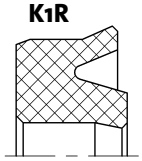
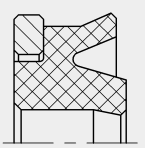
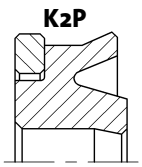
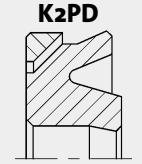
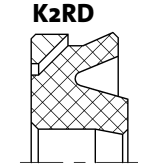
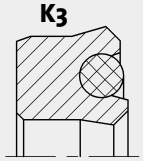
Piston seals

Application	Profile	Description	Temperature	max.speed	max. Pressure	Material	
	K1	**hydraulic, single acting** asymmetric piston seal for standard applications. design provides stable fit in the housing, ultimate sealing effect over a wide temperature range. avoids extensive drag pressure. back-to-back arrangement with guide ring in between or for double acting pistons or to separate different fluids.	-30 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	
			-20 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR	
			-20 °C ... +110 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR	
			-50 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR	
			-30 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR	
	K1R 	**hydraulic, single acting** as profile K1, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1	
			-20 °C ... +200 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 2	
			-50 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**	
			-25 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H	
			-60 °C ... +200 °C	-	-	ECOSIL	
	K2 	**hydraulic, single acting** as profile K2P, but more adaptation possibilities to diverse temperatures and media by selection of suitable seal material. K2 for standard housing design.				Seal part	Back-up ring
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOTAL
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOMID*
			-20 °C ... +200 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 2	ECOFLON II
			-50 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**	ECOTAL
			-40 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**	ECOMID*
			-50 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**	ECOFLON II
			-25 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOTAL
			-25 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOMID*
			-25 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOFLON II
	K2P 	**hydraulic, single acting** asymmetric piston seal for standard applications as K1, but due to design with active back-up ring suitable for higher pressure range or larger extrusion gaps. K2 for standard housing design.				Seal part	Back-up ring
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	ECOPUR	ECOTAL/ ECOMID*
			-20 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	H-ECOPUR	
			-20 °C ... +100 °C	0,7 m/s	700 bar (10.000 psi)	S-ECOPUR	
			-40 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	T-ECOPUR	
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	G-ECOPUR	
	K2PD 	**hydraulic, single acting** with active back-up ring suitable for hig- asymmetric piston seal for standard applications as K1, but due to design her pressure or larger extrusion gaps. K2PD for short housings.				Seal part	Back-up ring
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	ECOPUR	ECOTAL/ ECOMID*
			-20 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	H-ECOPUR	
			-20 °C ... +100 °C	0,7 m/s	700 bar (10.000 psi)	S-ECOPUR	
			-40 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	T-ECOPUR	
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	G-ECOPUR	
	K2RD 	**hydraulic, single acting** as profile K2P, but more adaptation possibilities to diverse temperatures and media by selection of suitable seal material. K2RD for short housings.				Seal part	Back-up ring
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOTAL
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOMID*
			-20 °C ... +200 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 2	ECOFLON II
			-50 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**	ECOTAL
			-40 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**	ECOMID*
			-50 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**	ECOFLON II
			-25 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOTAL
			-25 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOMID*
			-25 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOFLON II
	K3 	**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...)				Seal part	O ring
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	NBR (70 Sh A)
			-20 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR	NBR (70 Sh A)
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR	NBR (70 Sh A)
			-20 °C ... +100 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR	NBR (70 Sh A)
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR	NBR (70 Sh A)
			-50 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR	MVQ 70 / ECOSIL

linear moving · rotating · oscillating · spiral moving · static

Not bolded symbols: please consult our technical dpmt. for application limitations

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

** attention: not suitable for mineral oils !

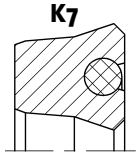
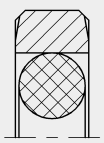
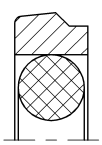
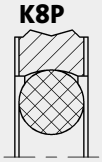
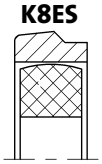
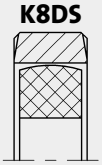
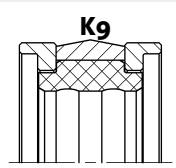
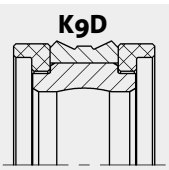
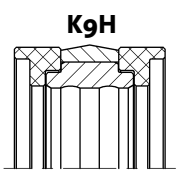
Application	Profile	Description	Temperature	max.speed	max. Pressure	Material		
	K3F	**PTFE-piston seal, single acting** O-Ring activated, asymmetrical PTFE piston seal, low friction and no stick-slip effect. good adaptation possibilities for diverse temperatures and media by selection of suitable O-Ring material, almost no dead spots as required for applications in food and pharma industry.				Seal part	O-Ring	
			-20 °C ... +200 °C	1 m/s	100 bar (1450 psi)	ECOFLON 1	FPM/FKM (75 Sh A)	
			-20 °C ... +200 °C	1 m/s	160 bar (2300 psi)	ECOFLON 2	FPM/FKM (75 Sh A)	
			-25 °C ... +150 °C	1 m/s	100 bar (1450 psi)	ECOFLON 1	ECORUBBER-H	
			-25 °C ... +150 °C	1 m/s	160 bar (2300 psi)	ECOFLON 2	ECORUBBER-H	
			-60 °C ... +80 °C	0,5 m/s	200 bar (2900 psi)	ECOPE	MVQ 70 / ECOSIL	
			-60 °C ... +200 °C	1 m/s	100 bar (1450 psi)	ECOFLON 1	MVQ 70 / ECOSIL	
			-60 °C ... +200 °C	1 m/s	160 bar (2300 psi)	ECOFLON 2	MVQ 70 / ECOSIL	
	K3S	**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.				Seal part	Spring	
			-200 °C ...+260 °C	1 m/s	100 bar (1450 psi)	ECOFLON 1	1.4310	
			-200 °C ...+260 °C	1 m/s	160 bar (2300 psi)	ECOFLON 2	1.4310	
			-200 °C ...+ 80 °C	0,5 m/s	200 bar (2900 psi)	ECOPE	1.4310	
	K4	**hydraulic, single acting** asymmetric piston seal for standard applications as K3 but due to design with active back-up ring suitable for larger extrusion gaps. K4 for short housings				Seal part	O-ring	Back-up
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	ECOPUR		
			-20 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	H-ECOPUR	NBR (70 Sh.A)	ECOTAL/ ECOMID*
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	T-ECOPUR		
			-20 °C ... +100 °C	0,7 m/s	700 bar (10.000 psi)	S-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	G-ECOPUR		
	K4P	**hydraulic, single acting** asymmetric piston seal for standard applications as K3 but due to design with active back-up ring suitable for larger extrusion gaps or higher pressure. K4P for standard housing design				Seal part	O-ring	Back-up
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	ECOPUR		
			-20 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	H-ECOPUR	NBR (70 Sh.A)	ECOTAL/ ECOMID*
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	T-ECOPUR		
			-20 °C ... +100 °C	0,7 m/s	700 bar (10.000 psi)	S-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	G-ECOPUR		
	K5	**pneumatic, single acting** asymmetric piston seal, extremely wear resistant, for use in lubricated or dry pneumatic applications. special design of sealing lip allows retention of initial lubricating film.						
			-30 °C ... +110 °C	1 m/s	25 bar (360 psi)	ECOPUR		
			-20 °C ... +110 °C	1 m/s	25 bar (360 psi)	H-ECOPUR		
			-20 °C ... +110 °C	2 m/s	25 bar (360 psi)	S-ECOPUR		
			-50 °C ... +110 °C	1 m/s	25 bar (360 psi)	T-ECOPUR		
			-30 °C ... +110 °C	1 m/s	25 bar (360 psi)	G-ECOPUR		
	K5R	**pneumatic, single acting** asymmetric piston seal, good wear resistant, for use in lubricated or dry pneumatic applications. good adaptation possibilities for diverse temperatures and media by selection of suitable seal material. special design of sealing lip allows retention of initial lubricating film.						
			-30 °C ... + 80 °C	1 m/s	25 bar (360 psi)	ECORUBBER 1		
			-20 °C ... +200 °C	1 m/s	25 bar (360 psi)	ECORUBBER 2		
			-50 °C ... +150 °C	1 m/s	25 bar (360 psi)	ECORUBBER 3**		
			-25 °C ... +150 °C	1 m/s	25 bar (360 psi)	ECORUBBER-H		
	K6	**hydraulic, single acting** symmetric piston seal for simple standard applications, not recommended for new designs (profile K1 preferred). also for larger cross section, easier to install.						
			-30 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR		
			-20 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR		
			-20 °C ... +110 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR		
			-50 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR		
			-30 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR		
	K6R	**hydraulic, single acting** as profile K6 , but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material. also for larger cross section, easier to install.						
			-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1		
			-20 °C ... +200 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 2		
			-50 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**		
			-25 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H		
			-60 °C .. +200 °C	-	-	ECOSIL		

linear moving rotating oscillating spiral moving static

Not bolded symbols: please consult our technical dpmt. for application limitations

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

** attention: not suitable for mineral oils !

Application	Profile	Description	Temperature	max.speed	max. Pressure	Material	
	K7 	**hydraulic, single acting** O-Ring activated symmetric piston seal for simple standard applications, not recommended for new designs (profile K3 preferred)				Seal part	O-ring
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	NBR (70 Sh.A)
			-20 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR	
			-20 °C ... +100 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR	
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR	
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR	
	K8 	**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.				Glide ring	O-ring
			-30 °C ... +100 °C	10 m/s	400 bar (5800 psi)	ECOFLON 2/3/4	NBR (70 Sh.A)
			-20 °C ... +200 °C	10 m/s	400 bar (5800 psi)		FPM/FKM (75)
			-50 °C ... +150 °C	10 m/s	400 bar (5800 psi)		EPDM (70)**
			-60 °C ... +200 °C	10 m/s	400 bar (5800 psi)		MVQ (70)
			-60 °C ... +80 °C	10 m/s	400 bar (5800 psi)	ECOPE	MVQ 70 / ECOSIL
	K8E 	**hydraulic, single acting** O-Ring activated asymmetric PTFE piston seal, low friction. for extreme low or high speed. suitable for positioning functions.				Glide ring	O-ring
			-30 °C ... +100 °C	10 m/s	400 bar (5800 psi)	ECOFLON 2/3/4	NBR (70 Sh.A)
			-20 °C ... +200 °C	10 m/s	400 bar (5800 psi)		FPM/FKM (75)
			-50 °C ... +150 °C	10 m/s	400 bar (5800 psi)		EPDM (70)**
			-60 °C ... +200 °C	10 m/s	400 bar (5800 psi)		MVQ (70)
			-60 °C ... +80 °C	10 m/s	400 bar (5800 psi)	ECOPE	MVQ 70 / ECOSIL
	K8P 	**hydraulic, double acting** O-Ring activated symmetric PU piston seal with excellent static and dynamic sealing capacity, extremely wear resistant.				Glide ring	O-ring
			-30 °C ... +100 °C	1 m/s	250 bar (3600 psi)	ECOPUR	NBR 70Sh.A
			-20 °C ... +100 °C	1 m/s	250 bar (3600 psi)	H-ECOPUR	NBR 70Sh.A
			-20 °C ... +100 °C	1,4 m/s	250 bar (3600 psi)	S-ECOPUR	NBR 70Sh.A
			-30 °C ... +100 °C	1 m/s	250 bar (3600 psi)	T-ECOPUR	NBR 70Sh.A
	K8ES 	**hydraulic, single acting** profile ring-activated asymmetric PTFE piston seal, similar to K8E, but special heavy duty design. for heavy industry hydraulics or for special housing dimensions.				Glide ring	Energizer
			-30 °C ... +100 °C	10 m/s	400 bar (5800 psi)	ECOFLON 2, 3, 4	ECORUBBER 1
			-20 °C ... +200 °C	10 m/s	400 bar (5800 psi)	ECOFLON 2, 3, 4	ECORUBBER 2
			-50 °C ... +150 °C	10 m/s	400 bar (5800 psi)	ECOFLON 2, 3, 4	ECORUBBER 3**
			-25 °C ... +150 °C	10 m/s	400 bar (5800 psi)	ECOFLON 2, 3, 4	ECORUBBER-H
	K8DS 	**hydraulic, double acting** profile ring-activated symmetric PTFE piston seal, similar to S9D, but special heavy duty design. for heavy industry hydraulics or for special housing dimensions.				Glide ring	Energizer
			-30 °C ... +100 °C	10 m/s	400 bar (5800 psi)	ECOFLON 2, 3, 4	ECORUBBER 1
			-20 °C ... +200 °C	10 m/s	400 bar (5800 psi)	ECOFLON 2, 3, 4	ECORUBBER 2
			-50 °C ... +150 °C	10 m/s	400 bar (5800 psi)	ECOFLON 2, 3, 4	ECORUBBER 3**
			-25 °C ... +150 °C	10 m/s	400 bar (5800 psi)	ECOFLON 2, 3, 4	ECORUBBER-H
	K9 	**hydraulic, double acting** profile ring-activated compact piston seal with integrated guiding elements. excellent static sealing capacity. commonly used in standard cylinders.				Seal	Energizer	Back-up ring
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	ECO-RUBBER 1	ECOTAL / ECOMID*
			-20 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR		
			-20 °C ... +100 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR		
	K9D 	**hydraulic, double acting** profile ring-activated compact piston seal with integrated guiding elements. excellent static and dynamic sealing capacity.				Seal	Energizer	Back-up ring
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	ECO-RUBBER 1	ECOTAL / ECOMID*
			-20 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR		
			-20 °C ... +100 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR		
	K9H 	**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.				Seal	Energizer	Back-up ring
			-20 °C ... +100 °C	0,3 m/s	1500 bar (21700 psi)	H-ECOPUR	ECO-RUBBER 1	ECOTAL / ECOMID*
			-30 °C ... +100 °C	0,3 m/s	1500 bar (21700 psi)	G-ECOPUR		
	K9F	**hydraulic, double acting** profile ring-activated compact PTFE piston seal with integrated guiding elements. low friction, good chemical and thermal resistance.				Seal	Energizer	Back-up ring
			-30 °C ... +100 °C	1,5 m/s	500 bar (7200 psi)	ECOFLON 2	ECO-RUBBER 1	ECOTAL
			-30 °C ... +100 °C	1,5 m/s	500 bar (7200 psi)	ECOFLON 2		ECOMID
			-20 °C ... +200 °C	1,5 m/s	400 bar (5800 psi)	ECOFLON 2	ECO-RUBBER 2	ECOPAEK
			-20 °C ... +200 °C	1,5 m/s	400 bar (5800 psi)	ECOFLON 2		ECOFLON 4

linear moving rotating oscillating spiral moving static

* ECOTAL up to ø260 mm, ECOMID above ø260 mm
** attention: not suitable for mineral oils !

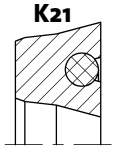
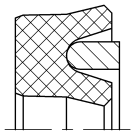
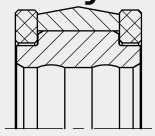
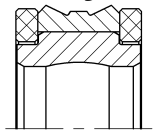
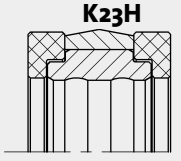
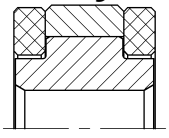
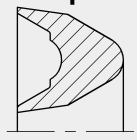
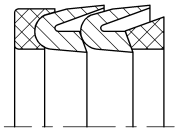
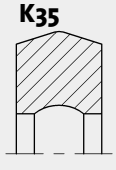
Not bolded symbols: please consult our technical dpmt. for application limitations

Application	Profile	Description	Temperature	max.speed	max. Pressure	Material		
	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.				K10	K 11	K 12
			-30 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)	ECOTAL ECOMID*	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR	ECOTAL ECOMID*
			-20 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)			
			-40 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)			
			-20 °C ... +100 °C	0,7 m/s	500 bar (7200 psi)			
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECO- FLON 2	ECORUBBER1 ECORUBBER2 ECORUBBER3 ECORUBBER-H	ECO- FLON 2
			-20 °C ... +200 °C	0,5 m/s	250 bar (3600 psi)			
			-50 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)			
			-25 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)			
	K1012	**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.				K 10	K 11	K 12
			-30 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)	ECOTAL ECOMID*	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR	ECOTAL ECOMID*
			-20 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)			
			-40 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)			
			-20 °C ... +100 °C	0,7 m/s	500 bar (7200 psi)			
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECO- FLON 2	ECORUBBER1 ECORUBBER2 ECORUBBER3 ECORUBBER-H	ECO- FLON 2
			-20 °C ... +200 °C	0,5 m/s	250 bar (3600 psi)			
			-50 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)			
			-25 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)			
	K1315	**hydraulic, single acting** chevron sealing set, design with flexible sealing lips, good sealing ability in higher pressure range. for heavy industry hydraulics, water-hydraulic systems				K 13	K 14	K15
			-30 °C ... +100 °C	0,5 m/s	600 bar (8700 psi)	ECOTAL ECOMID*	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR	ECOTAL ECOMID*
			-20 °C ... +100 °C	0,5 m/s	600 bar (8700 psi)			
			-40 °C ... +100 °C	0,5 m/s	600 bar (8700 psi)			
			-20 °C ... +100 °C	0,7 m/s	600 bar (8700 psi)			
	K16	**hydraulic/pneumatic, single acting** simple cup seal, usually fixed on the piston by means of a clamping plate. mainly used for replacement in old hydraulic and pneumatic cylinders or for low-grade secondary applications. also used for food filling / portioning equipment.						
			-30 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	ECOPUR		
			-20 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	H-ECOPUR		
			-50 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	T-ECOPUR		
			-20 °C ... +110 °C	0,7 m/s	160 bar (2300 psi)	S-ECOPUR		
			-30 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	G-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1		
			-25 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H		
			-20 °C ... +200 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 2		
			-50 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3		
	K16B	**hydraulic/pneumatic, single acting** simple cup seal, usually fixed on the piston by means of a clamping plate. mainly used for replacement in old hydraulic and pneumatic cylinders or for low-grade secondary applications. also used for food filling / portioning equipment.						
			-30 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	ECOPUR		
			-20 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	H-ECOPUR		
			-50 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	T-ECOPUR		
			-20 °C ... +110 °C	0,7 m/s	160 bar (2300 psi)	S-ECOPUR		
			-30 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	G-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1		
			-25 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H		
			-20 °C ... +200 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 2		
			-50 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3		
	K17	**hydraulic, double acting** space saving, compact piston seal with integrated guiding elements. excellent static sealing capacity, suitable for small housings.				Seal part	Back-up ring	
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECOPUR	ECOTAL ECOMID*	
			-20 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	H-ECOPUR		
			-40 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	T-ECOPUR		
			-20 °C ... +100 °C	0,7 m/s	250 bar (3600 psi)	S-ECOPUR		
	K17R	**hydraulic, double acting** space saving, compact piston seal with integrated guiding elements. excellent static sealing capacity, good adaptation possibilities for diverse temperatures and media by selection of suitable material. suitable for small housings.				Seal part	Back-up ring	
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOTAL	
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOMID*	
			-20 °C ... +200 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 2	ECOFLON 2	
			-20 °C ... +200 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 2	ECOPAEK	
	K19	**PTFE-piston seal, single acting** finger-spring activated, asymmetrical PTFE piston seal, low friction and good dry running properties, excellent chemical and thermal resistance, mainly used in chemical, pharma and food industry.				Seal part	Spring	
			-200 °C ... +260 °C	15 m/s	100 bar (1450 psi)	ECOFLON 1	1.4310	
			-200 °C ... +260 °C	15 m/s	160 bar (2300 psi)	ECOFLON 2	1.4310	
			-200 °C ... +260 °C	15 m/s	160 bar (2300 psi)	ECOFLON 3	1.4310	
			-200 °C ... +80 °C	15 m/s	200 bar (2900 psi)	ECOPE	1.4310	
	K20	**hydraulic, double acting** space saving, compact piston seal, suitable for standard O-Ring housings. advantage compared to O-Ring: integrated active back-up rings for high pressure, design with interference fit on outside diameter prevents twisting in dynamic applications.				Seal part	Back-up ring	
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	ECORUBBER 1	ECOTAL ECOMID*	
			-25 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	ECORUBBER-H		
			-20 °C ... +200 °C	0,5 m/s	700 bar (10.000 psi)	ECORUBBER 2	ECOPAEK ECOFLON	
			-25 °C ... +150 °C	0,5 m/s	700 bar (10.000 psi)	ECORUBBER-H		

linear moving · rotating · oscillating · spiral moving · static

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

Not bolded symbols: please consult our technical dpmt. for application limitations

Application	Profile	Description	Temperature	max.speed	max. Pressure	Material		
	K21 	**hydraulic, single acting** O-Ring activated symmetric rod seal with sharp-edged sealing lips, good sealing effect for high viscosity fluids, not recommended for new designs (profile S3 preferred).				Seal part	O-ring	
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	NBR 70 Sh.A	
			-20 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR	NBR 70 Sh.A	
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR	NBR 70 Sh.A	
			-20 °C ... +100 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR	NBR 70 Sh.A	
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR	NBR 70 Sh.A	
	K22	**hydraulic, single acting** symmetric piston seal with support ring for simple applications to serve repair purpose, not recommended for new designs (profile K1 preferred). retainer ring in angled design possible.				Seal part	Support ring	
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	ECOTAL/ ECOMID*	
			-20 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR		
			-40 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR		
			-20 °C ... +100 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR		
	K22R 	**hydraulic, single acting** symmetric piston seal as K22, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.. retainer ring in angled design possible.				Seal part	Support ring	
			-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1	ECOTAL	
			-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1	ECOMID	
			-20 °C ... +200 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 2	ECOFLON 2	
			-50 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**	ECOTAL	
			-40 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**	ECOMID	
			-50 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**	ECOFLON 2	
			-25 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H	ECOTAL	
			-25 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H	ECOMID	
			-25 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H	ECOFLON 2	
	K23 	**hydraulic, double acting** profile ring-activated compact piston seal with integrated back-up rings, excellent static sealing capacity. external guiding elements required.				Seal	Energizer	Back-up rings
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	ECO-RUBBER 1	ECOTAL/ ECOMID*
			-20 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR		
			-20 °C ... +100 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR		
	K23D 	**hydraulic, double acting** profile ring-activated compact piston seal with integrated back-up rings. excellent static and dynamic sealing capacity. external guiding elements required.				Seal	Energizer	Back-up rings
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	ECO-RUBBER 1	ECOTAL / ECOMID*
			-20 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR		
			-20 °C ... +100 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR		
	K23H 	**hydraulic, double acting** profile ring-activated compact piston seal with integrated back-up rings. design for high pressure range, excellent static sealing capacity. mainly used in mining / tunneling industry. external guiding elements required.				Seal	Energizer	Back-up rings
			-20 °C ... +100 °C	0,3 m/s	1500 bar (21000 psi)	H-ECOPUR	ECO-RUBBER 1	ECOTAL / ECOMID*
			-30 °C ... +100 °C	0,3 m/s	1500 bar (21000 psi)	G-ECOPUR		
	K23F 	**hydraulic, double acting** profile ring-activated compact PTFE piston seal with integrated back-up rings. low friction, good chemical and thermal resistance. external guiding elements required.				Seal	Energizer	Back-up rings
			-30 °C ... +100 °C	1,5 m/s	500 bar (7200 psi)	ECOFLON 2	ECO-RUBBER 1	ECOTAL
			-30 °C ... +100 °C	1,5 m/s	500 bar (7200 psi)	ECOFLON 2		ECOMID
			-20 °C ... +200 °C	1,5 m/s	400 bar (5800 psi)	ECOFLON 2	ECO-RUBBER 2	ECOPAEK
			-20 °C ... +200 °C	1,5 m/s	400 bar (5800 psi)	ECOFLON 2		ECOFLON 4
			-20 °C ... +200 °C	1,5 m/s	400 bar (5800 psi)	ECOFLON 4		ECOFLON 4
	K24 	**hydraulic, single acting** chevron ring with flexible lip design. replacement part for standard commercial housings (male and female adapter mainly made of metal).				Seal		
			-30 °C ... +110 °C	0,5 m/s	500 bar (7200 psi)	ECOPUR		
			-20 °C ... +110 °C	0,5 m/s	500 bar (7200 psi)	H-ECOPUR		
			-50 °C ... +110 °C	0,5 m/s	500 bar (7200 psi)	T-ECOPUR		
			-20 °C ... +110 °C	0,7 m/s	500 bar (7200 psi)	S-ECOPUR		
			-30 °C ... +110 °C	0,5 m/s	500 bar (7200 psi)	G-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1		
			-20 °C ... +200 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 2		
			-50 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**		
			-25 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER H		
	K32 	**hydraulic, single acting** chevron sealing set, design 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).				Seal	Collar	Back-up ring
			-30 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)	ECOPUR	ECOTAL / ECOMID*	ECOTAL / ECOMID*
			-20 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)	H-ECOPUR		
			-40 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)	T-ECOPUR		
			-20 °C ... +100 °C	0,7 m/s	500 bar (7200 psi)	S-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)	G-ECOPUR		
	K35 	**hydraulic, double acting** compact piston seal with almost no dead spots as required for applications in food and pharma industry, also commonly used as O-Ring replacement, because design with interference fit on outside diameter maintains non-twisting in dynamic applications.				Seal part		
			-30 °C ... +110 °C	0,4 m/s	400 bar (5800 psi)	ECOPUR		
			-20 °C ... +110 °C	0,4 m/s	400 bar (5800 psi)	H-ECOPUR		
			-50 °C ... +110 °C	0,4 m/s	400 bar (5800 psi)	T-ECOPUR		
			-20 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	S-ECOPUR		
			-30 °C ... +110 °C	0,4 m/s	400 bar (5800 psi)	G-ECOPUR		

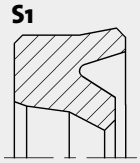
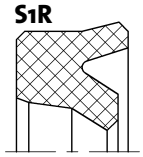
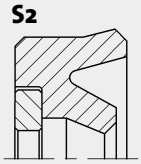
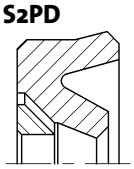
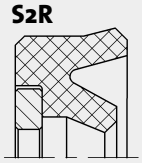
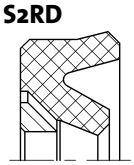
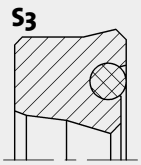
linear moving · rotating · oscillating · spiral moving · static

Not bolded symbols: please consult our technical dpmt. for application limitations

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

** attention: not suitable for mineral oils !

Rod Seals

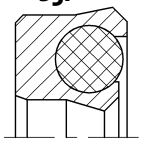
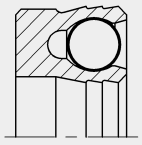
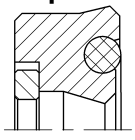
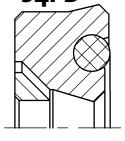
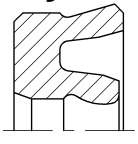
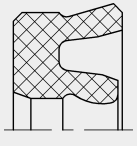
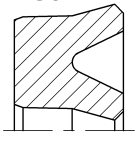
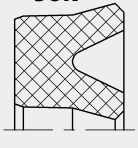
Application	Profile	Description	Temperature	max.speed	max. Pressure	Material	
	S1 	**hydraulic, single acting** asymmetric rod seal for standard applications. interference fit on outside diameter maintains stable fit in the housing. design provides ultimate sealing effect over a wide temperature range and good backpumping ability. also used as secondary seal in combination with PTFE-seal type S9.	-30 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	
			-20 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR	
			-20 °C ... +110 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR	
			-50 °C ... +110 °C	0,5 m/s	400 bar (5800psi)	T-ECOPUR	
			-30 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR	
	S1R 	**hydraulic, single acting** as profile S01-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1	
			-20 °C ... +200 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 2	
			-50 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**	
			-25 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H	
			-60 °C ... +200 °C	-	-	ECOSIL	
	S2 	**hydraulic, single acting** asymmetric rod seal for standard applications as S1, but due to design with active back-up ring suitable for larger extrusion gaps or higher pressure range. S02-P for standard housing design				Seal part	Back-up ring
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	ECOPUR	
			-20 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	H-ECOPUR	
			-20 °C ... +100 °C	0,7 m/s	700 bar (10.000 psi)	S-ECOPUR	ECOTAL/
			-40 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	T-ECOPUR	ECOMID*
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	G-ECOPUR	
	S2PD 	**hydraulic, single acting** asymmetric rod seal for standard applications as S1, but due to design with active back-up ring suitable for larger extrusion gaps or higher pressure range. S2PD for short housings				Seal part	Back-up ring
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	ECOPUR	
			-20 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	H-ECOPUR	ECOTAL/
			-20 °C ... +100 °C	0,7 m/s	700 bar (10.000 psi)	S-ECOPUR	ECOMID*
			-40 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	T-ECOPUR	
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	G-ECOPUR	
	S2R 	**hydraulic, single acting** as profile S2, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material. S2R for standard housing design				Seal part	Back-up ring
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOTAL*
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOMID*
			-20 °C ... +200 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 2	ECOFLON 2
			-50 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**	ECOTAL*
			-40 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**	ECOMID*
			-50 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**	ECOFLON 2
			-25 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOTAL*
			-25 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER H	ECOMID*
			-25 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER H	ECOFLON 2
	S2RD 	**hydraulic, single acting** as profile S02-P, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material. S2RD for short housings				Seal part	Back-up ring
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOTAL*
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOMID*
			-20 °C ... +200 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 2	ECOFLON 2
			-50 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**	ECOTAL*
			-40 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**	ECOMID*
			-50 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3**	ECOFLON 2
			-25 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOTAL*
			-25 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER H	ECOMID*
			-25 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER H	ECOFLON 2
	S3 	**hydraulic, single acting** O-Ring activated, asymmetrical rod seal. interference fit on outside diameter maintains stable fit in the housing. design provides ultimate sealing effect. especially suitable for short stroke applications (e.g. spindle seals, coupling actuators...)				Seal part	O ring
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	NBR (70 Sh A)
			-20 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR	NBR (70 Sh A)
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR	NBR (70 Sh A)
			-20 °C ... +100 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR	NBR (70 Sh A)
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR	NBR (70 Sh A)

linear moving rotating oscillating spiral moving static

Not bolded symbols: please consult our technical dpmt. for application limitations

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

** attention: not suitable for mineral oils !

Application	Profile	Description	Temperature	max.speed	max. Pressure	Material			
	S3F 	**PTFE-rodseal, 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 & pharma industry.				Seal part	O-Ring		
			-20 °C ... +200 °C	1 m/s	100 bar (1450 psi)	ECOFLON 1	FPM/FKM (75 Sh A)		
			-20 °C ... +200 °C	1 m/s	160 bar (2300 psi)	ECOFLON 2	FPM/FKM (75 Sh A)		
			-25 °C ... +150 °C	1 m/s	100 bar (1450 psi)	ECOFLON 1	ECORUBBER-H		
			-25 °C ... +150 °C	1 m/s	160 bar (2300 psi)	ECOFLON 2	ECORUBBER-H		
			-60 °C ... +80 °C	0,5 m/s	200 bar (2900 psi)	ECOPE	MVQ 70 / ECOSIL		
			-60 °C ... +200 °C	1 m/s	100 bar (1450 psi)	ECOFLON 1	MVQ 70 / ECOSIL		
			-60 °C ... +200 °C	1 m/s	160 bar (2300 psi)	ECOFLON 2	MVQ 70 / ECOSIL		
	S3S 	**PTFE-rodseal, single acting** helicoil spring activated, asymmetrical PTFE rod seal, low friction and good dry running properties, excellent chemical and thermal resistance, mainly used in chemical, pharma and food industry.				Seal part	Spring		
			-200 °C ...+260 °C	1 m/s	100 bar (1450 psi)	ECOFLON 1	1.4310		
			-200 °C ...+260 °C	1 m/s	160 bar (2300 psi)	ECOFLON 2	1.4310		
			-200 °C ...+ 80 °C	0,5 m/s	200 bar (2900 psi)	ECOPE	1.4310		
	S4 	**hydraulic, single acting** asymmetric rod seal for standard applications as S3 but due to design with active back-up ring suitable for larger extrusion gaps or higher pressure range. S04-P for standard housing design				Seal part	O-ring	Back-up	
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	ECOPUR	NBR (70 Sh.A)	ECOTAL/ ECOMID*	
			-20 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	H-ECOPUR			
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	T-ECOPUR			
			-20 °C ... +100 °C	0,7 m/s	700 bar (10.000 psi)	S-ECOPUR			
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	G-ECOPUR			
	S4PD 	**hydraulic, single acting** asymmetric rod seal for standard applications as S3, but due to design with active back-up ring suitable for larger extrusion gaps or higher pressure range. S4PD for short housings.				Seal part	O-ring	Back-up	
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	ECOPUR	NBR (70 Sh.A)	ECOTAL/ ECOMID*	
			-20 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	H-ECOPUR			
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	T-ECOPUR			
			-20 °C ... +100 °C	0,7 m/s	700 bar (10.000 psi)	S-ECOPUR			
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	G-ECOPUR			
	S5 	**pneumatic, single acting** asymmetric rod seal, extremely wear resistant, for use in lubricated or dry pneumatic applications. special design of sealing lip allows retention of initial lubricating film.							
			-30 °C ... +110 °C	1 m/s	25 bar (360 psi)	ECOPUR			
			-20 °C ... +110 °C	1 m/s	25 bar (360 psi)	H-ECOPUR			
			-20 °C ... +110 °C	2 m/s	25 bar (360 psi)	S-ECOPUR			
			-50 °C ... +110 °C	1 m/s	25 bar (360 psi)	T-ECOPUR			
			-30 °C ... +110 °C	1 m/s	25 bar (360 psi)	G-ECOPUR			
	S5R 	**pneumatic, single acting** as profile S5R, good wear resistance and adaptation possibilities for diverse temperatures and media by selection of suitable seal material. special design of sealing lip allows retention of initial lubricating film.							
			-30 °C ... +80 °C	1 m/s	25 bar (360 psi)	ECORUBBER 1			
			-20 °C ... +200 °C	1 m/s	25 bar (360 psi)	ECORUBBER 2			
			-50 °C ... +150 °C	1 m/s	25 bar (360 psi)	ECORUBBER 3**			
			-25 °C ... +150 °C	1 m/s	25 bar (360 psi)	ECORUBBER-H			
	S6 	**hydraulic, single acting** symmetric rod seal for simple standard applications, not recommended for new designs (profile S1 should be preferred).							
			-30 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR			
			-20 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR			
			-20 °C ... +110 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR			
			-50 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR			
			-30 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR			
	S6R 	**hydraulic, single acting** as profile S6 , but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.							
			-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1			
			-20 °C ... +200 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 2			
			-50 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**			
			-25 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H			
			-60 °C ... +200 °C	-	-	ECOSIL			

linear moving rotating oscillating spiral moving static

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

** attention: not suitable for mineral oils !

Not bolded symbols: please consult our technical dpmt. for application limitations

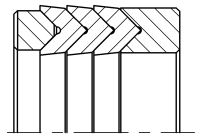
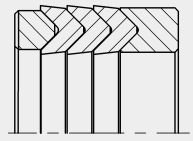
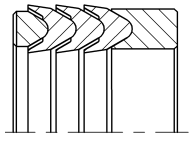
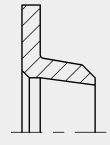
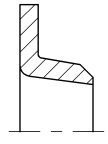
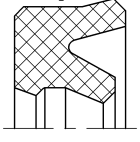
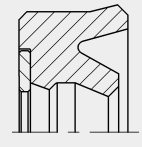
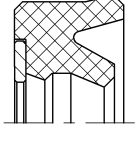
Application	Profile	Description	Temperature	max.speed	max. Pressure	Material			
	S3F	**PTFE-rodseal, single acting**				Seal part	O-Ring		
		O-Ring activated, asymmetrical PTFE rod seal, low friction, good dry running properties and adaptation possibilities for diverse temperatures and media by selection of suitable O-Ring material, almost no dead spots as required for applications in food & pharma industry.	-20 °C ... +200 °C	1 m/s	100 bar (1450 psi)	ECOFLON 1	FPM/FKM (75 Sh A)		
			-20 °C ... +200 °C	1 m/s	160 bar (2300 psi)	ECOFLON 2	FPM/FKM (75 Sh A)		
			-25 °C ... +150 °C	1 m/s	100 bar (1450 psi)	ECOFLON 1	ECORUBBER-H		
			-25 °C ... +150 °C	1 m/s	160 bar (2300 psi)	ECOFLON 2	ECORUBBER-H		
			-60 °C ... +80 °C	0,5 m/s	200 bar (2900 psi)	ECOPE	MVQ 70 / ECOSIL		
			-60 °C ... +200 °C	1 m/s	100 bar (1450 psi)	ECOFLON 1	MVQ 70 / ECOSIL		
			-60 °C ... +200 °C	1 m/s	160 bar (2300 psi)	ECOFLON 2	MVQ 70 / ECOSIL		
	S3S	**PTFE-rodseal, single acting**				Seal part	Spring		
		helicoil spring activated, asymmetrical PTFE rod seal, low friction and good dry running properties, excellent chemical and thermal resistance, mainly used in chemical, pharma and food industry.	-200 °C ...+260 °C	1 m/s	100 bar (1450 psi)	ECOFLON 1	1.4310		
			-200 °C ...+260 °C	1 m/s	160 bar (2300 psi)	ECOFLON 2	1.4310		
			-200 °C ...+ 80 °C	0,5 m/s	200 bar (2900 psi)	ECOPE	1.4310		
	S4	**hydraulic, single acting**				Seal part	O-ring	Back-up	
		asymmetric rod seal for standard applications as S3 but due to design with active back-up ring suitable for larger extrusion gaps or higher pressure range. S4 for standard housing design	-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	ECOPUR	NBR (70 Sh.A)	ECOTAL/ ECOMID*	
			-20 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	H-ECOPUR			
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	T-ECOPUR			
			-20 °C ... +100 °C	0,7 m/s	700 bar (10.000 psi)	S-ECOPUR			
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	G-ECOPUR			
	S4PD	**hydraulic, single acting**				Seal part	O-ring	Back-up	
		asymmetric rod seal for standard applications as S3 but due to design with active back-up ring suitable for larger extrusion gaps or higher pressure range. S4PD for short housings.	-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	ECOPUR	NBR (70 Sh.A)	ECOTAL/ ECOMID*	
			-20 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	H-ECOPUR			
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	T-ECOPUR			
			-20 °C ... +100 °C	0,7 m/s	700 bar (10.000 psi)	S-ECOPUR			
			-30 °C ... +100 °C	0,5 m/s	700 bar (10.000 psi)	G-ECOPUR			
	S5	**pneumatic, single acting**							
		asymmetric rod seal, extremely wear resistant, for use in lubricated or dry pneumatic applications. special design of sealing lip allows retention of initial lubricating film.	-30 °C ... +110 °C	1 m/s	25 bar (360 psi)	ECOPUR			
			-20 °C ... +110 °C	1 m/s	25 bar (360 psi)	H-ECOPUR			
			-20 °C ... +110 °C	2 m/s	25 bar (360 psi)	S-ECOPUR			
			-50 °C ... +110 °C	1 m/s	25 bar (360 psi)	T-ECOPUR			
			-30 °C ... +110 °C	1 m/s	25 bar (360 psi)	G-ECOPUR			
	S5R	**pneumatic, single acting**							
		as profile S5R, good wear resistance and adaptation possibilities for diverse temperatures and media by selection of suitable seal material. special design of sealing lip allows retention of initial lubricating film.	-30 °C ... +80 °C	1 m/s	25 bar (360 psi)	ECORUBBER 1			
			-20 °C ... +200 °C	1 m/s	25 bar (360 psi)	ECORUBBER 2			
			-50 °C ... +150 °C	1 m/s	25 bar (360 psi)	ECORUBBER 3**			
			-25 °C ... +150 °C	1 m/s	25 bar (360 psi)	ECORUBBER-H			
	S6	**hydraulic, single acting**							
		symmetric rod seal for simple standard applications, not recommended for new designs (profile S1 should be preferred).	-30 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR			
			-20 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR			
			-20 °C ... +110 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR			
			-50 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR			
			-30 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR			
	S6R	**hydraulic, single acting**							
		as profile S6 , but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1			
			-20 °C ... +200 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 2			
			-50 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**			
			-25 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H			
			-60 °C ... +200 °C	-	-	ECOSIL			

linear moving rotating oscillating spiral moving static

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

** attention: not suitable for mineral oils !

Not bolded symbols: please consult our technical dpmt. for application limitations

Application	Profile	Description	Temperature	max.speed	max. Pressure	Material		
	S1012 	**hydraulic, single acting** chevron sealing set, parting surface design. for heavy industry hydraulics.				S10	S 11	S12
			-30 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)	ECOTAL/ ECOMID*	ECOPUR	ECOTAL/ ECOMID*
			-20 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)		H-ECOPUR	
			-40 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)		T-ECOPUR	
			-20 °C ... +100 °C	0,7 m/s	500 bar (7200 psi)		S-ECOPUR	
			-30 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)		G-ECOPUR	
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECO-FLON 2	ECORUB. 1	ECO-FLON 2
			-20 °C ... +200 °C	0,5 m/s	250 bar (3600 psi)		ECORUB. 2	
			-50 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)		ECORUB. 3**	
			-25 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)		ECORUB.-H	
	S1012T 	**hydraulic, single acting** chevron sealing set, machined surface design. for heavy industry hydraulics.				S 10	S 11	S 12
			-30 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)	ECOTAL/ ECOMID*	ECOPUR	ECOTAL/ ECOMID*
			-20 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)		H-ECOPUR	
			-40 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)		T-ECOPUR	
			-20 °C ... +100 °C	0,7 m/s	500 bar (7200 psi)		S-ECOPUR	
			-30 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)		G-ECOPUR	
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECO-FLON 2	ECORUB. 1	ECO-FLON 2
			-20 °C ... +200 °C	0,5 m/s	250 bar (3600 psi)		ECORUB. 2	
			-50 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)		ECORUB. 3**	
			-25 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)		ECORUB.-H	
	S1315 	**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.				S 13-T	S 14-T	S 15-T
			-30 °C ... +100 °C	0,5 m/s	600 bar (8700 psi)	ECOTAL/ ECOMID*	ECOPUR	ECOTAL/ ECOMID*
			-20 °C ... +100 °C	0,5 m/s	600 bar (8700 psi)		H-ECOPUR	
			-40 °C ... +100 °C	0,5 m/s	600 bar (8700 psi)		T-ECOPUR	
			-20 °C ... +100 °C	0,7 m/s	600 bar (8700 psi)		S-ECOPUR	
			-30 °C ... +100 °C	0,5 m/s	600 bar (8700 psi)		G-ECOPUR	
	S16 	**hydraulic/pneumatic, single acting** simple hat seal, usually fixed in housing with clamp flange. mainly used for replacement in old hydraulic and pneumatic cylinders or for secondary applications.	-30 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	ECOPUR		
			-20 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	H-ECOPUR		
			-50 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	T-ECOPUR		
			-20 °C ... +110 °C	0,7 m/s	160 bar (2300 psi)	S-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1		
			-25 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H		
			-20 °C ... +200 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 2		
			-50 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**		
	S16B 	**hydraulic/pneumatic, single acting** simple hat seal, usually fixed in housing with clamp flange. mainly used for replacement in old hydraulic and pneumatic cylinders or for secondary applications.	-30 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	ECOPUR		
			-20 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	H-ECOPUR		
			-50 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	T-ECOPUR		
			-20 °C ... +110 °C	0,7 m/s	160 bar (2300 psi)	S-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1		
			-25 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H		
			-20 °C ... +200 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 2		
			-50 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**		
	S17	**hydraulic, single acting** asymmetric rod seal with additional sealing- respectively stabilizing lip. interference fit on outside diameter maintains stable fit in the housing. design mainly used for telescopic cylinders, mobile hydraulic or for special housing dimensions.	-30 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR		
			-20 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR		
			-20 °C ... +110 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR		
			-50 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR		
			-30 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR		
	S17R 	**hydraulic, single acting** as profile S17, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	-30 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1		
			-20 °C ... +110 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 2		
			-50 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**		
			-25 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H		
	S18 	**hydraulic, single acting** asymmetric rod seal as S17, but due to design with active back-up ring suitable for larger extrusion gaps or higher pressure range.				Seal part	Back-up ring	
			-30 °C ... +100 °C	0,5 m/s	600 bar (8700 psi)	ECOPUR	ECOTAL/ ECOMID*	
			-20 °C ... +100 °C	0,5 m/s	600 bar (8700 psi)	H-ECOPUR		
			-20 °C ... +100 °C	0,7 m/s	600 bar (8700 psi)	S-ECOPUR		
			-40 °C ... +100 °C	0,5 m/s	600 bar (8700 psi)	T-ECOPUR		
			-30 °C ... +100 °C	0,5 m/s	600 bar (8700 psi)	G-ECOPUR		
	S18R 	**hydraulic, single acting** asymmetric rod seal with additional sealing- respectively stabilizing lip and back ring. good adaptation possibilities for diverse temperatures and media by selection of suitable seal material, due to design with active back-up ring suitable for larger extrusion gaps or higher pressure range.				Seal part	Back-up ring	
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOTAL	
			-30 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOMID	
			-20 °C ... +200 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 2	ECOFLON 2	
			-40 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3	ECOTAL	
			-40 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3	ECOMID	
			-50 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER 3	ECOFLON 2	
			-20 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOTAL	
			-20 °C ... +100 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOMID	
			-20 °C ... +150 °C	0,5 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOFLON 2	

linear moving rotating oscillating spiral moving static

* ECOTAL up to ø260 mm, ECOMID above ø260 mm
** attention: not suitable for mineral oils !

Not bolded symbols: please consult our technical dpmt. for application limitations

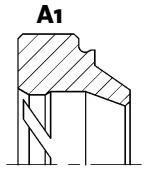
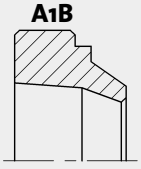
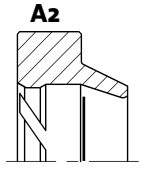
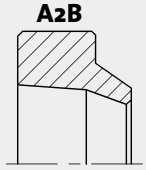
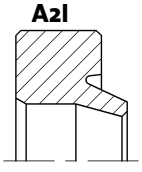
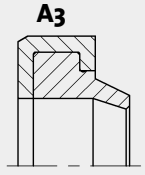
Application	Profile	Description	Temperature	max.speed	max. Pressure	Material	
	S19F	**PTFE-rodseal, single acting** finger spring activated, asymmetrical PTFE rod seal, low friction and good dry running properties, excellent chemical and thermal resistance, mainly used in chemical, pharma and food industry.				Seal part	Spring
			-200 °C ... +260 °C	15 m/s	100 bar (1450 psi)	ECOFLON 1	1.4310
			-200 °C ... +260 °C	15 m/s	160 bar (2300 psi)	ECOFLON 2	1.4310
			-200 °C ... +260 °C	15 m/s	160 bar (2300 psi)	ECOFLON 3	1.4310
			-200 °C ... +80 °C	15 m/s	200 bar (2900 psi)	ECOPE	1.4310
	S20	**hydraulic, double acting** space saving, compact rod seal, fits standard O-Ring housings. advantage compared to O-Ring: integrated active back-up rings for high pressure, design with interference fit on outside diameter maintains non-twisting in dynamic applications.				Seal part	Back-up ring
			-30 °C ... +100 °C	0,5 m/s	700 bar (10000 psi)	ECORUBBER 1	ECOTAL/ ECOMID*
			-20 °C ... +100 °C	0,5 m/s	700 bar (10000 psi)	ECORUBBER-H	
			-20 °C ... +200 °C	0,5 m/s	700 bar (10000 psi)	ECORUBBER 2	ECOPAEK/ ECOFLON
			-25 °C ... +150 °C	0,5 m/s	700 bar (10000 psi)	ECORUBBER-H	
	S21	**hydraulic, single acting** O-Ring activated symmetric rod seal with sharp-edged sealing lips, good sealing effect for high viscosity fluids, not recommended for new designs (profile S3 preferred).				Seal part	O-ring
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	NBR (70 Sh.A)
			-20 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR	NBR (70 Sh.A)
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR	NBR (70 Sh.A)
			-20 °C ... +100 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR	NBR (70 Sh.A)
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR	NBR (70 Sh.A)
	S22	**hydraulic, single acting** symmetric rod seal with support ring for simple applications to serve repair purpose, not recommended for new designs (profile S1 preferred). retainer ring in angled design possible.				Seal part	Support ring
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	ECOPUR	ECOTAL/ ECOMID*
			-20 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	H-ECOPUR	
			-20 °C ... +100 °C	0,7 m/s	400 bar (5800 psi)	S-ECOPUR	
			-40 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	T-ECOPUR	
			-30 °C ... +100 °C	0,5 m/s	400 bar (5800 psi)	G-ECOPUR	
	S22	**hydraulic, single acting** symmetric rod seal as S22, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material. retainer ring in angled design possible.				Seal part	Support ring
			-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1	ECOTAL
			-30 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 1	ECOMID
			-20 °C ... +200 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 2	ECOFLON 2
			-50 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**	ECOTAL
			-40 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**	ECOMID
			-50 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER 3**	ECOFLON 2
			-25 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H	ECOTAL
			-25 °C ... +100 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H	ECOMID
			-25 °C ... +150 °C	0,5 m/s	160 bar (2300 psi)	ECORUBBER-H	ECOFLON 2
	S24	**hydraulic, single acting** O-Ring activated rod seal with additional stabilizing lips and integrated active back ring for larger extrusion gaps, mainly used in mining industry.				Seal	O-ring	Back ring
			-30 °C ... +100 °C	0,5 m/s	700 bar (10000 psi)	ECOPUR	NBR (70 Sh.A)	ECOTAL/ ECOMID*
			-20 °C ... +100 °C	0,5 m/s	700 bar (10000 psi)	H-ECOPUR	NBR (70 Sh.A)	
			-30 °C ... +100 °C	0,5 m/s	700 bar (10000 psi)	T-ECOPUR	NBR (70 Sh.A)	
			-20 °C ... +100 °C	0,7 m/s	700 bar (10000 psi)	S-ECOPUR	NBR (70 Sh.A)	
			-30 °C ... +100 °C	0,5 m/s	700 bar (10000 psi)	G-ECOPUR	NBR (70 Sh.A)	
	S2527	**PTFE chevron set, single acting** optimized for low pressure, unequal angled chevron design results in good contact pressure even in low pressure range. external spring pretension necessary. mainly used in chemical, pharma and food industry.				S 25	S 26	S 27
			-200 °C ... +260 °C	1,5 m/s	100 bar (1450 psi)	ECO-FLON 2	ECOFLON 1	ECO-FLON 2
	S2931	**PTFE chevron set, single acting** optimized for high pressure, equal angled chevron design suitable for high pressure range. external spring pretension necessary. mainly used in chemical, pharma and food industry.				S 29	S 30	S 31
			-200 °C ... +260 °C	1,5 m/s	315 bar (4500 psi)	ECO-FLON 2	ECOFLON 1	ECO-FLON 2
	S32	**hydraulic, single acting** chevron set, design with extremely flexible sealing lips for difficult operating conditions (bad guiding, large tolerance range). available as total chevron set as well as intermediate chevrons only (in case of metal male and female adaptors).				Collar	Seal	Back ring
			-30 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)	ECOTAL/ ECOMID*	ECOPUR	ECOTAL/ ECOMID*
			-20 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)		H-ECOPUR	
			-40 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)		T-ECOPUR	
			-20 °C ... +100 °C	0,7 m/s	500 bar (7200 psi)		S-ECOPUR	
			-30 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)		G-ECOPUR	
	S35	**hydraulic, double acting** compact rod seal with almost no dead spots as required for applications in food and pharma industry, also commonly used as O-Ring replacement, because design with interference fit on outside diameter maintains non-twisting in dynamic applications.				Seal part	
			-30 °C ... +110 °C	0,4 m/s	400 bar (5800 psi)	ECOPUR	
			-20 °C ... +110 °C	0,4 m/s	400 bar (5800 psi)	H-ECOPUR	
			-20 °C ... +110 °C	0,5 m/s	400 bar (5800 psi)	S-ECOPUR	
			-50 °C ... +110 °C	0,4 m/s	400 bar (5800 psi)	T-ECOPUR	
			-30 °C ... +110 °C	0,4 m/s	400 bar (5800 psi)	G-ECOPUR	

linear moving · rotating · oscillating · spiral moving · static

* ECOTAL up to ø260 mm, ECOMID above ø260 mm
** attention: not suitable for mineral oils !

Not bolded symbols: please consult our technical dpmt. for application limitations

Wipers

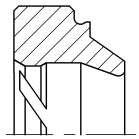
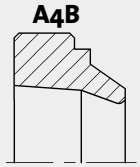
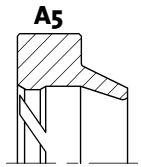
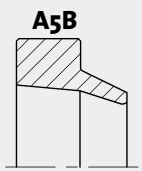
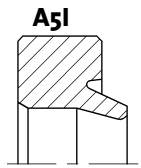
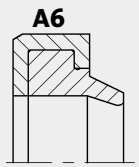
Application	Profile	Description	Temperature	max.speed	Material	
	A1 	**hydraulic, single acting** wiper with interference fit on outside diameter, providing a technically accurate closure at the cylinder. wiping edge assures a reliable protection against penetration of dust and dirt whilst allowing backflow of residual oil film. Back support area prevents tilting of wiper. For housings according ISO 6195-TypeA	-30 °C ... +110 °C	4 m/s	ECOPUR	
			-20 °C ... +110 °C	4 m/s	H-ECOPUR	
			-50 °C ... +110 °C	4 m/s	T-ECOPUR	
			-20 °C ... +110 °C	5 m/s	S-ECOPUR	
			-30 °C ... +110 °C	4 m/s	G-ECOPUR	
			-30 °C ... +100 °C	4 m/s	ECORUBBER 1	
			-25 °C ... +150 °C	4 m/s	ECORUBBER-H	
			-20 °C ... +200 °C	4 m/s	ECORUBBER 2	
			-50 °C ... +150 °C	4 m/s	ECORUBBER 3**	
	A1B 	**hydraulic, single acting** as profile A01-A, but without back support area. for housings according ISO 6195-TypeA	-30 °C ... +110 °C	4 m/s	ECOPUR	
			-20 °C ... +110 °C	4 m/s	H-ECOPUR	
			-50 °C ... +110 °C	4 m/s	T-ECOPUR	
			-20 °C ... +110 °C	5 m/s	S-ECOPUR	
			-30 °C ... +110 °C	4 m/s	G-ECOPUR	
			-30 °C ... +100 °C	4 m/s	ECORUBBER 1	
			-25 °C ... +150 °C	4 m/s	ECORUBBER-H	
			-20 °C ... +200 °C	4 m/s	ECORUBBER 2	
			-50 °C ... +150 °C	4 m/s	ECORUBBER 3**	
	A2 	**hydraulic, single acting** wiper with interference fit on outside diameter. wiping edge assures a reliable protection against penetration of dust and dirt whilst allowing backflow of residual oil film. back support area prevents tilting of wiper.	-30 °C ... +110 °C	4 m/s	ECOPUR	
			-20 °C ... +110 °C	4 m/s	H-ECOPUR	
			-50 °C ... +110 °C	4 m/s	T-ECOPUR	
			-20 °C ... +110 °C	5 m/s	S-ECOPUR	
			-30 °C ... +110 °C	4 m/s	G-ECOPUR	
			-30 °C ... +100 °C	4 m/s	ECORUBBER 1	
			-25 °C ... +150 °C	4 m/s	ECORUBBER-H	
			-20 °C ... +200 °C	4 m/s	ECORUBBER 2	
			-50 °C ... +150 °C	4 m/s	ECORUBBER 3**	
	A2B 	**hydraulic, single acting** wiper with interference fit on outside diameter. wiping edge assures a reliable protection against penetration of dust and dirt whilst allowing backflow of residual oil film.	-30 °C ... +110 °C	4 m/s	ECOPUR	
			-20 °C ... +110 °C	4 m/s	H-ECOPUR	
			-50 °C ... +110 °C	4 m/s	T-ECOPUR	
			-20 °C ... +110 °C	5 m/s	S-ECOPUR	
			-30 °C ... +110 °C	4 m/s	G-ECOPUR	
			-30 °C ... +100 °C	4 m/s	ECORUBBER 1	
			-25 °C ... +150 °C	4 m/s	ECORUBBER-H	
			-20 °C ... +200 °C	4 m/s	ECORUBBER 2	
			-50 °C ... +150 °C	4 m/s	ECORUBBER 3**	
	A2I 	**hydraulic, single acting** as profile A2, but without back support area. special housing design according ISO 6195-TypeC	-30 °C ... +110 °C	4 m/s	ECOPUR	
			-20 °C ... +110 °C	4 m/s	H-ECOPUR	
			-50 °C ... +110 °C	4 m/s	T-ECOPUR	
			-20 °C ... +110 °C	5 m/s	S-ECOPUR	
			-30 °C ... +110 °C	4 m/s	G-ECOPUR	
			-30 °C ... +100 °C	4 m/s	ECORUBBER 1	
			-25 °C ... +150 °C	4 m/s	ECORUBBER-H	
			-20 °C ... +200 °C	4 m/s	ECORUBBER 2	
			-50 °C ... +150 °C	4 m/s	ECORUBBER 3**	
					Wiping part	**Housing**
	A3 	**hydraulic, single acting** wiper with mounting cage for press-fit installation into axially open housings. wiping edge assures 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-TypeB	-30 °C ... +80 °C	4 m/s	ECOPUR	
			-20 °C ... +80 °C	4 m/s	H-ECOPUR	
			-40 °C ... +80 °C	4 m/s	T-ECOPUR	
			-20 °C ... +80 °C	5 m/s	S-ECOPUR	ECOTAL/ ECOMID*
			-30 °C ... +80 °C	4 m/s	G-ECOPUR	
			-30 °C ... +80 °C	4 m/s	ECORUBBER 1	
			-25 °C ... +80 °C	4 m/s	ECORUBBER-H	
			-20 °C ... +200 °C	4 m/s	ECORUBBER 2	ECOPAEK
			-50 °C ... +150 °C	4 m/s	ECORUBBER 3**	

linear moving rotating oscillating spiral moving static

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

** attention: not suitable for mineral oils !

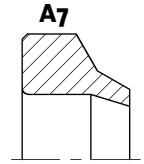
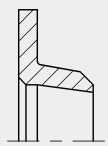
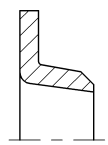
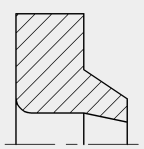
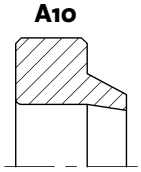
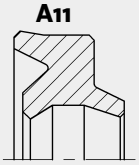
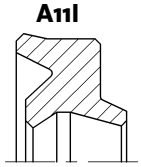
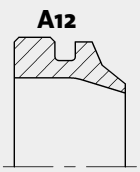
Not bolded symbols: please consult our technical dpmt. for application limitations

Application	Profile	Description	Temperature	max.speed	Material	
	A4 	**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-TypeA	-30 °C ... +110 °C	4 m/s	ECOPUR	
			-20 °C ... +110 °C	4 m/s	H-ECOPUR	
			-50 °C ... +110 °C	4 m/s	T-ECOPUR	
			-20 °C ... +110 °C	5 m/s	S-ECOPUR	
			-30 °C ... +110 °C	4 m/s	G-ECOPUR	
			-30 °C ... +100 °C	4 m/s	ECORUBBER 1	
			-25 °C ... +150 °C	4 m/s	ECORUBBER-H	
			-20 °C ... +200 °C	4 m/s	ECORUBBER 2	
			-50 °C ... +150 °C	4 m/s	ECORUBBER 3**	
	A4B 	**pneumatic, single acting** as profile A4, but without back support area for housings according ISO 6195-TypeA	-30 °C ... +110 °C	4 m/s	ECOPUR	
			-20 °C ... +110 °C	4 m/s	H-ECOPUR	
			-50 °C ... +110 °C	4 m/s	T-ECOPUR	
			-20 °C ... +110 °C	5 m/s	S-ECOPUR	
			-30 °C ... +110 °C	4 m/s	G-ECOPUR	
			-30 °C ... +100 °C	4 m/s	ECORUBBER I	
			-25 °C ... +150 °C	4 m/s	ECORUBBER-H	
			-20 °C ... +200 °C	4 m/s	ECORUBBER 2	
			-50 °C ... +150 °C	4 m/s	ECORUBBER 3**	
	A5 	**pneumatic, single acting** wiper with interference fit on outside diameter. special design of wiping lip allows retention of initial lubricating film. back support area prevents tilting of wiper.	-30 °C ... +110 °C	4 m/s	ECOPUR	
			-20 °C ... +110 °C	4 m/s	H-ECOPUR	
			-50 °C ... +110 °C	4 m/s	T-ECOPUR	
			-20 °C ... +110 °C	5 m/s	S-ECOPUR	
			-30 °C ... +110 °C	4 m/s	G-ECOPUR	
			-30 °C ... +100 °C	4 m/s	ECORUBBER I	
			-25 °C ... +150 °C	4 m/s	ECORUBBER-H	
			-20 °C ... +200 °C	4 m/s	ECORUBBER 2	
			-50 °C ... +150 °C	4 m/s	ECORUBBER 3**	
	A5B 	**pneumatic, single acting** wiper with interference fit on outside diameter. special design of wiping lip allows retention of initial lubricating film.	-30 °C ... +110 °C	4 m/s	ECOPUR	
			-20 °C ... +110 °C	4 m/s	H-ECOPUR	
			-50 °C ... +110 °C	4 m/s	T-ECOPUR	
			-20 °C ... +110 °C	5 m/s	S-ECOPUR	
			-30 °C ... +110 °C	4 m/s	G-ECOPUR	
			-30 °C ... +100 °C	4 m/s	ECORUBBER I	
			-25 °C ... +150 °C	4 m/s	ECORUBBER-H	
			-20 °C ... +200 °C	4 m/s	ECORUBBER 2	
			-50 °C ... +150 °C	4 m/s	ECORUBBER 3**	
	A5I 	**pneumatic, single acting** as profile A5, but without back support area. special housing design according ISO 6195-TypeC	-30 °C ... +110 °C	4 m/s	ECOPUR	
			-20 °C ... +110 °C	4 m/s	H-ECOPUR	
			-50 °C ... +110 °C	4 m/s	T-ECOPUR	
			-20 °C ... +110 °C	5 m/s	S-ECOPUR	
			-30 °C ... +110 °C	4 m/s	G-ECOPUR	
			-30 °C ... +100 °C	4 m/s	ECORUBBER I	
			-25 °C ... +150 °C	4 m/s	ECORUBBER-H	
			-20 °C ... +200 °C	4 m/s	ECORUBBER 2	
			-50 °C ... +150 °C	4 m/s	ECORUBBER 3**	
	A6 	**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-TypeB			Wiping part	Housing
			-30 °C ... +80 °C	4 m/s	ECOPUR	
			-20 °C ... +80 °C	4 m/s	H-ECOPUR	
			-40 °C ... +80 °C	4 m/s	T-ECOPUR	
			-20 °C ... +80 °C	5 m/s	S-ECOPUR	ECOTAL/ ECOMID*
			-30 °C ... +80 °C	4 m/s	G-ECOPUR	
			-30 °C ... +80 °C	4 m/s	ECORUBBER 1	
			-25 °C ... +80 °C	4 m/s	ECORUBBER-H	
			-20 °C ... +200 °C	4 m/s	ECORUBBER 2	ECOPAEK
			-50 °C ... +150 °C	4 m/s	ECORUBBER 3**	

linear moving rotating oscillating spiral moving static

* ECOTAL up to ø260 mm, ECOMID above ø260 mm
** attention: not suitable for mineral oils !

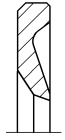
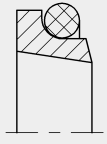
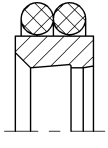
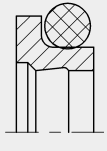
Not bolded symbols: please consult our technical dpmt. for application limitations

Application	Profile	Description	Temperature	max.speed	Material
	A7 	**hydraulic, single acting** wiper to fit in angled housings (30°angle). design mainly used in british equipment, in inch as well as metric dimensions.	-30 °C ... +110 °C -20 °C ... +110 °C -50 °C ... +110 °C -20 °C ... +110 °C -30 °C ... +110 °C -30 °C ... +100 °C -25 °C ... +150 °C -20 °C ... +200 °C -50 °C ... +150 °C	4 m/s 4 m/s 4 m/s 5 m/s 4 m/s 4 m/s 4 m/s 4 m/s 4 m/s	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR G-ECOPUR ECORUBBER 1 ECORUBBER-H ECORUBBER 2 ECORUBBER 3**
	A8 	**hydraulic/pneumatic, single acting** wiper usually fixed in housing with clamp flange. mainly used for replacement in old hydraulic and pneumatic cylinders or for secondary applications.	-30 °C ... +110 °C -20 °C ... +110 °C -50 °C ... +110 °C -20 °C ... +110 °C -30 °C ... +110 °C -30 °C ... +100 °C -25 °C ... +150 °C -20 °C ... +200 °C -50 °C ... +150 °C	4 m/s 4 m/s 4 m/s 5 m/s 4 m/s 4 m/s 4 m/s 4 m/s 4 m/s	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR G-ECOPUR ECORUBBER 1 ECORUBBER-H ECORUBBER 2 ECORUBBER 3**
	A8B 	**hydraulic/pneumatic, single acting** wiper usually fixed in housing with clamp flange. mainly used for replacement in old hydraulic and pneumatic cylinders or for secondary applications.	-30 °C ... +110 °C -20 °C ... +110 °C -50 °C ... +110 °C -20 °C ... +110 °C -30 °C ... +110 °C -30 °C ... +100 °C -25 °C ... +150 °C -20 °C ... +200 °C -50 °C ... +150 °C	4 m/s 4 m/s 4 m/s 5 m/s 4 m/s 4 m/s 4 m/s 4 m/s 4 m/s	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR G-ECOPUR ECORUBBER 1 ECORUBBER-H ECORUBBER 2 ECORUBBER 3**
	A9 	**hydraulic, single acting** wiper with dimensioning according to common types used in USA. for housings according AN 6231, ANSI/B93.35	-30 °C ... +110 °C -20 °C ... +110 °C -50 °C ... +110 °C -20 °C ... +110 °C -30 °C ... +110 °C -30 °C ... +100 °C -25 °C ... +150 °C -20 °C ... +200 °C -50 °C ... +150 °C	4 m/s 4 m/s 4 m/s 5 m/s 4 m/s 4 m/s 4 m/s 4 m/s 4 m/s	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR G-ECOPUR ECORUBBER 1 ECORUBBER-H ECORUBBER 2 ECORUBBER 3**
	A10 	**hydraulic, single acting** wiper with dimensioning according to common types used in USA. fixed relation between cross-section and height of wiper. for housings according AN 6231, ANSI/B93.35	-30 °C ... +110 °C -20 °C ... +110 °C -50 °C ... +110 °C -20 °C ... +110 °C -30 °C ... +110 °C -30 °C ... +100 °C -25 °C ... +150 °C -20 °C ... +200 °C -50 °C ... +150 °C	4 m/s 4 m/s 4 m/s 5 m/s 4 m/s 4 m/s 4 m/s 4 m/s 4 m/s	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR G-ECOPUR ECORUBBER 1 ECORUBBER-H ECORUBBER 2 ECORUBBER 3**
	A11 	**hydraulic/pneumatic, double acting** wiper including additional sealing lip. used in combination with O-ring activated PTFE seals (tandem) to reduce residual oil film. also used as complete solution for pneumatic applications in small diameter range. max. allowed pressure load: 16 bar (230 psi)	-30 °C ... +110 °C -20 °C ... +110 °C -50 °C ... +110 °C -20 °C ... +110 °C -30 °C ... +110 °C -30 °C ... +100 °C -25 °C ... +150 °C -20 °C ... +200 °C -50 °C ... +150 °C	4 m/s 4 m/s 4 m/s 5 m/s 4 m/s 4 m/s 4 m/s 4 m/s 4 m/s	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR G-ECOPUR ECORUBBER 1 ECORUBBER-H ECORUBBER 2 ECORUBBER 3**
	A11I 	**hydraulic/pneumatic, double acting** as profile A11, special housing design according ISO 6195-TypeC	-30 °C ... +110 °C -20 °C ... +110 °C -50 °C ... +110 °C -20 °C ... +110 °C -30 °C ... +110 °C -30 °C ... +100 °C -25 °C ... +150 °C -20 °C ... +200 °C -50 °C ... +150 °C	4 m/s 4 m/s 4 m/s 5 m/s 4 m/s 4 m/s 4 m/s 4 m/s 4 m/s	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR G-ECOPUR ECORUBBER 1 ECORUBBER-H ECORUBBER 2 ECORUBBER 3**
	A12 	**hydraulic, single acting** wiper with secondary lip, the technically accurate closure at the cylinder is providing reliable protection, even for heavy contamination.	-30 °C ... +110 °C -20 °C ... +110 °C -50 °C ... +110 °C -20 °C ... +110 °C -30 °C ... +110 °C	4 m/s 4 m/s 4 m/s 5 m/s 4 m/s	ECOPUR H-ECOPUR T-ECOPUR S-ECOPUR G-ECOPUR

linear moving rotating oscillating spiral moving static

* ECOTAL up to ø260 mm, ECOMID above ø260 mm
** attention: not suitable for mineral oils !

Not bolded symbols: please consult our technical dpmt. for application limitations

Application	Profile	Description	Temperature	max.speed	max.Pressure	Material	
	A13 	**hydraulic/pneumatic, single acting** scraper ring, mainly used in combination with wiper A2 or A1. 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 strenght.	-50 °C ... +80 °C	1 m/s	-	ECOTAL	
			-40 °C ... +80 °C	1 m/s	-	ECOMID*	
			-50 °C ... +260 °C	1 m/s	-	ECOPAEK	
	A25 	**hydraulic/pneumatic, single acting** PTFE-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).				Glide ring	Energizer
			-30 °C ... +100 °C	10 m/s	-	ECOFLON 2	NBR (70Sh.A)
			-20 °C ... +200 °C	10 m/s	-	ECOFLON 2	FPM (75Sh.A)
			-30 °C ... +100 °C	10 m/s	-	ECOFLON 3	NBR (70Sh.A)
			-20 °C ... +200 °C	10 m/s	-	ECOFLON 3	FPM (75Sh.A)
			-30 °C ... +100 °C	10 m/s	-	ECOFLON 4	NBR (70Sh.A)
			-20 °C ... +200 °C	10 m/s	-	ECOFLON 4	FPM (75Sh.A)
	A26 	**hydraulic/pneumatic, double acting** PTFE-double wiper with two O-rings as preloading elements. wiping edge assures 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 S9 (tandem). excellent chemical and thermal resistance (depends on O-ring).				Glide ring	Energizer
			-30 °C ... +100 °C	10 m/s	16 bar (230 psi)	ECOFLON 2	NBR (70Sh.A)
			-20 °C ... +200 °C	10 m/s	16 bar (230 psi)	ECOFLON 2	FPM (75Sh.A)
			-30 °C ... +100 °C	10 m/s	16 bar (230 psi)	ECOFLON 3	NBR (70Sh.A)
			-20 °C ... +200 °C	10 m/s	16 bar (230 psi)	ECOFLON 3	FPM (75Sh.A)
			-30 °C ... +100 °C	10 m/s	16 bar (230 psi)	ECOFLON 4	NBR (70Sh.A)
			-20 °C ... +200 °C	10 m/s	16 bar (230 psi)	ECOFLON 4	FPM (75Sh.A)
	A27 	**hydraulic/pneumatic, double acting** PTFE-double wiper with O-ring as preloading element. wiping edge assures 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 S9 (tandem). excellent chemical and thermal resistance (depends on O-ring).				Glide ring	Energizer
			-30 °C ... +100 °C	10 m/s	16 bar (230 psi)	ECOFLON 2	NBR (70Sh.A)
			-20 °C ... +200 °C	10 m/s	16 bar (230 psi)	ECOFLON 2	FPM (75Sh.A)
			-30 °C ... +100 °C	10 m/s	16 bar (230 psi)	ECOFLON 3	NBR (70Sh.A)
			-20 °C ... +200 °C	10 m/s	16 bar (230 psi)	ECOFLON 3	FPM (75Sh.A)
			-30 °C ... +100 °C	10 m/s	16 bar (230 psi)	ECOFLON 4	NBR (70Sh.A)
			-20 °C ... +200 °C	10 m/s	16 bar (230 psi)	ECOFLON 4	FPM (75Sh.A)

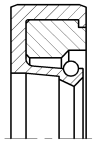
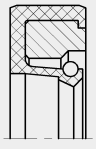
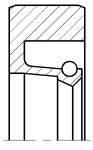
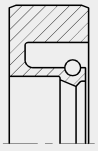
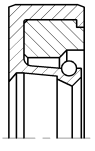
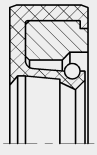
linear moving rotating oscillating spiral moving static

Not bolded symbols: please consult our technical dpmt. for application limitations

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

** attention: not suitable for mineral oils !

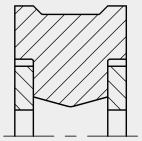
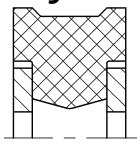
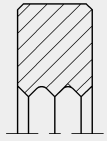
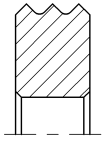
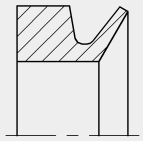
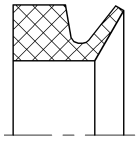
Rotary seals

Application	Profile	Description	Temperature	max.speed	max. Pressure	Material	
	R1 	**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.				Seal part	Energizer
			-30 °C ... +80 °C	5 m/s	0,5 bar (7 psi)	ECOPUR	ECOTAL/ ECOMID*
			-20 °C ... +80 °C	5 m/s	0,5 bar (7 psi)	H-ECOPUR	
			-40 °C ... +80 °C	5 m/s	0,5 bar (7 psi)	T-ECOPUR	
			-20 °C ... +80 °C	6 m/s	0,5 bar (7 psi)	S-ECOPUR	
			-30 °C ... +80 °C	5 m/s	0,5 bar (7 psi)	G-ECOPUR	
	R1R 	**single acting rotary shaft seal** spring loaded lip seal with retainer ring for press-fit installation into axially open housings. good adaptation possibilities 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.				Seal part	Energizer
			-30 °C ... +80 °C	10 m/s	0,5 bar (7 psi)	ECORUBBER 1	ECOTAL/ ECOMID*
			-25 °C ... +80 °C	10 m/s	0,5 bar (7 psi)	ECORUBBER-H	
			-20 °C ... +200 °C	15 m/s	0,5 bar (7 psi)	ECORUBBER 2	METAL
			-50 °C ... +80 °C	10 m/s	0,5 bar (7 psi)	ECORUBBER 3**	ECOTAL
			-50 °C ... +150 °C	10 m/s	0,5 bar (7 psi)	ECORUBBER 3**	METAL
			-50 °C ... +80 °C	5 m/s	0,2 bar (3 psi)	ECOSIL	ECOTAL
			-60 °C ... +200 °C	5 m/s	0,2 bar (3 psi)	ECOSIL	METAL
	R1AF 	**single acting rotary shaft seal** spring loaded lip seal with solid outer section for axially open housings with clamping plate fixation. mainly used for rolling mills, large gear mechanisms in heavy duty machinery, for shipbuilding industry and civil engineering.	-30 °C ... +110 °C	5 m/s	0,5 bar (7 psi)	ECOPUR	
			-20 °C ... +110 °C	5 m/s	0,5 bar (7 psi)	H-ECOPUR	
			-50 °C ... +110 °C	5 m/s	0,5 bar (7 psi)	T-ECOPUR	
			-20 °C ... +110 °C	6 m/s	0,5 bar (7 psi)	S-ECOPUR	
			-30 °C ... +100 °C	5 m/s	0,5 bar (7 psi)	G-ECOPUR	
			-30 °C ... +100 °C	10 m/s	0,5 bar (7 psi)	ECORUBBER 1	
			-25 °C ... +150 °C	10 m/s	0,5 bar (7 psi)	ECORUBBER-H	
			-20 °C ... +200 °C	15 m/s	0,5 bar (7 psi)	ECORUBBER 2	
			-50 °C ... +150 °C	10 m/s	0,2 bar (3 psi)	ECORUBBER 3**	
			-60 °C ... +200 °C	5 m/s	0,2 bar (3 psi)	ECOSIL	
	R1AS 	**single acting rotary shaft seal** split version of a spring loaded lip seal with solid outer section for axially open housings with clamping plate fixation. mainly used for repair purpose on rolling mills, large gear machanisms in heavy duty machinery, for shipbuilding industry and civil engineering.	-30 °C ... +110 °C	5 m/s	0,5 bar (7 psi)	ECOPUR	
			-20 °C ... +110 °C	5 m/s	0,5 bar (7 psi)	H-ECOPUR	
			-50 °C ... +110 °C	5 m/s	0,5 bar (7 psi)	T-ECOPUR	
			-20 °C ... +110 °C	6 m/s	0,5 bar (7 psi)	S-ECOPUR	
			-30 °C ... +100 °C	5 m/s	0,5 bar (7 psi)	G-ECOPUR	
			-30 °C ... +100 °C	10 m/s	0,5 bar (7 psi)	ECORUBBER 1	
			-25 °C ... +150 °C	10 m/s	0,5 bar (7 psi)	ECORUBBER-H	
			-20 °C ... +200 °C	15 m/s	0,5 bar (7 psi)	ECORUBBER 2	
			-50 °C ... +150 °C	10 m/s	0,2 bar (3 psi)	ECORUBBER 3**	
			-60 °C ... +200 °C	5 m/s	0,2 bar (3 psi)	ECOSIL	
	R2 	**single acting rotary shaft seal** as profile R1, but with additional dust lip to avoid ingress of dust and dirt.				Seal part	Energizer
			-30 °C ... +80 °C	5 m/s	0,5 bar (7 psi)	ECOPUR	ECOTAL/ ECOMID*
			-20 °C ... +80 °C	5 m/s	0,5 bar (7 psi)	H-ECOPUR	
			-40 °C ... +80 °C	5 m/s	0,5 bar (7 psi)	T-ECOPUR	
			-20 °C ... +80 °C	6 m/s	0,5 bar (7 psi)	S-ECOPUR	
			-30 °C ... +80 °C	5 m/s	0,5 bar (7 psi)	G-ECOPUR	
	R2R 	**single acting rotary shaft seal** as profile R1R, but with additional dust lip to avoid ingress of dust and dirt.				Seal part	Energizer
			-30 °C ... +80 °C	10 m/s	0,5 bar (7 psi)	ECORUBBER 1	ECOTAL/ ECOMID*
			-25 °C ... +80 °C	10 m/s	0,5 bar (7 psi)	ECORUBBER-H	
			-20 °C ... +200 °C	15 m/s	0,5 bar (7 psi)	ECORUBBER 2	METAL
			-50 °C ... +80 °C	10 m/s	0,5 bar (7 psi)	ECORUBBER 3**	ECOTAL
			-50 °C ... +150 °C	10 m/s	0,5 bar (7 psi)	ECORUBBER 3**	METAL
			-50 °C ... +80 °C	5 m/s	0,2 bar (3 psi)	ECOSIL	ECOTAL
			-60 °C ... +200 °C	5 m/s	0,2 bar (3 psi)	ECOSIL	METAL

linear moving · rotating · oscillating · spiral moving · static

Not bolded symbols: please consult our technical dpmt. for application limitations

* ECOTAL up to ø260 mm, ECOMID above ø260 mm
** attention: not suitable for mineral oils !

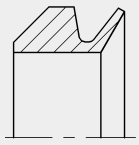
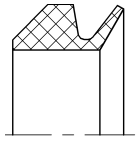
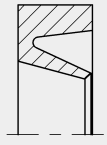
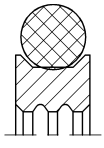
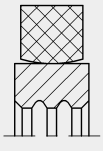
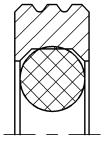
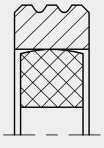
Application	Profile	Description	Temperature	max.speed	max. Pressure	Material	
	R3 	**double acting rotary seal** rotary seal with integrated backup rings for pivoting motion in hydraulic systems. interference fit on outside diameter maintains stable fit in the housing, back-up rings permit larger extrusion gap / higher pressure. mainly used for rotary pivots on excavators, grabs				Seal part	Back ring
			-30 °C ... +100 °C	0,2 m/s	400 bar (5800 psi)	ECOPUR	
			-20 °C ... +100 °C	0,2 m/s	400 bar (5800 psi)	H-ECOPUR	ECOTAL/ ECOMID*
			-40 °C ... +100 °C	0,2 m/s	400 bar (5800 psi)	T-ECOPUR	
			-20 °C ... +100 °C	0,3 m/s	400 bar (5800 psi)	S-ECOPUR	
			-30 °C ... +100 °C	0,2 m/s	400 bar (5800 psi)	G-ECOPUR	
	R3R 	**double acting rotary seal** as profile R3 but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.				Seal part	Back rings
			-30 °C ... +100 °C	0,2 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOTAL
			-30 °C ... +100 °C	0,2 m/s	250 bar (3600 psi)	ECORUBBER 1	ECOMID
			-25 °C ... +100 °C	0,2 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOTAL
			-25 °C ... +100 °C	0,2 m/s	250 bar (3600 psi)	ECORUBBER-H	ECOMID*
			-20 °C ... +200 °C	0,2 m/s	250 bar (3600 psi)	ECORUBBER 2	ECOFLON
	R4 	**double acting rotary seal** space saving rotary seal for pivoting motion in hydraulic systems. interference fit on outside diameter maintains stable fit in the housing, dynamic sealing lips on inside diameter.	-30 °C ... +110 °C	0,2 m/s	160 bar (2300 psi)	ECOPUR	
			-20 °C ... +110 °C	0,2 m/s	160 bar (2300 psi)	H-ECOPUR	
			-50 °C ... +110 °C	0,2 m/s	160 bar (2300 psi)	T-ECOPUR	
			-20 °C ... +110 °C	0,3 m/s	160 bar (2300 psi)	S-ECOPUR	
			-30 °C ... +110 °C	0,2 m/s	160 bar (2300 psi)	G-ECOPUR	
			-30 °C ... +100 °C	0,2 m/s	100 bar (1450 psi)	ECORUBBER 1	
			-25 °C ... +150 °C	0,2 m/s	100 bar (1450 psi)	ECORUBBER-H	
			-20 °C ... +200 °C	0,2 m/s	100 bar (1450 psi)	ECORUBBER 2	
			-50 °C ... +150 °C	0,2 m/s	100 bar (1450 psi)	ECORUBBER 3**	
	R5 	**double acting rotary seal** space saving rotary seal for pivoting motion in hydraulic systems. interference fit on inside diameter maintains stable fit in the housing, dynamic sealing lips on outside diameter.	-30 °C ... +110 °C	0,2 m/s	160 bar (2300 psi)	ECOPUR	
			-20 °C ... +110 °C	0,2 m/s	160 bar (2300 psi)	H-ECOPUR	
			-50 °C ... +110 °C	0,2 m/s	160 bar (2300 psi)	T-ECOPUR	
			-20 °C ... +110 °C	0,3 m/s	160 bar (2300 psi)	S-ECOPUR	
			-30 °C ... +110 °C	0,2 m/s	160 bar (2300 psi)	G-ECOPUR	
			-30 °C ... +100 °C	0,2 m/s	100 bar (1450 psi)	ECORUBBER 1	
			-25 °C ... +150 °C	0,2 m/s	100 bar (1450 psi)	ECORUBBER-H	
			-20 °C ... +200 °C	0,2 m/s	100 bar (1450 psi)	ECORUBBER 2	
			-50 °C ... +150 °C	0,2 m/s	100 bar (1450 psi)	ECORUBBER 3**	
	R6 	**axially acting rotary seal** elastic, excellent wear resistant V-Ring with interference fit on the shaft, rotates with the shaft, sealing axially against shaft collars, thrust blocks or the outer race of roller bearings, protecting the bearing against dust, dirt, oilsplash, watersplash and similar media. acting as a seal and slinger ring.	-30 °C ... +110 °C	25 m/s	-	ECOPUR	
			-20 °C ... +110 °C	25 m/s	-	H-ECOPUR	
			-50 °C ... +110 °C	25 m/s	-	T-ECOPUR	
			-20 °C ... +110 °C	25 m/s	-	S-ECOPUR	
			-30 °C ... +110 °C	25 m/s	-	G-ECOPUR	
	R6R 	**axially acting rotary seal** elastic, good wear resistant V-Ring as profile R6, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	-30 °C ... +100 °C	25 m/s	-	ECORUBBER 1	
			-20 °C ... +200 °C	25 m/s	-	ECORUBBER 2	
			-50 °C ... +150 °C	25 m/s	-	ECORUBBER 3**	
			-25 °C ... +150 °C	25 m/s	-	ECORUBBER-H	

linear moving rotating oscillating spiral moving static

Not bolded symbols: please consult our technical dpmt. for application limitations

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

** attention: not suitable for mineral oils !

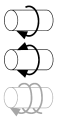
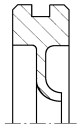
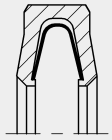
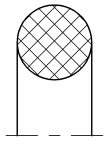
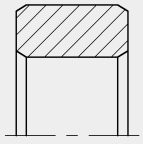
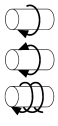
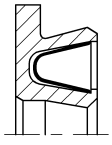
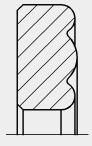
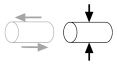
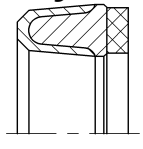
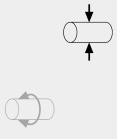
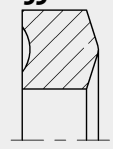
Application	Profile	Description	Temperature	max.speed	max. Pressure	Material	
	R7 	**axially acting rotary seal** elastic, excellent wear resistant V-Ring with interference fit on the shaft, rotates with the shaft, sealing axially against shaft collars, thrust blocks or the outer race of roller bearings, protecting the bearing against dust, dirt, oilsplash, watersplash and similar media. acting as a seal- and slingerring.	-30 °C ... +110 °C	25 m/s	-	ECOPUR	
			-20 °C ... +110 °C	25 m/s	-	H-ECOPUR	
			-50 °C ... +110 °C	25 m/s	-	T-ECOPUR	
			-20 °C ... +110 °C	25 m/s	-	S-ECOPUR	
			-30 °C ... +110 °C	25 m/s	-	G-ECOPUR	
	R7R 	**axially acting rotary seal** elastic, good wear resistant V-Ring as profile R7, but more adaptation possibilities for diverse temperatures and media by selection of suitable seal material.	-30 °C ... +100 °C	25 m/s	-	ECORUBBER 1	
			-20 °C ... +200 °C	25 m/s	-	ECORUBBER 2	
			-50 °C ... +150 °C	25 m/s	-	ECORUBBER 3**	
			-25 °C ... +150 °C	25 m/s	-	ECORUBBER-H	
	R8 	**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.	upon application	upon application	upon application	all materials possible	
	R9F 	**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.				Glide ring	Energizer
			-30 °C ... +100 °C	0,4 m/s	350 bar (5000 psi)	ECOFLON 2,3,4	NBR (70Sh.A) ECORUBBER 1
			-30 °C ... +100 °C	0,4 m/s	350 bar (5000 psi)	ECOFLON 2,3,4	
			-30 °C ... +80 °C	0,4 m/s	350 bar (5000 psi)	ECOPE	
	R9FS 	**double acting rotary seal** as profile R9F, but with a profile ring energizer instead of the O-ring. For heavy duty applications and non standard housings.				Glide ring	Energizer
			-30 °C ... +100 °C	0,4 m/s	350 bar (5000 psi)	ECOFLON 2,3,4	NBR (70Sh.A) ECORUBBER 1
			-30 °C ... +100 °C	0,4 m/s	350 bar (5000 psi)	ECOFLON 2,3,4	
			-30 °C ... +80 °C	0,4 m/s	350 bar (5000 psi)	ECOPE	
	R10F 	**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.				Glide ring	Energizer
			-30 °C ... +100 °C	0,4 m/s	350 bar (5000 psi)	ECOFLON 2,3,4	NBR (70Sh.A) ECORUBBER 1
			-30 °C ... +100 °C	0,4 m/s	350 bar (5000 psi)	ECOFLON 2,3,4	
			-30 °C ... +80 °C	0,4 m/s	350 bar (5000 psi)	ECOPE	
	R10FS 	**double acting rotary seal** as profile R10F, but with a profile ring energizer instead of the O-ring. For heavy duty applications and non standard housings.				Glide ring	Energizer
			-30 °C ... +100 °C	0,4 m/s	350 bar (5000 psi)	ECOFLON 2,3,4	NBR (70Sh.A) ECORUBBER 1
			-30 °C ... +100 °C	0,4 m/s	350 bar (5000 psi)	ECOFLON 2,3,4	
			-30 °C ... +80 °C	0,4 m/s	350 bar (5000 psi)	ECOPE	

linear moving rotating oscillating spiral moving static

Not bolded symbols: please consult our technical dpmt. for application limitations

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

** attention: not suitable for mineral oils !

Application	Profile	Description	Temperature	max.speed	max. Pressure	Material	
	**R11F** 	**single acting PTFE rotary seal** space saving rotary seal, deformed sealing lip acts selfadjusting on increasing temperature. for axially open housings with clamping plate fixation, elastic secondary seal or integrated O-ring necessary for static sealing in the housing. excellent chemical and thermal resistance, suitable for high speed applications.	-200°C ... +260°C	20 m/s	5 bar (70 psi)	ECOFLON 2,3,4	
	R12F 	**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.				Seal	Spring
			-200°C ... +260°C	15 m/s	300 bar (4300 psi)	ECOFLON 2,3,4	1.4310
	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 prefer profiles like S20/K20 or S35/K35.	-30 °C ... +110 °C	-	600 bar (8700 psi)	ECOPUR	
			-20 °C ... +110 °C	-	600 bar (8700 psi)	H-ECOPUR	
			-50 °C ... +110 °C	-	600 bar (8700 psi)	T-ECOPUR	
			-20 °C ... +110 °C	-	600 bar (8700 psi)	S-ECOPUR	
			-30 °C ... +110 °C	-	600 bar (8700 psi)	G-ECOPUR	
			-30 °C ... +100 °C	-	160 bar (2300 psi)	ECORUBBER 1	
			-20 °C ... +200°C	-	160 bar (2300 psi)	ECORUBBER 2	
			-50 °C ... +50 °C	-	160 bar (2300 psi)	ECORUBBER 3**	
			-25 °C ... +150 °C	-	160 bar (2300 psi)	ECORUBBER-H	
			-200°C .. +260°C	-	160 bar (2300 psi)	ECOFLON 1	
	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.	upon application	upon application	upon application	all materials possible	
	**R19F** 	**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.				Seal	Spring
			-200 °C ... +260 °C	2 m/s	150 bar (2100 psi)	ECOFLON 2,3,4	1.4310
			upon application	upon application	upon application	all other materials possible	1.4310
	R20 	**single acting flange seal** flange seal for static applications, suitable for high pressure range. direction of pressurization (from inside or outside) must be indicated when ordering the seal.	-30 °C ... +110 °C	-	800 bar (11600 psi)	ECOPUR	
			-20 °C ... +110 °C	-	800 bar (11600 psi)	H-ECOPUR	
			-50 °C ... +110 °C	-	800 bar (11600 psi)	T-ECOPUR	
			-20 °C ... +110 °C	-	800 bar (11600 psi)	S-ECOPUR	
			-30 °C ... +110 °C	-	800 bar (11600 psi)	G-ECOPUR	
	**R30** 	**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.				Seal	Cover	Backup
			-20 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)	ECORUBBER 2	ECOFLON	ECOTAL
			-25 °C ... +100 °C	0,5 m/s	500 bar (7200 psi)	ECORUBBER-H	ECOFLON	ECOTAL
			-20 °C ... +200 °C	0,5 m/s	1000 bar (14500 psi)	ECORUBBER 2	ECOFLON	ECOPAEK
			-25 °C ... +200 °C	0,5 m/s	1000 bar (14500 psi)	ECORUBBER-H	ECOFLON	ECOPAEK
	**R35** 	**single acting flange seal** flange seal for static applications, suitable for high pressure range. direction of pressurization (from inside or outside) must be indicated when ordering the seal.	-30 °C ... +110 °C	-	800 bar (11600 psi)	ECOPUR	
			-20 °C ... +110 °C	-	800 bar (11600 psi)	H-ECOPUR	
			-50 °C ... +110 °C	-	800 bar (11600 psi)	T-ECOPUR	
			-20 °C ... +110 °C	-	800 bar (11600 psi)	S-ECOPUR	
			-30 °C ... +110 °C	-	800 bar (11600 psi)	G-ECOPUR	
			-30 °C ... +100 °C	-	250 bar (3600 psi)	ECORUBBER 1	
			-20 °C ... +200 °C	-	250 bar (3600 psi)	ECORUBBER 2	
			-50 °C ... +150 °C	-	250 bar (3600 psi)	ECORUBBER 3**	
			-25 °C ... +150 °C	-	250 bar (3600 psi)	ECORUBBER H	
			-60 °C ... +200 °C	-	250 bar (3600 psi)	ECOSIL	

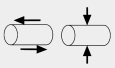
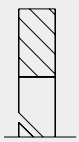
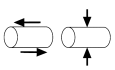
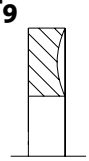
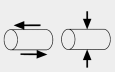
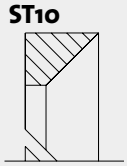
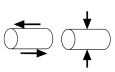
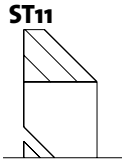
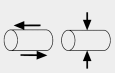
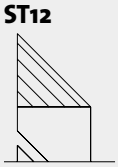
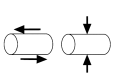
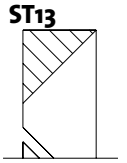
linear moving rotating oscillating spiral moving static

Not bolded symbols: please consult our technical dpmt. for application limitations

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

** attention: not suitable for mineral oils !

Back-up rings

Application	Profile	Description	Temperature	max.speed	Material
	**ST8** 	**back-up ring** common inactive back-up ring, mainly used with O-Rings to avoid gap extrusion. split and non split design available.	-50 °C ... +100 °C -40 °C ... +100 °C -200 °C ... +260 °C -200 °C ... +260 °C -30 °C ... +110 °C -20 °C ... +110 °C -50 °C ... +110 °C -30 °C ... +110 °C	- - - - - - - -	ECOTAL ECOMID* ECOFLON 1 ECOFLON 2 ECOPUR H-ECOPUR T-ECOPUR G-ECOPUR
	**ST9** 	**back-up ring** common inactive back-up ring especially for O-Rings to avoid gap extrusion. split and non split design available.	-200 °C ... +260 °C -30 °C ... +110 °C -20 °C ... +110 °C -50 °C ... +110 °C -30 °C ... +110 °C	- - - - -	ECOFLON 1 ECOPUR H-ECOPUR T-ECOPUR G-ECOPUR
	**ST10** 	**back-up ring** standard active back-up ring for piston seal type PD. normally already included in PD-type seal profiles, designed for automatic pressure activation. split and non split design available.	-50 °C ... +100 °C -40 °C ... +100 °C -200 °C ... +260 °C	- - -	ECOTAL ECOMID* ECOFLON 2
	**ST11** 	**back-up ring** standard active back-up ring for rod seal type PD. normally already included in PD-type seal profiles, designed for automatic pressure activation. split and non split design available.	-50 °C ... +100 °C -40 °C ... +100 °C -200 °C ... +260 °C	- - -	ECOTAL ECOMID* ECOFLON 2
	**ST12** 	**back-up ring** triangular back-up ring for rod applications, fits in special shaped housings (see seal data sheets). also used as integrated active back-up ring in special high pressure or low friction seal profiles. split and non split design available.	-50 °C ... +100 °C -40 °C ... +100 °C -200 °C ... +260 °C	- - -	ECOTAL ECOMID* ECOFLON 2
	**ST13** 	**back-up ring** triangular back-up ring for piston applications, fits in special shaped housings (see seal data sheets). also used as integrated active back-up ring in special high pressure or low friction seal profiles. split and non split design available.	-50 °C ... +100 °C -40 °C ... +100 °C -200 °C ... +260 °C	- - -	ECOTAL ECOMID* ECOFLON 2

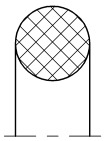
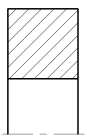
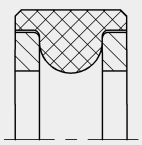
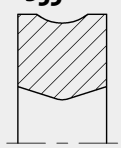
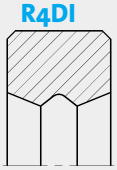
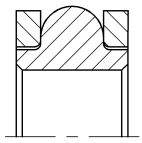
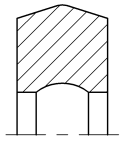
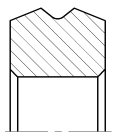
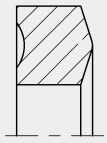
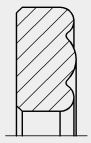
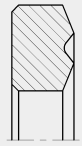
linear moving rotating oscillating spiral moving static

* ECOTAL up to ø260 mm, ECOMID above ø260 mm

Not bolded symbols: please consult our technical dpmt. for application limitations

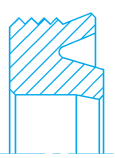
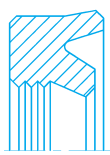
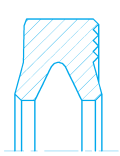
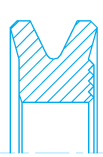
Static seals

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

Application	static	Profiles			
universal		R13 	R14 		**universal type** most common and simple seal profiles with proven reliability in multiple applications in every sector of industry.
inside sealing		S20R 	S35 	R4DI 	**inside sealing type** interference fit on outside diameter assures stable fit in the housing and reliable performance at all pressures.
outside sealing		K20R 	K35 	R5DO 	**outside sealing type** interference fit on inside diameter assures stable fit in the housing and reliable performance at all pressures.
axial sealing		R35 	R20 	R20DA 	**axial sealing type** robust profiles mainly used as flange seals, inside or outside pressurizsation possible. direction of pressurization (from inside or outside) must be indicated when ordering the seal.

For material data, temperature- and pressure limitations please refer to the respective entries in the profile description.

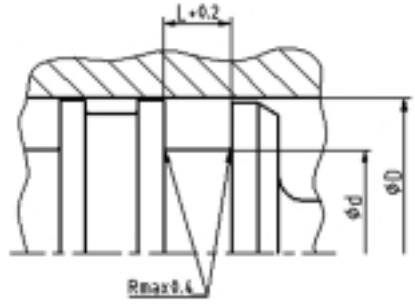
In addition to our standard range of static seals we certainly do offer special tailormade static seal profiles to satisfy the very specific needs of every customer, in every industry.

Special application	static	Profiles				
tailormade solutions						these special profiles are examples for our wide and flexible product range.

Piston seal housing details & recommendations

Indicated dimensions are required to process an order

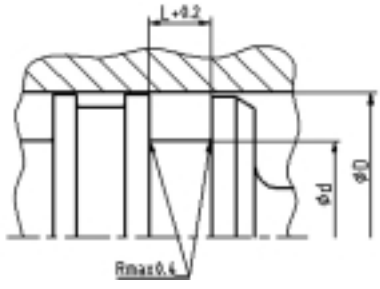
øD . . . . . outside diameter
ød . . . . . inside diameter
L . . . . . groove length



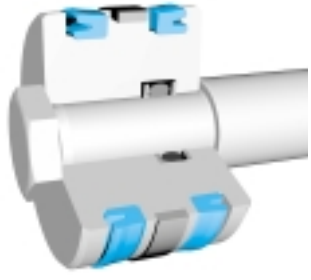
Surface roughness	R tmax (µm)	Ra (µm)
Sliding surface for PU/RUBBER seals	≤ 2.5	≤ 0.1 - 0.5
Sliding surface for PTFE seals	≤ 2	≤ 0.05 - 0.3
Bottom of groove	≤ 6.3	≤ 1.6
Groove face	≤ 15	≤ 3
bearing area Tp	> 50%	≤ 95%

Seal housing tolerances		
Ø d	h10	
Ø D	H9	

Easy ordering procedure	K1	H-ECOPUR	160 x 140 x 12
	profile	material	nominal housing dimensions



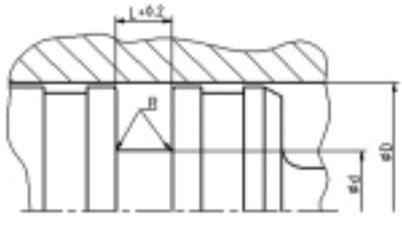
K1
K2
K3
K4
K5
K6
K7
K20
K21
K35



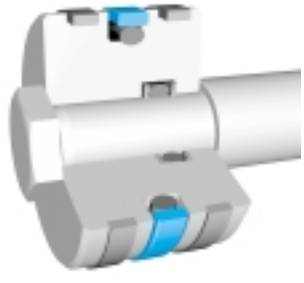
Main applications:
support- and retaining cylinders
standard cylinders

Advantages:
stable fit in the housing,
ultimate sealing effect,
wide temperature range

Standard Materials:
ECOPUR, ECORUBBER (all types)



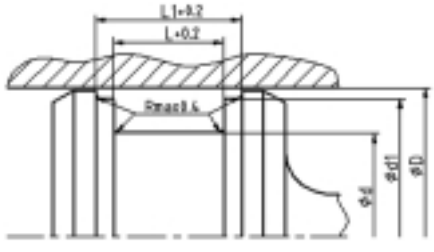
K8
K23



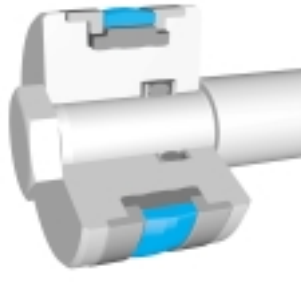
Main applications:
standard cylinders for positioning functions, mobile hydraulics, etc.

Advantages:
low friction, no stick-slip, excellent resistance against pressure shocks

Standard Materials:
ECOFLON / NBR or ECOFLON / Viton



K9
K17



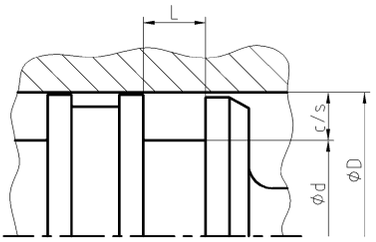
Main applications:
support- and retaining cylinders
standard cylinders

Advantages:
excellent static and dynamic sealing capacity, integrated guide rings

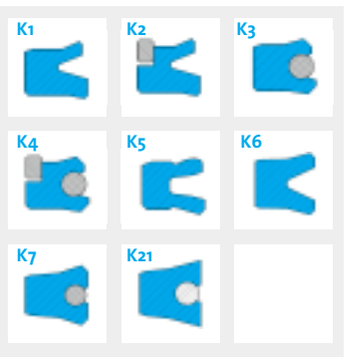
Standard Materials:
ECOPUR / ECORUBBER / ECOTAL

housing recommendations

single acting piston seals
lip type (u-cup) seals
compact seals



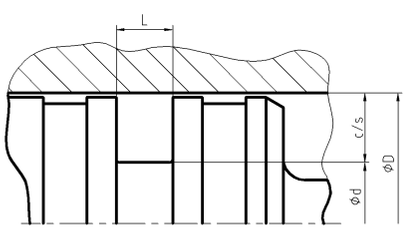
The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.



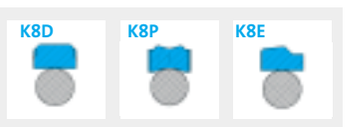
øD	ød	L	c/s
5 - 24,9	øD-8	6	4
25 - 49,9	øD-10	7	5
50 - 74,9	øD-12	8	6
75 - 149,9	øD-16	10	8
150 - 299,9	øD-20	12	10
300 - 500	øD-24	18	12
500 - 750	øD-30	20	15
> 750	øD-40	26	20

housing recommendations

single/double acting piston seals
o-ring activated PTFE (PU) seals



The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.

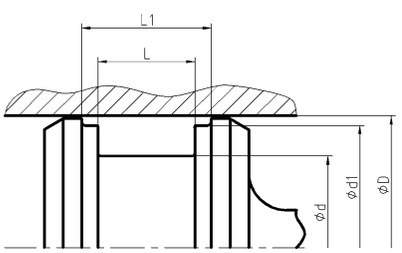


øD	ød	L	c/s
8-14,9	øD-4,9	2,2	2,45
15-39,9	øD-7,5	3,2	3,75
40-79,9	øD-11	4,2	5,5
80-132,9	øD-15,5	6,3	7,75
133 - 329,9	øD-21	8,1	10,5
330 - 669,9	øD-24,5	8,1	12,25
670 - 1.000	øD-28	9,5	14*
> 1.000	øD-28	9,5	14*

* only profiles K8D and K8E, not for profile K8P

housing recommendations

double acting piston seals
compact type



The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.

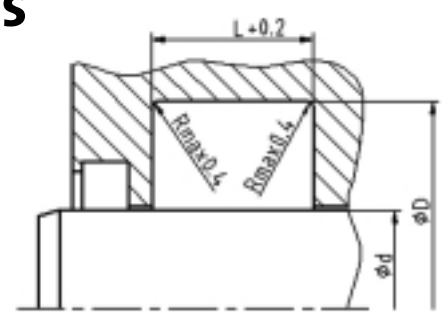
øD	ød	ød1	L*	L1*
20 - 49,9	øD-10	øD-3	12,5	20,5
50 - 79,9	øD-15	øD-4	20	28
80 - 149,9	øD-20	øD-5	25	36
150 - 399,9	øD-25	øD-6	32	46
400 - 750	øD-30	øD-8	36	50
>750	øD-40	øD-8	40	54

* not valid for profile K9H

Rod Seal
housing details & recommendations

Indicated dimensions are required to process an order

øD ..... outside diameter
ød ..... inside diameter
L ..... groove length

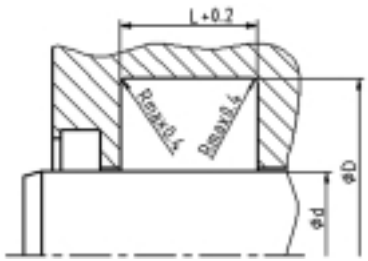


Surface roughness	R tmax (µm)	Ra (µm)
Sliding surface for PU/RUBBER seals	≤ 2.5	≤ 0.1 - 0.5
Sliding surface for PTFE seals	≤ 2	≤ 0.05 - 0.3
Bottom of groove	≤ 6.3	≤ 1.6
Groove face	≤ 15	≤ 3
bearing area Tp	> 50%	≤ 95%

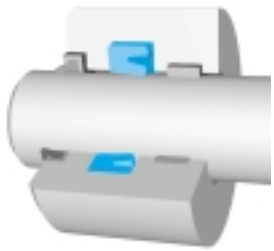
Seal housing tolerances

Ø d	f8
Ø D	H10

Easy ordering procedure	S1	ECOPUR	60 x 75 x 10
	profile	material	nominal housing dimensions



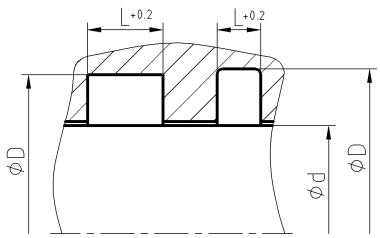
S1
S2 S17
S3 S18
S4 S19
S5 S35
S6
S7
S8



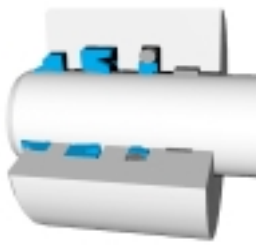
Main applications:
standard cylinders
light & standard hydraulic applications

Advantages:
stable fit in the housing, ultimate sealing effect, wide temperature range, good backpumping ability

Standard Materials:
ECOPUR, ECORUBBER



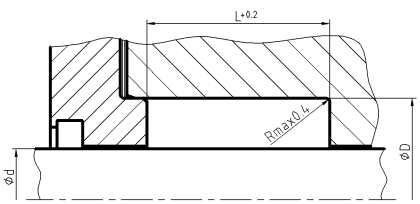
S9



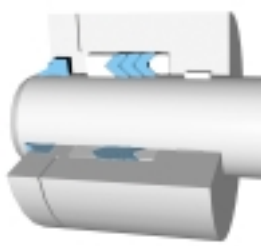
Main applications:
earth moving equipment,
heavy hydraulics

Advantages:
excellent resistance against pressure shocks, long lifetime

Standard Materials:
S9: ECOFLON / NBR or ECOFLON / VITON
S1: ECOPUR or ECORUBBER



S1012
S1315



Main applications:
heavy industry hydraulics, presses

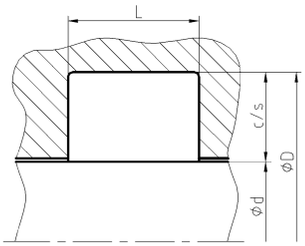
Advantages:
suitable for old, worn rods,
splitted version for easy installation available

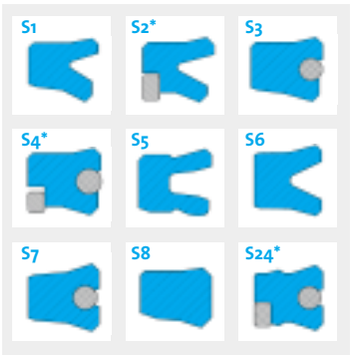
Standard Materials:
ECOPUR / ECOTAL

housing recommendations

single acting rod seals
lip type (u-cup) seals
compact seals

The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.



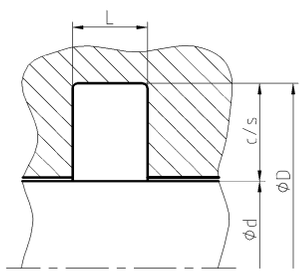


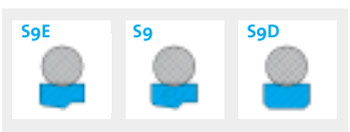
ød	øD	L	c/s
5 - 24,9 *	ød+8	6,3	4
25 - 49,9	ød+10	8	5
50 - 149,9	ød+15	10	7,5
150 - 299,9	ød+20	14	10
300 - 499,9	ød+25	17	12,5
500 - 699,9	ød+30	25	15
700 - 1.000	ød+40	32	20
> 1.000	ød+40	32	20

housing recommendations

single/double acting rod seals
O-ring activated PTFE (PU) seals

The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.



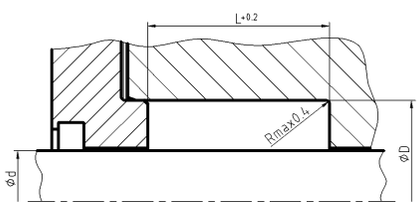


ød	øD	L	c/s
5 - 7,9	ød+4,9	2,2	2,45
8 - 18,9	ød+7,3	3,2	3,65
19 - 37,9	ød+10,7	4,2	5,35
38 - 199,9	ød+15,1	6,3	7,55
200 - 255,9	ød+20,5	8,1	10,25
256 - 649,9	ød+24	8,1	12
650 - 1.000	ød+27,3	9,5	13,65
> 1.000	ød+27,3	9,5	13,65

housing recommendations

single acting rod seals
chevron packings

The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.



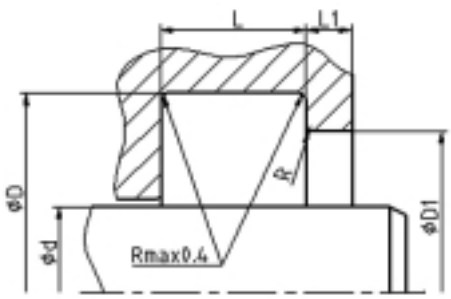
ød	øD	L	c/s
10 - 39,9	ød+10	16	5
40 - 74,9	ød+15	25	7,5
75 - 149,9	ød+20	32	10
150 - 199,9	ød+25	40	12,5
200 - 300	ød+30	50	15
> 300	ød+40	63	20

* Restrictions in minimum diameter for profiles with back-up rings.
Please consult our technical dpmt. for exact limitations.

Wiper Seal housing details & recommendations

Indicated dimensions are required to process an order

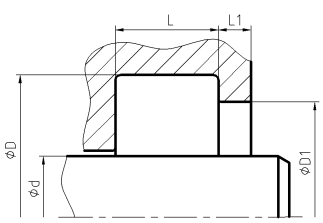
øD ..... outside diameter
ød .....inside diameter (rod)
L ..... groove length
H ..... total wiper height



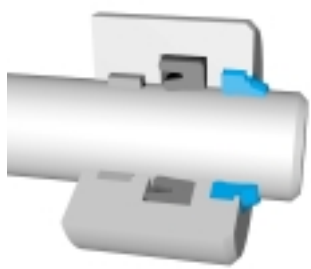
Surface roughness	R tmax (µm)	Ra (µm)
Sliding surface for PU/RUBBER seals	≤ 2.5	≤ 0.1 - 0.5
Sliding surface for PTFE seals	≤ 2	≤ 0.05 - 0.3
Bottom of groove	≤ 6.3	≤ 1.6
Groove face	≤ 15	≤ 3
bearing area Tp	> 50%	≤ 95%

Seal housing tolerances			
Ø D1	H11	L<10 mm	+0,2
Ø D	H11	L>10 mm	+0,3

Easy ordering procedure	A1	S-ECOPUR	60 x 68 x 4/7
	profile	material	nominal housing dimensions / total wiper height



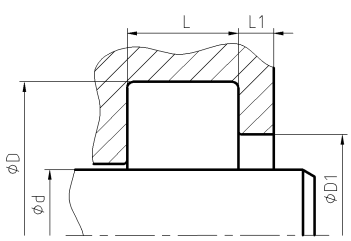
A1
A4



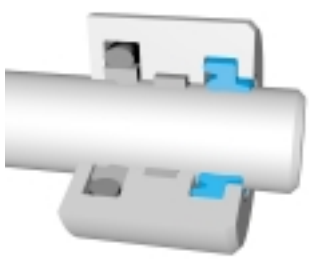
Main applications:
standard wiper for hydraulic

Advantages:
easy installation (snap-in)
excellent wear resistance,
technically accurate closure

Standard Materials:
ECOPUR / ECORUBBER



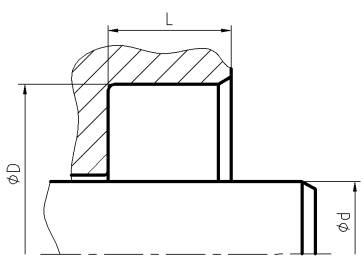
A11
A2
A5
A12



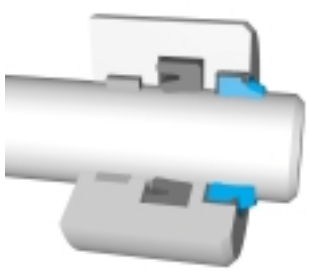
Main applications:
in combination with O-ring activated PTFE rod seals (S9)

Advantages:
excellent wear resistance,
double acting function

Standard Materials:
ECOPUR / ECORUBBER



A3
A6



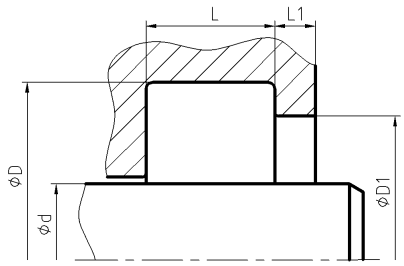
Main applications:
standard hydraulic applications,
pressfit for axially open housings

Advantages:
excellent wear resistance,
plastic retainer ring, no oxidation problem between retainer and housing

Standard Materials:
ECOPUR+ECOTAL / ECORUBBER+ECOTAL

housing recommendations
single acting wipers

The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.

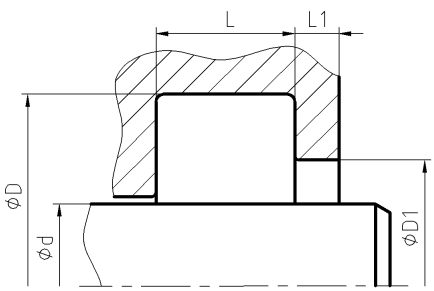


ød	øD	øD1	L	L1	H*
6 - 100	ød+8	ød+6	4	1	7
100,1 - 149,9	ød+12	ød+9	5,5	1,5	10
≥150	ød+15	ød+11	6,5	2	13

* H = total wiper height

housing recommendations
single/double acting wipers

The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.

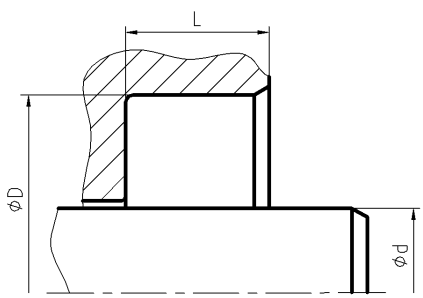


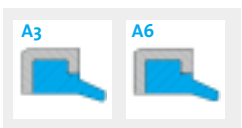
ød	øD	øD1	L	L1	H*
6 - 49,9	ød+8	ød+4	5	min. 2	8
50 - 99,9	ød+10	ød+5	6	min. 2	9,7
≥100	ød+15	ød+7,5	8,5	min. 2	13

* H = total wiper height

housing recommendations
single acting wipers

The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.





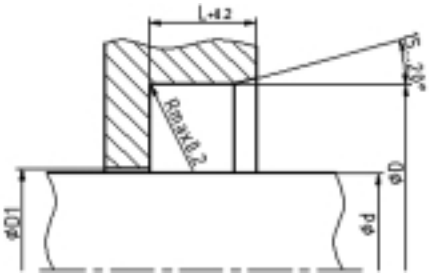
ød	øD	L	H*
6 - 9,9	ød+8	5	8
10 - 99,9	ød+10	7	10
100 - 200	ød+15	9	12
> 200	ød+20	12	16

* H = total wiper height

Rotary Seal housing details & recommendations

Indicated dimensions are required to process an order

øD . . . . . outside diameter
ød . . . . . .inside diameter (shaft)
L . . . . . groove length

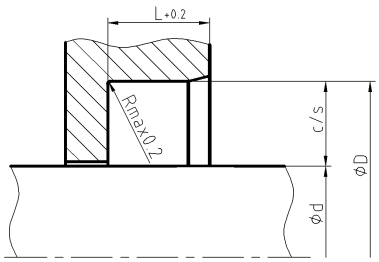


Surface roughness	R tmax (µm)	Ra (µm)
Sliding surface for PU/RUBBER seals	≤ 2.5	≤ 0.1 - 0.5
Sliding surface for PTFE seals	≤ 2	≤ 0.05 - 0.3
Bottom of groove	≤ 6.3	≤ 1.6
Groove face	≤ 15	≤ 3
bearing area Tp	> 50%	≤ 95%

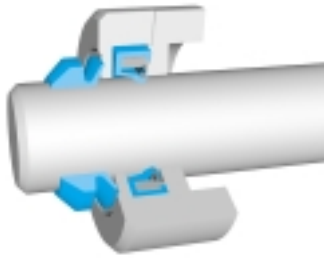
Seal housing tolerances

Ø d	f8
Ø D	H8

Easy ordering procedure	R1	ECORUBBER 1 / ECOTAL	60 x 80 x 10
	profile	material	nominal housing dimensions



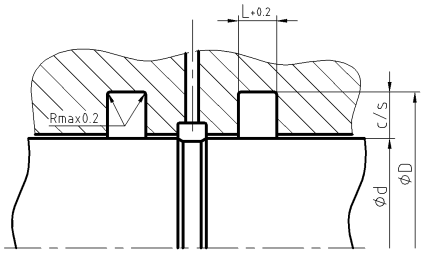
R1
R2



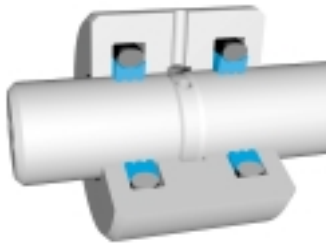
Main applications:
bearing protection

Advantages:
good adaptation possibilities for diverse temperatures and media

Standard Materials:
ECOPUR, ECORUBBER / ECOTAL, Aluminium



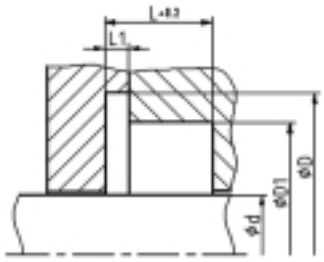
R9



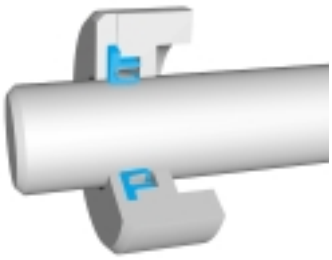
Main applications:
rotary pivots

Advantages:
for high pressure

Standard Materials:
ECOFLON + NBR or Viton



R19



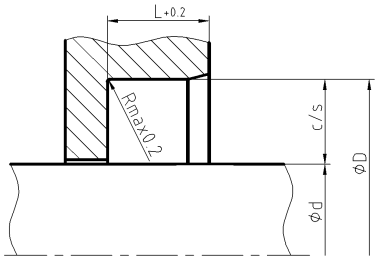
Main applications:
bearing protection for chemical and pharma industries

Advantages:
low friction, good chemical and thermal resistance, suitable for high speed

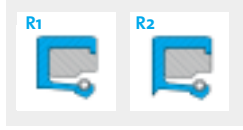
Standard Materials:
ECOFLON, stainless steel spring

housing recommendations

single acting rotary seals
oil seals / radial shaft seals



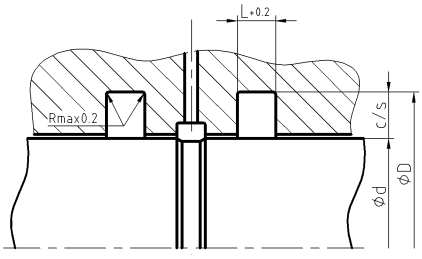
The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.



ød	øD	L	c/s
6 - 59,9	ød+12	7	6
60 - 139,9	ød+15	8	7,5
140 - 299,9	ød+20	10	10
300 - 499,9	ød+30	12	15
500 - 800	ød+40	20	20
> 800	ød+50	22	25

housing recommendations

double acting rotary seals
O-ring activated PTFE seals

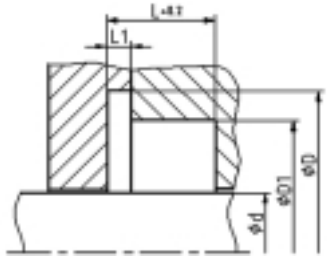


The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.

ød	øD	L	c/s
6 - 18,9	ød+4,9	2,2	2,45
19 - 37,9	ød+7,5	3,2	3,75
38 - 199,9	ød+11	4,2	5,5
200 - 255,9	ød+15,5	6,3	7,75
256 - 649,9	ød+21	8,1	10,5
>650	ød+28	9,5	14

housing recommendations

single acting rotary seals
Spring activated PTFE seals

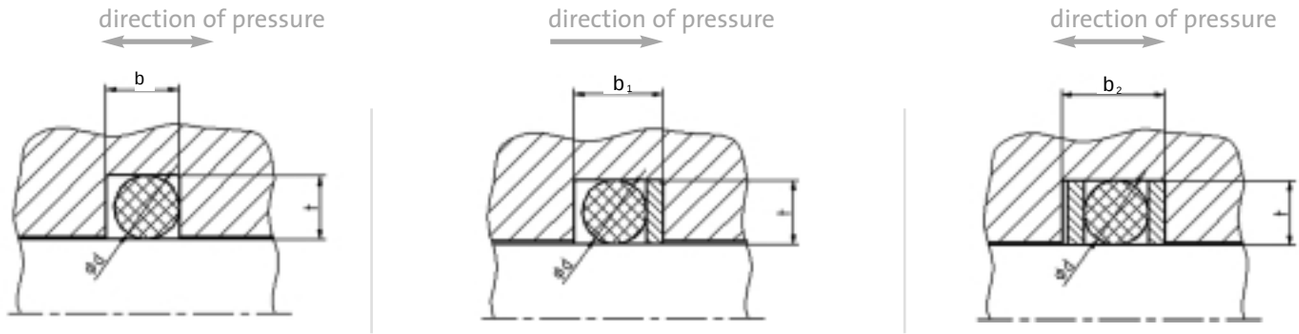


The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.

ød	øD	øD1	L	L1
5 - 19,9	ød+9	ød+5	3,6	0,85
20 - 39,9	ød+12,5	ød+7	4,8	1,35
40 - 399,9	ød+17,5	ød+10,5	7,1	1,8
≥400	ød+22	ød+14	9,5	2,8

O-ring
housing details & recommendations

O-Ring housing recommendations for static applications

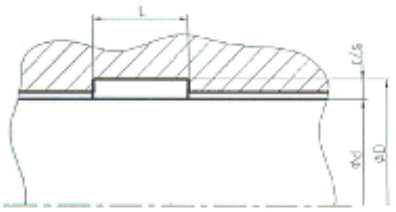


cord (mm)	groove (mm)	without back-up ring (mm)	one back-up ring (mm)	2 back-up rings (mm)	recommended back-up ring width (mm)
Ø d	t ± 0,05	b + 0,25	b1 + 0,25	b2 + 0,25	
1,5	1,10	2,1	3,1	4,1	1,0
1,78	1,35	2,5	3,5	4,5	1,0
2,00	1,56	2,7	4,2	5,7	1,5
2,50	2,05	3,3	4,8	6,3	1,5
2,62	2,18	3,5	5,0	6,5	1,5
3,00	2,52	3,9	5,4	6,9	1,5
3,50	3,00	4,4	5,9	7,4	1,5
3,53	3,00	4,4	5,9	7,4	1,5
4,00	3,40	5,0	6,7	8,4	1,7
5,00	4,25	6,3	8,0	9,7	1,7
5,33	4,53	6,7	8,4	10,1	1,7
5,70	4,85	7,1	9,1	11,1	2,0
6,00	5,10	7,5	9,5	11,5	2,0
6,99	5,94	8,8	10,8	12,8	2,0
7,00	5,95	8,8	10,8	12,8	2,0
8,00	6,80	10,0	12,5	15,0	2,5
10,00	8,50	12,5	15,0	17,5	2,5

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

housing recommendations

guide rings rod



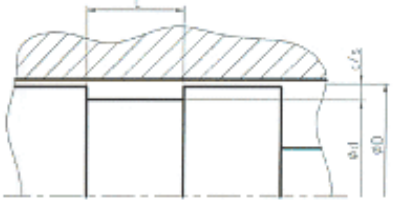
F1

The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.

ød	øD	L	c/s
6 - 29,9	ød+3	4	1,5
30 - 49,9	ød+3	5,6	1,5
50 - 99,9	ød+5	9,7	2,5
100 - 799,9	ød+5	15	2,5
800 - 1.000	ød+8	25	4
>1.000	ød+8	25	4

housing recommendations

guide rings piston



F1

The listing below is our suggestion for standard housing dimensions. Please note that we are able to produce those profiles to your specific need or any non standard housing.

ød	øD	L	c/s
6 - 29,9	øD-3	4	1,5
30 - 49,9	øD-3	5,6	1,5
50 - 99,9	øD-5	9,7	2,5
100 - 799,9	øD-5	15	2,5
800 - 1.000	øD-8	25	4
>1.000	øD-8	25	4