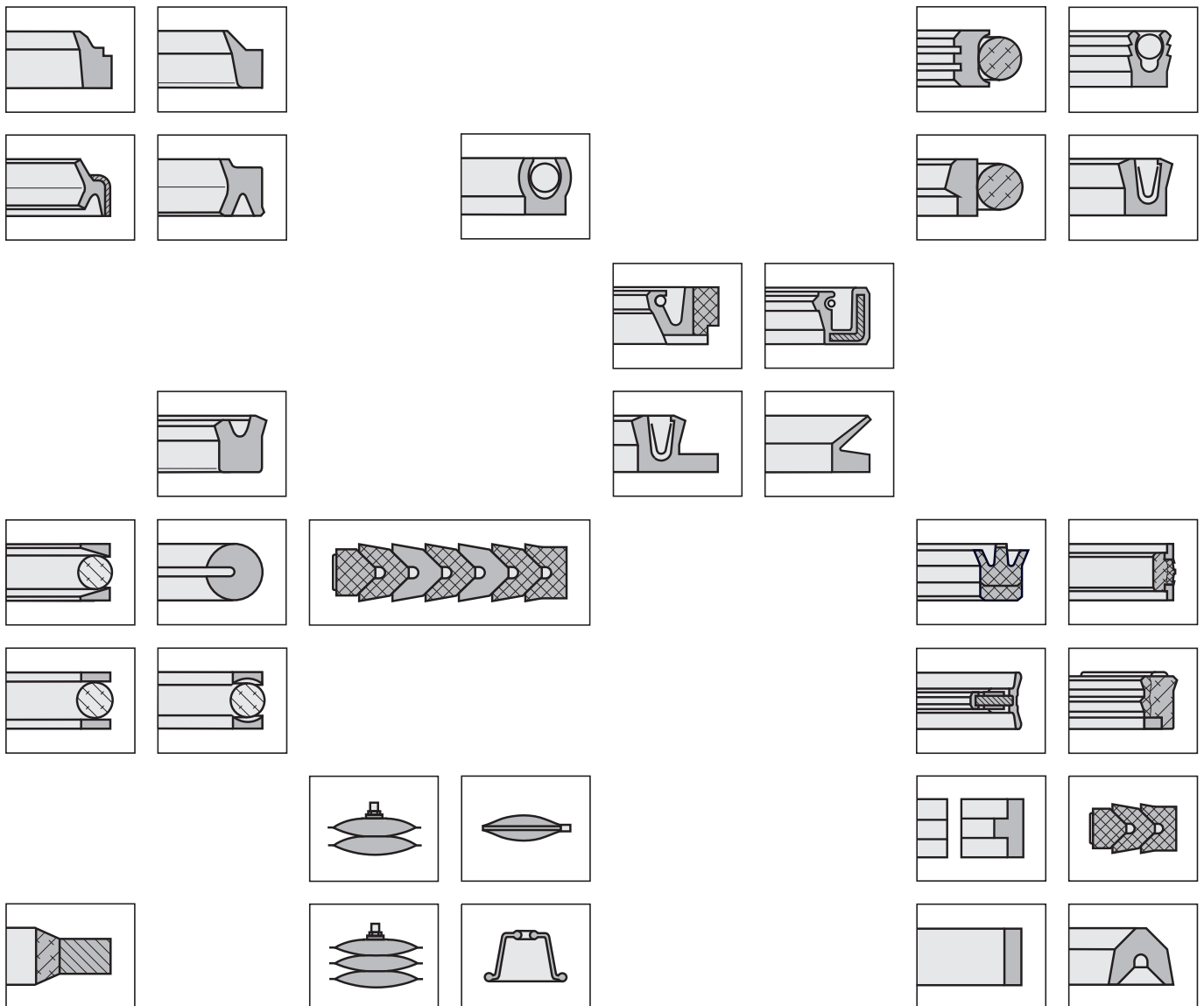


Overview of Products

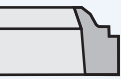
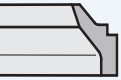
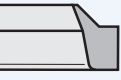
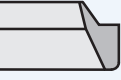
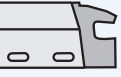



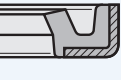





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Wipers

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	1A1	NBR, PUR, FKM, EPDM, PTFE	X	X	X	X	X		-	-35 / +100 -35 / +100	≤ 2 ≤ 2	Wiper with flush housing end, snap fit.	4 -500 14 -260	3
	1A1	POM, PA, PE	X	X	X	X	X		-	-40 / +100	≤ 1	Wiper with flush housing end, snap fit possible (depending on profile width and Ø). Also available in special dimensions at short notice from routine production.	65 -450	3
	1A5	NBR, PUR, FKM, EPDM, PTFE	X	X	X	X	X		-	-30 / +100 -30 / + 80	≤ 2 ≤ 1	Wiper for general applications, snap fit.	20 -360 8 -320	3
	1A5	POM, PA, PE	X	X	X	X	X		-	-40 / +100	≤ 1	Wiper for general applications, snap fit possible (depending on profile width and Ø). Also available in special dimensions at short notice from routine production.	65 -450	3
	1A6	NBR	X	X			X		-	-20/ +100	≤ 4	Wiper that balances out large radial play, for underground use.	20 -260	3
	1AM	NBR, PUR, FKM	X	X	X		X		-	-35 / +100*	≤ 2	Wiper with metal case, for open fitting areas. Press fit. *(-35 °C / +80 °C in pneumatic applications)	6 -240	3
	1AP	NBR	X	X	X		X		-	-30 / +100	≤ 2	Wiper with rubber-coated metal case, for open fitting areas. Press fit.	8 - 90	3
	1AF	PUR	X				X		-	-35 / +100	≤ 2	Wiper with increased wear resistance, with metal case. Press fit. For open fitting areas.	20 -120	3
	1AG	PUR	X				X		-	-35 / +100	≤ 2	PUR wiper with high abrasion resistance. Metal case for open fitting areas. Press fit.	22 -120	3
	1AH	NBR	X	X	X			X	-	-30 / +100	≤ 2	Double wiper with metal case, for open fitting areas. Press fit.	15 - 50	3
	1AH	PUR	X	X				X	-	-35 / +100	≤ 2	Double wiper with metal case and increased wear resistance, for open fitting areas. Press fit.	50 -100	3
	1AQ	NBR	X		X			X	- -	-30 / +100 -35 / + 80*	≤ 2	Double wiper with rubber-coated metal case, for open fitting areas. Press fit. *(Can also be used as a sealing wiper in pneumatic applications)	10 - 40	3

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Wipers

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	1AY	PUR, NBR, FKM, EPDM	X	X	X			X	-	-35 / +100*	≤ 2	Double wiper with increased wear resistance (PUR), snap fit. *(-35 °C / +80 °C in pneumatic applications)	8 -160	3
	1A7	PA-Comp.	X				X		-	-40 / +100	≤ 1	Wiper for clean end to housing, snap fit.	36 -260	3
	1A8	NBR/brass	X	X			X		-	-40 / +100	≤ 1	Wiper with metal case and two wiper lips for stubborn adherent dirt, e.g. ice, for open fitting areas. Press fit.	12 -140	3
	1S0	PTFE comp./ elastomer	X	X	X	X	X		-	-60 / +200	≤ 4	Wiper of PTFE, with O-ring as prestress element. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	6 -1500	3
	1S1	PTFE comp./ elastomer	X	X	X	X		X	-	-60 / +200	≤ 4	Double Wiper of PTFE, with O-ring as prestress element. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 -1500	3
	1S2	PTFE comp./ elastomer	X	X	X	X		X	-	-60 / +200	≤ 4	Double Wiper of PTFE, with O-ring as prestress element. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 -1500	3
	1S3	PTFE comp./ elastomer	X	X	X	X		X	-	-60 / +200	≤ 4	Double action wiper for environments with heavy dirt.	4 -1500	-
	1AJ	NBR, FKM		X			X		-	-25 / +100	≤ 0,5	Wiper for very small fitting areas in pneumatic applications.	3 - 35	5
	1AV	PUR	X				X		-	-35 / +100	≤ 2	Double wiper with dirt shield and pressure relief drill hole. Particularly suitable for applications in mobile hydraulics.	28 -200	5
	1AZ	NBR, PUR	X	X	X			X	-	-30 / +110 -35 / +100	≤ 1,0 ≤ 0,8	Double wiper, snap fit. Dimensions according to DIN ISO 3320 housings available	10 -440	3

Types and materials in bold are standard. Descriptions and application conditions based on material and application.










Guide and Bearing Elements

Profile	Type	Material	Application						Application Conditions			Description		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	Safe Load	T [°C]	v [m/s]		Ø [mm]	Product Group
	FB3	PTFE comp.	X						≤ 15 N/mm²	-100 / +200	≤ 5	Guide strip with very good sliding characteristics and stick-slip free run, for oil hydraulic applications. Available also with textured surface or lubrication pockets.	Cut goods	2
	FB2	PTFE comp.	X	X	X	X			≤ 15 N/mm²	-100 / +200	≤ 5	Guide strip with chamfer, very good sliding characteristics and stick-slip free run, for pneumatic, water hydraulic, chemical and foodstuff applications. Available also with textured surface or lubrication pockets.	Cut goods	2
	FB8	Comp. fabric	X	X	X	X			≤ 100 N/mm² at 25 °C	-50 / +120	≤ 0,8	Guide strip of compound fabric, for hydraulic, mechanical engineering and chemical applications. Cut goods, customising for length up to 5700 mm.	Cut goods	2
	FB9	Comp. fabric	X	X	X	X			≤ 100 N/mm² at 25 °C	-50 / +120	≤ 0,8	Guide strip of compound fabric, for hydraulic, mechanical engineering and chemical applications. Cut goods for customising, spiralised. Diameter range: ~45 mm up to ~210 mm.	Cut goods, spiralised	2
	FÜB	Comp. fabric, POM, PE, POM-Comp., PTFE-Comp.	X	X	X	X			Cpd. fab. ≤ 100 N/mm² at 25 °C	-50 / +120	≤ 0,8	Wear ring, oblique slot, for hydraulic, mechanical engineering and chemical applications. In the material POM also available in special dimensions at short notice from routine production.	10-1750	2
	FÜA	Comp. fabric, POM, PE, POM-Comp., PA-Comp.	X	X	X	X			Cpd. fab. ≤ 100 N/mm² at 25 °C	-50 / +120	≤ 0,8	Wear ring, straight slot, for hydraulic and general machine-building applications.	10-1750	2
	FÜS	Comp. fabric,	X	X	X	X			≤ 100 N/mm² at 25 °C	-50 / +120	≤ 0,8	Wear ring with stair cut, for hydraulic and general mechanical engineering applications.	10-1750	2
	FÜ1	PA	X	X	X	X			2,5 N/mm²	-40 / +100 ¹⁾	≤ 5	Guide rings FÜ1 are open piston guide rings with a mounting collar on the inside diameter and axial grooves for pressure relief. ¹⁾ in Water max. +60 °C	20 -250	2
	FD1	Metal composite	X	X					p x v ≤ 1,5* p _{Lmax.} = 140 N/mm²	-200 / +280	≤ 2	Radial slide bearing of a metal composite and a sliding layer of PTFE/lead for maintenance-free operation, general applications.	5 -300	2
	FD2	Metal composite	X	X					p x v ≤ 1,5* p _{Lmax.} = 140 N/mm²	-200 / +280	≤ 2	Radial slide bearing with flange, of a metal composite and a sliding layer of PTFE/lead for maintenance-free operation, general applications.	6 - 40	2
	FDA	Metal composite	X	X					p x v ≤ 1,5* p _{Lmax.} = 140 N/mm²	-200 / +280	≤ 2	Thrust washer of a metal composite and a sliding layer of PTFE/lead for maintenance-free operation, general applications.	10 - 62	2
	FDL	Metal composite	X	X					p x v ≤ 1,5* p _{Lmax.} = 140 N/mm²	-200 / +280	≤ 2	Slide band of a metal composite and a sliding layer of PTFE/lead for maintenance-free operation, general applications.	-	2

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

*p x v in N/mm² x m/s

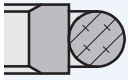
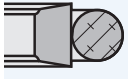
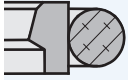
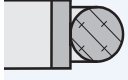
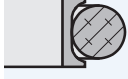

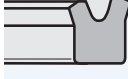
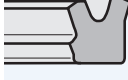



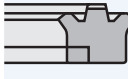
Guide and Bearing Elements

Profile	Type	Material	Application						Application Conditions			Description		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action		T [°C]	v [m/s]		Ø [mm]	Product Group
	FE1	Tin bronze	X	X					$p_{Lmax.} = 120 \text{ N/mm}^2$	-100 / +200	≤ 2	Slide bearing with diamond-shaped lubrication pockets, for high bearing loads and rough operation.	10 - 120	2
	FE2	Tin bronze	X	X					$p_{Lmax.} = 120 \text{ N/mm}^2$	-100 / +200	≤ 2	Slide bearing with round lubrication pockets for high bearing loads and rough operation.	10 - 120	2
	FE3	Tin bronze	X	X					$p_{Lmax.} = 120 \text{ N/mm}^2$	-100 / +200	≤ 2	Slide bearing without lubrication pockets, for high bearing loads.	10 - 120	2
	FG1	Metal composite and POM	X	X					$p \times v \leq 2,8^*$ $p_{Lmax.} = 140 \text{ N/mm}^2$	-40/+90	$\leq 2,5$	Slide bearing of a metal composite with a sliding layer of POM and round lubrication pockets.	10 - 120	2
	FGA	Metal composite and POM	X	X					$p \times v \leq 2,8^*$ $p_{Lmax.} = 140 \text{ N/mm}^2$	-40/+90	$\leq 2,5$	Thrust washer of a metal composite and a sliding layer of POM and round lubrication pockets.	10 - 120	2
	FE4	Tin bronze, graphite	X	X					$p \times v \leq 1,5^*$ $p_{Lmax.} = 80 \text{ N/mm}^2$	$\leq +250$	$\leq 0,25$	Radial slide bearing with graphite, self lubrication.	6 - 130	2
	FE5	Tin bronze, graphite	X	X					$p \times v \leq 1,5^*$ $p_{Lmax.} = 80 \text{ N/mm}^2$	$\leq +250$	$\leq 0,25$	Radial slide bearing with flange, with graphite, self lubrication.	6 - 120	2
	FE6	Sintered metal	X	X					$p \times v \leq 1,8^*$ $p_{LGrenz (dyn)} = 40 \text{ N/mm}^2$	-40/+80	≤ 7	Slide bearing made of sintered metal, oil impregnated.	1 - 200	2
	FE7	Sintered metal	X	X					$p \times v \leq 1,8^*$ $p_{LGrenz (dyn)} = 40 \text{ N/mm}^2$	-40/+80	≤ 7	Slide bearing made of sintered metal, oil impregnated.	3 - 200	2

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

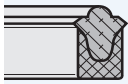
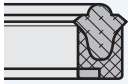
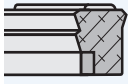
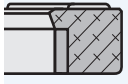

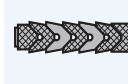
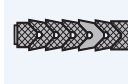


* $p \times v$ in $\text{N/mm}^2 \times \text{m/s}$

Rod Seals for Hydraulic Applications

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	p [bar]	T [°C]	v [m/s]			
	1G2	PTFE comp./ elastomer	X		X	X	X	≤ 400	-60 / +200	≤ 4	Slide seal set for general machine-building, machine tools and mobile hydraulic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 - 1500	4
	1GT	PTFE comp./ elastomer	X		X	X	X	≤ 400	-60 / +200	≤ 4	Slide seal set for general machine-building, machine tools and mobile hydraulic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 - 1000	4
	1G9	PTFE comp./ elastomer	X		X	X	X	≤ 400	-60 / +200	≤ 4	Slide seal set for general machine-building, machine tools and mobile hydraulic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 - 1500	4
	1G0	PTFE comp./ elastomer	X	X	X	X	X	H: ≤ 160 P: ≤ 16	-60 / +200	≤ 4	Slide seal set for light-duty hydraulic and pneumatic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	3 - 200	4/5
	1G4	PTFE comp./ elastomer	X		X	X	X	≤ 350	-60 / +200	≤ 4	Slide seal set for O-ring fitting areas according to ASA 568 A. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 - 400	4
	1H0	NBR, FKM, EPDM, HNBR	X	X		X	X	≤ 160 ¹⁾ ≤ 16 ²⁾	-25 / +100 ¹⁾ -25 / + 80 ²⁾	≤ 0,5 ¹⁾ ≤ 1 ²⁾	Lip seal for standard hydraulic and pneumatic applications. ¹⁾ in hydraulic applications (depending on profile width and material) ²⁾ in pneumatic applications	2 - 320	4/5
	1H1	PUR	X			X	X	≤ 400	-35 / +100	≤ 0,5	Lip seal with increased wear and pressure resistance, for tough operating conditions in hydraulic applications.	4 - 280	4
	1H2	PUR	X			X	X	≤ 400	-35 / +100	≤ 0,5	Lip seal like 1H1, but with 2 sealing lips for retention of a lubrication pocket and for better sealing effect in depressurised state.	8 - 280	4
	1H3	PUR	X			X	X	≤ 400	-35 / +100	≤ 0,5	Compact lip seal for small fitting areas in hydraulic applications.	5 - 270	4
	1HL	PUR	X			X	X	≤ 250	-35 / +110	≤ 1	Compact lip seal for small fitting areas in hydraulic applications. Optimized for particularly low friction	20 - 80	4
	1H4	PUR/NBR	X			X	X	≤ 500	-35 / +110	≤ 0,5	Lip seal with 2 sealing lips, O-ring and back-up ring for the toughest operating conditions in hydraulic applications.	40 - 240	4
	1HK	PUR	X			X	X	≤ 500 ¹⁾	-35 / +110	≤ 0,5	PUR compact rod seal with integrated anti-extrusion ring. A typical application is as a buffer seal in sealing systems. ¹⁾ Temporary up to 1000 bar.	55 - 250	4

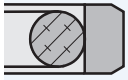
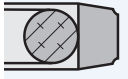
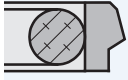
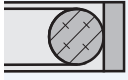
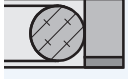







Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Rod Seals for Hydraulic Applications

Profile	Type	Material	Application						Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	1H6	NBR/fabric, FKM	X				X		≤ 250	-30 / +100	≤ 0,5	Fabric Compact seal for medium-duty hydraulic applications.	5 - 535	4
	1H8	NBR/fabric, FKM	X				X		≤ 250	-30 / +100	≤ 0,5	Compact seal with back-up ring against gap extrusion, for medium-duty hydraulic applications.	25 - 140	4
	1H9	NBR/PTFE-compound	X				X		≤ 315	-30 / +100	≤ 0,5	Compact seal with back-up ring, good sealing effect also at low pressures.	6 - 360	4
	1HC	NBR/PTFE-compound	X				X		≤ 315	-30 / +100	≤ 1	Compact seal with back-up ring for fitting areas according to ISO 7425-2.	5 - 210	4
	MA0	NBR/fabric, FKM/fabric, PUR	X				X		≤ 500	-40 / +100	≤ 0,5	Fabric chevron sealing set for complicated and not exactly definable operating conditions in hydraulic applications.	5 - 1100	4
	MA2	NBR/fabric, FKM/fabric, PUR	X				X		≤ 350	-40 / +100	≤ 0,5	Fabric chevron sealing set for complicated operating conditions, standard series for pressures up to 350 bar in hydraulic applications.	8 - 200	4
	MA3	NBR/fabric, FKM/fabric, PUR	X				X		≤ 500	-40 / +100	≤ 0,5	Fabric chevron sealing set for difficult operating conditions, standard series for pressures up to 500 bar in hydraulic applications.	10 - 320	4
	3H2	PUR/NBR	X				X		≤ 350	-35 / +80	≤ 0,5	PUR lip seal with o-ring, to achieve good sealing even at low pressures.	3 - 500	4
	1HS	PUR	X	X			X		≤ 200 ¹⁾ ≤ 20 ¹⁾	-35 / +90	≤ 1,0 ¹⁾ ≤ 0,2 ¹⁾	PUR lip seal, especially suitable for use in gas springs. ¹⁾ Hydraulics/Gas Springs ¹⁾ Rotating Unions	3 - 28	4





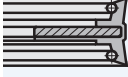

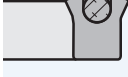


Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Piston Seals for Hydraulic Applications

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	p [bar]	T [°C]	v [m/s]			
	2G2	PTFE-comp./ elastomer	X		X	X	X	≤ 400	-60 / +200	≤ 4	Slide seal set for general machine-building, machine tools and mobile hydraulic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	8 - 1500	4
	2GT	PTFE-comp./ elastomer	X		X	X	X	≤ 400	-60 / +200	≤ 4	Slide seal set for general machine-building, machine tools and mobile hydraulic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	8 - 1000	4
	2G9	PTFE-comp./ elastomer	X		X	X	X	≤ 400	-60 / +200	≤ 4	Slide seal set for general machine-building, machine tools and mobile hydraulic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	8 - 1500	4
	2G0	PTFE-comp./ elastomer	X	X	X	X	X	H: ≤ 160 P: ≤ 16	-60 / +200	≤ 4	Slide seal set for light-duty hydraulic and pneumatic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	7 - 200	4/5
	2G5	PTFE-comp./ elastomer	X		X	X	X	≤ 500	-60 / +200	≤ 4	Slide seal set for heavy-duty hydraulic applications, only for divided pistons.	20 - 300	4
	2G4	PTFE-comp./ elastomer	X		X	X	X	≤ 350	-60 / +200	≤ 4	Slide seal set for O-ring fitting areas according to ASA 568 A. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	8 - 400	4
	2G3	Thermoplast/ NBR	X				X	≤ 800	-30 / +110	≤ 1	Special slide seal set with divided slide ring (stepped cut) for heavy-duty hydraulic applications. Very simple fitting.	25 - 330	4
	2G6	PUR/ elastomer	X				X	≤ 300	-35 / +110	≤ 0,5	PUR slide seal set for light to medium-duty hydraulic applications.	20 - 200	4
	2H0	NBR, FKM, EPDM, HNBR	X	X			X	H: ≤ 160 ¹⁾ P: ≤ 16	-25 / +100	≤ 0,5	Lip seal for standard hydraulic and pneumatic applications. ¹⁾ Depending on profile width and material.	4 - 350	4/5
	2H1	PUR	X				X	≤ 400	-35 / +100	≤ 0,5	Lip seal with increased wear and pressure resistance for hydraulic applications.	12 - 400	4
	2H2	NBR/fabric, FKM/fabric	X				X	≤ 500	-40 / +100	≤ 1	Compact seal for heavy-duty hydraulic applications, only for divided pistons.	32 - 300	4
	2H3	NBR/fabric, FKM/fabric	X				X	≤ 250	-40 / +100	≤ 0,5	Lip seal with back-up ring for medium-duty hydraulic applications, only for divided pistons.	20 - 300	4

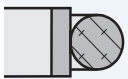
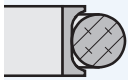
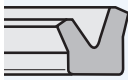

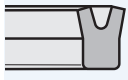

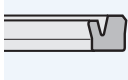
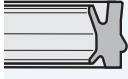


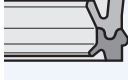

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Piston Seals for Hydraulic Applications

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	p [bar]	T [°C]	v [m/s]			
	2H6	PUR	X				X	≤ 400	-30 / +100	≤ 0,5	Multi-part compact seal with increased wear resistance for medium to heavy-duty hydraulic applications, for closed grooves in standard hydraulic cylinders.	25 -160	4
	2H8	NBR	X				X	≤ 350	-30 / +100	≤ 0,5	Multi-part compact seal for medium to heavy-duty hydraulic applications, for closed grooves in standard hydraulic cylinders.	20 -160	4
	MA4	NBR/fabric, FKM/fabric, PUR	X				X	≤ 500	-40 / +100	≤ 0,5	Fabric chevron sealing set for heavy-duty hydraulic applications. Only for divided pistons. Do not fit with axial compression.	20 -300	4
	MB0	NBR/fabric, FKM/fabric, PUR	X				X	≤ 500	-40 / +100	≤ 0,5	Fabric chevron sealing set with radial pretension for heavy-duty hydraulic applications. Only for divided pistons. Do not fit with axial compression.	9 -400	4
	2T2	NBR, FKM	X	X			X	≤ 10	-20 / +100	≤ 0,5	Complete piston, spring-supported, for pneumatic applications (in simple constructions also for low-pressure hydraulic applications).	26 -300	5
	2HD	PUR	X				X	≤ 250 ≤ 600*	-30 / +100	≤ 0,5	Piston Seal for small fitting areas, interchangeable with, for example, X-rings. (* static applications)	12 -150	4
	3H2	PUR/NBR	X				X	≤ 350	-35 / +80	≤ 0,5	PUR lip seal with o-ring, to achieve good sealing even at low pressures.	3 -500	4
	3H1	PUR	X				X	≤ 400	-30 / +80	≤ 0,5	PUR lip seal, symmetric, for standard hydraulic applications.	5 -950	4
	-	Elastomere/ Fabric	X				X	-	-	-	Piston packings for conveying thick materials or highly viscous abrasive media, e.g. in concrete pumps. Diameters from 50 mm to over 400 mm available on request.	DN 180 DN 200 DN 230 DN 250	4

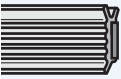


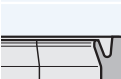
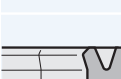
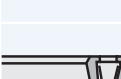
Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Rod Seals for Pneumatic Applications

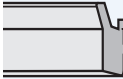

Profile	Type	Material	Application						Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	1G0	PTFE comp./ elastomer	X	X	X	X	X	X	H: ≤ 160 P: ≤ 16	-60 / +200	≤ 4	Slide seal set for light-duty hydraulic and pneumatic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	3 - 200	4
	1G4	PTFE comp./ elastomer	X		X	X		X	≤ 350	-60 / +200	≤ 4	Slide seal set for O-ring fitting areas according to ASA 568 A. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 - 400	4
	1H0	NBR, FKM, EPDM, HNBR	X	X			X		H: ≤ 160 ¹⁾ P: ≤ 16	-35 / +80	≤ 1	Lip seal for standard hydraulic and pneumatic applications. ¹⁾ Depending on profile width and material.	2 - 320	4/5
	1PJ	NBR, FKM		X			X		≤ 10	-25 / +80	≤ 1	Lip seal for very small fitting areas in pneumatic applications.	3 - 16	5
	3PJ	NBR, FKM		X			X		≤ 8	-25 / +70	≤ 0,4	Symmetrical Lip seal for minimum fitting areas in pneumatic applications.	3 - 34	5
	1P0	NBR, FKM, EPDM, PUR, HNBR		X			X		≤ 16	-20 / +80	≤ 1	Lip seal (with special lip shape) for pneumatic applications, standard series.	3 - 80	5
	1PB	NBR		X			X		≤ 16	-20 / +80	≤ 1	Lip seal for small fitting areas in pneumatic applications.	3 - 17	5
	1PA	PUR		X					≤ 16	-35 / +80	≤ 1	Seal wiper with increased wear resistance for pneumatic applications.	12 - 63	5
	1PG	PUR		X					≤ 16	-20 / +80	≤ 1	Seal wiper for hygienic applications in pneumatic systems.	12 - 25	5
	1P5	FKM		X					≤ 16	-10 / +150	≤ 1	Seal wiper for higher temperatures with a snap ring according to DIN 7993 as retaining element for pneumatic applications.	8 - 63	5
	1P3	NBR/plastic		X					≤ 16	-20 / +80	≤ 1	Seal wiper in two-part construction for pneumatic applications.	12 - 63	5
	1P4	NBR, PUR		X					≤ 10	-10 / +80 -35 / +80	≤ 1	Seal wipers for small cylinders in pneumatic applications.	4 - 16	5

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Rod Seals for Pneumatic Applications

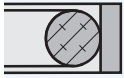

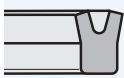
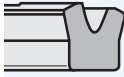


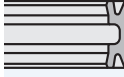

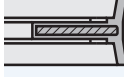
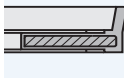

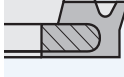
Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	1P6	PUR/metal	X					≤ 16	-35 / +80	≤ 1	Seal wiper and guide element as combined component for pneumatic applications.	8 - 40	5
	1PF	PUR	X					≤ 16	-35 / +80	≤ 1	Seal wiper with increased wear resistance, for small fitting areas in pneumatic applications.	3 - 63	5
	1PE	NBR, FKM, EPDM	X				X	≤ 10	-20 / +100	-	Pneumatic rod seal, inside sealing, with very low friction Application: Pneumatic valves	6 - 90	5
	1PN	PUR	X					≤ 10	-35 / +80	≤ 1	Seal wiper for rotation protected cylinders in pneumatic applications.	12 - 32	5
	1PL	PUR	X					≤ 10	-30 / +80	≤ 1	Seal wiper for rotation protected cylinders in pneumatic applications.	4 - 10	5
	1P7	PE PTFE Comp.	X					≤ 16 ≤ 16	-30 / + 80 -35 / +200	≤ 4 ≤ 10	Seal wiper for rotation protected cylinders in pneumatic applications.	10 - 63	5

Damping Rings

Profile	Type	Material	Application						Application Conditions			Description		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	1P8	NBR, PUR		X X					≤ 16	-20 / +80 -35 / +80	≤ 1	The pneumatic damping seal rings 1P8 seal damping pistons in pneumatic cylinders.		
	1P9	NBR		X					≤ 16	-30 / +80	≤ 1	Pneumatic damping seal rings for small fitting areas.		

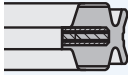


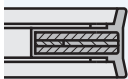



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Piston Seals for Pneumatic Applications

Profile	Type	Material	Application						Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	2G0	PTFE-comp./ elastomer	X	X	X	X	X	X	H: ≤ 160 P: ≤ 16	-60 / +200	≤ 4	Slide seal set for light-duty hydraulic and pneumatic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	7 - 200	4/5
	2H0	NBR, FKM, EPDM, HNBR	X	X		X	X	X	H: ≤ 160 ¹⁾ P: ≤ 16	-25 / +100	≤ 0,5	Lip seal for standard hydraulic and pneumatic applications. ¹⁾ Depending on profile width and material.	4 - 350	4/5
	3PJ	NBR, FKM	X			X	X		≤ 8	-25 / +70	≤ 0,4	Symmetrical Lip seal for minimum fitting areas in pneumatic applications.	6 - 40	5
	2PJ	NBR, FKM		X			X		≤ 10	-25 / +80	≤ 1	Lip seal for very small fitting areas in pneumatic applications.	6 - 40	5
	2P0	NBR, PUR, EPDM, FKM, HNBR	X				X		≤ 16	-20 / +80 -30 / +80	≤ 1	Lip seal with special lip shape for pneumatic applications, standard series.	10 - 470	5
	2PA	NBR, PUR, EPDM, FKM, HNBR	X				X		≤ 12	-20 / +80 -30 / +80	≤ 1	Lip seal for small fitting areas in pneumatic applications.	4 - 200	5
	2P8	NBR, FKM, EPDM	X				X		≤ 16	-20 / +80	≤ 1	Double lip seal for two-sided pressurisation in pneumatic applications.	16 - 160	5
	2T2	NBR, FKM	X	X			X		≤ 10	-20 / +100	≤ 0,5	Complete piston, spring-supported, for pneumatic applications (in simple constructions also for low-pressure hydraulic applications).	26 - 300	5
	2P4	NBR, PUR, FKM	X				X		≤ 10	-20 / +100 -30 / +80	≤ 1	Complete piston with round sealing lips for pneumatic applications.	16 - 250	5
	2P5	NBR, FKM, PUR	X				X		≤ 10	-20 / +100	≤ 1	Complete piston, like 2P4, for one-sided pressurisation.	16 - 250	5
	2P6	NBR, FKM	X				X		≤ 10	-20 / +100	≤ 1	Complete piston with integrated end-of-travel damping for pneumatic applications.	6 - 100	5
	2P7	NBR, FKM	X				X		≤ 10	-20 / +100	≤ 1	Complete piston, like 2P6, for one-sided pressurisation.	6 - 100	5



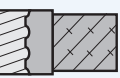
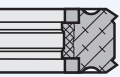


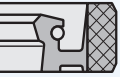





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Piston Seals for Pneumatic Applications

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	p [bar]	T [°C]	v [m/s]			
	2PG	NBR		X			X	≤ 10	-20 / +80	≤ 1	Complete piston with magnetic insert and end-of-travel damping.	16 - 100	5
	2PK Type 1	PUR, FKM		X			X	≤ 12	-30 / +80	≤ 1	Seal-Guide Element with damping buffers.	12 - 25	5
	2PK Type 2	PUR, FKM		X			X	≤ 12	-30 / +80	≤ 1	Seal-Guide Element with damping buffers.	32 - 100	5
	2PM	NBR, FKM	X				X	≤ 10	-20 / +80	≤ 1	Complete piston with magnetic insert to facilitate positioning with suitable reed contacts, for pneumatic applications.	32 - 125	5
	2PD	NBR		X			X	≤ 12	-20 / +100	≤ 1	Piston seal ring for very small fitting areas.	12 - 125	5
	2PE	NBR	X				X	≤ 10	-20 / +100	-	Pneumatic piston seal, outside sealing, with very low friction Application: Pneumatic valves	12 - 406	5
	2P9	NBR, FKM	X				X	≤ 16	-30 / +80	≤ 1	Lip seal for one-sided pressurisation in pneumatic applications.	16 - 100	5


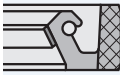




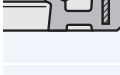
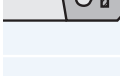
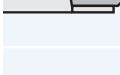



Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Rotary and Shaft Seals

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	1R0	PTFE comp./ elastomer	X	X	X	X	X		≤ 300	-45 / +200	≤ 1	Glide seal set for rotational movements. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	6 - 1500	8
	2R0	PTFE comp./ elastomer	X	X	X	X	X		≤ 300	-45 / +200	≤ 1	Glide seal set for rotational movements. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions. Use type 1R0 for new constructions.	8 - 1500	8
	1R6	mod. PA/NBR	X		X	X	X		≤ 500 p × v ≤ 70	-35 / +100	≤ 0,5	Rotary sealing set with special helical lubrication grooves.	45 - 160	8
	1R4	NBR/ NBR-fabric/PA	X				X		≤ 400 p × v ≤ 50	-30 / +100	≤ 0,2	Rotary seal set for two-sided pressurisation	30 - 262	8
	1V5	PTFE-Comp., PE	X		X	X	X		≤ 150	-100/+225	≤ 2	PTFE lip seal w. stainless-steel spring as prestress element, for rotational movements, e.g. spray-painting/enamelling lines. Also available with silicon filling for easier sterilisation.	8 -1500	6/8
	1V9	PTFE-Comp., PE	X		X	X	X		≤ 150	-100/+225	≤ 1	PTFE lip seal for rotational movements, inside sealing, with increased spring force.	20 - 700	6/8
	WG3	NBR/fabric, HNBR/fabric, VMQ/fabric, FKM/fabric			X	X	X		≤ 6 p × v < 24*	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 12	Fabric shaft seal, for heavy machine construction. Also with covered spring and friction optimised sealing lip available. * (1 bar < p ≤ 6 bar)	≤ 4000	8
	WG4	NBR/fabric, HNBR/fabric, VMQ/fabric, FKM/fabric					X		0	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal, standard, for heavy machine construction.	≤ 4000	8
	WG4-S	NBR/fabric, HNBR/fabric, VMQ/fabric, FKM/fabric					X		0	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal, standard, for heavy machine construction. With additional dust lip.	≤ 4000	8
	WG5	NBR/fabric, HNBR/fabric, VMQ/fabric, FKM/fabric					X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal, standard, for heavy machine construction. Also with covered spring and friction optimised sealing lip available.	≤ 4000	8
	WG6	NBR/fabric, HNBR/fabric, VMQ/fabric, FKM/fabric					X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal with radial lubrication grooves, similar to WG5. Also with covered spring and friction optimised sealing lip available.	≤ 4000	8
	WG7	NBR/fabric, HNBR/fabric, VMQ/fabric, FKM/fabric					X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal with radial lubrication grooves and lubrication groove on circumference, similar to WG5. Also with covered spring and friction optimised sealing lip available.	≤ 4000	8

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Rotary and Shaft Seals

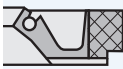











Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	WG8	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal with dust lip, similar to WG5. Also with covered spring and friction optimised sealing lip available.	≤ 4000	8
	WG9	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal, standard, with friction optimised sealing lip. For heavy machine construction, transmission construction, shipbuilding and wind mills.	≤ 4000	8
	WGT	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 1	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal, standard, for heavy machine construction, paper and aluminum industry. Also with friction optimised sealing lip available.	≤ 4000	8
	WGV	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal for wind mills, transmission construction, heavy machine construction and shipbuilding. Also with friction optimised sealing lip available.	≤ 4000	8
	WGW	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 1	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal for wind mills, transmission construction, heavy machine construction and shipbuilding. Also with friction optimised sealing lip available.	≤ 4000	8
	WGA	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 1	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal for wind mills, transmission construction, heavy machine construction and shipbuilding, outside sealing. Also with friction optimised sealing lip available.	≤ 4000	8
	WM3	NBR , HNBR, VMQ, FKM				X		≤ 3*	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15*	Rotary shaft seal with vulcanised steel band for heavy machine construction. Also with covered spring and friction optimised sealing lip available.	≤ 2500	8
	WM5	NBR , HNBR, VMQ, FKM				X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Rotary shaft seal with vulcanised steel band for heavy machine construction. Also with covered spring and friction optimised sealing lip available.	≤ 2500	8
	WM7	NBR , HNBR, VMQ, FKM				X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Rotary shaft seal with vulcanised steel band for heavy machine construction. Also with covered spring and friction optimised sealing lip available.	≤ 2500	8
	WM8	NBR , HNBR, VMQ, FKM				X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Rotary shaft seal with vulcanised steel band for heavy machine construction. Like WM5 but with additional dust lip. Also with covered spring and friction optimised sealing lip available.	≤ 2500	8
	WM9 -C	NBR , HNBR, VMQ, FKM				X		≤ 3	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 10	Rotary shaft seal for heavy machine construction with vulcanised steel band and friction optimised sealing lip.	≤ 2500	8
	WGS	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		-	-30 / +100 -40 / +150 -50 / +200 -20 / +200	-	Fabric shaft seal to withstand wide misalignments of some millimeters in static or quasistatic conditions.	≤ 4000	8

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* ≤ 1 bar at ≤ 15 m/s
 ≤ 2 bar at ≤ 12,5 m/s
 ≤ 3 bar at ≤ 8 m/s

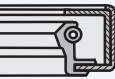
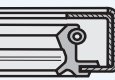

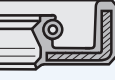










Rotary and Shaft Seals

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	WGS-2	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		-	-30 / +100 -40 / +150 -50 / +200 -20 / +200	-	Fabric shaft seal to withstand wide misalignments of some millimeters in static or quasistatic conditions. Like WGS, but with additional radial lubrication grooves and lubrication groove on its circumference.	≤ 4000	8
	WMS	NBR , HNBR, VMQ, FKM				X		-	-30 / +100 -40 / +150 -50 / +200 -20 / +200	-	Rotary shaft seal with metal strip inside, to withstand wide misalignments of some millimeters in static or quasistatic conditions.	≤ 2500	8
	WMS-2	NBR , HNBR, VMQ, FKM				X		-	-30 / +100 -40 / +150 -50 / +200 -20 / +200	-	Rotary shaft seal with metal case inside, to withstand wide misalignments of some millimeters in static or quasistatic conditions.	≤ 2500	8
	WGM	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 2	Fabric shaft seal against extreme contamination and salt water.	≤ 4000	8
	WB9	NBR , HNBR, FKM			X	X	X	≤ 0,5	-20 / +100 -40 / +150 -20 / +220	≤ 12 ≤ 15 ≤ 35	Rotary shaft seal for heavy machine construction, e.g. for the paper, steel and aluminum industries. Equalization of alignment errors up to 2.5 mm. Radial speeds up to 40 m/s are possible.	≤ 2500	8
	WB6	NBR , HNBR, FKM			X	X	X	≤ 0,5	-20 / +100 -40 / +150 -20 / +220	≤ 12 ≤ 15 ≤ 35	Rotary shaft seal for heavy machine construction, e.g. for the paper, steel and aluminum industries. Equalization of alignment errors up to 2.5 mm. Radial speeds up to 40 m/s are possible.	≤ 2500	8
	WSS	NBR				X		≤ 0,5	-30 / +100	≤ 15	Rotary shaft seal for heavy machine construction and for general purpose in hot steel mill plants, bearings and paper industry.	≤ 2500	8
	WSS-S	NBR				X		≤ 0,5	-30 / +100	≤ 15	Rotary shaft seal for heavy machine construction and for general purpose in hot steel mill plants, bearings and paper industry. Version with additional dust lip.	≤ 2500	8
	WA0	NBR , FKM				X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, DIN 3760, Form A.	6 - 700	8
	WAS	NBR , FKM				X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, DIN 3760, Form AS.	6 - 500	8
	WB0	NBR , FKM				X		≤ 0,5	-35 / +100	-	Shaft seal with metallic casing (formerly DIN 3760 Form B).	6 - 500	8
	WBS	NBR , FKM				X		≤ 0,5	-35 / +100	-	Shaft seal with metallic casing and dust lip (formerly DIN 3760 Form BS).	6 - 500	8



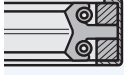
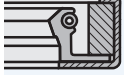



Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Rotary and Shaft Seals

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	WC0	NBR, FKM					X	≤ 0,5	-35 / +100	-	Shaft seal with metallic casing and cap (formerly DIN 3760 Form C).	6 -500	8
	WCS	NBR, FKM					X	≤ 0,5	-35 / +100	-	Shaft seal with metallic casing, cap and dust lip (formerly DIN 3760 Form CS).	6 -500	8
	WD0	NBR, FKM					X	≤ 10	-35 / +100	-	Shaft seal with metal case, like WA0, but up to 10 bar.	6 -500	8
	WD1	NBR, FKM					X	≤ 10	-35 / +100	-	Shaft seal with metal case, like WAS, but up to 10 bar.	6 -500	8
	WD2	NBR, FKM					X	≤ 1,5	-35 / +100	-	Shaft seal with metal case, like WA0, but up to 1,5 bar.	6 -500	8
	WD3	NBR, FKM					X	≤ 1,5	-35 / +100	-	Shaft seal with metal case, like WAS, but up to 1,5 bar.	6 -500	8
	WA3	NBR, FKM					X	≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WA0, with twist right.	6 -500	8
	WA4	NBR, FKM					X	≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WA0, with twist left.	6 -500	8
	WA5	NBR, FKM					X	≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WA0, with alternating twist.	6 -500	8
	WB3	NBR, FKM					X	≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WB0, with twist right.	6 -500	8
	WB4	NBR, FKM					X	≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WB0, with twist left.	6 -500	8
	WB5	NBR, FKM					X	≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WB0, with alternating twist.	6 - 500	8


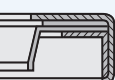
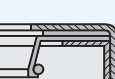

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Rotary and Shaft Seals

Profile	Type	Material	Application						Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	WA1	NBR, FKM					X		0	-35 / +100	-	Shaft seal with metal case, like WA0, without spring for depressurised applications.	6 - 500	8
	WB1	NBR, FKM					X		0	-35 / +100	-	Shaft seal with metal case, like WB0, without spring for depressurised applications.	6 - 500	8
	WZ0	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WA0, with two sealing lips for media separation.	6 - 500	8
	WZ1	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WB0, with two sealing lips for media separation.	6 - 500	8
	WZ2	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WB0, with two wedged-in sealing lips for media separation.	6 - 500	8
	WB2	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WB0, with wedged-in sealing lip.	6 - 500	8
	WC1	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WC0, with wedged-in sealing lip.	6 - 500	8
	WE0	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WA0, but outside sealing.	6 - 500	8
	WN0	PTFE comp.			X	X	X		≤ 5	-20 / +250	≤ 25	PTFE shaft seal, standard.	8 - 200	8
	WN1	PTFE comp.			X	X	X		≤ 30	-20 / +250	≤ 2	PTFE shaft seal, with two sealing lips, for higher pressures.	8 - 200	8
	WN2	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal, with spring-supported sealing lip, for out-of-round shafts or large shaft play.	8 - 200	8
	WN3	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal, like WN2, but with additional axial sealing function.	8 - 200	8


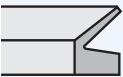

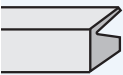
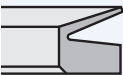



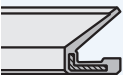


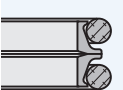
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Rotary and Shaft Seals

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group	
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]				v [m/s]
	WN4	PTFE comp.			X	X	X		≤ 5	-20 / +250	≤ 25	PTFE shaft seal, like WN0, but with additional axial sealing function.	8 - 200	8
	WN5	PTFE comp.			X	X	X		≤ 30	-20 / +250	≤ 2	PTFE shaft seal, like WN1, but with additional axial sealing function.	8 - 200	8
	WP0	PTFE comp.			X	X	X		≤ 7	-20 / +250	≤ 25	PTFE shaft seal, standard, with metal case.	8 - 200	8
	WP1	PTFE comp.			X	X	X		≤ 7	-20 / +250	≤ 25	PTFE shaft seal, standard, with metal case and additional dust lip.	8 - 200	8
	WP2	PTFE comp.			X	X	X		≤ 35	-20 / +250	≤ 3	PTFE shaft seal with metal case, with two sealing lips for higher pressures.	8 - 200	8
	WP3	PTFE comp.			X	X	X		≤ 35	-20 / +250	≤ 3	PTFE shaft seal with metal case, like WP2, but with dust lip.	8 - 200	8
	WP4	PTFE comp.			X	X	X		≤ 1,5	-20 / +250	≤ 30	PTFE shaft seal with metal case, with reduced pressing force, well suited for use as protective bearing seal.	8 - 200	8
	WP5	PTFE comp.			X	X	X		≤ 1,5	-20 / +250	≤ 30	PTFE shaft seal with metal case, like WP4, but with dust lip.	8 - 200	8
	WP6	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal with metal case, with spring-supported sealing lip for out-of-round shafts or shaft play.	8 - 200	8
	WP7	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal with metal case, like WP6, but with dust lip.	8 - 200	8
	WP8	PTFE comp.			X	X	X		-	-20 / +250	-	PTFE shaft seal with metal case, with two sealing lips for media separation.	8 - 200	8
	WK0	NBR/metal, FKM/metal					X		-	-15 / +100	-	Bearing sealing cap.	13 - 190	8

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Rotary and Shaft Seals

Profile	Type	Material	Application						Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	WK1	NBR/metal, FKM/metal					X		-	-15 / +100	-	Bearing sealing cap. Stepped version.	Dimen- sions on request	8
	VA0	NBR, FKM					X		0	-35 / +100 -25 / +200	≤ 10	V-ring, standard.	3 -2000	8
	VA6	NBR/steel, HNBR/steel					X		0	-30 / +100 -40 / +150	≤ 20	V-ring with embedded spring, used on back-up rolls of hot and cold rolling mills. Also available with friction optimised sealing lip.	≤ 2500	8
	VS0	NBR, FKM					X		0	-35 / +100 -25 / +200	≤ 10	V-ring, with reinforced back.	5 -200	8
	VL0	NBR, FKM					X		0	-35 / +100 -25 / +200	≤ 10	V-ring, for small fitting areas.	140-450	8
	VL6	NBR/steel, HNBR/steel					X		0	-30 / +100 -40 / +150	≤ 20	V-ring with embedded spring, used on back-up rolls of hot and cold rolling mills. Also available with friction optimised sealing lip.	≤ 2500	8
	VE0	NBR, FKM					X		0	-35 / +100 -25 / +200	≤ 10	V-ring, for large diameters.	450-1250	8
	VRME	NBR, FKM					X		0	-35 / +100 -25 / +200	≤ 10	V-ring, for large diameters.	210-1450	8
	VA7	NBR/steel, HNBR/steel					X		0	-30 / +100 -40 / +150	≤ 20	V-ring, used on back-up rolls of hot and cold rolling mills. Also available with friction optimised sealing lip.	≤ 2500	8
	VA8	NBR/steel, HNBR/steel					X		0	-30 / +100 -40 / +150	≤ 20	V-ring, used on back-up rolls of hot and cold rolling mills. Also available with friction optimised sealing lip.	≤ 2500	8
	WL0	Steel							-	-	-	Shaft protection sleeve	12 -200	8
	3L0	Metal/NBR, Metal/HNBR, Metal/FKM, Metal/VMQ							≤ 3	-40 / +200	≤ 3	Mechanical face seal for applications with ultra high wear conditions. Also available with trapezoid prestress elements	38 -667	8

Types and materials in bold are standard. Descriptions and application conditions based on material and application.







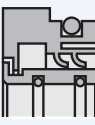
Rotary and Shaft Seals

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Types and materials in bold are standard. Descriptions and application conditions based on material and application.












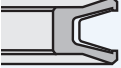
¹⁾Versions for sliding speeds up to 120 m/s on request.

Bearing Isolators

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	LS	PTFE, O-Ring: FKM			X	X	X	0	-40 / +120	≤ 25	Bearing Isolators in flanged design (standard) for general purpose. Retains grease and oil splash. Excludes heavy water spray and dry contaminants from the bearing cavity.	12 - 254	8
	LN	PTFE, O-Ring: FKM			X	X	X	0	-40 / +120	≤ 25	Bearing Isolators in flush mount design for general purpose. Retains grease and oil splash. Excludes heavy water spray and dry contaminants from the bearing cavity.	12 - 250	8
	LM	PTFE, O-Ring: FKM			X	X	X	0	-40 / +120	≤ 25	Bearing Isolators in flanged design for step shaft applications. Retains grease and oil splash. Excludes heavy water spray and dry contaminants from the bearing cavity.	12 - 254	8
	LB/ SB	PTFE, O-Ring: FKM			X	X	X	0	-40 / +120	≤ 25	Bearing Isolators as drop-in replacement for LER-Seals, available as solid seal or split seal. Retains grease and oil splash. Excludes heavy water spray and dry contaminants from the bearing cavity.	57 - 178	8
	SL	PTFE, O-Ring: FKM			X	X	X	0	-40 / +120	≤ 15	Bearing Isolators in split seal design. No wear sleeve or shaft refurbishment necessary. Retains grease and oil splash. Excludes heavy water spray and dry contaminants from the bearing cavity.	12,5-254	8
	ML	Bronze, O-Ring: FKM			X	X	X	0	-40 / +200	≤ 35	Bearing Isolators to protect against heavier water spray and dry contaminants. Retains grease and oil splash.	15,5-254	8
	FS	PTFE, O-Ring: FKM, Rotor: Stain- less Steel			X	X	X	≤ 0,3	-40 / +120	≤ 25	Bearing Isolators for max. 0,3 bar internal pressure. Retains grease and oil splash. Excludes heavy water spray and dry contaminants from the bearing cavity.	13 - 250	8


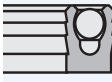
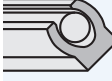




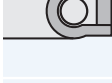

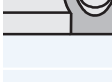
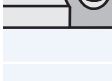

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Seals for Chemical Plants and Process Plant Engineering

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	MA	PTFE comp., PE, PA, PUR			X	X	X		≤ 300	-200 / +260	≤ 1,2	Chevron sealing set with pretension through profile width, for valves and spindles.	10 - 400	6
	MB	PTFE comp., PE, PA, PUR			X	X	X		≤ 300	-200 / +260	≤ 1,2	Chevron sealing set with pretension through shape, for valves and spindles.	10 - 400	6
	1V1	PTFE comp., PE			X	X	X		≤ 350	-70 / +225	≤ 10	PTFE lip seal, inside sealing, for aggressive media, also available with silicon filling for easier sterilisation or with inner wiper lip.	4-1500	6
	2V1	PTFE comp., PE			X	X	X		≤ 350	-70 / +225	≤ 10	PTFE lip seal, outside sealing, for aggressive media, also available with silicon filling for easier sterilisation or with outside wiper lip.	6-1500	6
	3V1	PTFE comp., PE			X	X	X		≤ 350	-70 / +225	-	PTFE lip seal, static, radial-acting, for aggressive media, also available with silicon filling for easier sterilisation.	4-1500	6
	1V5	PTFE comp., PE			X	X	X		≤ 150	-100 / +225	≤ 2	PTFE lip seal, for rotational movements, e.g. spray-painting/enamelling lines. Also available with silicon filling for easier sterilisation or with rounded sealing lip.	8-1500	6/8
	1V9	PTFE-Comp., PE	X		X	X	X		≤ 150	-100 / +225	≤ 1	PTFE lip seal for rotational movements, inside sealing, with increased spring force.	20 - 700	6/8
	1V3	PTFE comp., PE			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal, for flanges with inside pressure, also available with silicon filling for easier sterilisation or with o-ring as prestress element.	32-1500	6
	1VU	PTFE comp., PE			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal, for flanges with inside pressure, also available with silicon filling for easier sterilisation.	45-1500	6
	2V3	PTFE comp., PE			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal, for flanges with outside pressure, also available with silicon filling for easier sterilisation.	40-1500	6
	1V6	PTFE comp.			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal with u-spring, for flanges or rotary joints with inside pressure.	100 - 1500	6
	2V6	PTFE comp.			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal with u-spring, for flanges or rotary joints with outside pressure.	100 - 1500	6

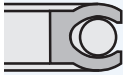

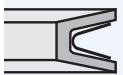


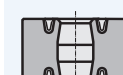






Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Seals for Chemical Plants and Process Plant Engineering

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group	
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]				v [m/s]
	1V7	PTFE comp., PE			X	X	X		≤ 250 ≤ 450*	-120 / +260	≤ 10	PTFE lip seal, inside sealing, with reinforced spring force and several sealing lips for dynamic applications (*with backup-rings). Also available as encapsulated version or with wiper element.	25-1500	6
	2V7	PTFE-Comp., PE			X	X	X		≤ 250 ≤ 450*	-120 / +260	≤ 10	PTFE lip seal, inside sealing, with reinforced spring force and several sealing lips for dynamic applications. (*with backup-rings).0	25-1500	6
	1VQ	PTFE-comp.			X	X	X		≤ 400	-120 / +225	-	PTFE lip seal for spherical joints. Dynamic sealing lip inside.	30-1500	6
	2VQ	PTFE-comp.			X	X	X		≤ 400	-120 / +225	-	PTFE lip seal for spherical joints. Dynamic sealing lip outside.	30-1500	6
	1VO	PTFE-comp., PE			X	X	X		≤ 500	-40 / +200	-	PTFE lip seal with o-ring as prestress element, for flanges with inside pressure.	30-1500	6
	1V8	PTFE-comp., PE	X		X	X	X		≤ 350	-120 / +230	-	PTFE lip seal for flanges with inside pressure and highest stress.	30-1500	6
	2V8	PTFE-comp., PE	X		X	X	X		≤ 350	-120 / +230	-	PTFE lip seal for flanges with outside pressure and highest stress.	20-1500	6
	1VL	PTFE-comp.			X	X	X		≤ 30	-120 / +225	-	PTFE lip seal, encapsulated, with increased springforce, for flanges with inside pressure.	30-1500	6
	1VK	PTFE-comp.			X	X	X		≤ 30	-120 / +225	-	PTFE lip seal, encapsulated, for flanges with inside pressure.	30-1500	6
	1V2	PTFE comp., PE			X	X	X		≤ 400	-120 / +260	≤ 5	PTFE lip seal, inside sealing, with reinforced spring force for gas and vacuum applications. Also available with wiper lip.	4-1500	6
	2V2	PTFE comp., PE			X	X	X		≤ 400	-120 / +260	≤ 5	PTFE lip seal, outside sealing, with reinforced spring force for gas and vacuum applications.	6-1500	6
	1V4	PTFE comp., PE			X	X	X		≤ 500	-200 / +260	-	PTFE lip seal, for flanges with inside pressure, with reinforced spring force.	12-1500	6

Types and materials in bold are standard. Descriptions and application conditions based on material and application.



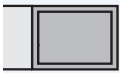





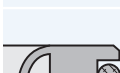

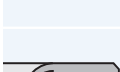

Seals for Chemical Plants and Process Plant Engineering

Profile	Type	Material	Application						Application Conditions			Description		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	2V4	PTFE comp., PE			X	X	X		≤ 500	-200 / +260	-	PTFE lip seal, for flanges with outside pressure, with reinforced spring force.	5-1500	6
	1VR	PTFE-comp.			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal for flanges with inside pressure and high stress.	30-1500	-
	2VR	PTFE-comp.			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal for flanges with outside pressure and high stress.	30-1500	-
	3V6	PTFE comp.			X	X	X		≤ 800	-60 / +200	≤ 5	PTFE lip seal with O-ring as prestress element and symmetrical shape. Application temperature depends on the O-ring material selected.	10-1500	6
	-	PTFE comp., PE			X	X	X		-	-70 / +225	≤ 10	PTFE complete piston, sterilisable, for pumps, dosing devices and filling machines. The size, version and material depends on the particular application and technical requirements ¹⁾ .	30- 300	6
	-	PTFE comp., PE			X	X	X		-	-70 / +225	≤ 10	PTFE double lip seal, double action, sterilisable, for pumps, dosing devices and filling machines. The size, version and material depends on the particular application and technical requirements ¹⁾ .	12- 100	6
	ROA	PTFE, FKM, FFKM			X	X	X		-	-200/+260	-	PTFE O-ring, standard, for aggressive media, also available in various elastomers (see individual brochures).	8-3000	3/9
	ROB	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, outside slot.	8-1500	9
	ROC	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, slot on ring surface.	8-1500	9
	ROD	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, 45° outside slot.	8-1500	9
	ROE	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, 45° inside slot.	8-1500	9
	ROF	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, inside slot.	8-1500	9

Types and materials in bold are standard. Descriptions and application conditions based on material and application.


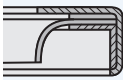
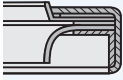

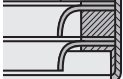
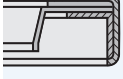
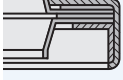
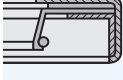



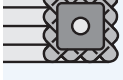
¹⁾ Also available with o-rings as prestress elements.

Seals for Chemical Plants and Process Plant Engineering

Profile	Type	Material	Application				Application Conditions			Description	Ø [mm]	Product Group		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]				T [°C]	v [m/s]
	ROG	FKM/FEP, FKM/PFA, MVQ/FEP, MVQ/PFA			X	X	X	X	-	-25 / +200 -25 / +200 -60 / +200 -60 / +250	-	FEP, (PFA) encapsulated O-ring with FKM or MVQ core.	6-2500	9
	ROK	MVQ/FEP, MVQ/PFA			X	X	X	X	-	-60 / +200 -60 / +250	-	FEP, (PFA) encapsulated O-ring with MVQ hollow core.	12-2500	9
	XRG	FKM/FEP, FKM/PFA, MVQ/FEP, MVQ/PFA			X	X	X		-	-25 / +200 -25 / +200 -60 / +200 -60 / +250	-	FEP, (PFA) encapsulated rectangular ring with FKM or MVQ core.	22 - 152	9
	ROS	PTFE			X	X	X		-	-20 / +200	-	PTFE encapsulated O-ring with elastomer core.	20 - 400	9
	WN0	PTFE comp.			X	X	X		≤ 5	-20 / +250	≤ 25	PTFE shaft seal, standard.	8 - 200	8
	WN1	PTFE comp.			X	X	X		≤ 30	-20 / +250	≤ 2	PTFE shaft seal, with two sealing lips, for higher pressures.	8 - 200	8
	WN2	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal, with spring-supported sealing lip, for out-of-round shafts or large shaft play.	8 - 200	8
	WN3	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal, like WN2, but with additional axial sealing function.	8 - 200	8
	WN4	PTFE comp.			X	X	X		≤ 5	-20 / +250	≤ 25	PTFE shaft seal, like WN0, but with additional axial sealing function.	8 - 200	8
	WN5	PTFE comp.			X	X	X		≤ 30	-20 / +250	≤ 2	PTFE shaft seal, like WN1, but with additional axial sealing function.	8 - 200	8
	WN6	PTFE comp.			X	X	X		-	-20 / +250	≤ 8	PTFE shaft seal, with increased pressing force, specially for gases and abrasive media.	8 - 200	8
	WN7	PTFE comp.			X	X	X		≤ 1,5	-20 / +250	≤ 30	PTFE shaft seal, low lip pressure, well suited for use as protective bearing seal.	8 - 200	8

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Seals for Chemical Plants and Process Plant Engineering

Profile	Type	Material	Application				Application Conditions			Description	Ø [mm]	Product Group		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]				T [°C]	v [m/s]
	WN8	PTFE comp.			X	X	X		-	-20 / +250	-	PTFE shaft seal, with spring-supported sealing lip.	8 - 200	8
	WP0	PTFE comp.			X	X	X		≤ 7	-20 / +250	≤ 25	PTFE shaft seal, standard, with metal case.	8 - 200	8
	WP1	PTFE comp.			X	X	X		≤ 7	-20 / +250	≤ 25	PTFE shaft seal, standard, with metal case and additional dust lip.	8 - 200	8
	WP2	PTFE comp.			X	X	X		≤ 35	-20 / +250	≤ 3	PTFE shaft seal with metal case, with two sealing lips for higher pressures.	8 - 200	8
	WP3	PTFE comp.			X	X	X		≤ 35	-20 / +250	≤ 3	PTFE shaft seal with metal case, like WP2, but with dust lip.	8 - 200	8
	WP4	PTFE comp.			X	X	X		≤ 1,5	-20 / +250	≤ 30	PTFE shaft seal with metal case, with reduced pressing force, well suited for use as protective bearing seal.	8 - 200	8
	WP5	PTFE comp.			X	X	X		≤ 1,5	-20 / +250	≤ 30	PTFE shaft seal with metal case, like WP4, but with dust lip.	8 - 200	8
	WP6	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal with metal case, with spring-supported sealing lip for out-of-round shafts or shaft play.	8 - 200	8
	WP7	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal with metal case, like WP6, but with dust lip.	8 - 200	8
	WP8	PTFE comp.			X	X		X	-	-20 / +250	-	PTFE shaft seal with metal case, with two sealing lips for media separation.	8 - 200	8
	3C0	Various materials			X	X	X	X	-	-	-	Stuffing box packings in various materials, dimensions and versions. See individual brochure.	-	6
	3C1	Various materials			X	X	X	X	≤+200*	-	-	Superject elastic packings with elastomer core and lubrication reservoir. Plugable rings, made to measure. * depending on the selected material.	-	6

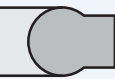
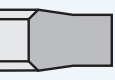
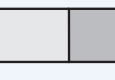
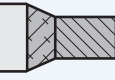
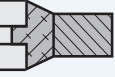
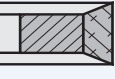



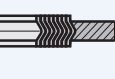
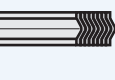
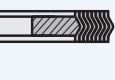
Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Seals for Chemical Plants and Process Plant Engineering

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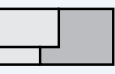

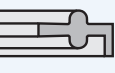
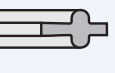
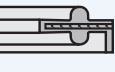
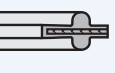




Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Static Seals

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	4F0	NBR	X	X	X	X		≤ 315	-30 /+100	-	Flange Seal for sealing of flanges and connection plates on controllers and modular valves.	2 - 45	-
	4F1	PUR	X	X			X	≤ 600	-35 /+110	-	Flange Seal for sealing of flanges and connection plates on controllers and modular valves.	17 - 55	9
	4F2	NBR, FKM, EPDM, PUR, PTFE	X	X	X	X		-	-30 /+100 -15 /+230 -35 /+130 -35 /+110 -200 /+260	-	Square Gasket Rings and Tube Rings for static sealing.	up to 400	-
	4U0	NBR/steel, FKM/steel, EPDM steel	X	X	X	X	X	≤ 1000	-30 /+100	-	U-ring, standard, as screw seal.	3 -127	9
	4U1	NBR/steel, FKM/steel, EPDM steel	X	X	X	X	X	≤ 1000	-30 /+100	-	U-ring, self-centring, as screw seal.	10 - 76	9
	4U2	NBR/steel, FKM/steel, EPDM steel	X	X	X	X	X	≤ 1000	-30 /+100	-	U-ring, as screw seal, for outer pressurisation.	7,2 - 24	9
	3C0 -101	Special-PTFE	X	X	X	X	X	≤ 100	-240 /+270 *	-	PTFE flat gasket, piece goods, self-adhesive on one side, for flange or vessel seals. *(temporarily up to ca. +310 °C)	Piece goods	9
	3C0 -113	Special-PTFE	X	X	X	X	X	≤ 200	-240 /+270 *	-	PTFE flat gasket with multidirectional stretched fibrous structure, piece goods, self-adhesive on one side, for flange or vessel seals. Also available as plates. *(temporarily up to ca. +310 °C)	Piece goods, plates	9
	4F4	Graphite/stainless steel, PTFE/stainless steel	X	X	X	X	X	to PN 250	≤ +550 ≤ +260	-	Spiral-wound gasket with inner and outer ring for inside pressure, available in various pressure stages for flanges and vessels.	DN 10 - DN 300	9
	4F5	Graphite/stainless steel, PTFE/stainless steel	X	X	X	X	X	to PN 100	≤ +550 ≤ +260	-	Spiral-wound gasket with outer ring for inside pressure, available in various pressure stages for flanges and vessels.	DN 10 - DN 600	9
	4F6	Graphite/stainless steel, PTFE/stainless steel	X	X	X	X	X	to PN 100	≤ +550 ≤ +260	-	Spiral-wound gasket for inside pressure, available in various material combinations and pressure stages.	DN 10 - DN 300	9
	4F7	Graphite/stainless steel, PTFE/stainless steel	X	X	X	X	X	to PN 100	≤ +550 ≤ +260	-	Spiral-wound gasket with inner ring for outside pressure, available in various material combinations and pressure stages.	DN 10 - DN 300	9

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Static Seals

Profile	Type	Material	Application				Application Conditions			Description	Ø [mm]	Product Group		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]				T [°C]	v [m/s]
	4FM-A	NBR, FKM, EPDM, PTFE, VMQ, HNBR			X	X		-	≤ +90	-	Gasket ring in rounded form, for food industry fittings. Available in various materials. Standard version according to DIN 11851	DN 10 - DN 150	9	
	4FM-B	NBR, FKM, EPDM, PTFE, VMQ, HNBR			X	X		-	≤ +90	-	Gasket ring in rounded form, with flange. For food industry fittings. Available in various materials.	DN 10 - DN 150	9	
	4FM-C	NBR, FKM, EPDM, PTFE, VMQ, HNBR			X	X		-	≤ +90	-	Gasket ring in angular form, with flange. For food industry fittings. Available in various materials.	DN 10 - DN 150	9	
	4FM-D	PTFE/ elastomer			X	X		-	≤ +200	-	Gasket ring in rounded form with inserted O-Ring. For food industry fittings. Available in various materials.	DN 10 - DN 150	9	
	4FC-A	NBR, EPDM, VMQ, FKM, PTFE			X	X		-	-30 /+100 -35 /+130 -65 /+200 -15 /+230 -200 /+260	-	Gasket for Clamp Pipe Connections, with flange.	DN 10 - DN 200	9	
	4FC-B	NBR, EPDM, VMQ, FKM, PTFE			X	X		-	-30 /+100 -35 /+130 -65 /+200 -15 /+230 -200 /+260	-	Gasket for Clamp Pipe Connections, without flange.	DN 12 - DN 219,1	9	
	4FC-E	PTFE/EPDM, PTFE/FKM			X	X		-	-35 /+130 -15 /+230	-	PTFE encapsulated elastomer gasket for Clamp Pipe Connections, with flange.	DN 12 - DN 219,1	9	
	4FC-F	PTFE/EPDM, PTFE/FKM			X	X		-	-35 /+130 -15 /+230	-	PTFE encapsulated elastomer gasket for Clamp Pipe Connections, without flange.	DN 12 - DN 219,1	9	
	ROA	PTFE, FKM, FFKM			X	X	X	-	-200/+260	-	PTFE O-ring, standard, for aggressive media, also available in various elastomers (see individual brochures).	8-3000	3/9	
	ROB	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, outside slot.	8-1500	9
	ROC	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, slot on ring surface.	8-1500	9
	ROD	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, 45° outside slot.	8-1500	9

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

¹⁾ pressure is depending on the selected cross-section and material

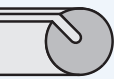
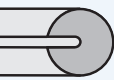




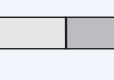

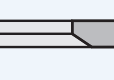



²⁾ depending on the selected material

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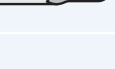
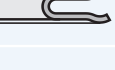
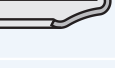
Static Seals

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group	
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]				v [m/s]
	ROE	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, 45° inside slot.	8-1500	9
	ROF	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, inside slot.	8-1500	9
	ROG	FKM/FEP, FKM/PFA, VMQ/FEP, VMQ/PFA			X	X	X	X	-	-25 / +200 -25 / +200 -60 / +200 -60 / +250	-	FEP, (PFA) encapsulated O-ring with FKM or VMQ core.	6-2500	9
	ROK	VMQ/FEP, VMQ/PFA			X	X	X	X	-	-60 / +200 -60 / +250	-	FEP, (PFA) encapsulated O-ring with VMQ hollow core.	12-2500	9
	XRG	FKM/FEP, FKM/PFA, VMQ/FEP, VMQ/PFA			X	X	X		-	-25 / +200 -25 / +200 -60 / +200 -60 / +250	-	FEP, (PFA) encapsulated rectangular ring with FKM or VMQ core.	22 - 152	9
	ROS	PTFE			X	X	X		-	-20 / +200	-	PTFE encapsulated O-ring with elastomer core.	20 - 400	9
	4F2	Fibre composite, expanded graphite, pure graphite	X	X	X	X			¹⁾	-	-	Flat gaskets in all shapes and sizes, e.g. with expanded metal insert and/or metal edges. Approvals: e.g. DVGW, KTW, WRC, BAM.	-	-
	4F3	Fibre composite, expanded graphite, pure graphite	X	X	X	X			¹⁾	-	-	Flat gaskets in small numbers and large series, in all sizes, e.g. with expanded metal insert or in segmented design. Approvals: e.g. DVGW, KTW, WRC, BAM.	up to 900	-
	4FD	NBR, FKM, EPDM	X	X	X	X			-	-30 /+100 -20 /+200 -45 /+150	-	Profile packing ring to DIN 3869 for sealing of pipe connections, fittings and screw plugs.	DN 8 - DN 60	9
	3HS	PUR	X	X				X	-	-35 /+110	-	Static radial sealing with high extrusion resistance and increased tightness against leaks in the case of pressure pulsations.	31,75 - 110	9
	1M0	1.4301, 1.4541, 2.4668, 2.4669	X		X		X		≤ 800 ¹⁾	≤ +430	-	Metal O-Ring, inside pressure, for static sealings, Version A. Version B, with bore-holes. Version G, filled with gas.	5 - 7600	9
	2M0	1.4301, 1.4541, 2.4668, 2.4669	X		X		X		≤ 800 ¹⁾	≤ +430	-	Metal O-Ring, outside pressure, for static sealings, Version A. Version B, with bore-holes. Version G, filled with gas.	5 - 7600	9

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

¹⁾ pressure is depending on the selected cross-section and material

Static Seals



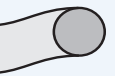


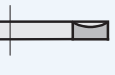
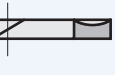
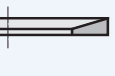
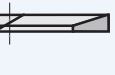
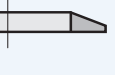
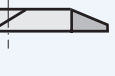

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	1MC	2.4668, 2.4669, 2.4654	X	X	X	X	X	≤5300 ¹⁾	≤ +650	-	Metal C-Ring, inside pressure, for static sealings.	6 - 3000	9
	2MC	2.4668, 2.4669, 2.4654	X	X	X	X	X	≤5300 ¹⁾	≤ +650	-	Metal C-Ring, outside pressure, for static sealings.	6 - 3000	9
	1MS	2.4669, 1.4301, 2.4668	X	X	X	X	X	≤6500 ¹⁾	≤ +650	-	Metal C-Ring, spring-supported, inside pressure, for static sealings.	20-7600	9
	2MS	2.4669, 1.4301, 2.4668	X	X	X	X	X	≤6500 ¹⁾	≤ +650	-	Metal C-Ring, spring-supported, outside pressure, for static sealings.	20-7600	9
	1ME	2.4668, 2.4669, 2.4654	X	X	X	X	X	≤ 380 ¹⁾	≤ +650	-	Metal C-Ring, inside pressure, for static sealings.	45-1200	9
	2ME	2.4668, 2.4669, 2.4654	X	X	X	X	X	≤ 380 ¹⁾	≤ +650	-	Metal C-Ring, outside pressure, for static sealings.	45-1200	9
	1MU	2.4668, 2.4669, 2.4654	X	X	X	X	X	≤ 280 ¹⁾	≤ +650	-	Metal U-Ring, inside pressure, for static sealings.	45-1200	9
	2MU	2.4668, 2.4669, 2.4654	X	X	X	X	X	≤ 280 ¹⁾	≤ +650	-	Metal U-Ring, outside pressure, for static sealings.	45-1200	9

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

¹⁾ pressure is depending on the selected cross-section and material


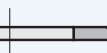







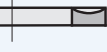

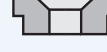


O-Rings, X-Rings and Back-up Rings

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	XRO	NBR, FKM, EPDM	X	X	X	X	X	X	≤ 400	-30 / +100	≤ 0,5	X-ring for static and dynamic applications. Advantage: less tendency to twist than an O-ring.	2,6 - 401	3
	ROA	NBR, PTFE FKM, EPDM, CR, PUR, Silicone, FFKM	X	X	X	X	X	X	≤ 400	-30 / +100	≤ 0,5	O-ring for static and dynamic applications (the application conditions depend strongly on the material selected).	0,74 - 2500	3/9
	RON	NBR, FKM, Silicone, EPDM	X	X	X		X	X	-	-	-	The elastomer cord is a product used for simple applications since many years in all fields of technology and industry.	-	3
	EE0	PTFE, PTFE comp., POM, PEEK	X	X	X	X	X		-	-100/+200	-	Back-up ring, one layer, continuous.	1 - 1500	3
	ES0	PTFE, PTFE comp., POM, PEEK	X	X	X	X	X		-	-100/+200	-	Back-up ring, one layer, slotted.	1 - 1500	3
	EE1	PTFE, PTFE comp., POM, PEEK	X	X	X	X	X		-	-100/+200	-	Back-up ring, one layer, continuous, concave. The shape of the O-ring is retained almost completely, as a result of which higher stresses are possible.	1 - 1500	3
	ES1	PTFE, PTFE comp., POM, PEEK	X	X	X	X	X		-	-100/+200	-	Back-up ring, one layer, slotted, concave. The shape of the O-ring is retained almost completely, as a result of which higher stresses are possible.	1 - 1500	3
	EE2	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, trapezoid, one layer, continuous, outside sealing. Trapezoid back-up rings reduce the sealing gap with their shape and permit higher system pressures.	1 - 1500	3
	ES2	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, trapezoid, one layer, slotted, outside sealing. Trapezoid back-up rings reduce the sealing gap with their shape and permit higher system pressures.	1 - 1500	3
	EE3	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, trapezoid, one layer, continuous, inside sealing. Trapezoid back-up rings reduce the sealing gap with their shape and permit higher system pressures.	1 - 1500	3
	ES3	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, trapezoid, one layer, slotted, inside sealing. Trapezoid back-up rings reduce the sealing gap with their shape and permit higher system pressures.	1 - 1500	3
	EE4	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, one layer, continuous, inside chamfer.	1 - 1500	3







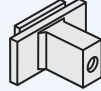


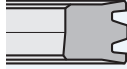

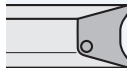
Types and materials in bold are standard. Descriptions and application conditions based on material and application.

O-Rings, X-Rings and Back-up Rings

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	ES4	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, one layer, slotted, inside chamfer.	1 - 1500	3
	EE5	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, one layer, continuous, outside chamfer.	1 - 1500	3
	ES5	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, one layer, slotted, outside chamfer.	1 - 1500	3
	EE6	POM, PTFE comp., PEEK	X	X	X	X	X		-	-50 / +100	-	Back-up ring, one layer, continuous, concave, inside chamfer. The shape of the O-ring is retained approximately, as a result of which higher stresses are possible.	1 - 1500	3
	ES6	POM, PTFE comp., PEEK	X	X	X	X	X		-	-50 / +100	-	Back-up ring, one layer, slotted, concave, inside chamfer. The shape of the O-ring is retained approximately, as a result of which higher stresses are possible.	1 - 1500	3
	EE7	POM, PTFE comp., PEEK	X	X	X	X	X		-	-50 / +100	-	Back-up ring, one layer, continuous, concave, outside chamfer. The shape of the O-ring is retained approximately, as a result of which higher stresses are possible.	1 - 1500	3
	ES7	POM, PTFE comp., PEEK	X	X	X	X	X		-	-50 / +100	-	Back-up ring, one layer, slotted, concave, outside chamfer. The shape of the O-ring is retained approximately, as a result of which higher stresses are possible.	1 - 1500	3
	SP1	PTFE	X	X	X	X	X		-	-100/+200	-	Back-up ring, spiral shaped, inside sealing.	1 - 1500	3
	SP2	PTFE	X	X	X	X	X		-	-100/+200	-	Back-up ring, spiral shaped, outside sealing.	1 - 1500	3
	EEP	NBR, FKM	X	X			X		-	-55 / +110	-	Back-Up ring, endless, concave, measures for combination with o-rings according to ASA 568.	2,44 - 660,50	3
	EEM	mod. PTFE	X		X	X	X		-	-30 / +200	-	Elastic, endless back-up ring with re-deformation after installation at the groove bottom, For supporting o-rings in static applications. Safe against twisting and shearing.	3 - 200	3
	EEV	POM, PA, PTFE, PTFE comp.	X				X		-	-	-	Sealing seats and valve seat seals of various materials according to customer specification or drawing available at short notice. Application conditions depend on the material required.	-	-

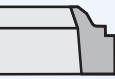
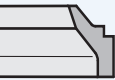
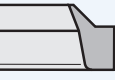
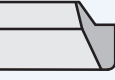
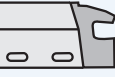
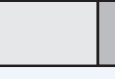
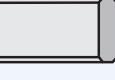


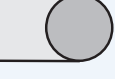


Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Other Seals and Constructional Elements

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	HK	Elastomer/ fabric							-	-20 / +80	-	Flexible separators for balancing of filling levels in, for example, supply tanks in hydraulic systems and to protect media against contamination and oxidation.	-	1
	5F1		X						≤ 12	-10 / +80	-	Silencers in various versions, materials and sizes, see brochure.	M5, 1/8" - 1"	5
	MES	POM							-	-	-	Measuring cones for exact determination of the diameters of sealing profiles. Standard measuring range: 5 - 400 mm in steps of 1,00 mm.	5 - 400	3
		Elastomers, elastom./fabr., PTFE							-	-	-	Diaphragms for media separation or to separate areas of different pressures.	-	10
	3T0	Elastomers, elastom./fabr., PTFE, leather							-	-	-	Bellows to protect, for example, gear levers and joints against contamination and the weather.	-	10
	3T1	Silicone, NBR, EPDM	X	X	X				-	≤ +200* ≤ +110* ≤ +150*	-	Modular Bellows to protect against contamination and the weather. Modular design for flexible applications. * With support rings (PMMA, standard): max. 80 °C.	60 -135	10
									-	-	-	On request moulded and machined parts of elastomer or plastic according to customer drawing.	-	-
			X	X	X	X			-	-	-	Solid balls, hollow balls or balls with steel cores of various elastomers or plastics.	-	10
	5T3								-	-	-	Rollers and wheels of various elastomers or plastics.	-	10
	1HP -A	NBR	X						≤300	-	-	Seals for pipe testing machines for highest pressures in leak testing of pipes in the iron and steel industry, in general mechanical engineering and in pipeline construction.	21- 51	10
	1HP -B	PUR, NBR	X						≤1600 ≤1200	-	-	Seals for pipe testing machines for highest pressures in leak testing of pipes in the iron and steel industry, in general mechanical engineering and in pipeline construction.	33-660	10
	1HP -C	NBR	X						≤ 600/ ≤ 800	-	-	Seals for pipe testing machines for highest pressures in leak testing of pipes in the iron and steel industry, in general mechanical engineering and in pipeline construction.	114-406	10

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Seals for the Mining Industry

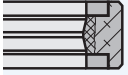





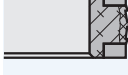

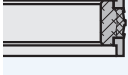
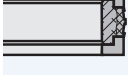
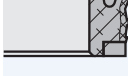

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	1A1	NBR, PUR, FKM, EPDM, PTFE	X	X	X	X	X		-	-35/ +100 -35/ +100	≤ 2 ≤ 2	Wiper with flush housing end, snap fit.	4 -500 14 -260	3
	1A1	POM, PA, PE	X	X	X	X	X		-	-40/ +100	≤ 1	Wiper with flush housing end, snap fit possible (depending on profile width and profile Ø). Also available in special dimensions at short notice from routine production.	65 -450	3
	1A5	NBR, PUR, FKM, EPDM, PTFE	X	X	X	X	X		-	-30/ +100 -30/ +80	≤ 2 ≤ 1	Wiper for general applications, snap fit.	20 -360 8 -320	3
	1A5	POM, PA, PE	X	X	X	X	X		-	-40/ +100	≤ 1	Wiper for general applications, snap fit possible (depending on profile width and profile Ø). Also available in special dimensions at short notice from routine production.	65 -450	3
	1A6	NBR	X	X			X		-	-20/ +100	≤ 4	Wiper that balances out large radial play, for underground use.	20 -260	3
	FB3	PTFE comp.	X						≤ 15 N/mm²	-100/ +200	≤ 5	Guide strip with very good sliding characteristics and stick-slip free run, for light to medium-duty oil hydraulic applications. Available also with lubrication pockets.	Cut goods	2
	FB2	PTFE comp.		X					≤ 15 N/mm²	-100/ +200	≤ 5	Guide strip with chamfer, very good sliding characteristics and stick-slip free run, for pneumatic and light to medium-duty water hydraulic applications. Available also with lubrication pockets.	Cut goods	2
	FÜB	Comp. fabric, POM, PE	X	X	X	X			HGW: ≤ 75 N/mm² at 80 °C	-30/ +120	≤ 5	Wear ring, oblique slot, for medium to heavy-duty hydraulic applications. In POM also available in special dimensions at short notice from routine production.	10 -500	2
	FÜA	Comp. fabric, POM, PE	X	X	X	X			HGW: ≤ 75 N/mm² at 80 °C	-30/ +120	≤ 0,5	Wear ring, straight slot, for medium to heavy-duty hydraulic applications. In POM also available in special dimensions at short notice from routine production.	10 -500	2
	ROA	PUR, NBR	X	X	X	X	X	X	≤ 600	-35/ +50 ¹⁾ -35/+110 ²⁾	≤ 0,5	O-ring, primarily for controllers, valves and cylinders when conventional elastomers can no longer be used because of their physical properties.	1,78-260	3
	4F0	NBR	X	X	X		X		≤ 315	-30/ +100	-	Flange seal for sealing of flanges and connection plates on controllers and modular valves.	2 - 45	-
	1B0	FKM/POM	X					X	≤ 350	+ 5/ +60 ¹⁾ -20/+100 ²⁾	≤ 0,5	Double-acting rod and spindle seal primarily for valves.	16 - 320	-

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

¹⁾ HFA, HFB and HFC fluids

²⁾ Mineral oils

Seals for the Mining Industry

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	p [bar]	T [°C]	v [m/s]			
	1B1	NBR-fabric/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,5	Double-acting rod seal with fabric bearing surface for hydraulic props and cylinders.	23 - 160	-
	1B2	NBR-fabric/ POM	X				X	≤ 350	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,5	Double-acting rod seal with fabric bearing surface and back-up wear rings for hydraulic props and cylinders.	35 - 90	-
	1B3	NBR-fabric/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Single-acting compact rod seal with fabric bearing surface for hydraulic props and cylinders.	27 - 250	-
	1B4	NBR-fabric/ POM	X				X	≤ 350	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Single-acting rod seal with fabric bearing surface for hydraulic props and cylinders.	100-270	-
	1B5	PUR/NBR/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Single-acting rod seal for hydraulic props and cylinders.	63 - 230	-
	2B0	NBR/POM	X				X	≤ 400	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Double-acting cylinder seal in cylinders for hydraulic roof supports and tunnel-driving machines.	40 - 325	-
	2B2	NBR-fabric/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Double-acting cylinder seal with fabric bearing surface in cylinders for hydraulic roof supports and tunnel-driving machines.	40 - 320	-
	2B5	NBR-fabric/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Design like 2B2, but with increased pretension in cylinders for hydraulic roof supports and tunnel-driving machines.	105-310	-
	2B3	NBR-fabric/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Double-acting cylinder seal with back-up wear rings in cylinders for hydraulic roof supports and tunnel-driving machines.	40 - 250	-
	2B6	NBR-fabric/ POM	X				X	≤ 1500	+ 5/+ 60 ¹⁾ -20/+ 80 ²⁾	≤ 0,1	Double-acting cylinder seal with fabric bearing surface & back-up wear rings for telescope props with foot valve.	55 - 320	-
	2B7	NBR-fabric/ POM	X				X	≤ 500 ³⁾	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Single-acting cylinder seal with fabric bearing surface.	110-285	-
	2B4	NBR-fabric/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Single-acting cylinder seal with fabric bearing surface for individual hydraulic props or aligning cylinders.	90 -220	-




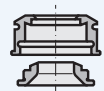


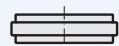
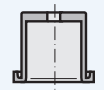

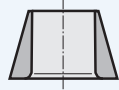
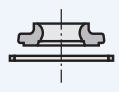
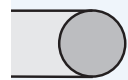
Types and materials in bold are standard. Descriptions and application conditions based on material and application.

¹⁾ HFA, HFB and HFC fluids

²⁾ Mineral oils

³⁾ With trapezoid back-up rings ≤ 2000 bar







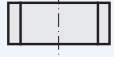





Accessories for the Food Industry

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	5GS1	PUR, EPDM				X		-	-30 / + 80 -30 / + 120	-	Spreaders to divert medium in bottlenecks	-	7
	5GA1	PUR, EPDM, NBR				X		-	-30 / + 80 -30 / + 120 -30 / + 100	-	Pressure gasket rings for axial sealing of tanks against liquids and pressurised gases	-	7
	5GZ1	POM, PE				X		-	-40 / + 100 -30 / + 80	-	Centering bells , one-part, for pressure gasket rings of filling elements	-	7
	5GZ2	POM, PE				X		-	-40 / + 100 -30 / + 80	-	Centering bells , two-part with thread, for pressure gasket rings of filling elements	-	7
	5GV1	EPDM, NBR				X		-	-30 / + 120 -50 / + 100	-	Valve shaft seals for valve stems and needles	-	7
	5GV2	EPDM, NBR, PUR				X		-	-30 / + 120 -30 / + 100 -30 / + 80	-	Valve seat seals for axial sealing of tanks against liquids	-	7
	5GF	PUR				X		-	-30 / + 100	-	Bottle pads are used in filling and labelling units for damping/protection against torsion	-	7
	5GP1	PUR, NBR				X		-	-30 / + 80 -30 / + 100	-	Packing bells for packing and unpacking units of various bottles and packing systems	-	7
	5GST	PA, PUR, PE				X		-	-40 / + 100 -30 / + 100 -30 / + 80	-	Inlet/Discharge stars are used to pick up and transfer containers in filling units	-	7
	5GSP	Silicon				X		-	-60 / + 200	-	Bung gaskets/Tapered plugs for filling of barrels	-	7
	5GV4	EPDM				X		-	-30 / + 120	-	Valve seals for KEG flat fittings , also available with square gasket ring.	-	7
	-	EPDM, FKM, FFKM, HNBR, NBR, VMQ				X		-	-60/+250 ^{*)}	-	Sealings an moulded parts made of detectable materials and for 3-A sanitary applications. Almost any geometry can be made. Properties see individual brochures.	-	7

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

*) Material VMQ

Pneumatic Compression/Lifting Cushions

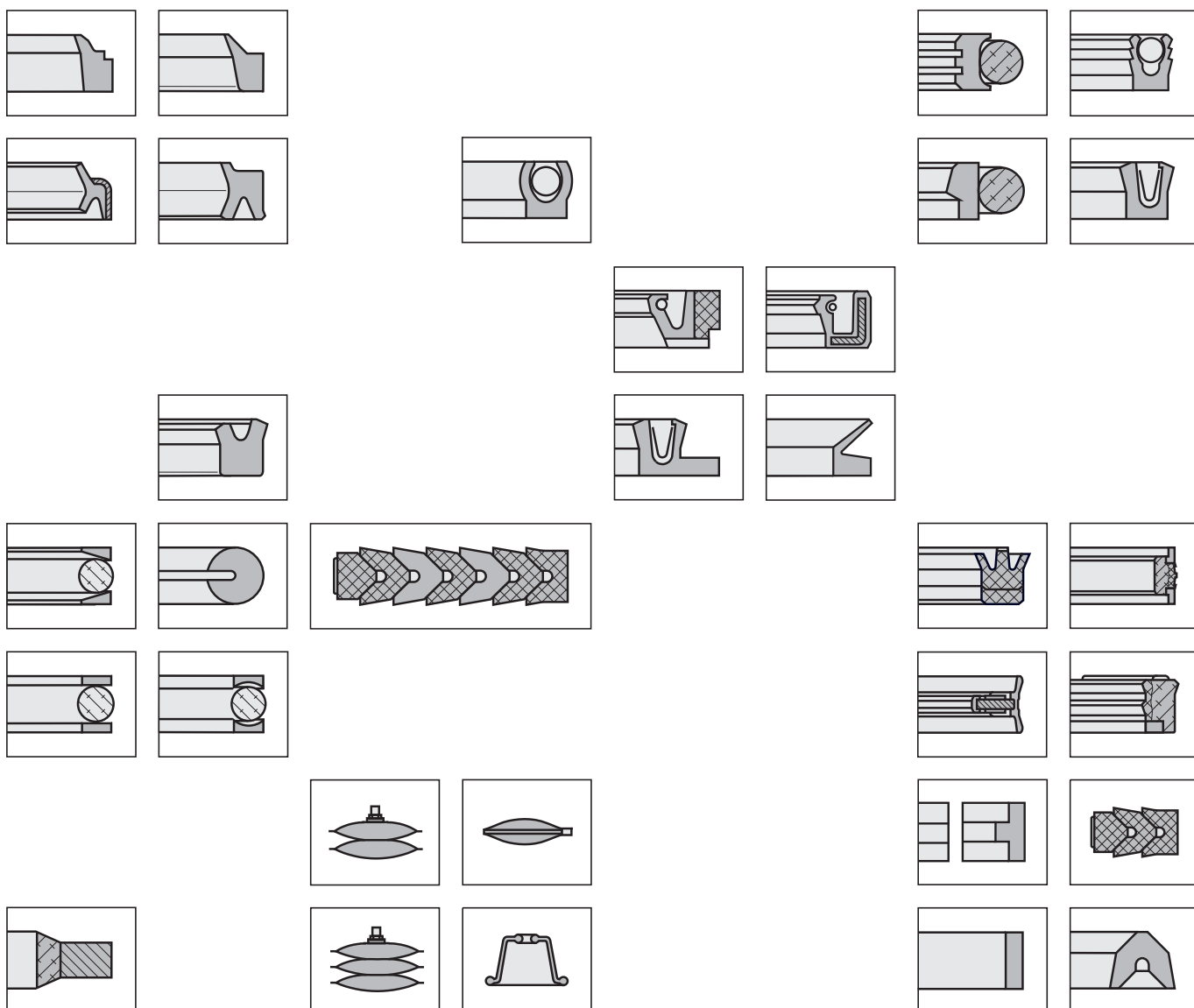
Profile	Type	Material	Application					Application Conditions			Description	C ^{b)} [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	HP1	Elastomer/ Fabric	X					≤ 7	-20/ +70	668	Compressed air cushion, single-stage Application: Pressing, lifting, guiding, clamping, damping, compressing	30 - 500	10
	ST1	Elastomer/ Fabric	X					≤ 3	-	-	Comp. air cushion, for small fitting areas single-stage, height: 12 mm	-	10
	HP2	Elastomer/ Fabric	X					≤ 7	-20/ +70	668	Compressed air cushion, two-stage Application: Pressing, lifting, guiding, clamping, damping, compressing	60 -1000	10
	ST2	Elastomer/ Fabric	X					≤ 3	-	-	Comp. air cushion, for small fitting areas two-stage, height: 24 mm	-	10
	HP3	Elastomer/ Fabric	X					≤ 7	-20/ +70	668	Compressed air cushion, three-stage Application: Pressing, lifting, guiding, clamping, damping, compressing	90 -1500	10
	ST3	Elastomer/ Fabric	X					≤ 3	-	-	Comp. air cushion, for small fitting areas three-stage, height: 36 mm	-	10
	TOR -PF	Polyurethane, Polyurethane/ Fabric	X					≤ 0,5	-	-	Ring cushion, flat Application: Sealing, pressing, flanging, handling and isolating Operation with compressed air	-	10
	TOR -EF	Elastomer/ Fabric	X					≤ 7	-	-	Ring cushion, flat Application: Sealing, pressing, flanging, handling and isolating Operation with compressed air	-	10
	TOR -PH	Polyurethane, Polyurethane/ Fabric	X					≤ 0,5	-	-	Ring cushion, high Application: Sealing, pressing, flanging, handling and isolating Operation with compressed air	-	10
	TOR -EH	Elastomer/ Fabric	X					≤ 7	-	-	Ring cushion, high Application: Sealing, pressing, flanging, handling and isolating Operation with compressed air	-	10
	CLP	Elastomer/ Fabric	X					≤ 8	-	657	Lifting cushion, single stage, for heavy loads. Application: Lifting of heavy loads Operation with compressed air	66 - 585	10
	OPV/ HPV	Elastomer/ Fabric	X					-	-	-	Pipe stopper Diameter: 50 to 2.500 mm (depending on version) Operation with compressed air	-	10
	MEM	Polyurethane, Polyurethane/ Fabric	X					≤ 0,01 ≤ 0,1	-	-	Membrane, circular Flexible inflatable membranes for low pressures. Application: Sealing, pressing, flanging, handling and isolating	-	10
	MEM	Polyurethane, Polyurethane/ Fabric	X					≤ 0,01 ≤ 0,1	-	-	Membrane, rectangle/square Flexible inflatable membranes for low pressures. Application: Sealing, pressing, flanging, handling and isolating	-	10
	MEM	Polyurethane, Polyurethane/ Fabric	X					≤ 0,01 ≤ 0,1	-	-	Membrane, polygon/complex Shape Flexible inflatable membranes for low pressures. Application: Sealing, pressing, flanging, handling and isolating	-	10

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

^{a)} F = max. lifting force

^{b)} C = max. stroke distance

Overview of Products

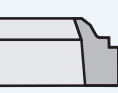
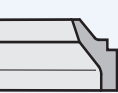
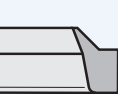











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For detailed informations please
see our extensive catalogue,
wich you can receive from us
free of charge.

Wipers

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	1A1	NBR, PUR, FKM, EPDM, PTFE	X	X	X	X	X		-	-35 / +100 -35 / +100	≤ 2 ≤ 2	Wiper with flush housing end, snap fit.	4 -500 14 -260	3
	1A1	POM, PA, PE	X	X	X	X	X		-	-40 / +100	≤ 1	Wiper with flush housing end, snap fit possible (depending on profile width and Ø). Also available in special dimensions at short notice from routine production.	65 -450	3
	1A5	NBR, PUR, FKM, EPDM, PTFE	X	X	X	X	X		-	-30 / +100 -30 / + 80	≤ 2 ≤ 1	Wiper for general applications, snap fit.	20 -360 8 -320	3
	1A5	POM, PA, PE	X	X	X	X	X		-	-40 / +100	≤ 1	Wiper for general applications, snap fit possible (depending on profile width and Ø). Also available in special dimensions at short notice from routine production.	65 -450	3
	1A6	NBR	X	X			X		-	-20/ +100	≤ 4	Wiper that balances out large radial play, for underground use.	20 -260	3
	1AM	NBR, PUR, FKM	X	X	X		X		-	-35 / +100*	≤ 2	Wiper with metal case, for open fitting areas. Press fit. *(-35 °C / +80 °C in pneumatic applications)	6 -240	3
	1AP	NBR	X	X	X		X		-	-30 / +100	≤ 2	Wiper with rubber-coated metal case, for open fitting areas. Press fit.	8 - 90	3
	1AF	PUR	X				X		-	-35 / +100	≤ 2	Wiper with increased wear resistance, with metal case. Press fit. For open fitting areas.	20 -120	3
	1AG	PUR	X				X		-	-35 / +100	≤ 2	PUR wiper with high abrasion resistance. Metal case for open fitting areas. Press fit.	22 -120	3
	1AH	NBR	X	X	X			X	-	-30 / +100	≤ 2	Double wiper with metal case, for open fitting areas. Press fit.	15 - 50	3
	1AH	PUR	X	X				X	-	-35 / +100	≤ 2	Double wiper with metal case and increased wear resistance, for open fitting areas. Press fit.	50 -100	3
	1AQ	NBR	X		X			X	- -	-30 / +100 -35 / + 80*	≤ 2	Double wiper with rubber-coated metal case, for open fitting areas. Press fit. *(Can also be used as a sealing wiper in pneumatic applications)	10 - 40	3

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Wipers

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	1AY	PUR, NBR, FKM, EPDM	X	X	X			X	-	-35 / +100*	≤ 2	Double wiper with increased wear resistance (PUR), snap fit. *(-35 °C / +80 °C in pneumatic applications)	8 -160	3
	1A7	PA-Comp.	X				X		-	-40 / +100	≤ 1	Wiper for clean end to housing, snap fit.	36 -260	3
	1A8	NBR/brass	X	X			X		-	-40 / +100	≤ 1	Wiper with metal case and two wiper lips for stubborn adherent dirt, e.g. ice, for open fitting areas. Press fit.	12 -140	3
	1S0	PTFE comp./ elastomer	X	X	X	X	X		-	-60 / +200	≤ 4	Wiper of PTFE, with O-ring as prestress element. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	6 -1500	3
	1S1	PTFE comp./ elastomer	X	X	X	X		X	-	-60 / +200	≤ 4	Double Wiper of PTFE, with O-ring as prestress element. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 -1500	3
	1S2	PTFE comp./ elastomer	X	X	X	X		X	-	-60 / +200	≤ 4	Double Wiper of PTFE, with O-ring as prestress element. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 -1500	3
	1S3	PTFE comp./ elastomer	X	X	X	X		X	-	-60 / +200	≤ 4	Double action wiper for environments with heavy dirt.	4 -1500	-
	1AJ	NBR, FKM		X			X		-	-25 / +100	≤ 0,5	Wiper for very small fitting areas in pneumatic applications.	3 - 35	5
	1AV	PUR	X				X		-	-35 / +100	≤ 2	Double wiper with dirt shield and pressure relief drill hole. Particularly suitable for applications in mobile hydraulics.	28 -200	5
	1AZ	NBR, PUR	X	X	X			X	-	-30 / +110 -35 / +100	≤ 1,0 ≤ 0,8	Double wiper, snap fit. Dimensions according to DIN ISO 3320 housings available	10 -440	3

Types and materials in bold are standard. Descriptions and application conditions based on material and application.










Guide and Bearing Elements

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group	
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	Safe Load	T [°C]				v [m/s]
	FB3	PTFE comp.	X						≤ 15 N/mm²	-100 / +200	≤ 5	Guide strip with very good sliding characteristics and stick-slip free run, for oil hydraulic applications. Available also with textured surface or lubrication pockets.	Cut goods	2
	FB2	PTFE comp.	X	X	X	X			≤ 15 N/mm²	-100 / +200	≤ 5	Guide strip with chamfer, very good sliding characteristics and stick-slip free run, for pneumatic, water hydraulic, chemical and foodstuff applications. Available also with textured surface or lubrication pockets.	Cut goods	2
	FB8	Comp. fabric	X	X	X	X			≤ 100 N/mm² at 25 °C	-50 / +120	≤ 0,8	Guide strip of compound fabric, for hydraulic, mechanical engineering and chemical applications. Cut goods, customising for length up to 5700 mm.	Cut goods	2
	FB9	Comp. fabric	X	X	X	X			≤ 100 N/mm² at 25 °C	-50 / +120	≤ 0,8	Guide strip of compound fabric, for hydraulic, mechanical engineering and chemical applications. Cut goods for customising, spiralised. Diameter range: ~45 mm up to ~210 mm.	Cut goods, spiralised	2
	FÜB	Comp. fabric, POM, PE, POM-Comp., PTFE-Comp.	X	X	X	X			Cpd. fab. ≤ 100 N/mm² at 25 °C	-50 / +120	≤ 0,8	Wear ring, oblique slot, for hydraulic, mechanical engineering and chemical applications. In the material POM also available in special dimensions at short notice from routine production.	10-1750	2
	FÜA	Comp. fabric, POM, PE, POM-Comp., PA-Comp.	X	X	X	X			Cpd. fab. ≤ 100 N/mm² at 25 °C	-50 / +120	≤ 0,8	Wear ring, straight slot, for hydraulic and general machine-building applications.	10-1750	2
	FÜS	Comp. fabric,	X	X	X	X			≤ 100 N/mm² at 25 °C	-50 / +120	≤ 0,8	Wear ring with stair cut, for hydraulic and general mechanical engineering applications.	10-1750	2
	FÜ1	PA	X	X	X	X			2,5 N/mm²	-40 / +100 ¹⁾	≤ 5	Guide rings FÜ1 are open piston guide rings with a mounting collar on the inside diameter and axial grooves for pressure relief. ¹⁾ in Water max. +60 °C	20 -250	2
	FD1	Metal composite	X	X					p x v ≤ 1,5* p _{Lmax.} = 140 N/mm²	-200 / +280	≤ 2	Radial slide bearing of a metal composite and a sliding layer of PTFE/lead for maintenance-free operation, general applications.	5 -300	2
	FD2	Metal composite	X	X					p x v ≤ 1,5* p _{Lmax.} = 140 N/mm²	-200 / +280	≤ 2	Radial slide bearing with flange, of a metal composite and a sliding layer of PTFE/lead for maintenance-free operation, general applications.	6 - 40	2
	FDA	Metal composite	X	X					p x v ≤ 1,5* p _{Lmax.} = 140 N/mm²	-200 / +280	≤ 2	Thrust washer of a metal composite and a sliding layer of PTFE/lead for maintenance-free operation, general applications.	10 - 62	2
	FDL	Metal composite	X	X					p x v ≤ 1,5* p _{Lmax.} = 140 N/mm²	-200 / +280	≤ 2	Slide band of a metal composite and a sliding layer of PTFE/lead for maintenance-free operation, general applications.	-	2

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

*p x v in N/mm² x m/s

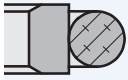
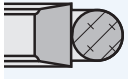
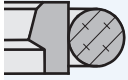
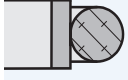
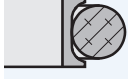

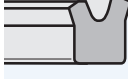
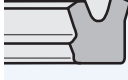



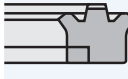
Guide and Bearing Elements

Profile	Type	Material	Application						Application Conditions			Description		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action		T [°C]	v [m/s]		Ø [mm]	Product Group
	FE1	Tin bronze	X	X					$p_{Lmax.} = 120 \text{ N/mm}^2$	-100 / +200	≤ 2	Slide bearing with diamond-shaped lubrication pockets, for high bearing loads and rough operation.	10 - 120	2
	FE2	Tin bronze	X	X					$p_{Lmax.} = 120 \text{ N/mm}^2$	-100 / +200	≤ 2	Slide bearing with round lubrication pockets for high bearing loads and rough operation.	10 - 120	2
	FE3	Tin bronze	X	X					$p_{Lmax.} = 120 \text{ N/mm}^2$	-100 / +200	≤ 2	Slide bearing without lubrication pockets, for high bearing loads.	10 - 120	2
	FG1	Metal composite and POM	X	X					$p \times v \leq 2,8^*$ $p_{Lmax.} = 140 \text{ N/mm}^2$	-40/+90	$\leq 2,5$	Slide bearing of a metal composite with a sliding layer of POM and round lubrication pockets.	10 - 120	2
	FGA	Metal composite and POM	X	X					$p \times v \leq 2,8^*$ $p_{Lmax.} = 140 \text{ N/mm}^2$	-40/+90	$\leq 2,5$	Thrust washer of a metal composite and a sliding layer of POM and round lubrication pockets.	10 - 120	2
	FE4	Tin bronze, graphite	X	X					$p \times v \leq 1,5^*$ $p_{Lmax.} = 80 \text{ N/mm}^2$	$\leq +250$	$\leq 0,25$	Radial slide bearing with graphite, self lubrication.	6 - 130	2
	FE5	Tin bronze, graphite	X	X					$p \times v \leq 1,5^*$ $p_{Lmax.} = 80 \text{ N/mm}^2$	$\leq +250$	$\leq 0,25$	Radial slide bearing with flange, with graphite, self lubrication.	6 - 120	2
	FE6	Sintered metal	X	X					$p \times v \leq 1,8^*$ $p_{LGrenz (dyn)} = 40 \text{ N/mm}^2$	-40/+80	≤ 7	Slide bearing made of sintered metal, oil impregnated.	1 - 200	2
	FE7	Sintered metal	X	X					$p \times v \leq 1,8^*$ $p_{LGrenz (dyn)} = 40 \text{ N/mm}^2$	-40/+80	≤ 7	Slide bearing made of sintered metal, oil impregnated.	3 - 200	2

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

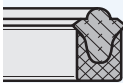
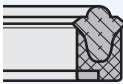
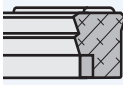
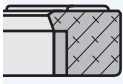


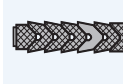
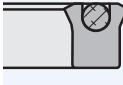

* $p \times v$ in $\text{N/mm}^2 \times \text{m/s}$

Rod Seals for Hydraulic Applications

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	p [bar]	T [°C]	v [m/s]			
	1G2	PTFE comp./ elastomer	X		X	X	X	≤ 400	-60 / +200	≤ 4	Slide seal set for general machine-building, machine tools and mobile hydraulic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 - 1500	4
	1GT	PTFE comp./ elastomer	X		X	X	X	≤ 400	-60 / +200	≤ 4	Slide seal set for general machine-building, machine tools and mobile hydraulic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 - 1000	4
	1G9	PTFE comp./ elastomer	X		X	X	X	≤ 400	-60 / +200	≤ 4	Slide seal set for general machine-building, machine tools and mobile hydraulic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 - 1500	4
	1G0	PTFE comp./ elastomer	X	X	X	X	X	H: ≤ 160 P: ≤ 16	-60 / +200	≤ 4	Slide seal set for light-duty hydraulic and pneumatic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	3 - 200	4/5
	1G4	PTFE comp./ elastomer	X		X	X	X	≤ 350	-60 / +200	≤ 4	Slide seal set for O-ring fitting areas according to ASA 568 A. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 - 400	4
	1H0	NBR, FKM, EPDM, HNBR	X	X		X		≤ 160 ¹⁾ ≤ 16 ²⁾	-25 / +100 ¹⁾ -25 / + 80 ²⁾	≤ 0,5 ¹⁾ ≤ 1 ²⁾	Lip seal for standard hydraulic and pneumatic applications. ¹⁾ in hydraulic applications (depending on profile width and material) ²⁾ in pneumatic applications	2 - 320	4/5
	1H1	PUR	X			X		≤ 400	-35 / +100	≤ 0,5	Lip seal with increased wear and pressure resistance, for tough operating conditions in hydraulic applications.	4 - 280	4
	1H2	PUR	X			X		≤ 400	-35 / +100	≤ 0,5	Lip seal like 1H1, but with 2 sealing lips for retention of a lubrication pocket and for better sealing effect in depressurised state.	8 - 280	4
	1H3	PUR	X			X		≤ 400	-35 / +100	≤ 0,5	Compact lip seal for small fitting areas in hydraulic applications.	5 - 270	4
	1HL	PUR	X			X		≤ 250	-35 / +110	≤ 1	Compact lip seal for small fitting areas in hydraulic applications. Optimized for particularly low friction	20 - 80	4
	1H4	PUR/NBR	X			X		≤ 500	-35 / +110	≤ 0,5	Lip seal with 2 sealing lips, O-ring and back-up ring for the toughest operating conditions in hydraulic applications.	40 - 240	4
	1HK	PUR	X			X		≤ 500 ¹⁾	-35 / +110	≤ 0,5	PUR compact rod seal with integrated anti-extrusion ring. A typical application is as a buffer seal in sealing systems. ¹⁾ Temporary up to 1000 bar.	55 - 250	4

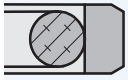
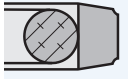
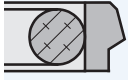
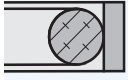
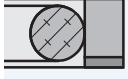







Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Rod Seals for Hydraulic Applications

Profile	Type	Material	Application				Application Conditions			Description	Ø	Product Group		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	1H6	NBR/fabric, FKM	X				X		≤ 250	-30 / +100	≤ 0,5	Fabric Compact seal for medium-duty hydraulic applications.	5 - 535	4
	1H8	NBR/fabric, FKM	X				X		≤ 250	-30 / +100	≤ 0,5	Compact seal with back-up ring against gap extrusion, for medium-duty hydraulic applications.	25 - 140	4
	1H9	NBR/PTFE-compound	X				X		≤ 315	-30 / +100	≤ 0,5	Compact seal with back-up ring, good sealing effect also at low pressures.	6 - 360	4
	1HC	NBR/PTFE-compound	X				X		≤ 315	-30 / +100	≤ 1	Compact seal with back-up ring for fitting areas according to ISO 7425-2.	5 - 210	4
	MA0	NBR/fabric, FKM/fabric, PUR	X				X		≤ 500	-40 / +100	≤ 0,5	Fabric chevron sealing set for complicated and not exactly definable operating conditions in hydraulic applications.	5 - 1100	4
	MA2	NBR/fabric, FKM/fabric, PUR	X				X		≤ 350	-40 / +100	≤ 0,5	Fabric chevron sealing set for complicated operating conditions, standard series for pressures up to 350 bar in hydraulic applications.	8 - 200	4
	MA3	NBR/fabric, FKM/fabric, PUR	X				X		≤ 500	-40 / +100	≤ 0,5	Fabric chevron sealing set for difficult operating conditions, standard series for pressures up to 500 bar in hydraulic applications.	10 - 320	4
	3H2	PUR/NBR	X				X		≤ 350	-35 / +80	≤ 0,5	PUR lip seal with o-ring, to achieve good sealing even at low pressures.	3 - 500	4
	1HS	PUR	X	X			X		≤ 200 ¹⁾ ≤ 20 ¹⁾	-35 / +90	≤ 1,0 ¹⁾ ≤ 0,2 ¹⁾	PUR lip seal, especially suitable for use in gas springs. ¹⁾ Hydraulics/Gas Springs ¹⁾ Rotating Unions	3 - 28	4




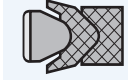


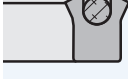
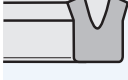

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Piston Seals for Hydraulic Applications

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	p [bar]	T [°C]	v [m/s]			
	2G2	PTFE-comp./ elastomer	X		X	X	X	≤ 400	-60 / +200	≤ 4	Slide seal set for general machine-building, machine tools and mobile hydraulic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	8 - 1500	4
	2GT	PTFE-comp./ elastomer	X		X	X	X	≤ 400	-60 / +200	≤ 4	Slide seal set for general machine-building, machine tools and mobile hydraulic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	8 - 1000	4
	2G9	PTFE-comp./ elastomer	X		X	X	X	≤ 400	-60 / +200	≤ 4	Slide seal set for general machine-building, machine tools and mobile hydraulic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	8 - 1500	4
	2G0	PTFE-comp./ elastomer	X	X	X	X	X	H: ≤ 160 P: ≤ 16	-60 / +200	≤ 4	Slide seal set for light-duty hydraulic and pneumatic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	7 - 200	4/5
	2G5	PTFE-comp./ elastomer	X		X	X	X	≤ 500	-60 / +200	≤ 4	Slide seal set for heavy-duty hydraulic applications, only for divided pistons.	20 - 300	4
	2G4	PTFE-comp./ elastomer	X		X	X	X	≤ 350	-60 / +200	≤ 4	Slide seal set for O-ring fitting areas according to ASA 568 A. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	8 - 400	4
	2G3	Thermoplast/ NBR	X				X	≤ 800	-30 / +110	≤ 1	Special slide seal set with divided slide ring (stepped cut) for heavy-duty hydraulic applications. Very simple fitting.	25 - 330	4
	2G6	PUR/ elastomer	X				X	≤ 300	-35 / +110	≤ 0,5	PUR slide seal set for light to medium-duty hydraulic applications.	20 - 200	4
	2H0	NBR, FKM, EPDM, HNBR	X	X			X	H: ≤ 160 ¹⁾ P: ≤ 16	-25 / +100	≤ 0,5	Lip seal for standard hydraulic and pneumatic applications. ¹⁾ Depending on profile width and material.	4 - 350	4/5
	2H1	PUR	X				X	≤ 400	-35 / +100	≤ 0,5	Lip seal with increased wear and pressure resistance for hydraulic applications.	12 - 400	4
	2H2	NBR/fabric, FKM/fabric	X				X	≤ 500	-40 / +100	≤ 1	Compact seal for heavy-duty hydraulic applications, only for divided pistons.	32 - 300	4
	2H3	NBR/fabric, FKM/fabric	X				X	≤ 250	-40 / +100	≤ 0,5	Lip seal with back-up ring for medium-duty hydraulic applications, only for divided pistons.	20 - 300	4

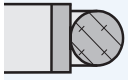
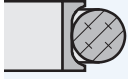




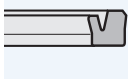
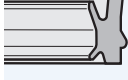




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Piston Seals for Hydraulic Applications

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	p [bar]	T [°C]	v [m/s]			
	2H6	PUR	X				X	≤ 400	-30 / +100	≤ 0,5	Multi-part compact seal with increased wear resistance for medium to heavy-duty hydraulic applications, for closed grooves in standard hydraulic cylinders.	25 -160	4
	2H8	NBR	X				X	≤ 350	-30 / +100	≤ 0,5	Multi-part compact seal for medium to heavy-duty hydraulic applications, for closed grooves in standard hydraulic cylinders.	20 -160	4
	MA4	NBR/fabric, FKM/fabric, PUR	X				X	≤ 500	-40 / +100	≤ 0,5	Fabric chevron sealing set for heavy-duty hydraulic applications. Only for divided pistons. Do not fit with axial compression.	20 -300	4
	MB0	NBR/fabric, FKM/fabric, PUR	X				X	≤ 500	-40 / +100	≤ 0,5	Fabric chevron sealing set with radial pretension for heavy-duty hydraulic applications. Only for divided pistons. Do not fit with axial compression.	9 -400	4
	2T2	NBR, FKM	X	X			X	≤ 10	-20 / +100	≤ 0,5	Complete piston, spring-supported, for pneumatic applications (in simple constructions also for low-pressure hydraulic applications).	26 -300	5
	2HD	PUR	X				X	≤ 250 ≤ 600*	-30 / +100	≤ 0,5	Piston Seal for small fitting areas, interchangeable with, for example, X-rings. (* static applications)	12 -150	4
	3H2	PUR/NBR	X				X	≤ 350	-35 / +80	≤ 0,5	PUR lip seal with o-ring, to achieve good sealing even at low pressures.	3 -500	4
	3H1	PUR	X				X	≤ 400	-30 / +80	≤ 0,5	PUR lip seal, symmetric, for standard hydraulic applications.	5 -950	4
	-	Elastomere/ Fabric	X				X	-	-	-	Piston packings for conveying thick materials or highly viscous abrasive media, e.g. in concrete pumps. Diameters from 50 mm to over 400 mm available on request.	DN 180 DN 200 DN 230 DN 250	4






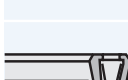
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Rod Seals for Pneumatic Applications

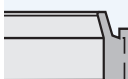

Profile	Type	Material	Application						Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	1G0	PTFE comp./ elastomer	X	X	X	X	X	X	H: ≤ 160 P: ≤ 16	-60 / +200	≤ 4	Slide seal set for light-duty hydraulic and pneumatic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	3 - 200	4
	1G4	PTFE comp./ elastomer	X		X	X	X	X	≤ 350	-60 / +200	≤ 4	Slide seal set for O-ring fitting areas according to ASA 568 A. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	4 - 400	4
	1H0	NBR, FKM, EPDM, HNBR	X	X			X		H: ≤ 160 ¹⁾ P: ≤ 16	-35 / +80	≤ 1	Lip seal for standard hydraulic and pneumatic applications. ¹⁾ Depending on profile width and material.	2 - 320	4/5
	1PJ	NBR, FKM		X			X		≤ 10	-25 / +80	≤ 1	Lip seal for very small fitting areas in pneumatic applications.	3 - 16	5
	3PJ	NBR, FKM		X			X		≤ 8	-25 / +70	≤ 0,4	Symmetrical Lip seal for minimum fitting areas in pneumatic applications.	3 - 34	5
	1P0	NBR, FKM, EPDM, PUR, HNBR		X			X		≤ 16	-20 / +80	≤ 1	Lip seal (with special lip shape) for pneumatic applications, standard series.	3 - 80	5
	1PB	NBR		X			X		≤ 16	-20 / +80	≤ 1	Lip seal for small fitting areas in pneumatic applications.	3 - 17	5
	1PA	PUR		X					≤ 16	-35 / +80	≤ 1	Seal wiper with increased wear resistance for pneumatic applications.	12 - 63	5
	1PG	PUR		X					≤ 16	-20 / +80	≤ 1	Seal wiper for hygienic applications in pneumatic systems.	12 - 25	5
	1P5	FKM		X					≤ 16	-10 / +150	≤ 1	Seal wiper for higher temperatures with a snap ring according to DIN 7993 as retaining element for pneumatic applications.	8 - 63	5
	1P3	NBR/plastic		X					≤ 16	-20 / +80	≤ 1	Seal wiper in two-part construction for pneumatic applications.	12 - 63	5
	1P4	NBR, PUR		X					≤ 10	-10 / +80 -35 / +80	≤ 1	Seal wipers for small cylinders in pneumatic applications.	4 - 16	5

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Rod Seals for Pneumatic Applications

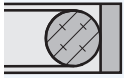

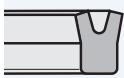
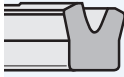


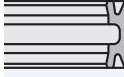

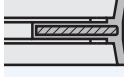
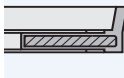

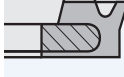
Profile	Type	Material	Application					Application Conditions			Description		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]	Ø [mm]	Product Group
	1P6	PUR/metal	X						≤ 16	-35 / +80	≤ 1	Seal wiper and guide element as combined component for pneumatic applications.	8 - 40 5
	1PF	PUR	X						≤ 16	-35 / +80	≤ 1	Seal wiper with increased wear resistance, for small fitting areas in pneumatic applications.	3 - 63 5
	1PE	NBR, FKM, EPDM	X				X		≤ 10	-20 / +100	-	Pneumatic rod seal, inside sealing, with very low friction Application: Pneumatic valves	6 - 90 5
	1PN	PUR	X						≤ 10	-35 / +80	≤ 1	Seal wiper for rotation protected cylinders in pneumatic applications.	12 - 32 5
	1PL	PUR	X						≤ 10	-30 / +80	≤ 1	Seal wiper for rotation protected cylinders in pneumatic applications.	4 - 10 5
	1P7	PE PTFE Comp.	X						≤ 16 ≤ 16	-30 / + 80 -35 / +200	≤ 4 ≤ 10	Seal wiper for rotation protected cylinders in pneumatic applications.	10 - 63 5

Damping Rings

Profile	Type	Material	Application					Application Conditions			Description		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]	Ø [mm]	Product Group
	1P8	NBR, PUR	X	X					≤ 16	-20 / +80 -35 / +80	≤ 1	The pneumatic damping seal rings 1P8 seal damping pistons in pneumatic cylinders.	12 - 78 5
	1P9	NBR	X						≤ 16	-30 / +80	≤ 1	Pneumatic damping seal rings for small fitting areas.	10 - 110 5

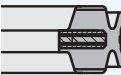


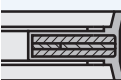



Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Piston Seals for Pneumatic Applications

Profile	Type	Material	Application						Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	2G0	PTFE-comp./ elastomer	X	X	X	X	X	X	H: ≤ 160 P: ≤ 16	-60 / +200	≤ 4	Slide seal set for light-duty hydraulic and pneumatic applications. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	7 - 200	4/5
	2H0	NBR, FKM, EPDM, HNBR	X	X		X	X	X	H: ≤ 160 ¹⁾ P: ≤ 16	-25 / +100	≤ 0,5	Lip seal for standard hydraulic and pneumatic applications. ¹⁾ Depending on profile width and material.	4 - 350	4/5
	3PJ	NBR, FKM	X			X	X		≤ 8	-25 / +70	≤ 0,4	Symmetrical Lip seal for minimum fitting areas in pneumatic applications.	6 - 40	5
	2PJ	NBR, FKM	X			X			≤ 10	-25 / +80	≤ 1	Lip seal for very small fitting areas in pneumatic applications.	6 - 40	5
	2P0	NBR, PUR, EPDM, FKM, HNBR	X			X			≤ 16	-20 / +80 -30 / +80	≤ 1	Lip seal with special lip shape for pneumatic applications, standard series.	10 - 470	5
	2PA	NBR, PUR, EPDM, FKM, HNBR	X			X			≤ 12	-20 / +80 -30 / +80	≤ 1	Lip seal for small fitting areas in pneumatic applications.	4 - 200	5
	2P8	NBR, FKM, EPDM	X			X			≤ 16	-20 / +80	≤ 1	Double lip seal for two-sided pressurisation in pneumatic applications.	16 - 160	5
	2T2	NBR, FKM	X	X			X		≤ 10	-20 / +100	≤ 0,5	Complete piston, spring-supported, for pneumatic applications (in simple constructions also for low-pressure hydraulic applications).	26 - 300	5
	2P4	NBR, PUR, FKM	X			X			≤ 10	-20 / +100 -30 / +80	≤ 1	Complete piston with round sealing lips for pneumatic applications.	16 - 250	5
	2P5	NBR, FKM, PUR	X			X			≤ 10	-20 / +100	≤ 1	Complete piston, like 2P4, for one-sided pressurisation.	16 - 250	5
	2P6	NBR, FKM	X			X			≤ 10	-20 / +100	≤ 1	Complete piston with integrated end-of-travel damping for pneumatic applications.	6 - 100	5
	2P7	NBR, FKM	X			X			≤ 10	-20 / +100	≤ 1	Complete piston, like 2P6, for one-sided pressurisation.	6 - 100	5



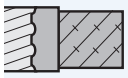
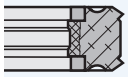








Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Piston Seals for Pneumatic Applications

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	2PG	NBR		X				X	≤ 10	-20 / +80	≤ 1	Complete piston with magnetic insert and end-of-travel damping.	16 - 100	5
	2PK Type 1	PUR, FKM		X				X	≤ 12	-30 / +80	≤ 1	Seal-Guide Element with damping buffers.	12 - 25	5
	2PK Type 2	PUR, FKM		X				X	≤ 12	-30 / +80	≤ 1	Seal-Guide Element with damping buffers.	32 - 100	5
	2PM	NBR, FKM		X				X	≤ 10	-20 / +80	≤ 1	Complete piston with magnetic insert to facilitate positioning with suitable reed contacts, for pneumatic applications.	32 - 125	5
	2PD	NBR		X				X	≤ 12	-20 / +100	≤ 1	Piston seal ring for very small fitting areas.	12 - 125	5
	2PE	NBR		X				X	≤ 10	-20 / +100	-	Pneumatic piston seal, outside sealing, with very low friction Application: Pneumatic valves	12 - 406	5
	2P9	NBR, FKM		X				X	≤ 16	-30 / +80	≤ 1	Lip seal for one-sided pressurisation in pneumatic applications.	16 - 100	5


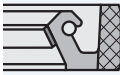




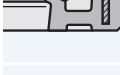
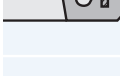
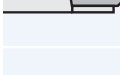



Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Rotary and Shaft Seals

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	p [bar]	T [°C]	v [m/s]			
	1R0	PTFE comp./ elastomer	X	X	X	X	X	≤ 300	-45 / +200	≤ 1	Glide seal set for rotational movements. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions.	6 - 1500	8
	2R0	PTFE comp./ elastomer	X	X	X	X	X	≤ 300	-45 / +200	≤ 1	Glide seal set for rotational movements. Depending on PTFE compound and elastomer, adaptable to many media and operating conditions. Use type 1R0 for new constructions.	8 - 1500	8
	1R6	mod. PA/NBR	X		X	X	X	≤ 500 p x v ≤ 70	-35 / +100	≤ 0,5	Rotary sealing set with special helical lubrication grooves.	45 - 160	8
	1R4	NBR/ NBR-fabric/PA	X				X	≤ 400 p x v ≤ 50	-30 / +100	≤ 0,2	Rotary seal set for two-sided pressurisation	30 - 262	8
	1V5	PTFE-Comp., PE	X		X	X	X	≤ 150	-100/+225	≤ 2	PTFE lip seal w. stainless-steel spring as prestress element, for rotational movements, e.g. spray-painting/enamelling lines. Also available with silicon filling for easier sterilisation.	8 - 1500	6/8
	1V9	PTFE-Comp., PE	X		X	X	X	≤ 150	-100/+225	≤ 1	PTFE lip seal for rotational movements, inside sealing, with increased spring force.	20 - 700	6/8
	WG3	NBR/fabric, HNBR/fabric, VMQ/fabric, FKM/fabric			X	X	X	≤ 6 p x v < 24*	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 12	Fabric shaft seal, for heavy machine construction. Also with covered spring and friction optimised sealing lip available. * (1 bar < p ≤ 6 bar)	≤ 4000	8
	WG4	NBR/fabric, HNBR/fabric, VMQ/fabric, FKM/fabric					X	0	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal, standard, for heavy machine construction.	≤ 4000	8
	WG4 -S	NBR/fabric, HNBR/fabric, VMQ/fabric, FKM/fabric					X	0	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal, standard, for heavy machine construction. With additional dust lip.	≤ 4000	8
	WG5	NBR/fabric, HNBR/fabric, VMQ/fabric, FKM/fabric					X	≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal, standard, for heavy machine construction. Also with covered spring and friction optimised sealing lip available.	≤ 4000	8
	WG6	NBR/fabric, HNBR/fabric, VMQ/fabric, FKM/fabric					X	≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal with radial lubrication grooves, similar to WG5. Also with covered spring and friction optimised sealing lip available.	≤ 4000	8
	WG7	NBR/fabric, HNBR/fabric, VMQ/fabric, FKM/fabric					X	≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal with radial lubrication grooves and lubrication groove on circumference, similar to WG5. Also with covered spring and friction optimised sealing lip available.	≤ 4000	8

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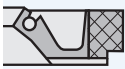











Rotary and Shaft Seals

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	WG8	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal with dust lip, similar to WG5. Also with covered spring and friction optimised sealing lip available.	≤ 4000	8
	WG9	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal, standard, with friction optimised sealing lip. For heavy machine construction, transmission construction, shipbuilding and wind mills.	≤ 4000	8
	WGT	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 1	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal, standard, for heavy machine construction, paper and aluminum industry. Also with friction optimised sealing lip available.	≤ 4000	8
	WGV	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal for wind mills, transmission construction, heavy machine construction and shipbuilding. Also with friction optimised sealing lip available.	≤ 4000	8
	WGW	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 1	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal for wind mills, transmission construction, heavy machine construction and shipbuilding. Also with friction optimised sealing lip available.	≤ 4000	8
	WGA	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 1	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Fabric shaft seal for wind mills, transmission construction, heavy machine construction and shipbuilding, outside sealing. Also with friction optimised sealing lip available.	≤ 4000	8
	WM3	NBR , HNBR, VMQ, FKM				X		≤ 3*	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15*	Rotary shaft seal with vulcanised steel band for heavy machine construction. Also with covered spring and friction optimised sealing lip available.	≤ 2500	8
	WM5	NBR , HNBR, VMQ, FKM				X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Rotary shaft seal with vulcanised steel band for heavy machine construction. Also with covered spring and friction optimised sealing lip available.	≤ 2500	8
	WM7	NBR , HNBR, VMQ, FKM				X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Rotary shaft seal with vulcanised steel band for heavy machine construction. Also with covered spring and friction optimised sealing lip available.	≤ 2500	8
	WM8	NBR , HNBR, VMQ, FKM				X		≤ 0,5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 15	Rotary shaft seal with vulcanised steel band for heavy machine construction. Like WM5 but with additional dust lip. Also with covered spring and friction optimised sealing lip available.	≤ 2500	8
	WM9 -C	NBR , HNBR, VMQ, FKM				X		≤ 3	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 10	Rotary shaft seal for heavy machine construction with vulcanised steel band and friction optimised sealing lip.	≤ 2500	8
	WGS	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		-	-30 / +100 -40 / +150 -50 / +200 -20 / +200	-	Fabric shaft seal to withstand wide misalignments of some millimeters in static or quasistatic conditions.	≤ 4000	8

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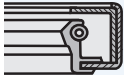











* ≤ 1 bar at ≤ 15 m/s
 ≤ 2 bar at ≤ 12,5 m/s
 ≤ 3 bar at ≤ 8 m/s

Rotary and Shaft Seals

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	WGS-2	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		-	-30 / +100 -40 / +150 -50 / +200 -20 / +200	-	Fabric shaft seal to withstand wide misalignments of some millimeters in static or quasistatic conditions. Like WGS, but with additional radial lubrication grooves and lubrication groove on its circumference.	≤ 4000	8
	WMS	NBR , HNBR, VMQ, FKM				X		-	-30 / +100 -40 / +150 -50 / +200 -20 / +200	-	Rotary shaft seal with metal strip inside, to withstand wide misalignments of some millimeters in static or quasistatic conditions.	≤ 2500	8
	WMS-2	NBR , HNBR, VMQ, FKM				X		-	-30 / +100 -40 / +150 -50 / +200 -20 / +200	-	Rotary shaft seal with metal case inside, to withstand wide misalignments of some millimeters in static or quasistatic conditions.	≤ 2500	8
	WGM	NBR/fabric , HNBR/fabric, VMQ/fabric, FKM/fabric				X		≤ 5	-30 / +100 -40 / +150 -50 / +200 -20 / +200	≤ 2	Fabric shaft seal against extreme contamination and salt water.	≤ 4000	8
	WB9	NBR , HNBR, FKM			X	X	X	≤ 0,5	-20 / +100 -40 / +150 -20 / +220	≤ 12 ≤ 15 ≤ 35	Rotary shaft seal for heavy machine construction, e.g. for the paper, steel and aluminum industries. Equalization of alignment errors up to 2.5 mm. Radial speeds up to 40 m/s are possible.	≤ 2500	8
	WB6	NBR , HNBR, FKM			X	X	X	≤ 0,5	-20 / +100 -40 / +150 -20 / +220	≤ 12 ≤ 15 ≤ 35	Rotary shaft seal for heavy machine construction, e.g. for the paper, steel and aluminum industries. Equalization of alignment errors up to 2.5 mm. Radial speeds up to 40 m/s are possible.	≤ 2500	8
	WSS	NBR				X		≤ 0,5	-30 / +100	≤ 15	Rotary shaft seal for heavy machine construction and for general purpose in hot steel mill plants, bearings and paper industry.	≤ 2500	8
	WSS-S	NBR				X		≤ 0,5	-30 / +100	≤ 15	Rotary shaft seal for heavy machine construction and for general purpose in hot steel mill plants, bearings and paper industry. Version with additional dust lip.	≤ 2500	8
	WA0	NBR , FKM				X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, DIN 3760, Form A.	6 - 700	8
	WAS	NBR , FKM				X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, DIN 3760, Form AS.	6 - 500	8
	WB0	NBR , FKM				X		≤ 0,5	-35 / +100	-	Shaft seal with metallic casing (formerly DIN 3760 Form B).	6 - 500	8
	WBS	NBR , FKM				X		≤ 0,5	-35 / +100	-	Shaft seal with metallic casing and dust lip (formerly DIN 3760 Form BS).	6 - 500	8



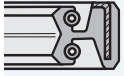
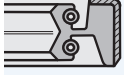





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Rotary and Shaft Seals

Profile	Type	Material	Application						Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	WC0	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metallic casing and cap (formerly DIN 3760 Form C).	6 - 500	8
	WCS	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metallic casing, cap and dust lip (formerly DIN 3760 Form CS).	6 - 500	8
	WD0	NBR, FKM					X		≤ 10	-35 / +100	-	Shaft seal with metal case, like WA0, but up to 10 bar.	6 - 500	8
	WD1	NBR, FKM					X		≤ 10	-35 / +100	-	Shaft seal with metal case, like WAS, but up to 10 bar.	6 - 500	8
	WD2	NBR, FKM					X		≤ 1,5	-35 / +100	-	Shaft seal with metal case, like WA0, but up to 1,5 bar.	6 - 500	8
	WD3	NBR, FKM					X		≤ 1,5	-35 / +100	-	Shaft seal with metal case, like WAS, but up to 1,5 bar.	6 - 500	8
	WA3	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WA0, with twist right.	6 - 500	8
	WA4	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WA0, with twist left.	6 - 500	8
	WA5	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WA0, with alternating twist.	6 - 500	8
	WB3	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WB0, with twist right.	6 - 500	8
	WB4	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WB0, with twist left.	6 - 500	8
	WB5	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WB0, with alternating twist.	6 - 500	8

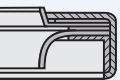
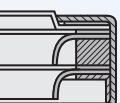


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Rotary and Shaft Seals

Profile	Type	Material	Application						Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	WA1	NBR, FKM					X		0	-35 / +100	-	Shaft seal with metal case, like WA0, without spring for depressurised applications.	6 - 500	8
	WB1	NBR, FKM					X		0	-35 / +100	-	Shaft seal with metal case, like WB0, without spring for depressurised applications.	6 - 500	8
	WZ0	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WA0, with two sealing lips for media separation.	6 - 500	8
	WZ1	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WB0, with two sealing lips for media separation.	6 - 500	8
	WZ2	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WB0, with two wedged-in sealing lips for media separation.	6 - 500	8
	WB2	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WB0, with wedged-in sealing lip.	6 - 500	8
	WC1	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WC0, with wedged-in sealing lip.	6 - 500	8
	WE0	NBR, FKM					X		≤ 0,5	-35 / +100	-	Shaft seal with metal case, like WA0, but outside sealing.	6 - 500	8
	WN0	PTFE comp.			X	X	X		≤ 5	-20 / +250	≤ 25	PTFE shaft seal, standard.	8 - 200	8
	WN1	PTFE comp.			X	X	X		≤ 30	-20 / +250	≤ 2	PTFE shaft seal, with two sealing lips, for higher pressures.	8 - 200	8
	WN2	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal, with spring-supported sealing lip, for out-of-round shafts or large shaft play.	8 - 200	8
	WN3	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal, like WN2, but with additional axial sealing function.	8 - 200	8


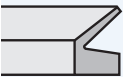

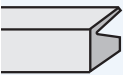
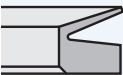



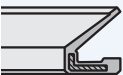


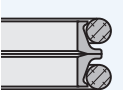
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Rotary and Shaft Seals

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group	
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]				v [m/s]
	WN4	PTFE comp.			X	X	X		≤ 5	-20 / +250	≤ 25	PTFE shaft seal, like WN0, but with additional axial sealing function.	8 - 200	8
	WN5	PTFE comp.			X	X	X		≤ 30	-20 / +250	≤ 2	PTFE shaft seal, like WN1, but with additional axial sealing function.	8 - 200	8
	WP0	PTFE comp.			X	X	X		≤ 7	-20 / +250	≤ 25	PTFE shaft seal, standard, with metal case.	8 - 200	8
	WP1	PTFE comp.			X	X	X		≤ 7	-20 / +250	≤ 25	PTFE shaft seal, standard, with metal case and additional dust lip.	8 - 200	8
	WP2	PTFE comp.			X	X	X		≤ 35	-20 / +250	≤ 3	PTFE shaft seal with metal case, with two sealing lips for higher pressures.	8 - 200	8
	WP3	PTFE comp.			X	X	X		≤ 35	-20 / +250	≤ 3	PTFE shaft seal with metal case, like WP2, but with dust lip.	8 - 200	8
	WP4	PTFE comp.			X	X	X		≤ 1,5	-20 / +250	≤ 30	PTFE shaft seal with metal case, with reduced pressing force, well suited for use as protective bearing seal.	8 - 200	8
	WP5	PTFE comp.			X	X	X		≤ 1,5	-20 / +250	≤ 30	PTFE shaft seal with metal case, like WP4, but with dust lip.	8 - 200	8
	WP6	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal with metal case, with spring-supported sealing lip for out-of-round shafts or shaft play.	8 - 200	8
	WP7	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal with metal case, like WP6, but with dust lip.	8 - 200	8
	WP8	PTFE comp.			X	X	X		-	-20 / +250	-	PTFE shaft seal with metal case, with two sealing lips for media separation.	8 - 200	8
	WK0	NBR/metal, FKM/metal					X		-	-15 / +100	-	Bearing sealing cap.	13 - 190	8

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Rotary and Shaft Seals

Profile	Type	Material	Application						Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	WK1	NBR/metal, FKM/metal					X		-	-15 / +100	-	Bearing sealing cap. Stepped version.	Dimensions on request	8
	VA0	NBR, FKM					X		0	-35 / +100 -25 / +200	≤ 10	V-ring, standard.	3 -2000	8
	VA6	NBR/steel, HNBR/steel					X		0	-30 / +100 -40 / +150	≤ 20	V-ring with embedded spring, used on back-up rolls of hot and cold rolling mills. Also available with friction optimised sealing lip.	≤ 2500	8
	VS0	NBR, FKM					X		0	-35 / +100 -25 / +200	≤ 10	V-ring, with reinforced back.	5 -200	8
	VL0	NBR, FKM					X		0	-35 / +100 -25 / +200	≤ 10	V-ring, for small fitting areas.	140-450	8
	VL6	NBR/steel, HNBR/steel					X		0	-30 / +100 -40 / +150	≤ 20	V-ring with embedded spring, used on back-up rolls of hot and cold rolling mills. Also available with friction optimised sealing lip.	≤ 2500	8
	VE0	NBR, FKM					X		0	-35 / +100 -25 / +200	≤ 10	V-ring, for large diameters.	450-1250	8
	VRME	NBR, FKM					X		0	-35 / +100 -25 / +200	≤ 10	V-ring, for large diameters.	210-1450	8
	VA7	NBR/steel, HNBR/steel					X		0	-30 / +100 -40 / +150	≤ 20	V-ring, used on back-up rolls of hot and cold rolling mills. Also available with friction optimised sealing lip.	≤ 2500	8
	VA8	NBR/steel, HNBR/steel					X		0	-30 / +100 -40 / +150	≤ 20	V-ring, used on back-up rolls of hot and cold rolling mills. Also available with friction optimised sealing lip.	≤ 2500	8
	WL0	Steel							-	-	-	Shaft protection sleeve	12 -200	8
	3L0	Metal/NBR, Metal/HNBR, Metal/FKM, Metal/VMQ							≤ 3	-40 / +200	≤ 3	Mechanical face seal for applications with ultra high wear conditions. Also available with trapezoid prestress elements	38 -667	8

Types and materials in bold are standard. Descriptions and application conditions based on material and application.







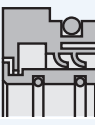
Rotary and Shaft Seals

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Types and materials in bold are standard. Descriptions and application conditions based on material and application.




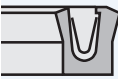
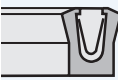

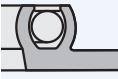




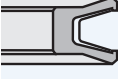
¹⁾ Versions for sliding speeds up to 120 m/s on request.

Bearing Isolators

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	LS	PTFE, O-Ring: FKM			X	X	X	0	-40 / +120	≤ 25	Bearing Isolators in flanged design (standard) for general purpose. Retains grease and oil splash. Excludes heavy water spray and dry contaminants from the bearing cavity.	12 - 254	8
	LN	PTFE, O-Ring: FKM			X	X	X	0	-40 / +120	≤ 25	Bearing Isolators in flush mount design for general purpose. Retains grease and oil splash. Excludes heavy water spray and dry contaminants from the bearing cavity.	12 - 250	8
	LM	PTFE, O-Ring: FKM			X	X	X	0	-40 / +120	≤ 25	Bearing Isolators in flanged design for step shaft applications. Retains grease and oil splash. Excludes heavy water spray and dry contaminants from the bearing cavity.	12 - 254	8
	LB/ SB	PTFE, O-Ring: FKM			X	X	X	0	-40 / +120	≤ 25	Bearing Isolators as drop-in replacement for LER-Seals, available as solid seal or split seal. Retains grease and oil splash. Excludes heavy water spray and dry contaminants from the bearing cavity.	57 - 178	8
	SL	PTFE, O-Ring: FKM			X	X	X	0	-40 / +120	≤ 15	Bearing Isolators in split seal design. No wear sleeve or shaft refurbishment necessary. Retains grease and oil splash. Excludes heavy water spray and dry contaminants from the bearing cavity.	12,5-254	8
	ML	Bronze, O-Ring: FKM			X	X	X	0	-40 / +200	≤ 35	Bearing Isolators to protect against heavier water spray and dry contaminants. Retains grease and oil splash.	15,5-254	8
	FS	PTFE, O-Ring: FKM, Rotor: Stain- less Steel			X	X	X	≤ 0,3	-40 / +120	≤ 25	Bearing Isolators for max. 0,3 bar internal pressure. Retains grease and oil splash. Excludes heavy water spray and dry contaminants from the bearing cavity.	13 - 250	8

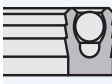
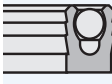


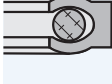


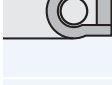
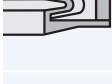
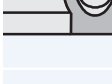
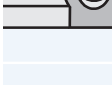

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Seals for Chemical Plants and Process Plant Engineering

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	MA	PTFE comp., PE, PA, PUR			X	X	X		≤ 300	-200 / +260	≤ 1,2	Chevron sealing set with pretension through profile width, for valves and spindles.	10 - 400	6
	MB	PTFE comp., PE, PA, PUR			X	X	X		≤ 300	-200 / +260	≤ 1,2	Chevron sealing set with pretension through shape, for valves and spindles.	10 - 400	6
	1V1	PTFE comp., PE			X	X	X		≤ 350	-70 / +225	≤ 10	PTFE lip seal, inside sealing, for aggressive media, also available with silicon filling for easier sterilisation or with inner wiper lip.	4-1500	6
	2V1	PTFE comp., PE			X	X	X		≤ 350	-70 / +225	≤ 10	PTFE lip seal, outside sealing, for aggressive media, also available with silicon filling for easier sterilisation or with outside wiper lip.	6-1500	6
	3V1	PTFE comp., PE			X	X	X		≤ 350	-70 / +225	-	PTFE lip seal, static, radial-acting, for aggressive media, also available with silicon filling for easier sterilisation.	4-1500	6
	1V5	PTFE comp., PE			X	X	X		≤ 150	-100 / +225	≤ 2	PTFE lip seal, for rotational movements, e.g. spray-painting/enamelling lines. Also available with silicon filling for easier sterilisation or with rounded sealing lip.	8-1500	6/8
	1V9	PTFE-Comp., PE	X		X	X	X		≤ 150	-100 / +225	≤ 1	PTFE lip seal for rotational movements, inside sealing, with increased spring force.	20 - 700	6/8
	1V3	PTFE comp., PE			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal, for flanges with inside pressure, also available with silicon filling for easier sterilisation or with o-ring as prestress element.	32-1500	6
	1VU	PTFE comp., PE			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal, for flanges with inside pressure, also available with silicon filling for easier sterilisation.	45-1500	6
	2V3	PTFE comp., PE			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal, for flanges with outside pressure, also available with silicon filling for easier sterilisation.	40-1500	6
	1V6	PTFE comp.			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal with u-spring, for flanges or rotary joints with inside pressure.	100 - 1500	6
	2V6	PTFE comp.			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal with u-spring, for flanges or rotary joints with outside pressure.	100 - 1500	6



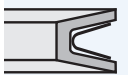

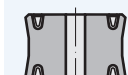







Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Seals for Chemical Plants and Process Plant Engineering

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	1V7	PTFE comp., PE			X	X	X	≤ 250 ≤ 450*	-120 / +260	≤ 10	PTFE lip seal, inside sealing, with reinforced spring force and several sealing lips for dynamic applications (*with backup-rings). Also available as encapsulated version or with wiper element.	25-1500	6
	2V7	PTFE-Comp., PE			X	X	X	≤ 250 ≤ 450*	-120 / +260	≤ 10	PTFE lip seal, inside sealing, with reinforced spring force and several sealing lips for dynamic applications. (*with backup-rings).0	25-1500	6
	1VQ	PTFE-comp.			X	X	X	≤ 400	-120 / +225	-	PTFE lip seal for spherical joints. Dynamic sealing lip inside.	30-1500	6
	2VQ	PTFE-comp.			X	X	X	≤ 400	-120 / +225	-	PTFE lip seal for spherical joints. Dynamic sealing lip outside.	30-1500	6
	1VO	PTFE-comp., PE			X	X	X	≤ 500	-40 / +200	-	PTFE lip seal with o-ring as prestress element, for flanges with inside pressure.	30-1500	6
	1V8	PTFE-comp., PE	X		X	X	X	≤ 350	-120 / +230	-	PTFE lip seal for flanges with inside pressure and highest stress.	30-1500	6
	2V8	PTFE-comp., PE	X		X	X	X	≤ 350	-120 / +230	-	PTFE lip seal for flanges with outside pressure and highest stress.	20-1500	6
	1VL	PTFE-comp.			X	X	X	≤ 30	-120 / +225	-	PTFE lip seal, encapsulated, with increased springforce, for flanges with inside pressure.	30-1500	6
	1VK	PTFE-comp.			X	X	X	≤ 30	-120 / +225	-	PTFE lip seal, encapsulated, for flanges with inside pressure.	30-1500	6
	1V2	PTFE comp., PE			X	X	X	≤ 400	-120 / +260	≤ 5	PTFE lip seal, inside sealing, with reinforced spring force for gas and vacuum applications. Also available with wiper lip.	4-1500	6
	2V2	PTFE comp., PE			X	X	X	≤ 400	-120 / +260	≤ 5	PTFE lip seal, outside sealing, with reinforced spring force for gas and vacuum applications.	6-1500	6
	1V4	PTFE comp., PE			X	X	X	≤ 500	-200 / +260	-	PTFE lip seal, for flanges with inside pressure, with reinforced spring force.	12-1500	6

Types and materials in bold are standard. Descriptions and application conditions based on material and application.



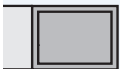





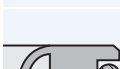
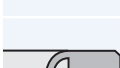
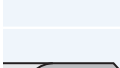

Seals for Chemical Plants and Process Plant Engineering

Profile	Type	Material	Application						Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]			
	2V4	PTFE comp., PE			X	X	X		≤ 500	-200 / +260	-	PTFE lip seal, for flanges with outside pressure, with reinforced spring force.	5-1500	6
	1VR	PTFE-comp.			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal for flanges with inside pressure and high stress.	30-1500	-
	2VR	PTFE-comp.			X	X	X		≤ 350	-120 / +225	-	PTFE lip seal for flanges with outside pressure and high stress.	30-1500	-
	3V6	PTFE comp.			X	X	X		≤ 800	-60 / +200	≤ 5	PTFE lip seal with O-ring as prestress element and symmetrical shape. Application temperature depends on the O-ring material selected.	10-1500	6
	-	PTFE comp., PE			X	X	X		-	-70 / +225	≤ 10	PTFE complete piston, sterilisable, for pumps, dosing devices and filling machines. The size, version and material depends on the particular application and technical requirements ¹⁾ .	30- 300	6
	-	PTFE comp., PE			X	X	X		-	-70 / +225	≤ 10	PTFE double lip seal, double action, sterilisable, for pumps, dosing devices and filling machines. The size, version and material depends on the particular application and technical requirements ¹⁾ .	12- 100	6
	ROA	PTFE, FKM, FFKM			X	X	X		-	-200/+260	-	PTFE O-ring, standard, for aggressive media, also available in various elastomers (see individual brochures).	8-3000	3/9
	ROB	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, outside slot.	8-1500	9
	ROC	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, slot on ring surface.	8-1500	9
	ROD	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, 45° outside slot.	8-1500	9
	ROE	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, 45° inside slot.	8-1500	9
	ROF	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, inside slot.	8-1500	9

Types and materials in bold are standard. Descriptions and application conditions based on material and application.


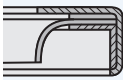


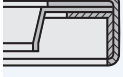



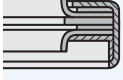

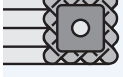
¹⁾ Also available with
o-rings as prestress elements.

Seals for Chemical Plants and Process Plant Engineering

Profile	Type	Material	Application				Application Conditions			Description	Ø [mm]	Product Group		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]				T [°C]	v [m/s]
	ROG	FKM/FEP, FKM/PFA, MVQ/FEP, MVQ/PFA			X	X	X	X	-	-25 / +200 -25 / +200 -60 / +200 -60 / +250	-	FEP, (PFA) encapsulated O-ring with FKM or MVQ core.	6-2500	9
	ROK	MVQ/FEP, MVQ/PFA			X	X	X	X	-	-60 / +200 -60 / +250	-	FEP, (PFA) encapsulated O-ring with MVQ hollow core.	12-2500	9
	XRG	FKM/FEP, FKM/PFA, MVQ/FEP, MVQ/PFA			X	X	X		-	-25 / +200 -25 / +200 -60 / +200 -60 / +250	-	FEP, (PFA) encapsulated rectangular ring with FKM or MVQ core.	22 - 152	9
	ROS	PTFE			X	X	X		-	-20 / +200	-	PTFE encapsulated O-ring with elastomer core.	20 - 400	9
	WN0	PTFE comp.			X	X	X		≤ 5	-20 / +250	≤ 25	PTFE shaft seal, standard.	8 - 200	8
	WN1	PTFE comp.			X	X	X		≤ 30	-20 / +250	≤ 2	PTFE shaft seal, with two sealing lips, for higher pressures.	8 - 200	8
	WN2	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal, with spring-supported sealing lip, for out-of-round shafts or large shaft play.	8 - 200	8
	WN3	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal, like WN2, but with additional axial sealing function.	8 - 200	8
	WN4	PTFE comp.			X	X	X		≤ 5	-20 / +250	≤ 25	PTFE shaft seal, like WN0, but with additional axial sealing function.	8 - 200	8
	WN5	PTFE comp.			X	X	X		≤ 30	-20 / +250	≤ 2	PTFE shaft seal, like WN1, but with additional axial sealing function.	8 - 200	8
	WN6	PTFE comp.			X	X	X		-	-20 / +250	≤ 8	PTFE shaft seal, with increased pressing force, specially for gases and abrasive media.	8 - 200	8
	WN7	PTFE comp.			X	X	X		≤ 1,5	-20 / +250	≤ 30	PTFE shaft seal, low lip pressure, well suited for use as protective bearing seal.	8 - 200	8

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Seals for Chemical Plants and Process Plant Engineering

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group	
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]				v [m/s]
	WN8	PTFE comp.			X	X	X		-	-20 / +250	-	PTFE shaft seal, with spring-supported sealing lip.	8 - 200	8
	WP0	PTFE comp.			X	X	X		≤ 7	-20 / +250	≤ 25	PTFE shaft seal, standard, with metal case.	8 - 200	8
	WP1	PTFE comp.			X	X	X		≤ 7	-20 / +250	≤ 25	PTFE shaft seal, standard, with metal case and additional dust lip.	8 - 200	8
	WP2	PTFE comp.			X	X	X		≤ 35	-20 / +250	≤ 3	PTFE shaft seal with metal case, with two sealing lips for higher pressures.	8 - 200	8
	WP3	PTFE comp.			X	X	X		≤ 35	-20 / +250	≤ 3	PTFE shaft seal with metal case, like WP2, but with dust lip.	8 - 200	8
	WP4	PTFE comp.			X	X	X		≤ 1,5	-20 / +250	≤ 30	PTFE shaft seal with metal case, with reduced pressing force, well suited for use as protective bearing seal.	8 - 200	8
	WP5	PTFE comp.			X	X	X		≤ 1,5	-20 / +250	≤ 30	PTFE shaft seal with metal case, like WP4, but with dust lip.	8 - 200	8
	WP6	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal with metal case, with spring-supported sealing lip for out-of-round shafts or shaft play.	8 - 200	8
	WP7	PTFE comp.			X	X	X		≤ 3,5	-20 / +250	≤ 8	PTFE shaft seal with metal case, like WP6, but with dust lip.	8 - 200	8
	WP8	PTFE comp.			X	X		X	-	-20 / +250	-	PTFE shaft seal with metal case, with two sealing lips for media separation.	8 - 200	8
	3C0	Various materials			X	X	X	X	-	-	-	Stuffing box packings in various materials, dimensions and versions. See individual brochure.	-	6
	3C1	Various materials			X	X	X	X	≤+200*	-	-	Superject elastic packings with elastomer core and lubrication reservoir. Plugable rings, made to measure. * depending on the selected material.	-	6


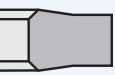
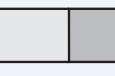
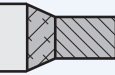
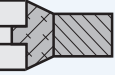
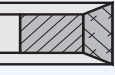




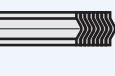
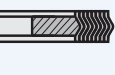
Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Seals for Chemical Plants and Process Plant Engineering

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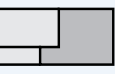

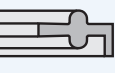
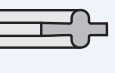
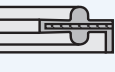
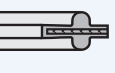




Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Static Seals

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	4F0	NBR	X	X	X	X		≤ 315	-30 /+100	-	Flange Seal for sealing of flanges and connection plates on controllers and modular valves.	2 - 45	-
	4F1	PUR	X	X			X	≤ 600	-35 /+110	-	Flange Seal for sealing of flanges and connection plates on controllers and modular valves.	17 - 55	9
	4F2	NBR, FKM, EPDM, PUR, PTFE	X	X	X	X		-	-30 /+100 -15 /+230 -35 /+130 -35 /+110 -200 /+260	-	Square Gasket Rings and Tube Rings for static sealing.	up to 400	-
	4U0	NBR/steel, FKM/steel, EPDM steel	X	X	X	X	X	≤ 1000	-30 /+100	-	U-ring, standard, as screw seal.	3 -127	9
	4U1	NBR/steel, FKM/steel, EPDM steel	X	X	X	X	X	≤ 1000	-30 /+100	-	U-ring, self-centring, as screw seal.	10 - 76	9
	4U2	NBR/steel, FKM/steel, EPDM steel	X	X	X	X	X	≤ 1000	-30 /+100	-	U-ring, as screw seal, for outer pressurisation.	7,2 - 24	9
	3C0 -101	Special-PTFE	X	X	X	X	X	≤ 100	-240/+270 *	-	PTFE flat gasket, piece goods, self-adhesive on one side, for flange or vessel seals. *(temporarily up to ca. +310 °C)	Piece goods	9
	3C0 -113	Special-PTFE	X	X	X	X	X	≤ 200	-240/+270 *	-	PTFE flat gasket with multidirectional stretched fibrous structure, piece goods, self-adhesive on one side, for flange or vessel seals. Also available as plates. *(temporarily up to ca. +310 °C)	Piece goods, plates	9
	4F4	Graphite/stainless steel, PTFE/stainless steel	X	X	X	X	X	to PN 250	≤ +550 ≤ +260	-	Spiral-wound gasket with inner and outer ring for inside pressure, available in various pressure stages for flanges and vessels.	DN 10 - DN 300	9
	4F5	Graphite/stainless steel, PTFE/stainless steel	X	X	X	X	X	to PN 100	≤ +550 ≤ +260	-	Spiral-wound gasket with outer ring for inside pressure, available in various pressure stages for flanges and vessels.	DN 10 - DN 600	9
	4F6	Graphite/stainless steel, PTFE/stainless steel	X	X	X	X	X	to PN 100	≤ +550 ≤ +260	-	Spiral-wound gasket for inside pressure, available in various material combinations and pressure stages.	DN 10 - DN 300	9
	4F7	Graphite/stainless steel, PTFE/stainless steel	X	X	X	X	X	to PN 100	≤ +550 ≤ +260	-	Spiral-wound gasket with inner ring for outside pressure, available in various material combinations and pressure stages.	DN 10 - DN 300	9

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Static Seals

Profile	Type	Material	Application				Application Conditions			Description	Ø [mm]	Product Group		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]				T [°C]	v [m/s]
	4FM-A	NBR, FKM, EPDM, PTFE, VMQ, HNBR				X	X		-	≤ +90	-	Gasket ring in rounded form, for food industry fittings. Available in various materials. Standard version according to DIN 11851	DN 10 - DN 150	9
	4FM-B	NBR, FKM, EPDM, PTFE, VMQ, HNBR				X	X		-	≤ +90	-	Gasket ring in rounded form, with flange. For food industry fittings. Available in various materials.	DN 10 - DN 150	9
	4FM-C	NBR, FKM, EPDM, PTFE, VMQ, HNBR				X	X		-	≤ +90	-	Gasket ring in angular form, with flange. For food industry fittings. Available in various materials.	DN 10 - DN 150	9
	4FM-D	PTFE/ elastomer				X	X		-	≤ +200	-	Gasket ring in rounded form with inserted O-Ring. For food industry fittings. Available in various materials.	DN 10 - DN 150	9
	4FC-A	NBR, EPDM, VMQ, FKM, PTFE			X	X			-	-30 /+100 -35 /+130 -65 /+200 -15 /+230 -200 /+260	-	Gasket for Clamp Pipe Connections, with flange.	DN 10 - DN 200	9
	4FC-B	NBR, EPDM, VMQ, FKM, PTFE			X	X			-	-30 /+100 -35 /+130 -65 /+200 -15 /+230 -200 /+260	-	Gasket for Clamp Pipe Connections, without flange.	DN 12 - DN 219,1	9
	4FC-E	PTFE/EPDM, PTFE/FKM			X	X			-	-35 /+130 -15 /+230	-	PTFE encapsulated elastomer gasket for Clamp Pipe Connections, with flange.	DN 12 - DN 219,1	9
	4FC-F	PTFE/EPDM, PTFE/FKM			X	X			-	-35 /+130 -15 /+230	-	PTFE encapsulated elastomer gasket for Clamp Pipe Connections, without flange.	DN 12 - DN 219,1	9
	ROA	PTFE, FKM, FFKM			X	X	X		-	-200/+260	-	PTFE O-ring, standard, for aggressive media, also available in various elastomers (see individual brochures).	8-3000	3/9
	ROB	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, outside slot.	8-1500	9
	ROC	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, slot on ring surface.	8-1500	9
	ROD	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, 45° outside slot.	8-1500	9

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

¹⁾ pressure is depending on the selected cross-section and material

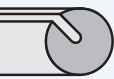
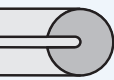




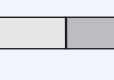

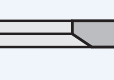



²⁾ depending on the selected material

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Static Seals

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group	
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]				v [m/s]
	ROE	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, 45° inside slot.	8-1500	9
	ROF	PTFE			X	X	X	X	-	-200/+260	-	PTFE O-ring, inside slot.	8-1500	9
	ROG	FKM/FEP, FKM/PFA, VMQ/FEP, VMQ/PFA			X	X	X	X	-	-25 / +200 -25 / +200 -60 / +200 -60 / +250	-	FEP, (PFA) encapsulated O-ring with FKM or VMQ core.	6-2500	9
	ROK	VMQ/FEP, VMQ/PFA			X	X	X	X	-	-60 / +200 -60 / +250	-	FEP, (PFA) encapsulated O-ring with VMQ hollow core.	12-2500	9
	XRG	FKM/FEP, FKM/PFA, VMQ/FEP, VMQ/PFA			X	X	X		-	-25 / +200 -25 / +200 -60 / +200 -60 / +250	-	FEP, (PFA) encapsulated rectangular ring with FKM or VMQ core.	22 - 152	9
	ROS	PTFE			X	X	X		-	-20 / +200	-	PTFE encapsulated O-ring with elastomer core.	20 - 400	9
	4F2	Fibre composite, expanded graphite, pure graphite	X	X	X	X			¹⁾	-	-	Flat gaskets in all shapes and sizes, e.g. with expanded metal insert and/or metal edges. Approvals: e.g. DVGW, KTW, WRC, BAM.	-	-
	4F3	Fibre composite, expanded graphite, pure graphite	X	X	X	X			¹⁾	-	-	Flat gaskets in small numbers and large series, in all sizes, e.g. with expanded metal insert or in segmented design. Approvals: e.g. DVGW, KTW, WRC, BAM.	up to 900	-
	4FD	NBR, FKM, EPDM	X	X	X	X			-	-30 /+100 -20 /+200 -45 /+150	-	Profile packing ring to DIN 3869 for sealing of pipe connections, fittings and screw plugs.	DN 8 - DN 60	9
	3HS	PUR	X	X				X	-	-35 /+110	-	Static radial sealing with high extrusion resistance and increased tightness against leaks in the case of pressure pulsations.	31,75 - 110	9
	1M0	1.4301, 1.4541, 2.4668, 2.4669	X		X		X		≤ 800 ¹⁾	≤ +430	-	Metal O-Ring, inside pressure, for static sealings, Version A. Version B, with bore-holes. Version G, filled with gas.	5 - 7600	9
	2M0	1.4301, 1.4541, 2.4668, 2.4669	X		X		X		≤ 800 ¹⁾	≤ +430	-	Metal O-Ring, outside pressure, for static sealings, Version A. Version B, with bore-holes. Version G, filled with gas.	5 - 7600	9

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

¹⁾ pressure is depending on the selected cross-section and material

Static Seals





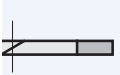
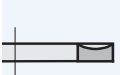
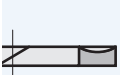
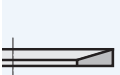
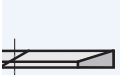


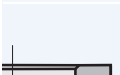
Profile	Type	Material	Application				Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]			
	1MC	2.4668, 2.4669, 2.4654	X	X	X	X	≤5300 ¹⁾	≤ +650	-	Metal C-Ring, inside pressure, for static sealings.	6 - 3000	9
	2MC	2.4668, 2.4669, 2.4654	X	X	X	X	≤5300 ¹⁾	≤ +650	-	Metal C-Ring, outside pressure, for static sealings.	6 - 3000	9
	1MS	2.4669, 1.4301, 2.4668	X	X	X	X	≤6500 ¹⁾	≤ +650	-	Metal C-Ring, spring-supported, inside pressure, for static sealings.	20-7600	9
	2MS	2.4669, 1.4301, 2.4668	X	X	X	X	≤6500 ¹⁾	≤ +650	-	Metal C-Ring, spring-supported, outside pressure, for static sealings.	20-7600	9
	1ME	2.4668, 2.4669, 2.4654	X	X	X	X	≤ 380 ¹⁾	≤ +650	-	Metal C-Ring, inside pressure, for static sealings.	45-1200	9
	2ME	2.4668, 2.4669, 2.4654	X	X	X	X	≤ 380 ¹⁾	≤ +650	-	Metal C-Ring, outside pressure, for static sealings.	45-1200	9
	1MU	2.4668, 2.4669, 2.4654	X	X	X	X	≤ 280 ¹⁾	≤ +650	-	Metal U-Ring, inside pressure, for static sealings.	45-1200	9
	2MU	2.4668, 2.4669, 2.4654	X	X	X	X	≤ 280 ¹⁾	≤ +650	-	Metal U-Ring, outside pressure, for static sealings.	45-1200	9

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

¹⁾ pressure is depending on the selected cross-section and material






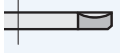
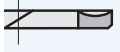
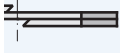
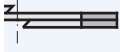
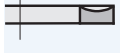

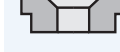


O-Rings, X-Rings and Back-up Rings

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	XRO	NBR, FKM, EPDM	X	X	X	X	X	X	≤ 400	-30 / +100	≤ 0,5	X-ring for static and dynamic applications. Advantage: less tendency to twist than an O-ring.	2,6 - 401	3
	ROA	NBR, PTFE FKM, EPDM, CR, PUR, Silicone, FFKM	X	X	X	X	X	X	≤ 400	-30 / +100	≤ 0,5	O-ring for static and dynamic applications (the application conditions depend strongly on the material selected).	0,74 - 2500	3/9
	RON	NBR, FKM, Silicone, EPDM	X	X	X		X	X	-	-	-	The elastomer cord is a product used for simple applications since many years in all fields of technology and industry.	-	3
	EE0	PTFE, PTFE comp., POM, PEEK	X	X	X	X	X		-	-100/+200	-	Back-up ring, one layer, continuous.	1 - 1500	3
	ES0	PTFE, PTFE comp., POM, PEEK	X	X	X	X	X		-	-100/+200	-	Back-up ring, one layer, slotted.	1 - 1500	3
	EE1	PTFE, PTFE comp., POM, PEEK	X	X	X	X	X		-	-100/+200	-	Back-up ring, one layer, continuous, concave. The shape of the O-ring is retained almost completely, as a result of which higher stresses are possible.	1 - 1500	3
	ES1	PTFE, PTFE comp., POM, PEEK	X	X	X	X	X		-	-100/+200	-	Back-up ring, one layer, slotted, concave. The shape of the O-ring is retained almost completely, as a result of which higher stresses are possible.	1 - 1500	3
	EE2	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, trapezoid, one layer, continuous, outside sealing. Trapezoid back-up rings reduce the sealing gap with their shape and permit higher system pressures.	1 - 1500	3
	ES2	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, trapezoid, one layer, slotted, outside sealing. Trapezoid back-up rings reduce the sealing gap with their shape and permit higher system pressures.	1 - 1500	3
	EE3	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, trapezoid, one layer, continuous, inside sealing. Trapezoid back-up rings reduce the sealing gap with their shape and permit higher system pressures.	1 - 1500	3
	ES3	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, trapezoid, one layer, slotted, inside sealing. Trapezoid back-up rings reduce the sealing gap with their shape and permit higher system pressures.	1 - 1500	3
	EE4	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, one layer, continuous, inside chamfer.	1 - 1500	3







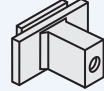


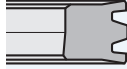

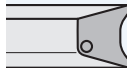
Types and materials in bold are standard. Descriptions and application conditions based on material and application.

O-Rings, X-Rings and Back-up Rings

Profile	Type	Material	Application					Application Conditions			Description		
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]	Ø [mm]	Product Group
	ES4	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, one layer, slotted, inside chamfer.	1 - 1500 3
	EE5	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, one layer, continuous, outside chamfer.	1 - 1500 3
	ES5	POM, PTFE comp., PEEK	X		X	X	X		-	-50 / +100	-	Back-up ring, one layer, slotted, outside chamfer.	1 - 1500 3
	EE6	POM, PTFE comp., PEEK	X	X	X	X	X		-	-50 / +100	-	Back-up ring, one layer, continuous, concave, inside chamfer. The shape of the O-ring is retained approximately, as a result of which higher stresses are possible.	1 - 1500 3
	ES6	POM, PTFE comp., PEEK	X	X	X	X	X		-	-50 / +100	-	Back-up ring, one layer, slotted, concave, inside chamfer. The shape of the O-ring is retained approximately, as a result of which higher stresses are possible.	1 - 1500 3
	EE7	POM, PTFE comp., PEEK	X	X	X	X	X		-	-50 / +100	-	Back-up ring, one layer, continuous, concave, outside chamfer. The shape of the O-ring is retained approximately, as a result of which higher stresses are possible.	1 - 1500 3
	ES7	POM, PTFE comp., PEEK	X	X	X	X	X		-	-50 / +100	-	Back-up ring, one layer, slotted, concave, outside chamfer. The shape of the O-ring is retained approximately, as a result of which higher stresses are possible.	1 - 1500 3
	SP1	PTFE	X	X	X	X	X		-	-100/+200	-	Back-up ring, spiral shaped, inside sealing.	1 - 1500 3
	SP2	PTFE	X	X	X	X	X		-	-100/+200	-	Back-up ring, spiral shaped, outside sealing.	1 - 1500 3
	EEP	NBR, FKM	X	X			X		-	-55 / +110	-	Back-Up ring, endless, concave, measures for combination with o-rings according to ASA 568.	2,44 - 660,50 3
	EEM	mod. PTFE	X		X	X	X		-	-30 / +200	-	Elastic, endless back-up ring with re-deformation after installation at the groove bottom, For supporting o-rings in static applications. Safe against twisting and shearing.	3 - 200 3
	EEV	POM, PA, PTFE, PTFE comp.	X				X		-	-	-	Sealing seats and valve seat seals of various materials according to customer specification or drawing available at short notice. Application conditions depend on the material required.	- -

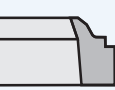
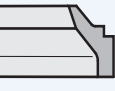



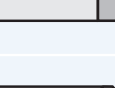

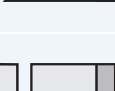
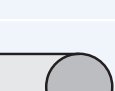



Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Other Seals and Constructional Elements

Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	HK	Elastomer/ fabric							-	-20 / +80	-	Flexible separators for balancing of filling levels in, for example, supply tanks in hydraulic systems and to protect media against contamination and oxidation.	-	1
	5F1		X						≤ 12	-10 / +80	-	Silencers in various versions, materials and sizes, see brochure.	M5, 1/8" - 1"	5
	MES	POM							-	-	-	Measuring cones for exact determination of the diameters of sealing profiles. Standard measuring range: 5 - 400 mm in steps of 1,00 mm.	5 - 400	3
		Elastomers, elastom./fabr., PTFE							-	-	-	Diaphragms for media separation or to separate areas of different pressures.	-	10
	3T0	Elastomers, elastom./fabr., PTFE, leather							-	-	-	Bellows to protect, for example, gear levers and joints against contamination and the weather.	-	10
	3T1	Silicone, NBR, EPDM	X	X	X				-	≤ +200* ≤ +110* ≤ +150*	-	Modular Bellows to protect against contamination and the weather. Modular design for flexible applications. * With support rings (PMMA, standard): max. 80 °C.	60 -135	10
									-	-	-	On request moulded and machined parts of elastomer or plastic according to customer drawing.	-	-
			X	X	X	X			-	-	-	Solid balls, hollow balls or balls with steel cores of various elastomers or plastics.	-	10
	5T3								-	-	-	Rollers and wheels of various elastomers or plastics.	-	10
	1HP -A	NBR	X						≤300	-	-	Seals for pipe testing machines for highest pressures in leak testing of pipes in the iron and steel industry, in general mechanical engineering and in pipeline construction.	21- 51	10
	1HP -B	PUR, NBR	X						≤ 1600 ≤ 1200	-	-	Seals for pipe testing machines for highest pressures in leak testing of pipes in the iron and steel industry, in general mechanical engineering and in pipeline construction.	33-660	10
	1HP -C	NBR	X						≤ 600/ ≤ 800	-	-	Seals for pipe testing machines for highest pressures in leak testing of pipes in the iron and steel industry, in general mechanical engineering and in pipeline construction.	114-406	10

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

Seals for the Mining Industry

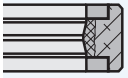
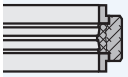





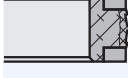
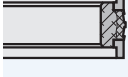
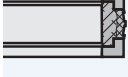


Profile	Type	Material	Application					Application Conditions			Description			
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]	v [m/s]		Ø [mm]	Product Group
	1A1	NBR, PUR, FKM, EPDM, PTFE	X	X	X	X	X		-	-35/ +100 -35/ +100	≤ 2 ≤ 2	Wiper with flush housing end, snap fit.	4 -500 14 -260	3
	1A1	POM, PA, PE	X	X	X	X	X		-	-40/ +100	≤ 1	Wiper with flush housing end, snap fit possible (depending on profile width and profile Ø). Also available in special dimensions at short notice from routine production.	65 -450	3
	1A5	NBR, PUR, FKM, EPDM, PTFE	X	X	X	X	X		-	-30/ +100 -30/ +80	≤ 2 ≤ 1	Wiper for general applications, snap fit.	20 -360 8 -320	3
	1A5	POM, PA, PE	X	X	X	X	X		-	-40/ +100	≤ 1	Wiper for general applications, snap fit possible (depending on profile width and profile Ø). Also available in special dimensions at short notice from routine production.	65 -450	3
	1A6	NBR	X	X			X		-	-20/ +100	≤ 4	Wiper that balances out large radial play, for underground use.	20 -260	3
	FB3	PTFE comp.	X						≤ 15 N/mm²	-100/ +200	≤ 5	Guide strip with very good sliding characteristics and stick-slip free run, for light to medium-duty oil hydraulic applications. Available also with lubrication pockets.	Cut goods	2
	FB2	PTFE comp.		X					≤ 15 N/mm²	-100/ +200	≤ 5	Guide strip with chamfer, very good sliding characteristics and stick-slip free run, for pneumatic and light to medium-duty water hydraulic applications. Available also with lubrication pockets.	Cut goods	2
	FÜB	Comp. fabric, POM, PE	X	X	X	X			HGW: ≤ 75 N/mm² at 80 °C	-30/ +120	≤ 5	Wear ring, oblique slot, for medium to heavy-duty hydraulic applications. In POM also available in special dimensions at short notice from routine production.	10 -500	2
	FÜA	Comp. fabric, POM, PE	X	X	X	X			HGW: ≤ 75 N/mm² at 80 °C	-30/ +120	≤ 0,5	Wear ring, straight slot, for medium to heavy-duty hydraulic applications. In POM also available in special dimensions at short notice from routine production.	10 -500	2
	ROA	PUR, NBR	X	X	X	X	X	X	≤ 600	-35/ +50 ¹⁾ -35/+110 ²⁾	≤ 0,5	O-ring, primarily for controllers, valves and cylinders when conventional elastomers can no longer be used because of their physical properties.	1,78-260	3
	4F0	NBR	X	X	X		X		≤ 315	-30/ +100	-	Flange seal for sealing of flanges and connection plates on controllers and modular valves.	2 - 45	-
	1B0	FKM/POM	X					X	≤ 350	+ 5/ +60 ¹⁾ -20/+100 ²⁾	≤ 0,5	Double-acting rod and spindle seal primarily for valves.	16 - 320	-

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

¹⁾ HFA, HFB and HFC fluids

²⁾ Mineral oils

Seals for the Mining Industry

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	p [bar]	T [°C]	v [m/s]			
	1B1	NBR-fabric/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,5	Double-acting rod seal with fabric bearing surface for hydraulic props and cylinders.	23 - 160	-
	1B2	NBR-fabric/ POM	X				X	≤ 350	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,5	Double-acting rod seal with fabric bearing surface and back-up wear rings for hydraulic props and cylinders.	35 - 90	-
	1B3	NBR-fabric/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Single-acting compact rod seal with fabric bearing surface for hydraulic props and cylinders.	27 - 250	-
	1B4	NBR-fabric/ POM	X				X	≤ 350	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Single-acting rod seal with fabric bearing surface for hydraulic props and cylinders.	100-270	-
	1B5	PUR/NBR/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Single-acting rod seal for hydraulic props and cylinders.	63 - 230	-
	2B0	NBR/POM	X				X	≤ 400	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Double-acting cylinder seal in cylinders for hydraulic roof supports and tunnel-driving machines.	40 - 325	-
	2B2	NBR-fabric/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Double-acting cylinder seal with fabric bearing surface in cylinders for hydraulic roof supports and tunnel-driving machines.	40 - 320	-
	2B5	NBR-fabric/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Design like 2B2, but with increased pretension in cylinders for hydraulic roof supports and tunnel-driving machines.	105-310	-
	2B3	NBR-fabric/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Double-acting cylinder seal with back-up wear rings in cylinders for hydraulic roof supports and tunnel-driving machines.	40 - 250	-
	2B6	NBR-fabric/ POM	X				X	≤ 1500	+ 5/+ 60 ¹⁾ -20/+ 80 ²⁾	≤ 0,1	Double-acting cylinder seal with fabric bearing surface & back-up wear rings for telescope props with foot valve.	55 - 320	-
	2B7	NBR-fabric/ POM	X				X	≤ 500 ³⁾	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Single-acting cylinder seal with fabric bearing surface.	110-285	-
	2B4	NBR-fabric/ POM	X				X	≤ 500	+ 5/+ 60 ¹⁾ -20/+ 100 ²⁾	≤ 0,1	Single-acting cylinder seal with fabric bearing surface for individual hydraulic props or aligning cylinders.	90 -220	-




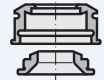


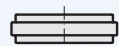
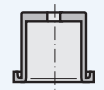

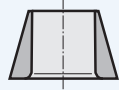
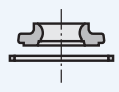
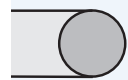
Types and materials in bold are standard. Descriptions and application conditions based on material and application.

¹⁾ HFA, HFB and HFC fluids

²⁾ Mineral oils

³⁾ With trapezoid back-up rings ≤ 2000 bar




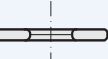

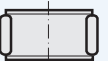
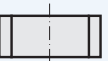

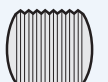


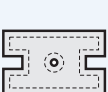
Accessories for the Food Industry

Profile	Type	Material	Application					Application Conditions			Description	Ø [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	5GS1	PUR, EPDM				X		-	-30 / + 80 -30 / + 120	-	Spreaders to divert medium in bottlenecks	-	7
	5GA1	PUR, EPDM, NBR				X		-	-30 / + 80 -30 / + 120 -30 / + 100	-	Pressure gasket rings for axial sealing of tanks against liquids and pressurised gases	-	7
	5GZ1	POM, PE				X		-	-40 / + 100 -30 / + 80	-	Centering bells , one-part, for pressure gasket rings of filling elements	-	7
	5GZ2	POM, PE				X		-	-40 / + 100 -30 / + 80	-	Centering bells , two-part with thread, for pressure gasket rings of filling elements	-	7
	5GV1	EPDM, NBR				X		-	-30 / + 120 -50 / + 100	-	Valve shaft seals for valve stems and needles	-	7
	5GV2	EPDM, NBR, PUR				X		-	-30 / + 120 -30 / + 100 -30 / + 80	-	Valve seat seals for axial sealing of tanks against liquids	-	7
	5GF	PUR				X		-	-30 / + 100	-	Bottle pads are used in filling and labelling units for damping/protection against torsion	-	7
	5GP1	PUR, NBR				X		-	-30 / + 80 -30 / + 100	-	Packing bells for packing and unpacking units of various bottles and packing systems	-	7
	5GST	PA, PUR, PE				X		-	-40 / + 100 -30 / + 100 -30 / + 80	-	Inlet/Discharge stars are used to pick up and transfer containers in filling units	-	7
	5GSP	Silicon				X		-	-60 / + 200	-	Bung gaskets/Tapered plugs for filling of barrels	-	7
	5GV4	EPDM				X		-	-30 / + 120	-	Valve seals for KEG flat fittings , also available with square gasket ring.	-	7
	-	EPDM, FKM, FFKM, HNBR, NBR, VMQ				X		-	-60/+250 ^{*)}	-	Sealings an moulded parts made of detectable materials and for 3-A sanitary applications. Almost any geometry can be made. Properties see individual brochures.	-	7

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

*) Material VMQ

Pneumatic Compression/Lifting Cushions

Profile	Type	Material	Application					Application Conditions			Description	C ^{b)} [mm]	Product Group
			Hydraulics	Pneumatics	Chemicals	Foodstuffs	Single-Action	Double-Action	p [bar]	T [°C]			
	HP1	Elastomer/ Fabric	X					≤ 7	-20/ +70	668	Compressed air cushion, single-stage Application: Pressing, lifting, guiding, clamping, damping, compressing	30 - 500	10
	ST1	Elastomer/ Fabric	X					≤ 3	-	-	Comp. air cushion, for small fitting areas single-stage, height: 12 mm	-	10
	HP2	Elastomer/ Fabric	X					≤ 7	-20/ +70	668	Compressed air cushion, two-stage Application: Pressing, lifting, guiding, clamping, damping, compressing	60 -1000	10
	ST2	Elastomer/ Fabric	X					≤ 3	-	-	Comp. air cushion, for small fitting areas two-stage, height: 24 mm	-	10
	HP3	Elastomer/ Fabric	X					≤ 7	-20/ +70	668	Compressed air cushion, three-stage Application: Pressing, lifting, guiding, clamping, damping, compressing	90 -1500	10
	ST3	Elastomer/ Fabric	X					≤ 3	-	-	Comp. air cushion, for small fitting areas three-stage, height: 36 mm	-	10
	TOR -PF	Polyurethane, Polyurethane/ Fabric	X					≤ 0,5	-	-	Ring cushion, flat Application: Sealing, pressing, flanging, handling and isolating Operation with compressed air	-	10
	TOR -EF	Elastomer/ Fabric	X					≤ 7	-	-	Ring cushion, flat Application: Sealing, pressing, flanging, handling and isolating Operation with compressed air	-	10
	TOR -PH	Polyurethane, Polyurethane/ Fabric	X					≤ 0,5	-	-	Ring cushion, high Application: Sealing, pressing, flanging, handling and isolating Operation with compressed air	-	10
	TOR -EH	Elastomer/ Fabric	X					≤ 7	-	-	Ring cushion, high Application: Sealing, pressing, flanging, handling and isolating Operation with compressed air	-	10
	CLP	Elastomer/ Fabric	X					≤ 8	-	657	Lifting cushion, single stage, for heavy loads. Application: Lifting of heavy loads Operation with compressed air	66 - 585	10
	OPV/ HPV	Elastomer/ Fabric	X					-	-	-	Pipe stopper Diameter: 50 to 2.500 mm (depending on version) Operation with compressed air	-	10
	MEM	Polyurethane, Polyurethane/ Fabric	X					≤ 0,01 ≤ 0,1	-	-	Membrane, circular Flexible inflatable membranes for low pressures. Application: Sealing, pressing, flanging, handling and isolating	-	10
	MEM	Polyurethane, Polyurethane/ Fabric	X					≤ 0,01 ≤ 0,1	-	-	Membrane, rectangle/square Flexible inflatable membranes for low pressures. Application: Sealing, pressing, flanging, handling and isolating	-	10
	MEM	Polyurethane, Polyurethane/ Fabric	X					≤ 0,01 ≤ 0,1	-	-	Membrane, polygon/complex Shape Flexible inflatable membranes for low pressures. Application: Sealing, pressing, flanging, handling and isolating	-	10

Types and materials in bold are standard. Descriptions and application conditions based on material and application.

^{a)} F = max. lifting force

^{b)} C = max. stroke distance

Our recommendations are based on years of experience. However, unknown factors in the practical use can considerably restrict the validity of generally true statements. We are therefore unable to provide any guarantee for the correctness of our recommendations for the individual case.

The actual appearance of the products may differ from the drawings.

The actual product information 0001 06-2025 supersedes previous product informations. Subject to change.



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