

Machined seals – Selection guides

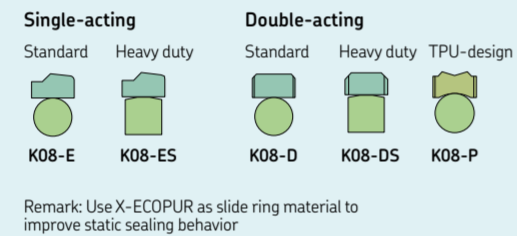
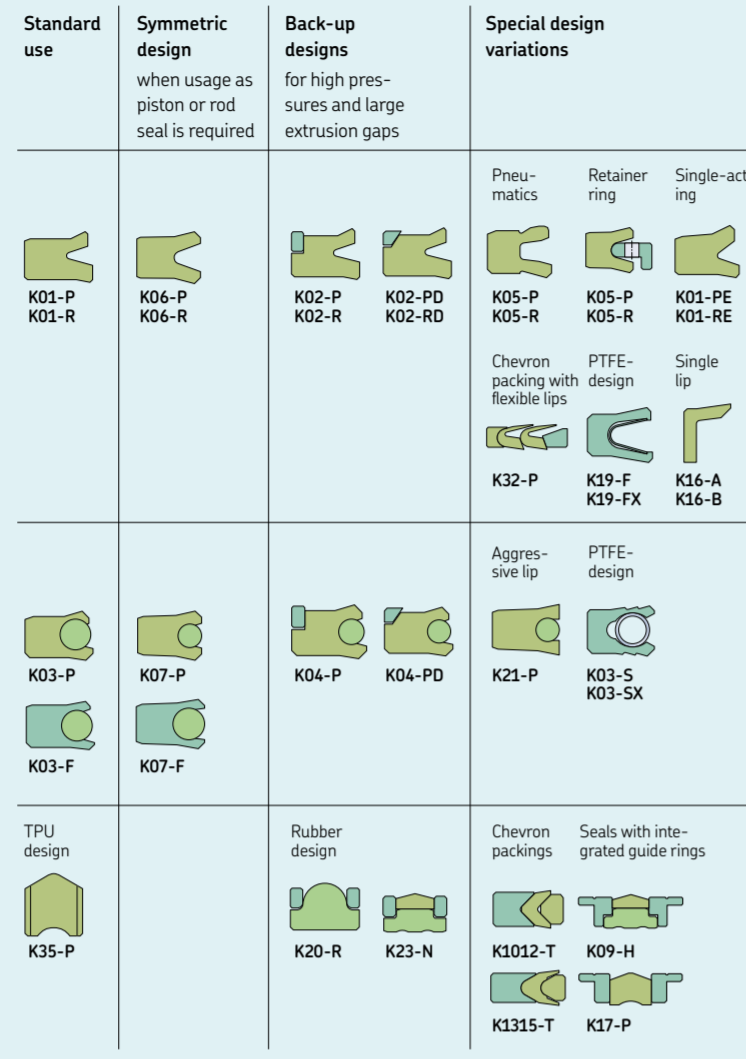
Piston seals

Unloaded lip seal designs
Lip seals without compact compression to minimize friction. Especially in the low pressure ranges the contact force is increased by the system pressure when it is needed. Typically for applications with frequent movement; focus on low friction and leak tightness.

Loaded lip seal designs
Lip seals with a softer energizer in between (compact compressed) are typical for applications with increased side loads and/or low temperatures; focus on leak tightness. Seals made of PTFE need energizer elements for operation.

Compact seal designs
Traditional compact seal design typically used in hydraulic cylinders; simple design also often used as static seals; dynamic seals use slide elements for improved frictional behaviour.

Activated slide ring designs
Mainly used in dynamic applications, allowing very good sliding properties and low break-away forces.



Remark: Use X-ECOPUR as slide ring material to improve static sealing behavior

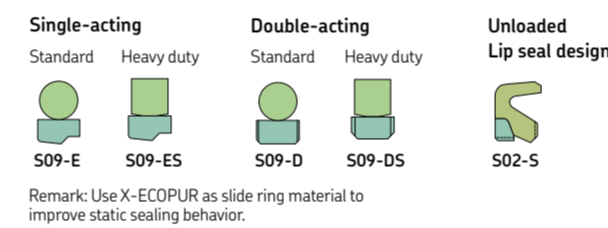
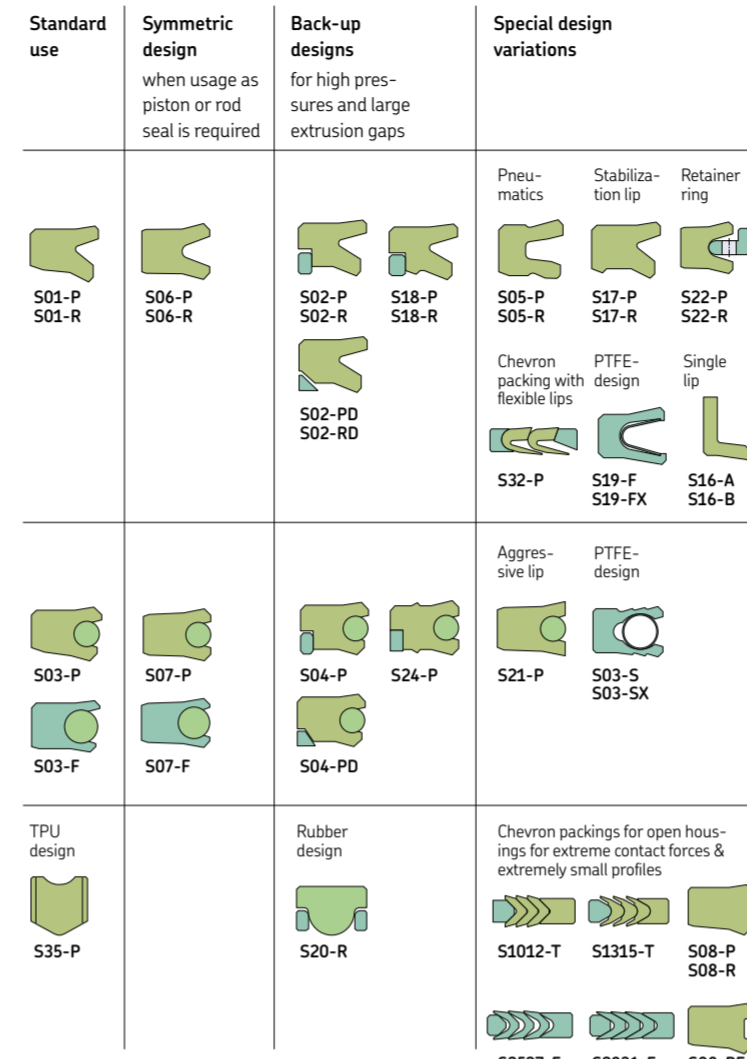
Rod seals

Unloaded lip seal designs
Lip seals without compact compression to minimize friction. Especially in the low pressure ranges the contact force is increased by the system pressure when it is needed. Typical for applications with frequent movement; focus on low friction and leak tightness.

Loaded lip seal designs
Lip seals with a softer energizer in between (compact compressed) are typical for applications with increased side loads and/or low temperatures; focus on leak tightness. Seals made of PTFE need energizer elements for operation.

Compact seal designs
Traditional compact seal design typically used in hydraulic cylinders; simple design also often used as static seals; dynamic seals use slide elements for improved frictional behaviour.

Activated slide rings & tandem seal designs
Mainly used in dynamic applications, allowing very good sliding properties and low break-away forces.



Remark: Use X-ECOPUR as slide ring material to improve static sealing behavior.

Wiper seals

Single-acting design Hydraulic
Single-acting wiper seals for hydraulics are typically used in light to medium duty applications, where the rod sealing system has very good leak tightness and the back pumping effect is not disturbed by the presence of back-up rings. The different variations are typically based on the housing types.

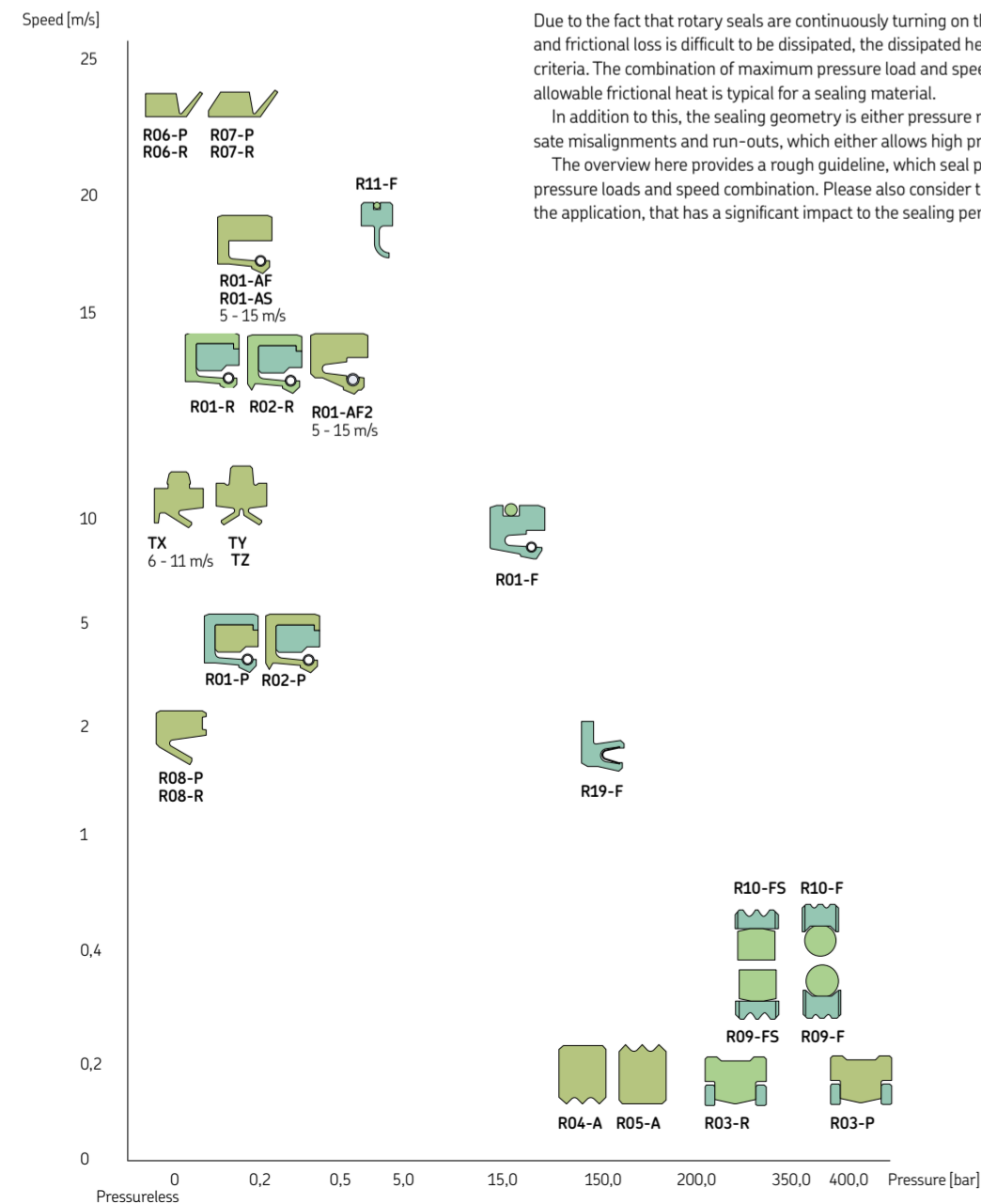
Single-acting design Pneumatic
Single-acting wiper seals for pneumatics are typically used in light to medium duty applications, where the sealing system requires a separate rod seal. The different variations are typically based on the housing types.

Double-acting design Hydraulic & Pneumatic
Double-acting wiper seals for hydraulics are typically used in medium to heavy duty applications, where the rod sealing system could have small leakage and/or the back-pumping effect is disturbed by a back-up ring. Double-acting wiper seals for pneumatics are used as a complete solution for light duty applications, where the function of the rod and the wiper seals can be combined.

Special wiper
Sometimes it is not enough to keep dust, dirt and contamination out of the sealing system. Therefore scrapers or a rod seal oriented outside the cylinder need to be used as a wiper seal.



Rotary seals



Due to the fact that rotary seals are continuously turning on the same position of the shaft and frictional loss is difficult to be dissipated, the dissipated heat is the most important design criteria. The combination of maximum pressure load and speed, which is representing the allowable frictional heat is typical for a sealing material.
In addition to this, the sealing geometry is either pressure resistant or flexible to compensate misalignments and run-outs, which either allows high pressure loads or high speeds.
The overview here provides a rough guideline, which seal profile can be used in the single pressure loads and speed combination. Please also consider the heat dissipation capability of the application, that has a significant impact to the sealing performance.

Materials overview

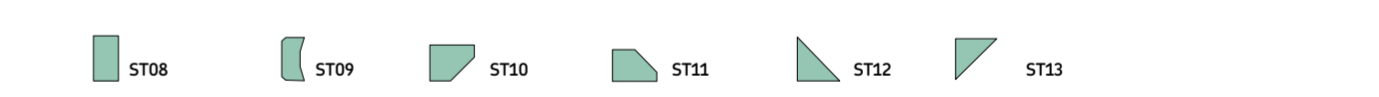
Material colour	Shore A/D hardness	Operating temperature, °C			Mineral oils HL, HLP, HVLP						
		min.	max.	short	60 °C	100 °C	40 °C	60 °C	40 °C	60 °C	
Elastomers, polyurethanes ECOPUR Polyurethane (TPU) 95/48 -30 110 125 A B B D B D T-ECOPUR Polyurethane (TPU) 95/48 -50 100 120 A B B D B D H-ECOPUR Polyurethane (TPU) 95/48 -20 110 125 A A A A A A S-ECOPUR Polyurethane (TPU) 95/48 -20 110 125 A A A A A A ECOPUR LD Cast polyurethane (CPU) 95/48 -35 110 125 A B B D B D G-ECOPUR Cast polyurethane (CPU) 95/47 -30 110 125 A A A A A A X-ECOPUR Hard grade polyurethane (TPU) 97/57 -30 115 130 A A B B D B D X-ECOPUR H Hard grade polyurethane (TPU) 97/60 -20 115 130 A A A A A A X-ECOPUR S Hard grade polyurethane (TPU) 96/58 -20 115 130 A A A A A A											
Elastomers, rubber SKF Ecorubber-1 Acrylonitrile butadiene rubber (NBR) 85/- -30 100 120 A A A A A A SKF Ecorubber-H Hydrogenated NBR (H-NBR) 85/- -30 150 160 A A A A A A SKF Ecorubber-2 Fluorocarbonate rubber (FKM) 85/- -20 200 220 A A A A B A SKF Ecorubber-3 Ethylene propylene diene rubber (EPDM) 85/- -50 150 160 D D D D A A SKF Ecoflas Tetrafluoroethylene propylene rubber (TFE/P) 83/- -10 200 220 A A A A A A SKF Ecosil Silicone rubber (MVG) 85/- -60 200 220 B C no data no data A A											
Thermoplastics SKF Ecoflon 1 Polytetrafluoroethylene (PTFE) -57 -200 260 - A A A A A A SKF Ecoflon 2 Polytetrafluoroethylene +15% glass +5% MoS ₂ -62 -200 260 - A A A A A A SKF Ecoflon 3 Polytetrafluoroethylene +40% bronze -65 -200 260 - A A A A A A SKF Ecoflon 4 Polytetrafluoroethylene +25% carbon -65 -200 260 - A A A A A A SKF Ecoflon 5 Polytetrafluoroethylene +25% carbon -59 -200 260 - A A A A A A SKF Ecotal Polyacetal (POM) -82 -50 100 - A A A A A A SKF Ecomid Polyamide (PA) -77 -40 110 - A A A C' C' C' C' SKF Ecopeak Polyaryletherketone (PEEK) -87 -100 260 - A A A A A A SKF Ecowear Ultra-High Molecular Weight Polyethylene (UHMWPE) -61 -200 90 - A A A A A A											

* Exposure to water-based fluids or moisture causes swelling

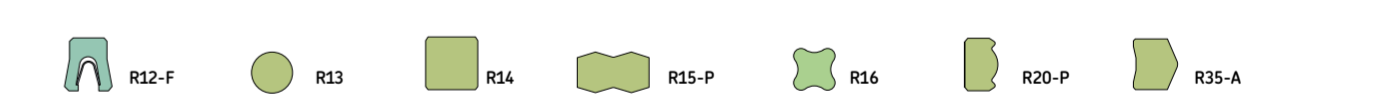
Guide rings



Back-up rings



Static seals



Scan for seal data sheets, material data sheets and more information:



skf.com/machinedseals

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