





STATIC SEALS

The values indicated here are maximum values. All of them must not be achieved simultaneously.

O-RINGS

Profile	Design	Material	Hardness (Shore A)	Color	Temperature (°C)	Special Feature
	O-Ring	EPDM	70	Black	-45 to +130	
	O-Ring	EPDM	70	Black	-50 to +150	Peroxide cross-linking
	O-Ring	FKM	75	Green	-15 to +200	
	O-Ring	FKM	75	Black	-15 to +200	Peroxide cross-linking
	O-Ring	FKM	80	Black	-15 to +200	
	O-Ring	FKM	90	Green	-15 to +200	
	O-Ring FEP	FEP encapsulated FKM		Transparent/Black	-20 to +205	FEP encapsulated FKM O-Ring
	O-Ring	HNBR	70	Black	-30 to +150	
	O-Ring	NBR	70	Black	-30 to +100	Bag in bag delivery is possible
	O-Ring	NBR	80	Black	-30 to +100	
	O-Ring	NBR	90	Black	-30 to +100	
	O-Ring	PTFE		White	-200 to +260	
	O-Ring	VMQ	70	Redbrown	-55 to +200	
	O-Ring FEP	FEP encapsulated VMQ		Transparent/Redbrown	-60 to +205	FEP encapsulated VMQ O-Ring

ROUND CORD AND ROUND CORD RINGS

Profile	Design	Material	Hardness (Shore A)	Color	Temperature (°C)	Special Feature
	RS	EPDM	70	Black	-50 to +150	Peroxide cross-linking
	RS	FKM	75	Black	-15 to +200	
	RS	NBR	70	Black	-30 to +100	
	RS	VMQ	60	Redbrown	-55 to +200	FDA- and EC 1935/2004-compliant

X-RINGS

Profile	Design	Material	Hardness (Shore A)	Color	Temperature (°C)	Special Feature
	X-Ring	NBR	70	Black	-30 to +100	
	X-Ring	FKM	70	Black	-15 to +200	

BACK-UP RINGS





Profile	Design	Material	Hardness	Color	Temperature (°C)	Special Feature
	STU	NBR	90 Shore A	Black	-30 to +100	
	STR END	PTFE	≥ 51 Shore D	White	-200 to +260	
	STR GS	PTFE	≥ 51 Shore D	White	-200 to +260	
	STR END	POM	≥ 82 Shore D	White	-50 to +90	
	STR GS	POM	≥ 82 Shore D	White	-50 to +90	




BOLT SEALS

Profile	Design	Material	Hardness (Shore A)	Color	Max. pressure in MPa (bar)	Temperature (°C)	Special Feature
	US	FKM	70	Brown	25 (250)	-15 to +200	
	US	NBR	70	Black	25 (250)	-30 to +100	
	US	NBR	70	Black	25 (250)	-30 to +100	Metal ring, rust- and acid-resistant steel 1.4301 (AISI 304)
	USS	FKM	70	Brown	25 (250)	-15 to +200	Additional centering
	USS	FKM	70	Brown	25 (250)	-15 to +200	Additional centering, metal ring, rust- and acid-resistant steel 1.4301 (AISI 304)
	USS	NBR	70	Black	25 (250)	-30 to +100	Additional centering
	USS	NBR	70	Black	25 (250)	-30 to +100	Additional centering, metal ring, rust- and acid-resistant steel 1.4301 (AISI 304)

PROFILE RINGS IN ACCORDANCE WITH DIN 3869

Profile	Design	Material	Hardness (Shore A)	Color	Max. pressure in MPa (bar)	Temperature (°C)	Special Feature
	PRR	EPDM	80	Violet	60 (600)	-45 to +150	Peroxide cross-linking
	PRR	FKM	80	Green	60 (600)	-20 to +200	Certified DIN EN 549 E1/H3
	PRR	NBR	85	Black	60 (600)	-30 to +100	Certified DIN EN 549 B1/H3
	PRR221	TPU	92	Blue		-40 to +120	

SAE FLANGE SEALS

Profile	Design	Material	Hardness (Shore A)	Max. pressure in MPa (bar)	Temperature (°C)	Special Feature
	FLAN89	TPU	95	40 (400)	-30 to +100	

FORMED PARTS

Formed parts (design FOR) are customer-specific sealing elements. They can be manufactured based on a reference sample, a drawing or a special layout. In this way, they can be adjusted to the precise installation conditions. Elastomers and thermoplastics are available in a variety of grades.



ASSORTMENT BOXES

These boxes are equipped with various selections of seals, providing the required dimension for every repair needed on-site.

Profile	Design	Material	Hardness (Shore A)	Color
	BOX OR	NBR	70 90	Black
	BOX OR	FKM	80	Black
	BOX OR	EPDM	70	Black
	BOX OR	VMQ	70	Red-brown
	BOX RS	NBR	70	Black
	BOX RS	FKM	75	Black
	BOX XR	NBR	70	Black
	BOX XR	FKM	70	Black



ROTATING SEALS

The values indicated here are maximum values. All of them must not be achieved simultaneously.

CASSETTE SEALS

Profile	Design	Material	Hardness (Shore A)	Color	Max. pressure in MPa (bar)
	C	NBR	70	Black	0.05 (0.5)
	C	FKM	80	Brown	0.05 (0.5)

Cassette seals are only available as special designs upon request.

RADIAL SHAFT SEAL RINGS

Profile	Design	Material	Hardness (Shore A)	Color	Max. speed (m/s)	Max. pressure in MPa (bar)	Temperature (°C)
	WA	FKM	80	Brown	35	0.05 (0.5)	-30 to +200
	WA	NBR	70	Black	12	0.05 (0.5)	-40 to +100
	WAS	FKM	80	Brown	35	0.05 (0.5)	-30 to +200
	WAS	NBR	70	Black	12	0.05 (0.5)	-40 to +100
	WAK	FKM	80	Brown	35	0.05 (0.5)	-30 to +200
	WAK	NBR	70	Black	12	0.05 (0.5)	-40 to +100
	WAG	FKM	80	Brown	35	0.05 (0.5)	-30 to +200
	WAG	NBR	70	Black	12	0.05 (0.5)	-40 to +100
	WAY	FKM	80	Brown	35	1 (10)	-30 to +170
	WAY	NBR	80	Blue	12	1 (10)	-40 to +100

Profile	Design	Material	Hardness (Shore A)	Color	Max. speed (m/s)	Max. pressure in MPa (bar)	Temperature (°C)
	WASY	FKM	80	Brown	35	1 (10)	-30 to +170
	WASY	NBR	80	Blue	12	1 (10)	-40 to +100
	WAD	NBR	70	Black	6	0.05 (0.5)	-40 to +100
	WAO	NBR	70	Black	6		-40 to +100
	WAOK	NBR	70	Green	6		-40 to +100
	WB	NBR	70	Black	12	0.05 (0.5)	-40 to +100
	WBS	NBR	70	Black	12	0.05 (0.5)	-40 to +100
	WBD	NBR	70	Black	6	0.05 (0.5)	-40 to +100
	WBO	NBR	70	Black	6		-40 to +100
	WC	NBR	70	Black	12	0.05 (0.5)	-40 to +100
	WCS	NBR	70	Black	12	0.05 (0.5)	-40 to +100
	WCL	FKM	75	Black	15	0.05 (0.5) Optional 1 (10)	-30 to +200
	WCL	NBR	70	Black	12	0.05 (0.5) Optional 1 (10)	-40 to +100
	WCP20	PTFE		Grey	40	1 (10)	-90 to +250



RADIAL SHAFT SEAL RINGS

Profile	Design	Material	Hardness (Shore A)	Color	Max. speed (m/s)	Max. pressure in MPa (bar)	Temperature (°C)
	WE5	FKM	80	Black	25	0.05 (0.5)	-20 to +180
	WE5	NBR	80	Black	20	0.05 (0.5)	-40 to +100
	WE5	HNBR	80	Black	25	0.05 (0.5)	-40 to +150
	WEPO	PTFE		Black	15	1 (10)	-20 to +200
	WAX	NBR	70	Black	10	0.05 (0.5)	-40 to +100

AXIAL SEALS

Profile	Design	Material	Hardness (Shore A)	Color	Max. speed (m/s)	Temperature (°C)
	VRM01	FKM	70	Brown	12	-30 to +180
	VRM02	FKM	70	Brown	12	-30 to +180
	VRM01	NBR	70	Black	12	-40 to +100
	VRM02	NBR	70	Black	12	-40 to +100

V-RINGS

Profile	Design	Material	Hardness (Shore A)	Color	Temperature (°C)	Special Feature
	VA	FKM	60 70	Brown	-20 to +200	
	VA	NBR	60	Black	-40 to +100	Ozone-resistant
	VS	FKM	60	Brown	-20 to +200	
	VS	NBR	60	Black	-40 to +100	Ozone-resistant
	VL	FKM	60	Brown	-20 to +200	
	VL	NBR	60	Black	-40 to +100	Ozone-resistant
	VE	FKM	60 70	Brown	-20 to +200	
	VE	NBR	60	Black	-40 to +100	Ozone-resistant

Circumferential speed (m/s)

NBR: ≤ 8; axially secured starting at ≥ 8; radially secured starting at ≥ 12

FKM: ≤ 6.5; axially secured starting at ≥ 6.5; radially secured starting at ≥ 10



FLUID SEALS

The values indicated here are maximum values. All of them must not be achieved simultaneously.

END CAPS

Profile	Design	Material	Hardness (Shore A)	Color	Max. pressure in MPa (bar)	Temperature (°C)
	VER01	FKM	70	Brown	0.05 (0.5)	-20 to +200
	VER01	NBR	70	Black	0.05 (0.5)	-30 to +100
	VER02	FKM	70	Brown	0.05 (0.5)	-20 to +200
	VER02	NBR	70	Black	0.05 (0.5)	-30 to +100
	VER03	FKM	70	Brown	0.05 (0.5)	-20 to +200
	VER03	NBR	70	Black	0.05 (0.5)	-30 to +100

SHAFT SLEEVES

Profile	Design	Material
	WSH	Rust and acid-resistant steel 1.4301 (AISI 304)




PISTON SEALS

Profile	Design	Material	Hardness (Shore A)	Max. speed (m/s)	Max. pressure in MPa (bar)	Temperature (°C)
	N05	NBR	80	0.5	20 (200)	-30 to +100
	KNA16	NBR	80	0.5	50 (500)	-30 to +100
	KK 03	NBR	80	0.5	40 (400)	-30 to +100
	KNA23	NBR	90	0.5	16 (160)	-30 to +100
	N21	NBR	90	0.5	16 (160)	-30 to +100
	KK22	NBR F *	90	0.5	40 (400)	-30 to +100
	KDS01	NBR F *	90	0.5	40 (400)	-30 to +100
	KNA28	TPU	95	0.5	40 (400)	-40 to +100
	N25	TPU	95	0.5	30 (300)	-40 to +100
	N36	TPU	95	0.5	40 (400)	-40 to +100
	K70	TPU	95	0.5	25 (250)	-30 to +100
	K84	TPU	98	0.5	40 (400)	-30 to +100
	KPOR31	PTFE-Bronze		15	40 (400)	-30 to +100
	KPOR131	PTFE-Bronze		15	40 (400)	-30 to +100
	KPOR30	PTFE-Bronze		15	40 (400)	-30 to +100











* F: fabric (fabric-reinforced material)












PISTON SEALS



Profile	Design	Material	Hardness (Shore A)	Max. speed (m/s)	Max. pressure in MPa (bar)	Temperature (°C)
	KPOR130	PTFE-Bronze		15	40 (400)	-30 to +100
	KK71	PTFE-Bronze		1.5	40 (400)	-30 to +100
	KNA44	PTFE carbon + graphite		15	35 (350)	-150 to +250

ROD SEALS

Profile	Design	Material	Hardness (Shore A)	Max. speed (m/s)	Max. pressure in MPa (bar)	Temperature (°C)
	N21	NBR	90	0.5	16 (160)	-30 to +100
	SNI24	NBR	90	0.5	16 (160)	-30 to +100
	N05	NBR	80	0.5	20 (200)	-30 to +100
	SNI07	NBR	80	0.5	40 (400)	-30 to +100
	SDS01 3/2	NBR/NBR F *	90	0.5	40 (400)	-30 to +100
	SDS01 1/0	NBR F *	90	0.5	40 (400)	-30 to +100
	SDR01	NBR/NBR F *	90			-30 to +100
	N25	TPU	95	0.5	30 (300)	-40 to +100
	SNI30	TPU	95	0.5	40 (400)	-40 to +100
	SNI39	TPU	95	0.5	40 (400)	-40 to +100

Profile	Design	Material	Hardness (Shore A)	Max. speed (m/s)	Max. pressure in MPa (bar)	Temperature (°C)
	N36	TPU	95	0.5	40 (400)	-40 to +100
	S72	TPU	95	0.5	40 (400)	-30 to +100
	SNI35	TPU	95	0.5	40 (400)	-40 to +100
	SPOR30	PTFE-Bronze		15	40 (400)	-30 to +100
	SPOR130	PTFE-Bronze		15	40 (400)	-30 to +100
	SPOR131	PTFE-Bronze		15	40 (400)	-30 to +100
	SPOR31	PTFE-Bronze		15	40 (400)	-30 to +100
	SPOR06	PTFE-Bronze		2.0	16 (160)	-30 to +100
	SNI43	PTFE carbon + graphite		15	35 (350)	-150 to +250














RADIAL SEALS

Profile	Design	Material	Peripheral speed (m/s)	Max. pressure in MPa (bar)	Temperature (°C)
	RPORI32	PTFE carbon + graphite	≤ 2	30 (300)	-30 to +100
	RPORA32	PTFE carbon + graphite	≤ 2	30 (300)	-30 to +100








* F: fabric (fabric-reinforced material)



WIPERS

Profile	Design	Material	Hardness (Shore A)	Max. speed (m/s)	Temperature (°C)
	AE40	NBR	90	1	-30 to +110
	AE41	NBR	90	1	-30 to +110
	AM43	NBR	90	1	-30 to +110
	AM45	NBR	90	1	-30 to +110
	AD51	NBR	90	1	-30 to +110
	AE42	TPU	90	2	-40 to +100
	AE47	TPU	90	2	-40 to +100
	AM44	TPU	95	2	-40 to +100
	AM54	TPU	95	1	-40 to +100
	AD48	TPU	95	1	-40 to +100
	ADM55	TPU	95	1	-40 to +100
	AD60	PTFE-Bronze		15	-30 to +100
	AD61	PTFE-Bronze		15	-30 to +100
	AE80	PTFE-Bronze		15	-30 to +100

GUIDE ELEMENTS

Profile	Design	Material	Slide speed (m/s)	Contact pressure (N/mm ²)	Temperature (°C)	Delivered condition	Surface
	GS01	PTFE, bronze-filled	≤ 15	Static: ≤ 25 Dynamic: ≤ 15	-60 to +200	Roll	Structured
	GS10	PTFE, bronze-filled	≤ 15	Static: ≤ 25 Dynamic: ≤ 15	-60 to +200	Roll	Smooth
	FRK01	PTFE, bronze-filled	≤ 15	Static: ≤ 25 Dynamic: ≤ 15	-60 to +200	Strip, 30° cut	Structured
	FRS01	PTFE, bronze-filled	≤ 15	Static: ≤ 25 Dynamic: ≤ 15	-60 to +200	Strip, 30° cut	Structured
	GS05	Hard fabric with PTFE	≤ 1	Static: ≤ 350 Dynamic: ≤ 100	-50 to +120	Roll	Smooth
	FRK05	Hard fabric with PTFE	≤ 1	Static: ≤ 350 Dynamic: ≤ 100	-50 to +120	Ring, 45° bevel cut	Smooth
	FRS05	Hard fabric with PTFE	≤ 1	Static: ≤ 350 Dynamic: ≤ 100	-50 to +120	Ring, 45° bevel cut	Smooth



INSTALLATION AND DISMANTLING TOOLS

Installation tools ease the assembly and dismantling of seal profiles. They can be found on the online ordering platform EASY in the accessories (ZUB) section.

Art. No. 67189703



Set of dismantling tools for O-rings and u-rings, stable design, 8-part, case contains a complete set.

Application areas: The dismantling tools are suited for use with nearly any dimension.

Art. No. 67189704



Set of installation tools for u-rings, 5-part, incl. a holding block as a clamping aid for affixing the pliers, case contains a complete set.

Application areas: The installation pliers can be used for u-rings with a diameter of up to 165 mm.

Installation pliers S: 22 – 30 mm
Installation pliers M: 30 – 50 mm
Installation pliers L: 50 – 70 mm
Installation pliers XL: 70 – 165 mm

Art. No. 49406848



Calibration pliers for PTFE seals

Application areas: Calibration pliers can be used within the range of 50 – 360 mm.

Art. No. 67189705



Dismantling tool for shaft seal rings, u-rings and end caps

Application areas: These dismantling tools are suited for use with nearly any dimension.

Art. No. 67195157



PTFE cutter for PTFE guide band

Application areas: The cutting pliers cut the PTFE guide band at a 45° angle. The cleanly cut edges require no additional deburring. The maximum width of the PTFE guide band is 25 mm.

Art. No. 67195159:
Replacement blades for PTFE cutter (10 units)

CERTIFIED MATERIALS

LAST UPDATED: 02.12.2017

GAS DEVICES AND SYSTEMS IN DOMESTIC INSTALLATIONS OR IN HOME APPLIANCES

Approval	Certifying authority	Temperature range	Compound
DIN EN 549	DVGW	B1/H3 (0 up to +80 °C)	NB 90 18 03
DIN EN 549	DVGW	B1/H3 (0 up to +80 °C)	NB 70 28 22
DIN EN 549	DVGW	B2/H3 (-20 up to +80 °C)	NB 70 28 07
DIN EN 549	DVGW	B2/H3 (-20 up to +80 °C)	NB 70 27 17
DIN EN 549	DVGW	C2/H3 (-20 up to +100 °C)	HN 70 27 04
DIN EN 549	DVGW	C2/H3 (-20 up to +100 °C)	HN 70 18 10
DIN EN 549	DVGW	D2/H3 (-20 up to +125 °C)	HN 70 78 01
DIN EN 549	DVGW	E1/H3 (0 up to +150 °C)	FP 80 27 01
DIN EN 549	DVGW	E1/H3 (0 up to +150 °C)	FP 80 18 01
DIN EN 549	DVGW	E1/H3 (0 up to +150 °C)	FP 80 18 04

GAS SUPPLY LINES AND GAS PIPELINES

Approval	Certifying authority	Temperature range	Compound
DIN EN 682	DVGW	GBL (-15 up to +50 °C)	NB 70 27 32

DRINKING WATER

Approval	Certifying authority	Temperature range	Compound
DVGW type examination	DVGW	WA/WB	EP 70 39 01
CLP	eurofins		EP 70 39 01
ACS	eurofins		EP 70 39 01
BS6920	WRAS	Up to 85 °C	EP 70 39 01

WATER SUPPLY AND DRAINAGE

Approval	Certifying authority	Operating conditions	Compound
DVGW type examination	DVGW	WA/WB	EP 70 39 01

FOOD CONTACT AND PHARMACEUTICAL INDUSTRY

Approval	Certifying authority	Specification	Compound
FDA 21 CFR	CERISIE	§ 177.2600	EP 70 27 03
FDA 21 CFR	SGS Fresenius	§ 177.2600	SI 70 28 03
FDA 21 CFR	SGS Fresenius	§ 177.2600	SI 70 18 07
FDA 21 CFR	SGS Fresenius	§ 177.2600	SI 70 50 03
FDA 21 CFR	SGS Fresenius	§ 177.2600	SI 70 27 14
FDA 21 CFR	SGS Fresenius	§ 177.2600	EP 70 39 01
FDA 21 CFR	SGS Fresenius	§ 177.2600	SI 60 41 01
FDA 21 CFR	SGS Fresenius	§ 177.2600	FP 75 94 12
BfR (EG 1935/2004)	SGS Fresenius	Recommendation XV	SI 70 18 07
BfR (EG 1935/2004)	SGS Fresenius	Recommendation XV	SI 70 50 03
BfR (EG 1935/2004)	SGS Fresenius	Recommendation XV	SI 70 27 14
LFGB (EG 1935/2004)	SGS Fresenius	Recommendation XXI	EP 70 39 01
LFGB (EG 1935/2004)	SGS Fresenius	Recommendation XV	SI 60 41 01
LFGB (EG 1935/2004)	SGS Fresenius	Recommendation XXI	FP 75 94 12
CIP-/SIP-ability	ECOLAB		EP 70 39 01
WFI-ability	ECOLAB		EP 70 39 01
USP Class VI, 121 °C	BSL	Chapter 88 (in vivo)	EP 70 39 01
USP 32	BSL	Chapter 87 (in vitro)	EP 70 39 01
3-A Sanitary Standard	CERISIE	Class I	FP 75 94 12
3-A Sanitary Standard	CERISIE	Class II	EP 70 39 01
CIP-/SIP-ability	ECOLAB		FP 75 94 12
WFI-ability	ECOLAB		FP 75 94 12

OXYGEN, GASEOUS

Approval	Certifying authority	Application	Compound
DIN EN 1797/ISO 21010	BAM	100 °C/25 bar > 100 up to 150 °C/20 bar	FP 75 94 11

Elastomer	Hardness (Shore A)	Color
NBR	90	Black
NBR	70	Black
NBR	70	Black
NBR	70	Black
HNBR	70	Black
HNBR	70	Black
HNBR	70	Yellow
FKM	80	Black
FKM	80	Black
FKM	80	Green

Elastomer	Hardness (Shore A)	Color
NBR	70	Black

Elastomer	Hardness (Shore A)	Color
EPDM perox.	70	Black
EPDM perox.	70	Black
EPDM perox.	70	Black
EPDM perox.	70	Black

Elastomer	Hardness (Shore A)	Color
EPDM perox.	70	Black

Elastomer	Hardness (Shore A)	Color
EPDM perox.	70	Black
VMQ	70	Red-brown
VMQ	70	Red-brown
VMQ	70	Red-brown
FKM perox.	75	Black
VMQ	60	Red-brown
VMQ	70	Red-brown
EPDM perox.	70	Black
VMQ	70	Red-brown
VMQ	70	Red-brown
VMQ	70	Red-brown
EPDM perox.	70	Black
VMQ	60	Red-brown
FKM perox.	75	Black
EPDM perox.	70	Black
EPDM perox.	70	Black
EPDM perox.	70	Black
FKM perox.	75	Black
EPDM perox.	70	Black
FKM perox.	75	Black
FKM perox.	75	Black

Elastomer	Hardness (Shore A)	Color
FKM	75	Green