	2.30	8,700	SKF Ecotal[1]	S-ECOPUR / X-ECOPUR S
			–4	+212	2.30	8,700	SKF Ecotal[1]	S-ECOPUR / SKF Ecotal[1]
			–40	+212	1.64	8,700	SKF Ecotal[1]	T-ECOPUR / SKF Ecotal[1]
	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.						
			–22	+230	1.64	2,300	ECOPUR	
			–31	+230	1.64	2,300	ECOPUR LD	
			–22	+230	1.64	2,300	G-ECOPUR	
			–4	+230	1.64	2,300	H-ECOPUR	
			–4	+230	2.30	2,300	S-ECOPUR	
			–58	+230	1.64	2,300	T-ECOPUR	
			+14	+392	1.64	2,300	SKF Ecoflas	
			–13	+302	1.64	2,300	SKF Ecorubber-H	
			–22	+212	1.64	2,300	SKF Ecorubber-1	
			–4	+392	1.64	2,300	SKF Ecorubber-2	
			–58	+302	1.64	2,300	SKF Ecorubber-3[2]	

[1] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[2] Not suitable for mineral oils
[3] Alternative SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[4] Alternative SKF Ecomid

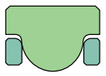
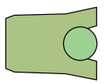
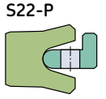
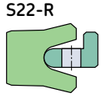
Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°F		ft/s	psi	–	
	S16-B	**Hydraulic/pneumatic, single-acting** Simple hat seal, usually fixed in housing with clamp flange. Mainly used for replacement in old hydraulic and pneumatic cylinders or for secondary applications.						
			–22	+230	1.64	2,300	ECOPUR	
			–31	+230	1.64	2,300	ECOPUR LD	
			–22	+230	1.64	2,300	G-ECOPUR	
			–4	+230	1.64	2,300	H-ECOPUR	
			–4	+230	2.30	2,300	S-ECOPUR	
			–58	+230	1.64	2,300	T-ECOPUR	
			+14	+392	1.64	2,300	SKF Ecoflas	
			–13	+302	1.64	2,300	SKF Ecorubber-H	
			–22	+212	1.64	2,300	SKF Ecorubber-1	
			–4	+392	1.64	2,300	SKF Ecorubber-2	
			–58	+302	1.64	2,300	SKF Ecorubber-3[2]	
	S17-P	**Hydraulic, single-acting** Asymmetric rod seal with additional 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.						
			–22	+230	1.64	5,800	ECOPUR	
			–31	+230	1.64	5,800	ECOPUR LD	
			–22	+230	1.64	5,800	G-ECOPUR	
			–4	+230	1.64	5,800	H-ECOPUR	
			–4	+230	2.30	5,800	S-ECOPUR	
			–58	+230	1.64	5,800	T-ECOPUR	
	S17-R	**Hydraulic, single-acting** As profile S17–P, but easily adaptable for diverse temperatures and media by selection of suitable seal material.						
			+14	+392	1.64	2,300	SKF Ecoflas	
			–13	+302	1.64	2,300	SKF Ecorubber-H	
			–22	+212	1.64	2,300	SKF Ecorubber-1	
			–4	+392	1.64	2,300	SKF Ecorubber-2	
			–58	+302	1.64	2,300	SKF Ecorubber-3[2]	
	S18-P	**Hydraulic, single-acting** Asymmetric rod seal as S17–P, but thanks to design with active back–up ring, it is suitable for larger extrusion gaps or higher pressure range.					**Seal**	**Back–up ring**
			–22	+212	1.64	8,700	ECOPUR	SKF Ecotal[1]
			–31	+212	1.64	8,700	ECOPUR LD	SKF Ecomid
			–22	+212	1.64	8,700	G-ECOPUR	SKF Ecomid
			–4	+212	1.64	8,700	H-ECOPUR	SKF Ecotal[1]
			–4	+212	2.30	8,700	S-ECOPUR	SKF Ecotal[1]
			–40	+212	1.64	8,700	T-ECOPUR	SKF Ecotal[1]
	S18-R	**Hydraulic, single-acting** Asymmetric rod seal with additional sealing– respectively stabilizing lip and back ring. Easily adaptable for diverse temperatures and media by selection of suitable seal material, thanks to design with active back–up ring, it is suitable for larger extrusion gaps or higher pressure range.					**Seal**	**Back–up ring**
			+14	+392	1.64	3,600	SKF Ecoflas	SKF Ecoflon 2
			–13	+302	1.64	3,600	SKF Ecorubber-H	SKF Ecoflon 2
			–13	+212	1.64	3,600	SKF Ecorubber-H	SKF Ecotal[1]
			–22	+212	1.64	3,600	SKF Ecorubber-1	SKF Ecotal[1]
			–4	+392	1.64	3,600	SKF Ecorubber-2	SKF Ecoflon 2
			–58	+302	1.64	3,600	SKF Ecorubber-3	SKF Ecoflon 2
			–40	+212	1.64	3,600	SKF Ecorubber-3	SKF Ecotal[1]
	S19-F	**PTFE rod seal, single-acting** Finger spring activated, asymmetrical PTFE rod seal, low friction and good dry running properties, excellent chemical and thermal resistance, mainly used in chemical, pharma and food industry.					**Seal**	**Spring**
			–328	+500	49.21	2,900	SKF Ecoflon 1	1.4310[3]
			–328	+500	49.21	5,800	SKF Ecoflon 2	1.4310[3]
			–328	+500	49.21	5,800	SKF Ecoflon 3	1.4310[3]
			–328	+500	49.21	5,800	SKF Ecoflon 4	1.4310[3]
			–328	+194	49.21	2,900	SKF ECOWAER 1000	1.4310[3]

[1] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[2] Not suitable for mineral oils
[3] Spring metal material specification

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

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°F		ft/s	psi	–		
	S20-R	**Hydraulic, double-acting**					**Seal**	**Back–up ring**	
		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.	–13	+302	1.64	10,000	SKF Ecorubber-H	SKF Ecoflon 2	
			–13	+302	1.64	10,000	SKF Ecorubber-H	SKF Ecopaek	
			–13	+212	1.64	10,000	SKF Ecorubber-H	SKF Ecotal[1)]	
			–22	+212	1.64	10,000	SKF Ecorubber-1	SKF Ecotal[1)]	
			–4	+392	1.64	10,000	SKF Ecorubber-2	SKF Ecoflon 2	
			–4	+392	1.64	10,000	SKF Ecorubber-2	SKF Ecopaek	
	S21-P	**Hydraulic, single-acting**					**Seal**	**O–ring**	
		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).	–22	+212	1.64	5,800	ECOPUR	NBR 70	
			–4	+212	1.64	5,800	H-ECOPUR	NBR 70	
			–4	+212	2.30	5,800	S-ECOPUR	NBR 70	
			–58	+230	1.64	5,800	T-ECOPUR	MVQ 70	
	S22-P	**Hydraulic, single-acting**					**Seal**	**Support ring**	
		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.	–22	+212	1.64	5,800	ECOPUR	SKF Ecotal[1)]	
			–31	+212	1.64	5,800	ECOPUR LD	SKF Ecomid	
			–22	+212	1.64	5,800	G-ECOPUR	SKF Ecomid	
			–4	+212	1.64	5,800	H-ECOPUR	SKF Ecotal[1)]	
			–4	+212	2.30	5,800	S-ECOPUR	SKF Ecotal[1)]	
			–40	+212	1.64	5,800	T-ECOPUR	SKF Ecotal[1)]	
	S22-R	**Hydraulic, single-acting**					**Seal**	**Support ring**	
		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.	+14	+392	1.64	2,300	SKF Ecoflas	SKF Ecoflon 2	
			–13	+302	1.64	2,300	SKF Ecorubber-H	SKF Ecoflon 2	
			–13	+212	1.64	2,300	SKF Ecorubber-H	SKF Ecotal[1)]	
			–22	+212	1.64	2,300	SKF Ecorubber-1	SKF Ecotal[1)]	
			–4	+392	1.64	2,300	SKF Ecorubber-2	SKF Ecoflon 2	
			–58	+302	1.64	2,300	SKF Ecorubber-3[2)]	SKF Ecoflon 2	
			–40	+212	1.64	2,300	SKF Ecorubber-3[2)]	SKF Ecotal[1)]	
	S24-P	**Hydraulic, single-acting**					**Seal**	**O–ring**	**Back-up ring**
		O–Ring activated rod seal with additional stabilizing lips and integrated active back ring for larger extrusion gaps, mainly used in mining industry.	–22	+212	1.64	10,000	ECOPUR	NBR 70	SKF Ecotal[1)]
			–4	+212	1.64	10,000	H-ECOPUR	NBR 70	SKF Ecotal[1)]
			–4	+212	2.30	10,000	S-ECOPUR	NBR 70	SKF Ecotal[1)]
			–40	+212	1.64	10,000	T-ECOPUR	MVQ 70	SKF Ecotal[1)]
	S2527-F	**PTFE chevron set, single-acting**					**S25–F**	**S26–F**	**S27–F**
		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.	–328	+500	4.92	1,450	SKF Ecoflon 2	SKF Ecoflon 1	SKF Ecoflon 2

[1)] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[2)] Not suitable for mineral oils

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

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material		
			°F		ft/s	psi	–		
	S2931-F	**PTFE chevron set, single-acting**					**S29-F**	**S30-F**	**S31-F**
		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.	–328	+500	4.92	4,500	SKF Ecoflon 2	SKF Ecoflon 1	SKF Ecoflon 2
	S32-P	**Hydraulic, single-acting**					**Pressure ring**	**Seal**	**Support ring**
		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).	–22	+212	1.64	7,200	SKF Ecotal[1)]	ECOPUR	SKF Ecotal[1)]
			–22	+212	1.64	7,200	X-ECOPUR	ECOPUR	SKF Ecotal[1)]
			–31	+212	1.64	7,200	SKF Ecomid	ECOPUR LD	SKF Ecomid
			–22	+212	1.64	7,200	G-ECOPUR 54D	G-ECOPUR	SKF Ecomid
			–22	+212	1.64	7,200	SKF Ecomid	G-ECOPUR	SKF Ecomid
			–4	+212	1.64	7,200	X-ECOPUR H	H-ECOPUR	SKF Ecotal[1)]
			–4	+212	1.64	7,200	SKF Ecotal[1)]	H-ECOPUR	SKF Ecotal[1)]
			–4	+212	2.30	7,200	SKF Ecotal[1)]	S-ECOPUR	SKF Ecotal[1)]
			–4	+212	2.30	7,200	X-ECOPUR S	S-ECOPUR	SKF Ecotal[1)]
			–40	+212	1.64	7,200	SKF Ecotal[1)]	T-ECOPUR	SKF Ecotal[1)]
	S35-P	**Hydraulic, double-acting**							
		Compact rod seal with almost no dead spots as required for applications in food and pharmaceutical industry. Also commonly used as O–Ring replacement because design with interference fit on outside diameter prevents twisting in dynamic applications.	–22	+230	1.31	5,800	ECOPUR		
			–31	+230	1.31	5,800	ECOPUR LD		
			–22	+230	1.31	5,800	G-ECOPUR		
			–4	+230	1.31	5,800	H-ECOPUR		
			–4	+230	1.64	5,800	S-ECOPUR		
			–58	+230	1.31	5,800	T-ECOPUR		

[1)] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches

Linear moving | Rotating | Oscillating | Spiral moving | Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Material
			°F		ft/s	–
	A01-A	**Hydraulic, single-acting** Wiper with interference fit on outside diameter, providing a technically accurate closure at the cylinder. Wiping edge provides reliable protection against penetration of dust and dirt whilst allowing backflow of residual oil film. Back support area prevents tilting of wiper. For housings compliant with ISO 6195–Type A.	–22	+230	13.12	ECOPUR
			–31	+230	13.12	ECOPUR LD
			–22	+230	13.12	G-ECOPUR
			–22	+230	13.12	G-ECOPUR 54D[2]
			–4	+230	13.12	H-ECOPUR
			–4	+230	13.12	S-ECOPUR
			–58	+230	13.12	T-ECOPUR
			–22	+230	13.12	X-ECOPUR[2]
			–4	+230	13.12	X-ECOPUR H[2]
			–4	+230	13.12	X-ECOPUR S[2]
			+14	+392	13.12	SKF Ecoflas
			–13	+302	13.12	SKF Ecorubber-H
			–22	+212	13.12	SKF Ecorubber-1
			–4	+392	13.12	SKF Ecorubber-2
			–58	+302	13.12	SKF Ecorubber-3[1]
	A01-B	**Hydraulic, single-acting** As profile A01–A, but without back support area. For housings according ISO 6195–TypeA.	–22	+230	13.12	ECOPUR
			–31	+230	13.12	ECOPUR LD
			–22	+230	13.12	G-ECOPUR
			–22	+230	13.12	G-ECOPUR 54D[2]
			–4	+230	13.12	H-ECOPUR
			–4	+230	13.12	S-ECOPUR
			–58	+230	13.12	T-ECOPUR
			–22	+230	13.12	X-ECOPUR[2]
			–4	+230	13.12	X-ECOPUR H[2]
			–4	+230	13.12	X-ECOPUR S[2]
			+14	+392	13.12	SKF Ecoflas
			–13	+302	13.12	SKF Ecorubber-H
			–22	+212	13.12	SKF Ecorubber-1
			–4	+392	13.12	SKF Ecorubber-2
			–58	+302	13.12	SKF Ecorubber-3[1]
	A02-A	**Hydraulic, single-acting** Wiper with interference fit on outside diameter. Wiping edge provides a reliable protection against penetration of dust and dirt whilst allowing backflow of residual oil film. Back support area prevents tilting of wiper.	–22	+230	13.12	ECOPUR
			–31	+230	13.12	ECOPUR LD
			–22	+230	13.12	G-ECOPUR
			–22	+230	13.12	G-ECOPUR 54D[2]
			–4	+230	13.12	H-ECOPUR
			–4	+230	13.12	S-ECOPUR
			–58	+230	13.12	T-ECOPUR
			–22	+230	13.12	X-ECOPUR[2]
			–4	+230	13.12	X-ECOPUR H[2]
			–4	+230	13.12	X-ECOPUR S[2]
			+14	+392	13.12	SKF Ecoflas
			–13	+302	13.12	SKF Ecorubber-H
			–22	+212	13.12	SKF Ecorubber-1
			–4	+392	13.12	SKF Ecorubber-2
			–58	+302	13.12	SKF Ecorubber-3[1]
	A02-B	**Hydraulic, single-acting** Wiper with interference fit on outside diameter. Wiping edge provides a reliable protection against penetration of dust and dirt whilst allowing backflow of residual oil film.	–22	+230	13.12	ECOPUR
			–31	+230	13.12	ECOPUR LD
			–22	+230	13.12	G-ECOPUR
			–22	+230	13.12	G-ECOPUR 54D[2]
			–4	+230	13.12	H-ECOPUR
			–4	+230	13.12	S-ECOPUR
			–58	+230	13.12	T-ECOPUR
			–22	+230	13.12	X-ECOPUR[2]
			–4	+230	13.12	X-ECOPUR H[2]
			–4	+230	13.12	X-ECOPUR S[2]
			+14	+392	13.12	SKF Ecoflas
			–13	+302	13.12	SKF Ecorubber-H
			–22	+212	13.12	SKF Ecorubber-1
			–4	+392	13.12	SKF Ecorubber-2
			–58	+302	13.12	SKF Ecorubber-3[1]

[1] Not suitable for mineral oils
[2] For hard grade polyurethanes, refer to material properties on **page 12**

Linear moving | Rotating | Oscillating | Spiral moving | Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Material	Seal	Housing
			°F		ft/s	–		
	A02-I	**Hydraulic, single-acting** As profile A02–A, but without back support area. Special housing design according ISO 6195–Type C.	–22	+230	13.12	ECOPUR		
			–4	+230	13.12	H-ECOPUR		
			–4	+230	13.12	S-ECOPUR		
			–58	+230	13.12	T-ECOPUR		
			–22	+230	13.12	X-ECOPUR[3]		
			–4	+230	13.12	X-ECOPUR H[2]		
			–4	+230	13.12	X-ECOPUR S[3]		
			+14	+392	13.12	SKF Ecoflas		
			–13	+302	13.12	SKF Ecorubber-H		
			–22	+212	13.12	SKF Ecorubber-1		
			–4	+392	13.12	SKF Ecorubber-2		
			–58	+302	13.12	SKF Ecorubber-3[2]		
	A03-A	**Hydraulic, single-acting** Wiper with mounting cage for press–fit installation into axially open housings. Wiping edge provides a reliable protection against penetration of dust and dirt, the use of plastic mounting cages avoids corrosion in the press–fit. For housings according ISO 6195–Type B.	–22	+176	13.12	ECOPUR	SKF Ecotal[1]	
			–4	+176	13.12	H-ECOPUR	SKF Ecotal[1]	
			–4	+176	16.40	S-ECOPUR	SKF Ecotal[1]	
			–40	+176	13.12	T-ECOPUR	SKF Ecotal[1]	
			–22	+176	13.12	X-ECOPUR[3]	SKF Ecotal[1]	
			–4	+176	13.12	X-ECOPUR H[3]	SKF Ecotal[1]	
			–4	+176	16.40	X-ECOPUR S[3]	SKF Ecotal[1]	
			+14	+392	13.12	SKF Ecoflas	SKF Ecopaek	
			–13	+176	13.12	SKF Ecorubber-H	SKF Ecotal[1]	
			–22	+176	13.12	SKF Ecorubber-1	SKF Ecotal[1]	
			–4	+392	13.12	SKF Ecorubber-2	SKF Ecopaek	
			–58	+302	13.12	SKF Ecorubber-3[2]	SKF Ecopaek	
	A04-A	**Pneumatic, single-acting** Wiper with interference fit on outside diameter, providing a technically accurate closure at the cylinder. Special design of wiping lip allows retention of initial lubricating film. Back support area prevents tilting of wiper. For housings according ISO 6195–Type A.	–22	+230	13.12	ECOPUR		
			–31	+230	13.12	ECOPUR LD		
			–22	+230	13.12	G-ECOPUR		
			–22	+230	13.12	G-ECOPUR 54D[3]		
			–4	+230	13.12	H-ECOPUR		
			–4	+230	13.12	S-ECOPUR		
			–58	+230	13.12	T-ECOPUR		
			–22	+230	13.12	X-ECOPUR[3]		
			–4	+230	13.12	X-ECOPUR H[3]		
			–4	+230	13.12	X-ECOPUR S[3]		
			+14	+392	13.12	SKF Ecoflas		
			–13	+302	13.12	SKF Ecorubber-H		
			–22	+212	13.12	SKF Ecorubber-1		
			–4	+392	13.12	SKF Ecorubber-2		
			–58	+302	13.12	SKF Ecorubber-3[2]		
	A04-B	**Pneumatic, single-acting** As profile A04–A, but without back support area. For housings according ISO 6195–Type A.	–22	+230	13.12	ECOPUR		
			–31	+230	13.12	ECOPUR LD		
			–22	+230	13.12	G-ECOPUR		
			–22	+230	13.12	G-ECOPUR 54D[3]		
			–4	+230	13.12	H-ECOPUR		
			–4	+230	13.12	S-ECOPUR		
			–58	+230	13.12	T-ECOPUR		
			–22	+230	13.12	X-ECOPUR[3]		
			–4	+230	13.12	X-ECOPUR H[3]		
			–4	+230	13.12	X-ECOPUR S[3]		
			+14	+392	13.12	SKF Ecoflas		
			–13	+302	13.12	SKF Ecorubber-H		
			–22	+212	13.12	SKF Ecorubber-1		
			–4	+392	13.12	SKF Ecorubber-2		
			–58	+302	13.12	SKF Ecorubber-3[2]		

[1] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[2] Not suitable for mineral oils
[3] For hard grade polyurethanes, refer to material properties on **page 12**

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Material	Seal	Housing
			°F		ft/s	–		
	A05–A	**Pneumatic, single-acting** Wiper with interference fit on outside diameter. Special design of wiping lip allows retention of initial lubricating film. Back support area prevents tilting of wiper.	–22	+230	13.12	ECOPUR		
			–31	+230	13.12	ECOPUR LD		
			–22	+230	13.12	G-ECOPUR		
			–22	+230	13.12	G-ECOPUR 54D[3]		
			–4	+230	13.12	H-ECOPUR		
			–4	+230	13.12	S-ECOPUR		
			–58	+230	13.12	T-ECOPUR		
			–22	+230	13.12	X-ECOPUR[3]		
			–4	+230	13.12	X-ECOPUR H[3]		
			–4	+230	13.12	X-ECOPUR S[3]		
			+14	+392	13.12	SKF Ecoflas		
			–13	+302	13.12	SKF Ecorubber-H		
			–22	+212	13.12	SKF Ecorubber-1		
			–4	+392	13.12	SKF Ecorubber-2		
			–58	+302	13.12	SKF Ecorubber-3[2]		
	A05-B	**Pneumatic, single-acting** Wiper with interference fit on outside diameter. Special design of wiping lip allows retention of initial lubricating film.	–22	+230	13.12	ECOPUR		
			–4	+230	13.12	H-ECOPUR		
			–4	+230	13.12	S-ECOPUR		
			–58	+230	13.12	T-ECOPUR		
			–22	+230	13.12	X-ECOPUR[3]		
			–4	+230	13.12	X-ECOPUR H[3]		
			–4	+230	13.12	X-ECOPUR S[3]		
			+14	+392	13.12	SKF Ecoflas		
			–13	+302	13.12	SKF Ecorubber-H		
			–22	+212	13.12	SKF Ecorubber-1		
			–4	+392	13.12	SKF Ecorubber-2		
			–58	+302	13.12	SKF Ecorubber-3[2]		
	A05-I	**Pneumatic, single-acting** As profile A05-A, but without back support area. Special housing design according ISO 6195-Type C.	–22	+230	13.12	ECOPUR		
			–4	+230	13.12	H-ECOPUR		
			–4	+230	13.12	S-ECOPUR		
			–58	+230	13.12	T-ECOPUR		
			–22	+230	13.12	X-ECOPUR[3]		
			–4	+230	13.12	X-ECOPUR H[3]		
			–4	+230	13.12	X-ECOPUR S[3]		
			+14	+392	13.12	SKF Ecoflas		
			–13	+302	13.12	SKF Ecorubber-H		
			–22	+212	13.12	SKF Ecorubber-1		
			–4	+392	13.12	SKF Ecorubber-2		
			–58	+302	13.12	SKF Ecorubber-3[2]		
	A06-A	**Pneumatic, single-acting** Wiper with mounting cage for press-fit installation into axially open housings. Special design of wiping lip allows retention of initial lubricating film, the use of plastic mounting cages avoids corrosion at the press-fit. For housings according ISO 6195-Type B.	–22	+176	13.12	ECOPUR	SKF Ecotal[1]	
			–4	+176	13.12	H-ECOPUR	SKF Ecotal[1]	
			–4	+176	16.40	S-ECOPUR	SKF Ecotal[1]	
			–40	+176	13.12	T-ECOPUR	SKF Ecotal[1]	
			–22	+176	13.12	X-ECOPUR[3]	SKF Ecotal[1]	
			–4	+176	13.12	X-ECOPUR H[3]	SKF Ecotal[1]	
			–4	+176	13.12	X-ECOPUR S[3]	SKF Ecotal[1]	
			+14	+392	13.12	SKF Ecoflas	SKF Ecopaek	
			–13	+176	13.12	SKF Ecorubber-H	SKF Ecotal[1]	
			–22	+176	13.12	SKF Ecorubber-1	SKF Ecotal[1]	
			–4	+392	13.12	SKF Ecorubber-2	SKF Ecopaek	
			–58	+302	13.12	SKF Ecorubber-3[2]	SKF Ecopaek	

[1] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[2] Not suitable for mineral oils
[3] For hard grade polyurethanes, refer to material properties on **page 12**

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Material
			°F		ft/s	–
	A07-A	**Hydraulic, single-acting** Wiper to fit in angled housings (30° angle).	–22	+230	13.12	ECOPUR
			–4	+230	13.12	H-ECOPUR
			–4	+230	13.12	S-ECOPUR
			–58	+230	13.12	T-ECOPUR
			–22	+230	13.12	X-ECOPUR[2]
			–4	+230	13.12	X-ECOPUR H[2]
			–4	+230	13.12	X-ECOPUR S[2]
			+14	+392	13.12	SKF Ecoflas
			–13	+302	13.12	SKF Ecorubber-H
			–22	+212	13.12	SKF Ecorubber-1
			–4	+392	13.12	SKF Ecorubber-2
			–58	+302	13.12	SKF Ecorubber-3[1]
	A08-A	**Hydraulic/pneumatic, single-acting** Wiper usually fixed in housing with clamp flange. Mainly used for replacement in old hydraulic and pneumatic cylinders or for secondary applications.	–22	+230	13.12	ECOPUR
			–31	+230	13.12	ECOPUR LD
			–22	+230	13.12	G-ECOPUR
			–22	+230	13.12	G-ECOPUR 54D[2]
			–4	+230	13.12	H-ECOPUR
			–4	+230	13.12	S-ECOPUR
			–58	+230	13.12	T-ECOPUR
			–22	+230	13.12	X-ECOPUR[2]
			–4	+230	13.12	X-ECOPUR H[2]
			–4	+230	13.12	X-ECOPUR S[2]
			+14	+392	13.12	SKF Ecoflas
			–13	+302	13.12	SKF Ecorubber-H
			–22	+212	13.12	SKF Ecorubber-1
			–4	+392	13.12	SKF Ecorubber-2
			–58	+302	13.12	SKF Ecorubber-3[1]
	A08-B	Wiper usually fixed in housing with clamp flange. Mainly used for replacement in old hydraulic and pneumatic cylinders or for secondary applications.	–22	+230	13.12	ECOPUR
			–31	+230	13.12	ECOPUR LD
			–22	+230	13.12	G-ECOPUR
			–22	+230	13.12	G-ECOPUR 54D[2]
			–4	+230	13.12	H-ECOPUR
			–4	+230	13.12	S-ECOPUR
			–58	+230	13.12	T-ECOPUR
			–22	+230	13.12	X-ECOPUR[2]
			–4	+230	13.12	X-ECOPUR H[2]
			–4	+230	13.12	X-ECOPUR S[2]
			+14	+392	13.12	SKF Ecoflas
			–13	+302	13.12	SKF Ecorubber-H
			–22	+212	13.12	SKF Ecorubber-1
			–4	+392	13.12	SKF Ecorubber-2
			–58	+302	13.12	SKF Ecorubber-3[1]
	A09-A	**Hydraulic, single-acting** Wiper with dimensioning according to common types used in USA. For housings according AN 6231, ANSI/B93.35.	–22	+230	13.12	ECOPUR
			–4	+230	13.12	H-ECOPUR
			–4	+230	13.12	S-ECOPUR
			–58	+230	13.12	T-ECOPUR
			–22	+230	13.12	X-ECOPUR[2]
			–4	+230	13.12	X-ECOPUR H[2]
			–4	+230	13.12	X-ECOPUR S[2]
			+14	+392	13.12	SKF Ecoflas
			–13	+302	13.12	SKF Ecorubber-H
			–22	+212	13.12	SKF Ecorubber-1
			–4	+392	13.12	SKF Ecorubber-2
			–58	+302	13.12	SKF Ecorubber-3[1]

[1] Not suitable for mineral oils
[2] For hard grade polyurethanes, refer to material properties on **page 12**

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

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Material
			°F		ft/s	–
	A10-A	**Hydraulic, single-acting** Wiper with dimensioning according to common types used in USA. Fixed relation between cross-section and height of wiper. For housings according AN 6231, ANSI/B93.35.	–22	+230	13.12	ECOPUR
			–4	+230	13.12	H-ECOPUR
			–4	+230	13.12	S-ECOPUR
			–58	+230	13.12	T-ECOPUR
			–22	+230	13.12	X-ECOPUR[2]
			–4	+230	13.12	X-ECOPUR H[2]
			–4	+230	13.12	X-ECOPUR S[2]
			+14	+392	13.12	SKF Ecoflas
			–13	+302	13.12	SKF Ecorubber-H
			–22	+212	13.12	SKF Ecorubber-1
			–4	+392	13.12	SKF Ecorubber-2
			–58	+302	13.12	SKF Ecorubber-3[1]
	A11-A	**Hydraulic/pneumatic, double-acting** Wiper including additional sealing lip, used in combination with O-ring activated PTFE seals (tandem) to reduce residual oil film. Also used as complete solution for pneumatic applications in small diameter range. max. allowed pressure load: 230 psi.	–22	+230	13.12	ECOPUR
			–31	+230	13.12	ECOPUR LD
			–22	+230	13.12	G-ECOPUR
			–4	+230	13.12	H-ECOPUR
			–4	+230	16.40	S-ECOPUR
			–58	+230	13.12	T-ECOPUR
			+14	+392	13.12	SKF Ecoflas
			–13	+302	13.12	SKF Ecorubber-H
			–22	+212	13.12	SKF Ecorubber-1
			–4	+392	13.12	SKF Ecorubber-2
			–58	+302	13.12	SKF Ecorubber-3[1]
	A11-I	**Hydraulic/pneumatic, double-acting** As profile A11-A, special housing design according ISO 6195-Type C.	–22	+230	13.12	ECOPUR
			–4	+230	13.12	H-ECOPUR
			–58	+230	13.12	T-ECOPUR
			–4	+230	16.40	S-ECOPUR
			+14	+392	13.12	SKF Ecoflas
			–13	+302	13.12	SKF Ecorubber-H
			–22	+212	13.12	SKF Ecorubber-1
			–4	+392	13.12	SKF Ecorubber-2
			–58	+302	13.12	SKF Ecorubber-3[1]
	A12-A	**Hydraulic, single-acting** Wiper with slight seal support, and extended lip for face sealing against heavy contamination.	–22	+230	13.12	ECOPUR
			–31	+230	13.12	ECOPUR LD
			–22	+230	13.12	G-ECOPUR
			–22	+230	13.12	G-ECOPUR 54D[2]
			–4	+230	13.12	H-ECOPUR
			–4	+230	16.40	S-ECOPUR
			–58	+230	13.12	T-ECOPUR
			–22	+230	13.12	X-ECOPUR[2]
			–4	+230	13.12	X-ECOPUR H[2]
			–4	+230	16.40	X-ECOPUR S[2]

[1] Not suitable for mineral oils
[2] For hard grade polyurethanes, refer to material properties on **page 12**

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

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°F		ft/s	psi	–	
	A12-B	**Hydraulic, double-acting** Wiper including additional sealing lip and secondary lip. Used in combination with tandem seal systems to reduce residual oil film. Also used as complete solution for pneumatic applications in small diameter range (max. 16 bar or *230 psi*). The technically accurate closure at the cylinder is providing reliable protection, even for heavy contamination.	–22	+230	13.12	230	ECOPUR	
			–31	+230	13.12	230	ECOPUR LD	
			–22	+230	13.12	230	G-ECOPUR	
			–4	+230	13.12	230	H-ECOPUR	
			–4	+230	16.40	230	S-ECOPUR	
			–58	+230	13.12	230	T-ECOPUR	
	A13-A	**Hydraulic/pneumatic, single-acting** Scraper ring, mainly used in combination with wiper A02 or A01. Firmly clinging dirt and extremely heavy soiling (mud, tar, ice) is wiped off, following elastomeric wiper is protected from damage. Recommended materials provide good dry running properties, high stiffness and breaking strength.	–94	+230	3.28	–	X-ECOPUR	
			–94	+230	3.28	–	X-ECOPUR H	
			–94	+230	3.28	–	X-ECOPUR S	
			–58	+176	3.28	–	SKF Ecotal[1]	
			–328	+194	3.28	–	SKF Ecowear 1000	
			–148	+500	3.28	–	SKF Ecopaek	
	A25-F	**Hydraulic/pneumatic, single-acting** 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).	–22	+212	16.40	–	**Glide ring** X-ECOPUR	**Energizer** NBR 70
			–4	+212	16.40	–	X-ECOPUR H	NBR 70
			–4	+212	16.40	–	X-ECOPUR S	NBR 70
			–4	+392	32.81	–	SKF Ecoflon 2,3,4	FPM 75
			–22	+212	32.81	–	SKF Ecoflon 2,3,4	NBR 70
			–67	+194	32.81	–	SKF Ecowear 1000	MVQ 70
			–22	+194	32.81	–	SKF Ecowear 1000	NBR 70
	A26-F	**Hydraulic/pneumatic, double-acting** 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).	–22	+212	16.40	230	**Glide ring** G-ECOPUR 54D	**Energizer** NBR 70
			–22	+212	16.40	230	X-ECOPUR	NBR 70
			–4	+212	16.40	230	X-ECOPUR H	NBR 70
			–4	+212	16.40	230	X-ECOPUR S	NBR 70
			–4	+392	32.81	230	SKF Ecoflon 2,3,4	FPM 75
			–22	+212	32.81	230	SKF Ecoflon 2,3,4	NBR 70
			–67	+194	32.81	230	SKF Ecowear 1000	MVQ 70
			–22	+194	32.81	230	SKF Ecowear 1000	NBR 70
	A27-F	**Hydraulic/pneumatic, double-acting** 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).	–22	+212	16.40	230	**Glide ring** G-ECOPUR 54D	**Energizer** NBR 70
			–22	+212	16.40	230	X-ECOPUR	NBR 70
			–4	+212	16.40	230	X-ECOPUR H	NBR 70
			–4	+212	16.40	230	X-ECOPUR S	NBR 70
			–4	+392	32.81	230	SKF Ecoflon 2,3,4	FPM 75
			–22	+212	32.81	230	SKF Ecoflon 2,3,4	NBR 70
			–67	+194	32.81	230	SKF Ecowear 1000	MVQ 70
			–22	+194	32.81	230	SKF Ecowear 1000	NBR 70

[1] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches

Rotary seals

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

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max	Pressure max.	Material	
			°F		ft/s	psi	–	
	R01-P	**Single-acting rotary shaft seal** 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.	–22	+176	16.40[3]	7	**Seal** ECOPUR	**Energizer** SKF Ecotal[1]
			–31	+176	16.40[3]	7	ECOPUR LD	SKF Ecomid
			–22	+176	16.40[3]	7	G-ECOPUR	SKF Ecomid
			–4	+176	16.40[3]	7	H-ECOPUR	SKF Ecotal[1]
			–4	+176	19.69[3]	7	S-ECOPUR	SKF Ecotal[1]
			–40	+176	16.40[3]	7	T-ECOPUR	SKF Ecotal[1]
	R01-R	**Single-acting rotary shaft seal** 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.	+14	+392	32.81[3]	7	**Seal** SKF Ecoflas	**Energizer** Metal
			–13	+176	32.81[3]	7	SKF Ecorubber-H	SKF Ecotal[1]
			–22	+176	32.81[3]	7	SKF Ecorubber-1	SKF Ecotal[1]
			–4	+392	49.21[3]	7	SKF Ecorubber-2	Metal
			–58	+176	32.81[3]	7	SKF Ecorubber-3[2]	SKF Ecotal[1]
			–58	+302	32.81[3]	7	SKF Ecorubber-3[2]	Metal
			–58	+176	16.40[3]	3	SKF Ecosil	SKF Ecotal[1]
			–76	+392	16.40[3]	3	SKF Ecosil	Metal
	R01-AF	**Single-acting rotary shaft seal** Spring loaded lip seal with solid outer section for axially open housings with clamping plate fixation. Mainly used for rolling mills, large gear mechanisms in heavy duty machinery, for shipbuilding industry and civil engineering.	–22	+230	16.40[3]	7	ECOPUR	
			–31	+230	16.40[3]	7	ECOPUR LD	
			–22	+230	16.40[3]	7	G-ECOPUR	
			–4	+230	16.40[3]	7	H-ECOPUR	
			–4	+230	19.69[3]	7	S-ECOPUR	
			–58	+230	16.40[3]	7	T-ECOPUR	
			+14	+392	32.81[3]	7	SKF Ecoflas	
			–13	+302	32.81[3]	7	SKF Ecorubber-H	
			–22	+212	32.81[3]	7	SKF Ecorubber-1	
			–4	+392	49.21[3]	7	SKF Ecorubber-2	
			–58	+302	32.81[3]	3	SKF Ecorubber-3[2]	
			–76	+392	16.40[3]	3	SKF Ecosil	
	R01-AS	**Single-acting rotary shaft seal** Split version of a spring loaded lip seal with solid outer section for axially open housings with clamping plate fixation. Mainly used for repair purpose on rolling mills, large gear mechanisms in heavy duty machinery, for shipbuilding industry and civil engineering.	–22	+230	16.40[3]	7	ECOPUR	
			–31	+230	16.40[3]	7	ECOPUR LD	
			–22	+230	16.40[3]	7	G-ECOPUR	
			–4	+230	16.40[3]	7	H-ECOPUR	
			–4	+230	19.69[3]	7	S-ECOPUR	
			–58	+230	16.40[3]	7	T-ECOPUR	
			+14	+392	32.81[3]	7	SKF Ecoflas	
			–13	+302	32.81[3]	7	SKF Ecorubber-H	
			–22	+212	32.81[3]	7	SKF Ecorubber-1	
			–4	+392	49.21[3]	7	SKF Ecorubber-2	
			–58	+302	32.81[3]	3	SKF Ecorubber-3[2]	
			–76	+392	16.40[3]	3	SKF Ecosil	
	R01-F	**Single-acting rotary shaft seal** Spring loaded PTFE-lip seal for axially open housings with clamping plate fixation, elastic secondary seal or integrated O-ring necessary for static sealing in the housing. Excellent chemical and thermal resistance, allowable pressure and speed depend on each other, it is not recommended to use all maximum values simultaneously.	–4	+392	32.81[3]	210	**Seal** SKF Ecoflon 4	**O-Ring** FPM 75
			–22	+212	32.81[3]	210	SKF Ecoflon 4	NBR 70

[1] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[2] Not suitable for mineral oils
[3] Surface speed limit values are depending on heat dissipation ability of the sealing system (shaft diameter, lubrication, ...)

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°F		ft/s	psi	–	
	R02-P	**Single-acting rotary shaft seal** As profile R01-P, but with additional dust lip to avoid ingress of dust and dirt.	–22	+176	16.40[3]	7	**Seal** ECOPUR	**Energizer** SKF Ecotal[1]
			–31	+176	16.40[3]	7	ECOPUR LD	SKF Ecomid
			–22	+176	16.40[3]	7	G-ECOPUR	SKF Ecomid
			–4	+176	16.40[3]	7	H-ECOPUR	SKF Ecotal[1]
			–4	+176	19.69[3]	7	S-ECOPUR	SKF Ecotal[1]
			–40	+176	16.40[3]	7	T-ECOPUR	SKF Ecotal[1]
	R02-R	**Single-acting rotary shaft seal** As profile R01-R, but with additional dust lip to avoid ingress of dust and dirt.	+14	+392	32.81[3]	7	**Seal** SKF Ecoflas	**Energizer** Metal
			–13	+176	32.81[3]	7	SKF Ecorubber-H	SKF Ecotal[1]
			–22	+176	32.81[3]	7	SKF Ecorubber-1	SKF Ecotal[1]
			–4	+392	49.21[3]	7	SKF Ecorubber-2	Metal
			–58	+176	32.81[3]	7	SKF Ecorubber-3[2]	SKF Ecotal[1]
			–58	+302	32.81[]	7	SKF Ecorubber-3[2]	Metal
			–58	+176	16.40[3]	3	SKF Ecosil	SKF Ecotal[1]
			–76	+392	16.40[3]	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.	–22	+212	0.66	5,800	**Seal** ECOPUR	**Back-up rings** SKF Ecotal[1]
			–4	+212	0.66	5,800	H-ECOPUR	SKF Ecotal[1]
			–4	+212	0.98	5,800	S-ECOPUR	SKF Ecotal[1]
			–40	+212	0.66	5,800	T-ECOPUR	SKF Ecotal[1]
	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.	+14	+392	0.66	3,600	**Seal** SKF Ecoflas	**Back-up rings** SKF Ecopaek
			–13	+212	0.66	3,600	SKF Ecorubber-H	SKF Ecotal[1]
			–22	+212	0.66	3,600	SKF Ecorubber-1	SKF Ecotal[1]
			–4	+392	0.66	3,600	SKF Ecorubber-2	SKF Ecoflon 2
			–58	+302	0.66	3,600	SKF Ecorubber-3	SKF Ecoflon 2
			–40	+212	0.66	3,600	SKF Ecorubber-3	SKF Ecotal[1]
	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.	–22	+230	0.66	2,300	ECOPUR	
			–4	+230	0.66	2,300	H-ECOPUR	
			–4	+230	0.98	2,300	S-ECOPUR	
			–58	+230	0.66	2,300	T-ECOPUR	
			+14	+392	0.66	1,450	SKF Ecoflas	
			–13	+302	0.66	1,450	SKF Ecorubber-H	
			–22	+212	0.66	1,450	SKF Ecorubber-1	
			–4	+392	0.66	1,450	SKF Ecorubber-2	
			–58	+302	0.66	1,450	SKF Ecorubber-3[2]	
	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.	–22	+230	0.66	2,300	ECOPUR	
			–4	+230	0.66	2,300	H-ECOPUR	
			–4	+230	0.98	2,300	S-ECOPUR	
			–58	+230	0.66	2,300	T-ECOPUR	
			+14	+392	0.66	1,450	SKF Ecoflas	
			–13	+302	0.66	1,450	SKF Ecorubber-H	
			–22	+212	0.66	1,450	SKF Ecorubber-1	
			–4	+392	0.66	1,450	SKF Ecorubber-2	
			–58	+302	0.66	1,450	SKF Ecorubber-3[2]	

[1] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[2] Not suitable for mineral oils
[3] Surface speed limit values are depending on heat dissipation ability of the sealing system (shaft diameter, lubrication, ...)

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°F		ft/s	psi	–	
	R06-P	**Axially acting rotary seal** Elastic, excellent wear resistant V-Ring with interference fit on the shaft, rotates with the shaft, sealing axially against shaft collars, thrust blocks or the outer race of roller bearings, protecting the bearing against dust, dirt, oilsplash, watersplash and similar media. Acting as a seal and slinger ring.	–22	+230	82.02	–	ECOPUR	
			–31	+230	82.02	–	ECOPUR LD	
			–22	+230	82.02	–	G-ECOPUR	
			–4	+230	82.02	–	H-ECOPUR	
			–4	+230	82.02	–	S-ECOPUR	
			–58	+230	82.02	–	T-ECOPUR	
	R06-R	**Axially acting rotary seal** Elastic, good wear resistant V-Ring as profile R06-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	+14	+392	82.02	–	SKF Ecoflas	
			–13	+302	82.02	–	SKF Ecorubber-H	
			–22	+212	82.02	–	SKF Ecorubber-1	
			–4	+392	82.02	–	SKF Ecorubber-2	
			–58	+302	82.02	–	SKF Ecorubber-3[1]	
	R07-P	**Axially acting rotary seal** Elastic, excellent wear resistant V-Ring with interference fit on the shaft, rotates with the shaft, sealing axially against shaft collars, thrust blocks or the outer race of roller bearings, protecting the bearing against dust, dirt, oilsplash, watersplash and similar media. Acting as a seal- and slingerring.	–22	+230	82.02	–	ECOPUR	
			–31	+230	82.02	–	ECOPUR LD	
			–22	+230	82.02	–	G-ECOPUR	
			–4	+230	82.02	–	H-ECOPUR	
			–4	+230	82.02	–	S-ECOPUR	
			–58	+230	82.02	–	T-ECOPUR	
	R07-R	**Axially acting rotary seal** Elastic, good wear resistant V-Ring as profile R07-P, but easily adaptable for diverse temperatures and media by selection of suitable seal material.	+14	+392	82.02	–	SKF Ecoflas	
			–13	+302	82.02	–	SKF Ecorubber-H	
			–22	+212	82.02	–	SKF Ecorubber-1	
			–4	+392	82.02	–	SKF Ecorubber-2	
			–58	+302	82.02	–	SKF Ecorubber-3[1]	
	R08-A	**Single-acting rotary seal** Springless rotary lip seal with arbitrary preload on inside and outside diameter in order to design the seal to different specific needs.	[2]		[2]	[2]	[2]	
	R09-F	**Double-acting rotary seal** O-ring activated, low friction PTFE rotary seal. Mainly used in applications with alternating pressure from one side of the seal to the other, such as hose reels, swivel joints, rotating track rings and machine tool hydraulics. Good chemical and thermal resistance achievable by selection of suitable O-ring material.	–4	+392	1.31	5,000	**Glide ring** SKF Ecoflon 4	**Energizer** FPM 75
			–22	+212	1.31	5,000	SKF Ecoflon 4	NBR 70

[1] Not suitable for mineral oils

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°F		ft/s	psi	–	
	R09-FS	**Double-acting rotary seal** As profile R09-F, but with a profile ring energizer instead of the O-ring. For heavy duty applications and non-standard housings.	–22 –4	+212 +392	1.31 1.31	5,000 5,000	**Glide ring** SKF Ecoflon 4 SKF Ecoflon 4	**Energizer** SKF Ecorubber-1 SKF Ecorubber-2
	R10-F	**Double-acting rotary seal** O-ring activated, low friction PTFE rotary seal. Mainly used in applications with alternating pressure from one side of the seal to the other, such as hose reels, swivel joints, rotating track rings and machine tool hydraulics. Good chemical and thermal resistance achievable by selection of suitable O-ring material.	–4 –22	+392 +212	1.31 1.31	5,000 5,000	**Glide ring** SKF Ecoflon 4 SKF Ecoflon 4	**Energizer** FPM 75 NBR 70
	R10-FS	**Double-acting rotary seal** As profile R10-F, but with a profile ring energizer instead of the O-ring. For heavy duty applications and non-standard housings.	–22 –4	+212 +392	1.31 1.31	5,000 5,000	**Glide ring** SKF Ecoflon 4 SKF Ecoflon 4	**Energizer** SKF Ecorubber-1 SKF Ecorubber-2
	R11-F	**Single-acting PTFE rotary seal** Space saving rotary seal, deformed sealing lip acts self-adjusting on increasing temperature. For axially open housings with clamping plate fixation, elastic secondary seal or integrated O-ring necessary for static sealing in the housing. Excellent chemical and thermal resistance, suitable for high speed applications.	–328	+500	65.62	70	SKF Ecoflon 2,3,4	
	R12-F	**Single-acting PTFE flange seal** Fingerspring activated flange seal, excellent chemical and thermal resistance, mainly used on flanges, fittings or pivoting joints in chemical industry.	–328	+500	3.28	4,300	**Seal** SKF Ecoflon 1,2,3,4	**Spring** 1.4310[2]
	R13	**O-ring** Well known, simple O-ring with proven reliability in multiple applications in every sector of industry. Excellent adaptation possibilities for diverse temperatures and media by selection of suitable seal material. Mainly used as static seal or as preloading element for PTFE-seals. For most dynamic applications, we recommend to use S20/K20 or S35/K35.	–22 –31 –22 –4 –4 –58 +14 –13 –22 –4 –58 –76 –328	+230 +230 +230 +230 +230 +230 +392 +302 +212 +392 +302 +392 +500	– – – – – – – – – – – – –	8,700 8,700 8,700 8,700 8,700 8,700 2,300 2,300 2,300 2,300 2,300 2,300 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[1] SKF Ecosil SKF Ecoflon 1	

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

Rotary seals

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material	
			°F		ft/s	psi	–	
	R14	**Square ring** Well-known, simple square ring, mainly used for static applications or as gaskets. Excellent adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	2)		2)	2)	2)	
	R15-P	**Double-acting static seal** For static applications as an O-ring replacement to avoid drilling in the housing, simple installation and higher extrusion resistance.	–22 –31 –22 –4 –4 –58	+230 +230 +230 +230 +230 +230	– – – – – –	5,800 5,800 5,800 5,800 5,800 5,800	ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	
	R16	**Double-acting static seal** For static and dynamic applications as an O-ring replacement in radial and axial grooves.	+14 –13 –22 –4 –58	+392 +302 +230 +392 +302	– – – – –	3,600 3,600 3,600 3,600 3,600	SKF Ecoflas SKF Ecorubber-H SKF Ecorubber-1 SKF Ecorubber-2 SKF Ecorubber-3[1]	
	R19-F	**Single-acting PTFE rotary seal** Fingerspring activated PTFE seal with integrated clamping flange on the back of seal for clamping fixation, acting as anti-twist device. Excellent chemical and thermal resistance. Suitable for relatively high pressure and high speed, however, allowable pressure and speed depend on each other. It is not recommended to use all maximum values simultaneously.	–328	+500	6.56	2,100	**Seal** SKF Ecoflon 1,2,3,4	**Spring** 1.4310[4]
	R20-P	**Single-acting flange seal** Flange seal for static applications, suitable for high pressure range. Direction of pressurization (from inside or outside) must be indicated when ordering the seal.	–22 –31 –22 –4 –4 –58	+230 +230 +230 +230 +230 +230	– – – – – –	11,600 11,600 11,600 11,600 11,600 11,600	ECOPUR ECOPUR LD G-ECOPUR H-ECOPUR S-ECOPUR T-ECOPUR	
	R30-A	**Valve stem seal with PTFE jacket** For low friction, rubber energizer automatically increases preload as it senses leakage. Mainly used as valve seal in oil industry/offshore applications.	–13 –13 –4 –4	+392 +212 +392 +212	1.64 1.64 1.64 1.64	14,500 7,200 14,500 7,200	**Seal** SKF Ecorubber-H SKF Ecorubber-H SKF Ecorubber-2 SKF Ecorubber-2	**Cover** SKF Ecoflon[3] SKF Ecoflon[3] SKF Ecoflon[3] SKF Ecoflon[3]	**Back-up ring** SKF Ecopaek SKF Ecotal[5] SKF Ecopaek SKF Ecotal[5]

[1] Not suitable for mineral oils
[2] Depending on the application. Contact SKF for more information
[3] For all types of SKF Ecoflon, refer to material properties on **page 12**
[4] Spring metal material specification
[5] SKF Ecotal up to Ø 10.24 inches, SKF Ecomid above Ø 10.24 inches

Rotary seals

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Pressure max.	Material
			°F		ft/s	psi	–
	R35-A	**Single-acting flange seal** Flange seal for static applications, suitable for high pressure range. Direction of pressurization (from inside or outside) must be indicated when ordering the seal.	–22	+230	–	11,600	ECOPUR
			–31	+230	–	11,600	ECOPUR LD
			–22	+230	–	11,600	G-ECOPUR
			–4	+230	–	11,600	H-ECOPUR
			–4	+230	–	11,600	S-ECOPUR
			–58	+230	–	11,600	T-ECOPUR
			+14	+392	–	3,600	SKF Ecoflas
			–13	+302	–	3,600	SKF Ecorubber-H
			–22	+212	–	3,600	SKF Ecorubber-1
			–4	+392	–	3,600	SKF Ecorubber-2
			–58	+302	–	3,600	SKF Ecorubber-3[1]
			–76	+392	–	3,600	SKF Ecosil

[1] Not suitable for mineral oils

Guide rings

Linear moving · Rotating · Oscillating · Spiral moving · Static

Grey symbols: contact SKF for application limitations

Appli-cation	Profile	Description	Temperature min.	Temperature max.	Speed max.	Specific load[3] max.	Material
			°F		ft/s	psi	–
	F01	**Guide ring F01** Most common guide ring for rod or piston application. Used in many standard cylinders, majority of applications require split version for installation into closed housings, non split design available (bushings).	–328	+392	13.12	435	SKF Ecoflon 2
			–328	+392	16.40	653	SKF Ecoflon 3
			–58	+212	13.12	3,626	SKF Ecotal[1]
			–40	+120	3.28	13,053	SKF Ecotex[2]
	F02	**Guide ring F02** For rod or piston application, split and non split design available. Not only used as guide ring, also as plain washer or spacer.	–328	+392	13.12	435	SKF Ecoflon 2
			–328	+392	16.40	653	SKF Ecoflon 3
			–58	+212	13.12	3,626	SKF Ecotal[1]
	F03	**Guide ring F03** For piston application. Angled design combines guide ring and back-up ring function. Split and non split design available.	–328	+392	13.12	435	SKF Ecoflon 2
			–328	+392	16.40	653	SKF Ecoflon 3
			–58	+212	13.12	3,626	SKF Ecotal[1]
	F04	**Guide ring F04** Same as profile F03 but for rod application.	–328	+392	13.12	435	SKF Ecoflon 2
			–328	+392	16.40	653	SKF Ecoflon 3
			–58	+212	13.12	3,626	SKF Ecotal[1]
	F05	**Guide ring F05** With integrated collar on inside diameter, for piston application. Split and non split design available.	–328	+392	13.12	435	SKF Ecoflon 2
			–328	+392	16.40	653	SKF Ecoflon 3
			–58	+212	13.12	3,626	SKF Ecotal[1]
	F06	**Guide ring F06** With integrated collar on outside diameter, for rod application. Split and non split design available.	–328	+392	13.12	435	SKF Ecoflon 2
			–328	+392	16.40	653	SKF Ecoflon 3
			–58	+212	13.12	3,626	SKF Ecotal[1]

[1] SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
[2] Special fabric reinforced material, available as a guide tape only
[3] 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 min.	Temperature max.	Speed max.	Specific load[2] max.	Material
			°F		ft/s	psi	–
	F07	**Guide ring F07** With groove on inside diameter, for piston application. Split and non split design available.	–328 –328 –58	+392 +392 +212	13.12 16.40 13.12	435 653 3,626	SKF Ecoflon 2 SKF Ecoflon 3 SKF Ecotal[1]
	F08	**Guide ring F08** With groove on outside diameter, for rod application. Split and non split design available.	–328 –328 –58	+392 +392 +212	13.12 16.40 13.12	435 653 3,626	SKF Ecoflon 2 SKF Ecoflon 3 SKF Ecotal[1]

1) SKF Ecotal up to ∅ 10.24 inches, SKF Ecomid above ∅ 10.24 inches
2) Depending on temperature and allowable compression. Contact SKF for more information

Appli-cation	Profile	Description	Temperature min.	max.	Material
			°F		–
	ST08	**Back-up ring** Common inactive back-up ring, mainly used with O-rings to avoid gap extrusion. Split and non split design available.	–94	+230	ECOPUR
			–94	+230	ECOPUR LD
			–94	+230	G-ECOPUR
			–94	+230	G-ECOPUR 54D
			–94	+230	H-ECOPUR
			–94	+230	S-ECOPUR
			–94	+230	T-ECOPUR
			–94	+230	X-ECOPUR
			–94	+230	X-ECOPUR H
			–94	+230	X-ECOPUR S
			–328	+500	SKF Ecoflon 1
			–328	+500	SKF Ecoflon 2
			–40	+212	SKF Ecomid[2)]
			–148	+500	SKF Ecopaek
			–58	+212	SKF Ecotal[1)]
	ST09	**Back-up ring** Common inactive back-up ring especially for O-rings to avoid gap extrusion. Split and non split design available.	–94	+230	ECOPUR
			–94	+230	ECOPUR LD
			–94	+230	G-ECOPUR
			–94	+230	G-ECOPUR 54D
			–94	+230	H-ECOPUR
			–94	+230	S-ECOPUR
			–94	+230	T-ECOPUR
			–94	+230	X-ECOPUR
			–94	+230	X-ECOPUR H
			–94	+230	X-ECOPUR S
			–328	+500	SKF Ecoflon 1
			–328	+500	SKF Ecoflon 2
			–40	+212	SKF Ecomid[2)]
			–148	+500	SKF Ecopaek
			–58	+212	SKF Ecotal[1)]
	ST10	**Back-up ring** Standard active back-up ring for piston seal type PD. Normally already included in PD-type seal profiles, designed for automatic pressure activation. Split and non split design available.	–328	+500	SKF Ecoflon 2
			–40	+212	SKF Ecomid[2)]
			–148	+500	SKF Ecopaek
			–58	+212	SKF Ecotal[1)]
	ST11	**Back-up ring** Standard active back-up ring for rod seal type PD. Normally already included in PD-type seal profiles, designed for automatic pressure activation. Split and non split design available.	–328	+500	SKF Ecoflon 2
			–40	+212	SKF Ecomid[2)]
			–148	+500	SKF Ecopaek
			–58	+212	SKF Ecotal[1)]
	ST12	**Back-up ring** Triangular back-up ring for rod applications, fits in special shaped housings (see seal data sheets). Also used as integrated active back-up ring in special high pressure or low friction seal profiles. Split and non split design available.	–328	+500	SKF Ecoflon 2
			–40	+212	SKF Ecomid[2)]
			–148	+500	SKF Ecopaek
			–58	+212	SKF Ecotal[1)]

[1)] Up to ∅ 10.24 inches
[2)] Above ∅ 10.24 inches

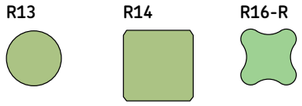
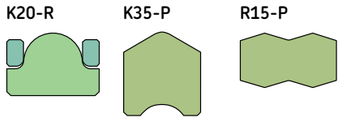
Back-up rings

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

Appli-cation	Profile	Description	Temperature min.	max.	Material
			°F		–
	ST13	**Back-up ring** Triangular back-up ring for piston applications, fits in special shaped housings (see seal data sheets). Also used as integrated active back-up ring in special high pressure or low friction seal profiles. Split and non split design available.	–328	+500	SKF Ecoflon 2
			–40	+212	SKF Ecomid[2)]
			–148	+500	SKF Ecopaek
			–58	+212	SKF Ecotal[1)]

[1)] Up to ∅ 10.24 inches
[2)] Above ∅ 10.24 inches

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

Appli-cation	Profile	Description
		**Universal type** Most common and simple seal profiles with proven reliability in a wide range of different applications and industries.
		**Inside sealing type** Interference fit on outside diameter provides stable fit in the housing and reliable performance at all pressures.
		**Outside sealing type** Interference fit on inside diameter provides stable fit in the housing and reliable performance at all pressures.
		**Axial sealing type** 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.

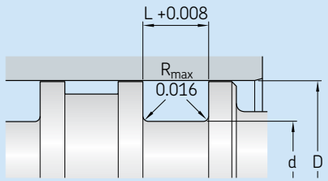
Appli-cation	Profile	Description
		**Tailor-made solutions** These special profiles are just some examples of SKF's wide and flexible machining capabilities.

Piston seal housing details and recommendations

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

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

Suggested standard housing dimension

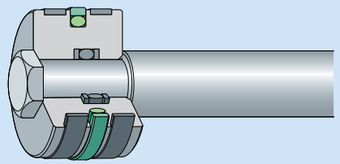


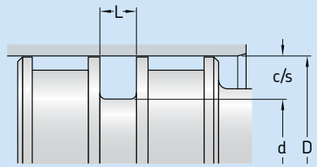
Indicated dimensions are required to process an order
D bore diameter
d housing groove diameter
L housing groove length
c/s cross section

	Surface properties $R_{t\,max}$	R_a
	µin	
Sliding surface for		
TPU/rubber seals	≤ 98.5	≤ 3.9–19.7
PTFE seals	≤ 78.8	≤ 2.0–11.8
Groove bottom	≤ 248.2	≤ 63.0
Groove face	≤ 591.0	≤ 118.2
Bearing area T_p	50–95%[1)]	

Seal housing tolerances
D H9
d h10

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





K08-D K08-P K08-E

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

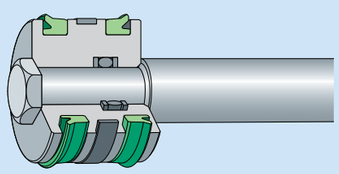
Main applications
Standard cylinders for positioning functions, mobile hydraulics, etc.

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

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

Bore diameter D over	incl.	Housing groove diameter d	Housing groove length L	Cross section c/s
in		in	in	in
0.31	0.59	D – 0.19	0.09	0.10
0.59	1.57	D – 0.30	0.13	0.15
1.57	3.15	D – 0.43	0.17	0.22
3.15	5.24	D – 0.61	0.25	0.31
5.24	12.99	D – 0.83	0.32	0.41
12.99	26.38	D – 0.96	0.32	0.48
26.38	39.37	D – 1.10	0.37	0.55[1)]
39.37		D – 1.50	0.37	0.75[1)]

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



K01 K02 K03 K04 K05 K06 K07 K21

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

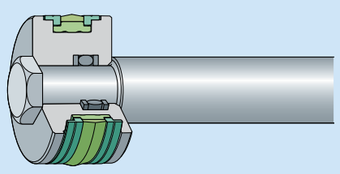
Main applications
Support and retaining cylinders, standard cylinders.

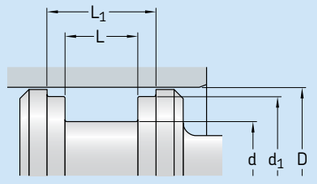
Advantages
Stable fit in the housing, ultimate sealing effect, wide temperature range.

Standard materials
ECOPUR, SKF Ecorubber (all types).

Bore diameter D over	incl.	Housing groove diameter d	Housing groove length L	Cross section c/s
in		in	in	in
0.55	0.98	D – 0.32	0.24	0.16
0.98	1.97	D – 0.39	0.28	0.20
1.97	2.95	D – 0.47	0.32	0.24
2.95	5.91	D – 0.59	0.39	0.30
5.91	11.81	D – 0.79	0.47	0.39
11.81	19.69	D – 0.98	0.71	0.49
19.69	29.53[1)]	D – 1.18	0.79	0.59
29.53[1)]		D – 1.57	1.02	0.79

[1)] Not all profiles are available above 23.62 inches





K09-H

Main function
Double-acting piston seal, compact type.

Main applications
Support and retaining cylinders, standard cylinders.

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

Standard materials
ECOPUR / SKF Ecorubber / SKF Ecotal.

Bore diameter D over	incl.	Housing groove diameter d	d_1	Housing groove length $L^{1)}$	L_1[1)]
in		in		in	
0.79	1.97	D – 0.39	D – 0.12	0.49	0.81
1.97	3.15	D – 0.59	D – 0.16	0.79	1.10
3.15	5.91	D – 0.79	D – 0.20	0.98	1.42
5.91	15.75	D – 0.98	D – 0.24	1.26	1.81
15.75		D – 1.18	D – 0.31	1.42	1.97

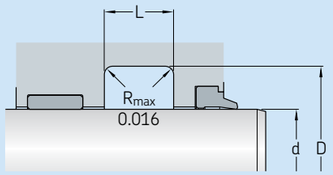
[1)] Not valid for profile K09-H

Rod seal housing details and recommendations

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

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

Suggested standard housing dimension

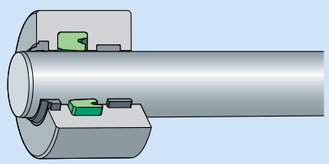


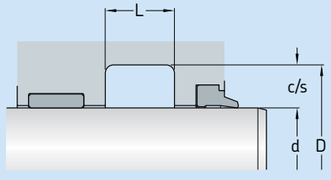
Indicated dimensions are required to process an order
D housing groove diameter
d rod diameter
L housing groove length
c/s cross section

	Surface properties $R_{t\,max}$	R_a
	µin	
Sliding surface for		
TPU/rubber seals	≤ 98.5	≤ 3.9–19.7
PTFE seals	≤ 78.8	≤ 2.0–11.8
Groove bottom	≤ 248.2	≤ 63.0
Groove face	≤ 591.0	≤ 118.2
Bearing area T_p	50–95%[1]	

Seal housing tolerances
D H10
d f8

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





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

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

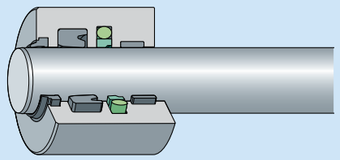
Main applications
Standard cylinders, light and standard hydraulic applications.

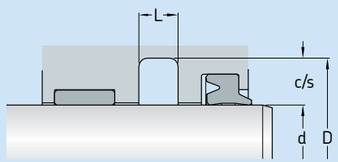
Advantages
Stable fit in the housing,
ultimate sealing effect,
wide temperature range,
good backpumping ability.

Standard materials
ECOPUR, SKF Ecorubber (all types)

Rod diameter d over	incl.	Housing groove diameter D	Housing groove length L	Cross section c/s
in		in	in	in
0.20	0.98[1]	d + 0.32	0.25	0.16
0.98	1.97	d + 0.39	0.31	0.20
1.97	5.91	d + 0.59	0.39	0.30
5.91	11.81	d + 0.79	0.55	0.39
11.81	19.69	d + 0.98	0.67	0.49
19.69	27.56[2]	d + 1.18	0.98	0.59
27.56	39.37[2]	d + 1.57	1.26	0.79
39.37		d + 1.57	1.26	0.79

[1] Restrictions in minimum diameter for profiles with back-up rings. Please consult our technical department for exact limitations.
[2] Not all profiles available above 23.62 inches





S09-E **S09-P** **S09-D**

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

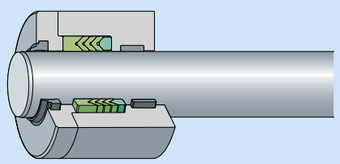
Main applications
Earth moving equipment,
heavy hydraulics.

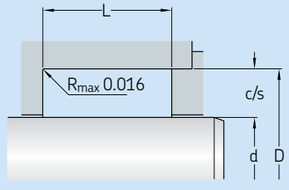
Advantages
Excellent resistance against pressure shocks, long lifetime.

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

Rod diameter d over	incl.	Housing groove diameter D	Housing groove length L	Cross section c/s
in		in	in	in
0.20	0.31	d + 0.19	0.09	0.10
0.31	0.75	d + 0.29	0.13	0.14
0.75	1.50	d + 0.42	0.17	0.21
1.50	7.87	d + 0.59	0.25	0.30
7.87	10.08	d + 0.80	0.32	0.40
10.08	25.59[1]	d + 0.94	0.32	0.47
25.59	39.37[1]	d + 1.08	0.37	0.54
39.37		d + 1.08	0.37	0.54

[1] Not all profiles available above 600 mm





S1012 **S1315**

Main function
Single-acting rod seals,
chevron packings.

Main applications
Heavy industry hydraulics, presses.

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

Standard materials
ECOPUR / SKF Ecotal.

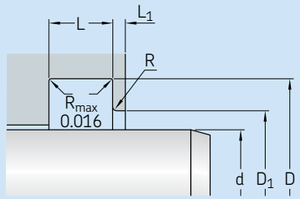
Rod diameter d over	incl.	Housing groove diameter D	Housing groove length L	Cross section c/s
in		in	in	
0.39	1.57	d + 0.39	0.63	0.20
1.57	2.95	d + 0.59	0.98	0.30
2.95	5.91	d + 0.79	1.26	0.39
5.91	7.87	d + 0.98	1.57	0.49
7.87	11.81	d + 1.18	1.97	0.59
11.81		d + 1.57	2.48	0.79

Wiper housing details and recommendations

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

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

Suggested standard housing dimension

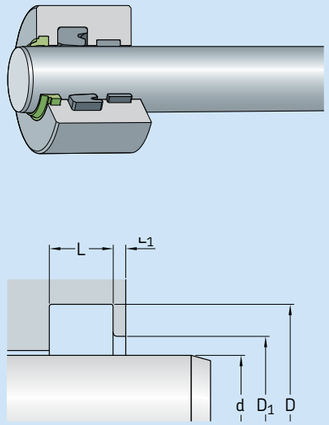


Indicated dimensions are required to process an order

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

	Surface properties $R_{t\,max}$	R_a
	µin	
Sliding surface for		
TPU/rubber seals	≤ 98.5	≤ 3.9–19.7
PTFE seals	≤ 78.8	≤ 2.0–11.8
Groove bottom	≤ 248.2	≤ 63.0
Groove face	≤ 591.0	≤ 118.2
Bearing area T_p	50–95%[1)]	
Seal housing tolerances		
D_1 H11	L < 0.39in +0.01	
D H11	L > 0.39in +0.01	

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



A01 **A04**

Main function
Single-acting wipers.

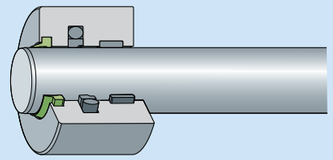
Main applications
Standard wiper for hydraulics.

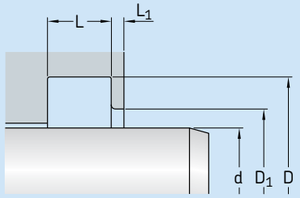
Advantages
Easy installation (snap-in), excellent wear resistance, technically accurate closure.

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

Rod diameter d over	incl.	Housing groove diameter D	D_1	Housing groove width L	L_1	Total wiper height H
in		in		in		in
0.24	3.94	d + 0.32	d + 0.24	0.16	0.04	0.275
3.94	5.91	d + 0.47	d + 0.35	0.22	0.06	0.394
5.91		d + 0.59	d + 0.43	0.22	0.08	0.312

SKF





A02 **A05** **A11**

Main function
Single/double-acting wipers.

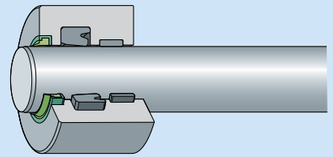
Main applications
In combination with O-ring activated PTFE rod seals (S09).

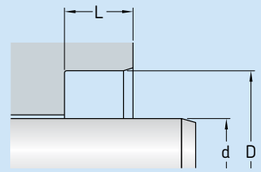
Advantages
Excellent wear resistance, double-acting function.

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

Rod diameter d over	incl.	Housing groove diameter D	D_1	Housing groove width L	L_1 min	Total wiper height H
in		in		in		in
0.24	1.97	d + 0.32	d + 0.16	0.20	0.08	0.315
1.97	3.94	d + 0.39	d + 0.20	0.24	0.08	0.382
3.94		d + 0.59	d + 0.28	0.33	0.08	0.512

C





A03 **A06**

Main function
Single-acting wipers.

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

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

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

Rod diameter d over	incl.	Housing groove diameter D	Housing groove width L	Total wiper height H
in		in	in	
0.24	0.39	d + 0.32	0.20	0.31
0.39	3.94	d + 0.39	0.28	0.39
3.94	7.87	d + 0.59	0.35	0.47
7.87		d + 0.79	0.47	0.63

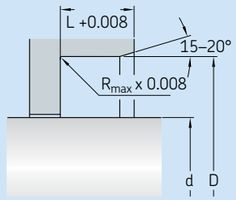
SKF

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

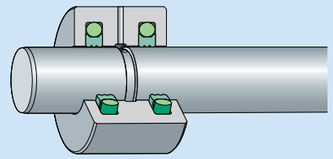


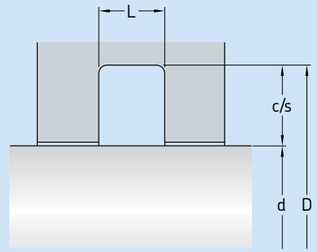
Indicated dimensions are required to process an order
D housing groove diameter
d shaft diameter
L housing groove length
c/s cross section

	Surface properties $R_{t\,max}$	R_a
	µin	
Sliding surface for		
TPU/rubber seals	≤ 98.5	≤ 3.9–19.7
PTFE seals	≤ 78.8	≤ 2.0–11.8
Groove bottom	≤ 248.2	≤ 63.0
Groove face	≤ 591.0	≤ 118.2
Bearing area T_p	50–95%[1)]	

Seal housing tolerances
depending on seal profile

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





R09

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

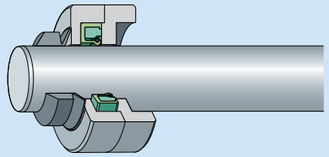
Main applications
Rotary pivots.

Advantages
For high pressure.

Standard materials
SKF Ecoflon NBR or FKM.

Shaft diameter d over	incl.	Housing groove diameter D	Housing groove length L	Cross section c/s
in		in	in	in
0.24	0.75	d + 0.19	0.09	0.10
0.75	1.50	d + 0.30	0.13	0.15
1.50	7.87	d + 0.43	0.17	0.22
7.87	10.08	d + 0.61	0.25	0.31
10.08	25.59	d + 0.83	0.32	0.41
25.59		d + 1.10	0.37	0.55

C



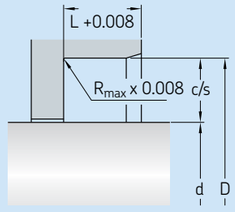
R01 **R02**

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

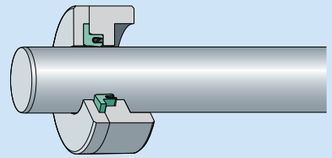
Main applications
Bearing protection.

Advantages
Easily adaptable for diverse temperatures and media.

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



Shaft diameter d over	incl.	Housing groove diameter D	Housing groove length L	Cross section c/s
in		in	in	in
0.24	2.36	d + 0.47	0.28	0.24
2.36	5.51	d + 0.59	0.31	0.30
5.51	11.81	d + 0.79	0.39	0.39
11.81	19.69	d + 1.18	0.47	0.59
19.69	31.50	d + 1.57	0.79	0.79
31.50		d + 1.97	0.87	0.98



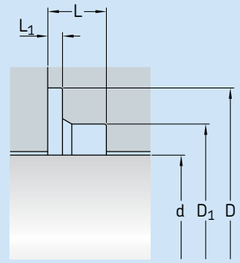
R19

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.



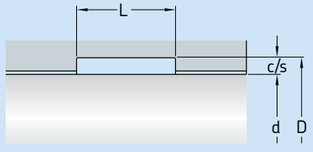
Shaft diameter d over	incl.	Housing groove diameter D	D_1	Housing groove length L	L_1
in		in		in	
0.20	0.79	d + 0.35	d + 0.20	0.14	0.03
0.79	1.57	d + 0.51	d + 0.28	0.19	0.05
1.57	15.75	d + 0.69	d + 0.41	0.28	0.07
15.75		d + 0.87	d + 0.55	0.37	0.11

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

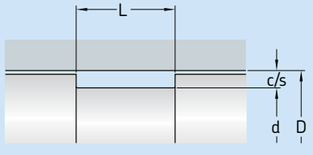
D H9
d f8
L +0.008



F01

Main function
Rod guide rings

Rod diameter d over	incl.	Housing groove diameter D	Housing groove length L	Cross section c/s
in		in	in	in
0.24	1.18	d + 0.12	0.16	0.06
1.18	1.97	d + 0.12	0.22	0.06
1.97	3.94	d + 0.20	0.38	0.10
3.94	31.50	d + 0.20	0.59	0.10
31.50	39.37	d + 0.31	0.98	0.16
39.37		d + 0.31	0.98	0.16



F01

Main function
Piston guide rings

Bore diameter D over	incl.	Housing groove diameter d	Housing groove length L	Cross section c/s
in		in	in	in
0.24	1.18	D – 0.12	0.16	0.06
1.18	1.97	D – 0.12	0.22	0.06
1.97	3.94	D – 0.20	0.38	0.10
3.94	31.50	D – 0.20	0.59	0.10
31.50	39.37	D – 0.31	0.98	0.16
39.37		D – 0.31	0.98	0.16

SKF

O-ring housing details and recommendations

Housing tolerances
f7 / H8

Bearing area
50–95% at a cutting depth of 0.5 R_z
based on C_{ref} = 0%

Surface	Surface roughness Pressure constant R_{tmax}	R_a	pulsating R_{tmax}	R_a
–	µin		µin	
Sliding surface[1)]	492.5	126.1	248.2	63.0
Bottom of groove[2)]	492.5	126.1	248.2	63.0
Groove face	492.5	126.1	248.2	63.0

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

O-ring housing recommendations for static applications

Direction of pressure

Direction of pressure

Direction of pressure

Cord d	Groove t +0.002	Without back-up ring L +0.010	One back-up ring L_1 +0.010	Two back-up rings L_2 +0.010	Recommended back-up ring width
in	in	in	in	in	in
0.06	0.04	0.08	0.12	0.16	0.04
0.07	0.05	0.10	0.14	0.18	0.04
0.08	0.06	0.11	0.17	0.22	0.06
0.10	0.08	0.13	0.19	0.25	0.06
0.10	0.09	0.14	0.20	0.26	0.06
0.12	0.10	0.15	0.21	0.27	0.06
0.14	0.12	0.17	0.23	0.29	0.06
0.14	0.12	0.17	0.23	0.29	0.06
0.16	0.13	0.20	0.26	0.33	0.07
0.20	0.17	0.25	0.31	0.38	0.07
0.21	0.18	0.26	0.33	0.40	0.07
0.22	0.19	0.28	0.36	0.44	0.08
0.24	0.20	0.30	0.37	0.45	0.08
0.28	0.23	0.35	0.43	0.50	0.08
0.28	0.23	0.35	0.43	0.50	0.08
0.31	0.27	0.39	0.49	0.59	0.10
0.39	0.33	0.49	0.59	0.69	0.10

SKF

PUB SE/P2 15235 EN.US · March 2015

This publication supersedes publication 11300.