



Semi finished Products | Seal Materials



Content





Semi-finished Products

The development, production and marketing of high quality semi-finished products in form of bars and tubes for the machining of sealing elements is an integral part of the core competence of Seal Maker Produktions-u. Vertriebs GmbH. Due to our most modern manufacturing technology we are able to cover the whole spectrum of seal applications. Our semi-finished billets, each of which is controlled several times before dispatch, are one of the most important components for our customers, contributing to their competitiveness by offering high quality at a reasonable price. Besides the wide range of standard dimensions which are carried on stock, special dimensions are also available within short delivery times in all materials and FDA-qualities.

*PU | NBR | EPDM | FPM | *AFLAS® | SILICONE | POM | PA | PTFE | PEEK | and many more

Polyurethanes



Polyurethanes have gained a substantial importance in modern seal technology. They hold a dominant market share in the sector of rod seals and piston seals. Seal Maker's Polyurethane semi-finished products stand out due to their highest material quality. In many applications seals made of Seal Maker Polyurethane outperform the service life of seals made out of competitive manufacturers' materials. The reason for this can be attributed on the one hand to the careful selection of raw materials, and on the other hand to the "direct" manufacturing technology. Unlike the thermoplastic processed products, the cast semi-finished products of Polyurethane billets made by Seal Maker have the greatest degree of freedom to develop their physical properties during polymerization. Any kind of negative influence during the polymerization process by heating up and plastic deformation is avoided with our technology. Besides the standard materials we also produce materials with an optimized coefficient of friction, and materials for direct contact with foodstuffs. A further important fact is that Seal Maker semi-finished products made of Polyurethane, up to a hardness of 95 Shore A, come with a clamping ring. This makes the use in lathe machines a lot easier, and also independent from the type of the production machine. With the Polyurethane series U5XX Seal Maker offers a wide-ranging delivery program which includes various optimized versions in addition to the standard version U500-R95. Be it high temperatures up to 135°C, or low temperature down to -50°C, or low friction, more hardness, less hardness, better chemical resistance, or an application in contact with food stuff, U5XX covers all the different sectors.

The high quality Polyurethane versions U5XX and U203 offered by Seal Maker are hydraulysis resistant (H-PU). More information you can find in our material data sheets.

Elastomers



Elastomers, often referred to as rubber materials, are a reasonable completion of the product range. Although they got widely pushed out of many applications by the modern Polyurethanes, the elastomer products remain important in seal technology due to their wide spectrum of thermal and chemical resistance. Seal Maker works exclusively with rubber compounds made by internationally highly recognized batch manufacturers. This, in conjunction with Seal Maker's modern processing technology, is the guarantee for well approved material compounds and an economical shaping. The resulting benefit for our customers is an excellent price-quality ratio, and also prompt availability of both standard and special dimensions and materials. All Seal Maker semi-finished products made of elastomer materials come in a hard shell, which makes them easy machinable in CNC lathes, despite the low hardness and high elasticity.

NBR | EPDM | FPM | *AFLAS® | SILICONE

Plastics



Hard plastics and fluorinated thermoplastics, as used for back up rings and guide rings, as well as for special and pre-loaded seals, complete the product range of Seal Maker semi-finished products. Seal Maker takes care that the suppliers of these products fulfill the high quality requirements as set by ourselves and by our customers. The excellent business connection we maintain with our suppliers, a broad product line, in combination with efficient warehouse management, guarantee prompt availability. Not only the dimensional range of semi-finished products is well adapted to the requirements of machining, it is also the wide variety of different material compounds which covers all the requirements of seal application.

POM | PA | PTFE | PEEK | diverse Compounds

Special Materials



These semi-finished material billets are high quality plastic products, produced solely by means of extrusion. The wide choice of thermoplastic products is convincing: sheets, bars and tubes are available in all important standard dimensions. Various material types are available in all standard and intermediate sizes as well as with well defined tolerances.

*AFLAS® is a registered trademark of the Asahi Company

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Chemical Consistency

Semi-finished Group	U203	U5XX	NBR	HNBR	EPDM	FPM	TFE/P	Silikon	РОМ	PA	PTFE	PEEK
Typical Seal Maker Products	U203- G95	U5XX- R95	NBR N107	HNBR HN112	EPDM E131	FPM F109	AFLAS AF101	Silicone S102	POM P101	PA A112	PTFE T101	PEEK PK100
Air up to 100° C	R	R	R	R	R	R	R	R	R	R	R	R
Water up to 90°	R	R	R	R	R	R	R	R	R	S	R	R
Sea Water	R	R	R	R	R	R	R	R	R	S	R	R
Steam up to 140°C	U	U	U	S	R	U	R	S	U	U	R	R
Mineral oil and greases	R	R	R	R	U	R	R	S	R	R	R	R
ASTM 1 aliphatic motor- and gear oils	R	R	R	R	U	R	R	R	R	R	R	R
ASTM 3 aromatic mineral oils	S	R	R	R	U	R	R	U	R	R	R	R
Aliphatic hydro-carbons (Propane, Butane, natural gas, etc.)	R	R	R	R	U	R	R	U	R	R	R	R
Aromatic hydro-carbons (Benzol, Toluol, xylol, etc.)	U	U	U	U	U	R	R	U	R	R	R	R
Chlorinated hydro-carbons (Chloro- form, Trichlorethylen, etc.)	U	U	U	U	U	R	R	U	U	U	R	R
Fuel (Benzine, Diesel, Kerosine)	S	R	R	R	U	R	R	U	R	R	R	R
Hydraulic oils with mineral oil basis	R	R	R	R	U	R	R	S	R	R	R	R
Hydraulik fluids of group HFA	R	R	R	R	U	R	R	S	R	S	R	R
Hydraulik fluids of group HFC (Glycol-water)	U	U	R	R	R	R	R	S	R	S	R	R
Hydraulik fluids of group HFD (Ester of phosphoric acid)	U	U	U	U	S	R	R	S	R	R	R	R
Breaking fluids based on Glycol	U	U	U	U	R	R	R	R	U	U	R	R
Silicone oils and greases	R	R	R	R	R	R	R	U	R	R	R	R
Animal and vegetarian oils and greases	R	R	R	R	U	R	R	R	R	R	R	R
Alcohol	U	U	S	S	R	S	R	R	R	R	R	R
Polar solvents (Acetone, MEK, Ethyl-Acetate, Di-Ethyl-Ether, etc.)	U	U	U	U	R	U	U	U	R	R	R	R
Diluted acids and leaches	R	R	S	S	R	R	R	S	S	S	R	R
Concentrated acids and leaches	U	U	U	U	R	R	R	U	U	U	R	R
Saline solution	R	R	R	R	R	R	R	R	R	S	R	R

R = resistant I S = suitable I U = unsuitable



The chart above gives an overlook over the most common pressure fluids and seal materials, and of their applicability. Please bear in mind that several working conditions, like e. g. the temperature, may influence the usability of different materials in the hydraulic fluids. For further and more detailed information you call on us, or you look them up in our media resistance table. In case of remaining doubt even tests might become necessary, which we are prepared to carry out on request of our customers.



Physical Properties

	Sealing materials Semi-finished products	Color	Density	Hardness	Hardness	100% modulus	300% modulus	Tear strength	Elong- ation at break
	DIN/ASTM Standard		DIN 53479	DIN 53505	DIN 53505	DIN 53504	DIN 53504	DIN 53504 / ASTM D4894	DIN 53504 / ASTM D489
	Units		g/cm³	Shore A	Shore D	N/mm²	N/mm²	N/mm²	%
	PU U500-R95		1,16 ±0,03	95 ±2	_	≥ 10	≥ 30	≥ 50	≥ 350
	PU 510-G88		1,17 ±0,03	90 ±2	_	≥ 10	≥ 25	≥ 45	≥ 350
ш	PU U520-OR95-HT		1,09 ±0,03	96 ±2	_	≥ 10	≥ 25	≥ 45	≥ 350
HAN	PU U530-B95-LT		1,11 ±0,03	95 ±2	_	≥7	≥ 15	≥ 40	≥ 450
RET	PU U540-VI95-CR		1,16 ±0,03	95 ±2	_	≥ 10	≥ 30	≥ 45	≥ 300
OLYU	PU U550-GM95		1,16 ±0,03	95 ±2	_	≥ 10	≥ 30	≥ 40	≥ 320
PO	PU U570-D57		1,17 ±0,03	_	57 ±3	≥ 12	≥ 25	≥ 40	≥ 330
	PU U580-D57 G		1,17 ±0,03	_	57 ±3	≥ 13	≥ 25	≥ 45	≥ 310
	PU U203-G95		1,10 ±0,03	95 ±2	_	≥ 10	≥ 15	≥ 40	≥ 400
	NBR N107		1,32 ±0,03	85 ±5	_	≥ 8,2	_	≥ 15	≥ 162
	H-NBR HN112		1,23 ±0,03	85 ±5	_	≥ 9,2	_	≥ 18	≥ 204
	HNBR HN900 RGD		1,30 ±0,03	88 ±5	_	≥ 6,6	_	≥ 20	≥ 247
	HNBR HN901 RGD (LT)		1,39 ±0,03	88 ±5	_	≥ 2,5	_	≥ 8	≥ 263
ERS	EPDM E131		1,22 ±0,03	85 ±5	_	≥ 5	_	≥ 11	≥ 190
TOM	AFLAS ® AF 101		1,68 ±0,03	85 ±5	_	≥ 3,4	_	≥ 6	≥ 224
ELAS.	FPM F109		2,44 ±0,03	85 ±5	_	≥ 7	_	≥ 10	≥ 146
Ш	FPM F111		1,88 ±0,03	85 ±5	_	≥ 5,8	_	≥ 10	≥ 171
	FPM F800 RGD		2,16 ±0,03	86 ±5	_	≥ 3,5	_	≥ 6	≥ 290
	Silicone Red S102		1,54 ±0,03	85 ±5	_	_	_	≥ 6	≥ 114
	Silicone Blue S103		1,54 ±0,03	85 ±5	_	_	_	≥ 6	≥ 114
	POM P101		1,42 ±0,02	_	_	_	_	≥ 68	≥ 35
	PA A112		1,14 ±0,02	_	_	_	_	≥ 80	≥ 25
SS	PTFE-PT101		2,16 ±0,02	_	62 ±3	_	_	≥ 23	≥ 250
STIC	PTFE-FT105		2,20 ±0,02	_	57 ±3	_	_	≥ 14	≥ 200
PLA:	PTFE-BR40 T110		3,08 ±0,04	_	65 ±3	_	_	≥ 23	≥ 200
	PTFE-T125 C25		2,10 ±0,05	_	65 ±3	_	_	≥ 14	≥ 70
	PEEK natural PK100-CN		1,31 ±0,02	_	_	_	_	≥ 115	≥ 17

Tear growth resistance	Compression set 72h/23°C	Compression set 22h/70°C	Compression set 22h/100°C	Compression set 22h/150°C	Compression set 22h/175°C	Coefficient of friction (dyn.)	Humidity absorption	Minimum service temperature	Maximum service temperature
DIN 53515	DIN 53517A	DIN 53517A	DIN 53517A	DIN 53517A	DIN 53517A	ASTM D1894	20°C/65°rel.M		
kN/m	%	%	%	%	%	h	%	°C	°C
≥ 100	≤ 17	≤ 25	≤ 35	_	_	_	_	-30	125
≥ 110	≤ 14	≤ 25	≤ 45	_	_	_	_	-30	115
≥ 110	≤ 15	≤ 30	≤ 30	_	_	_	_	-30	135
≥ 100	≤ 17	≤ 20	≤ 35	_	_	_	_	-50	105
≥ 120	_	≤ 25	≤ 40	_	_	_	_	-30	115
≥ 110	_	≤ 25	≤ 35	_	_	_	_	-30	125
≥ 130	_	≤ 25	≤ 35	_	_	_	_	-30	125
≥ 120	_	≤ 25	≤ 30	_	_	_	_	-30	125
≥ 100	_	≤ 20	≤ 30	_	_	_	_	-30	105
_	≤ 7	≤7	≤8	_	_	_	_	-25	100
	≤ 18	≤ 22	≤ 26	_	_	_	_	-25	150
_	≤ 23	≤ 15	_	≤ 27	_	_	_	-20	150
_	≤ 17	≤ 16	≤ 16	≤ 24	_	_	_	-40	150
_	≤ 25	≤ 23	≤ 24	≤ 49	_	_	_	-50	130
_	≤ 32	≤ 27	≤ 24	_	≤ 29	_	_	-15	210
_	≤ 17	≤ 10	≤ 7	_	≤ 11	_	_	-20	210
_	≤ 38	≤ 30	≤ 30	_	≤ 39	_	_	-25	210
_	≤ 18	≤ 12	≤ 12	_	≤ 26	_	_	-30	210
_	≤ 13	≤ 12	≤ 8	_	≤ 24	_	_	-55	210
_	≤ 4	_	_	_	≤ 22	_	_	-55	180
_	_	_	_	_	_	≤ 0,4	0,2	-50	100
_	_	_	_	_	_	≤ 0,4	2,2	-30	100
_	_	_	_	_	_	≤ 0,1	_	-200	260
_	_	_	_	_	_	≤ 0,08	_	-200	260
_	_	_	_	_	_	≤ 0,13	_	-200	260
_	_	_	_	_	_	≤ 0,13	_	-200	260
_	_	_	_	_	_	≤ 0,5	0,2	-50	-250



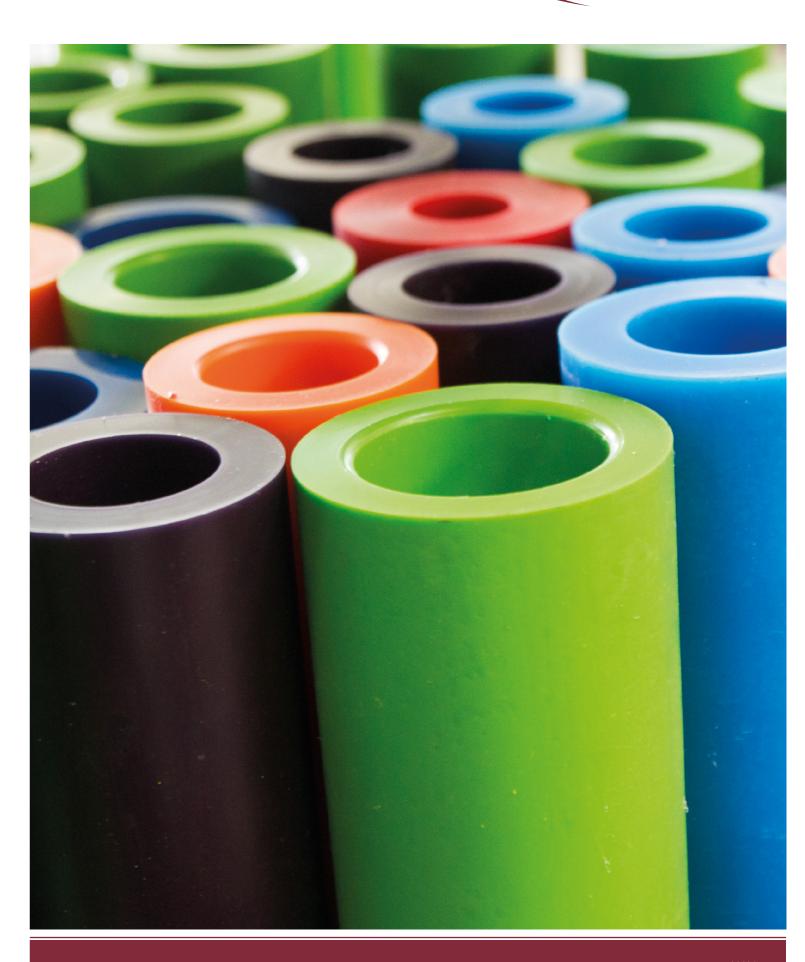
Food Contact Materials conform with FDA and EG 1935/2004

	Materials conform	Color						
	PU	U500-R95						
	PU	U530-B95-LT						
POLYURETHANE	PU	U540-VI95-CR						
2	PU	U570-D57						
	NBR	NBR111-W85						
	EPDM	E132-W85						
ELASTOMERS	FPM	F110-BR85						
	Silicone	S102-R85						
	Silicone	S103-BL85						
	POM	P101-WE						
	Polyamide	PA6-A112-WC						
PLASTICS	PTFE	T101-W						
	PEEK	PK100-CN						



The charts on page 8-10 only represent an excerpt of our most important seal materials and their typical properties. The data represent the typical results of tests. It is not recommended to go to the limits of more than one property. An exhaustive overlook over all Seal Maker materials can be found on pages 14 / 15.

More detailed information can be found in our material data sheets. In case of doubt we suggest to get in contact with our application engineers, or to carry out a test run.





Temperature Range

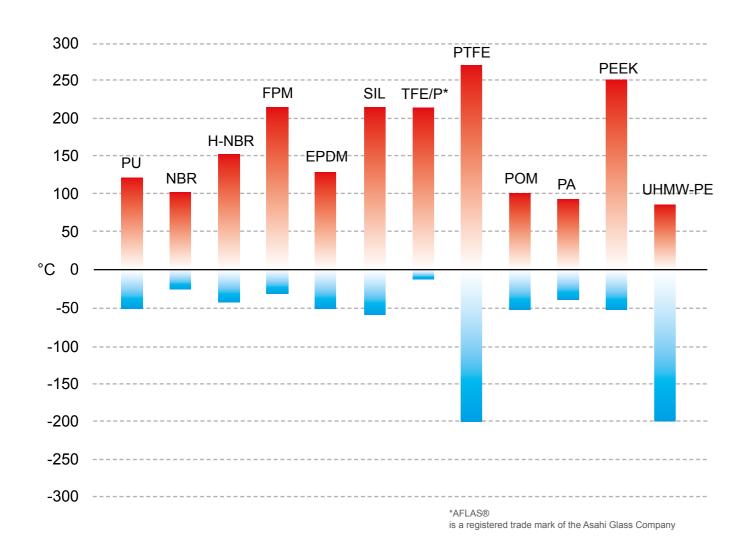








Table of materials

	Description	Color	Application temperature	Hardness at 20°C	Main application
	PU U500-R95 red		-30 to +125°C	Shore A 95 +/-2	Lip seals, wiper rings, chevron packs and other seal elements Mineral oil, HFA and HFB fluids, water, sea water, diluted acids and leaches. Improved thermal and chemical resistance, excellent wear resistance and low friction Applicable for contact with foodstuff
ysis	PU U510-G88 light green		-30 to +115°C	Shore A 90 +/-2	Lip seals, wiper rings, chevron packings and other seal elements Mineral oils, HFA, HFB fluids, water, sea water, diluted acids and leaches. Application for pneumatic and low pressure
stant to hydro	PU U520-OR95-HT orange		-30 to +135°C	Shore A 96 +/-2	Lip seals, wiper rings, chevron packings and other seal elements Mineral oils, HFA, HFB fluids, water, sea water, diluted acids and leaches. Application at elevated temperature
e grades resis	PU U530-B95-LT light blue		-50 to +105°C	Shore A 95 +/-2	Lip seals, wiper rings, chevron packings and other seal elements Mineral oils, HFA, HFB fluids, water, sea water Applications at low temperature
* all Polyurethane grades resistant to hydrolysis	PU U540-VI95-CR violet		-30 to +115°C	Shore A 95 +/-2	Lip seals, wiper rings, chevron packings and other seal elements Mineral oils, HFA, HFB fluids, water, sea water Improved chemical resistance, suitable for CIP processes Applicable for contact with foodstuff
	PU U550-GM95 dark red		-30 to +125°C	Shore A 95 +/-2	Lip seals, wiper rings, chevron packings and other seal elements Mineral oils, HFA, HFB fluids, water, sea water Improved wear and friction properties for water hydraulics, and heavy duty applications with insufficient lubrication
POLYURETHANE	PU U570-D57 blue		-30 to +125°C	Shore D 57 +/-3	Back-up rings, guide rings with preload element. Mineral oils, HFA, HFB fluids, water, sea water High pressure and extrusion resistance
PO	PU U580-D57G grey		-30 to +125°C	Shore D 57 +/-3	Back-up rings or composite seals with preload element Mineral oils, HFA, HFB fluids, water, sea water High pressure and extrusion resistance Improved wear and friction properties
	PU U203-G95 green		-30 to +105°C	Shore A 95 +/-2	Lip seals, wiper rings, chevron packings and other seal elements Mineral oils, HFA, HFB fluids, water, sea water
	NBR N107-B85 black		-25 to +100°C	Shore A 85 +/-5	Lip seals, wiper rings, vee packings and other seal elements Mineral oils, HFA, HFB fluids, water, sea water
NBR	NBR 95 N109-B95 black		-25 to +100°C	Shore A 95 +/-5	Lip seals, wiper rings, vee packings and other seal elements Mineral oils, HFA, HFB, HFC fluids, cold water High extrusion resistance
	NBR FDA N111-W85 white		-22 to +100°C	Shore A 85 +/-3	Lip seals, wiper rings, vee packings and other seal elements Mineral oils, HFA, HFB, HFC fluids, cold water
	H-NBR HN112-B85 black		-25 to +150°C	Shore A 85 +/-5	Lip seals, wiper rings, vee packings and other seal elements Mineral oils, HFA, HFB, HFC fluids, cold water Applicable for contact with foodstuff
H-NBR	H-NBR RGD HN900-B85-RGD black		-20 to +150°C	Shore A 85 +/-5	Lip seals, wiper rings, vee packings and other seal elements Mineral oils, HFA, HFB, HFC fluids at high temperature Aliphatic hydrocarbons, dilute acids and bases, RGD (ED) optimized for use in Oil & Gas Industry, meets the NORSOK M-710 requirements
	H-NBR RGD LT HN901-B85-RGD black		-40 to +150°C	Shore A 85 +/-5	Lip seals, wiper rings, vee packings and other seal elements Mineral oils, HFA, HFB, HFC fluids at high temperature Aliphatic hydrocarbons, dilute acids and bases, RGD (ED) optimized for use in Oil & Gas Industry, meets the NORSOK M-710 requirements, application at lower temperature
	FPM F109-BR85 brown		-20 to +210°C	Shore A 85 +/-5	Lip seals, wiper rings, vee packings and other seal elements Mineral oils, HFA, HFB, HFC fluids at high temperature Aliphatic hydrocarbons, dilute acids and bases RGD (ED) optimized for low temperature use in Oil & Gas Industry
V	FPM FDA F110-BR85 brown		-25 to +210°C	Shore A 85 +/-5	Lip seals, wiper rings, vee packings and other seal elements Mineral oils, HFD fluids at high temperature Very good chemical resistance such as phosphates and chlorinated hydrocarbons, crude and sour gas Applicable for contact with foodstuff
FPM	FPM F111-B85 black		-25 to +210°C	Shore A 85 +/-5	Lip seals, wiper rings, vee packings and other seal elements Mineral oils, HFA, HFB, HFC fluids at high temperature Aliphatic hydrocarbons, dilute acids and bases RGD (ED) optimized for low temperature use in Oil & Gas Industry
	FPM-RGD F800-B85-RGD black		-30 to +210°C	Shore A 85 +/-5	Lip seals, wiper rings, vee packings and other seal elements Mineral oils, HFD fluids at high temperature Very good chemical resistance such as phosphates and chlorinated hydrocarbons, crude and sour gas RGD (ED) optimized for use in Oil & Gas Industry Meets the NORSOK M-710 requirements

	Description	Color	Application temperature	Hardness at 20°C	Main application
	EPDM E131-B85 black		-50 to +130°C	Shore A 85 +/-5	Lip seals, vee packings and other seal elements Hot water and steam, ozone, dilute acids and alkaline solutions. EPDM is NOT resistant against mineral oils
EPDM	EPDM FDA E132-W85 white		-50 to +100°C	Shore A 85 +/-3	Lip seals, vee packings and other seal elements Hot water and steam, ozone, dilute acids and alkaline solutions. EPDM is NOT resistant against mineral oil Applicable for contact with foodstuff
	EPDM KTW E133-W270 black		-45 to +120°C	Shore A 85 +/-5	Lip seals, vee packings and other seal elements Hot water and steam, dilute acids and alkaline solutions. EPDM is NOT resistant against mineral oil Applicable for use in drinking water
SILICONE	Silicone FDA S102-R85 red		-55 to +210°C	Shore A 85 +/-5	Flange seals, gaskets and other static seals Mineral oils, HFA, HFB, HFC, HFD fluids, ozone Not recommended for dynamic applications Applicable for contact with foodstuff
SILIC	Silicone FDA S103-BL85 blue		-55 to +180°C	Shore A 85 +/-3	Flange seals, gaskets and other static seals Mineral oils, HFA, HFB, HFC, HFD fluids, ozone Not recommended for dynamic applications Applicable for contact with foodstuff
TFE/P	AFLAS AF101-B85 black		-15 to +210°C	Shore A 85 +/-5	Lip seals, vee packings and other seal elements Mineral oils, HFA, HFB, HFC, HFD fluids Hot water and steam, ozone, dilute acids and alkaline solutions, Sour oil and gas, amines
	PTFE-P FDA T101-W white		-200 to +260°C	Shore D 51 - 60	Composite seals with elastomer preload elements, spring loaded seals, Back-up and guide rings Resistance to almost all common chemicals and fluids except molten alkaline metals. Applicable for contact with foodstuff
PTFE	PTFE-F T105-G grey		-200 to +260°C	Shore D 55 - 64	Composite seals with elastomer preaload elements Spring loaded seals, back-up and guide rings Resistance to almost all common chemicals and fluids except molten alkaline metals. Glass fibre / MoS2 reinforced for improved wear and extrusion resistance
PT	PTFE-40% T110-BR40 bronze brown		-200 to +260°C	Shore D 62 - 67	Composite seals with elastomer preaload elements Resistance to almost all common chemicals except molten alkaline metals. Filled with 40% bronze for improved wear, pressure and extrusion resistance
	PTFE-25% T125-C25 carbon grey		-200 to +260°C	Shore D 62 - 67	Composite seals with elastomer preaload elements Spring loaded seals, back-up and guide rings, rotary seals Resistance to almost all common chemicals except molten alkaline metals. 25% carbon powder friction properties and increased extrusion resistance
	POM FDA P101-WE white		-50 to +100°C	-	Back-up and guide rings, machined parts with tight tolerances Mineral oils, HFA, HFB, HFC fluids Minor absorption of water, applicable for contact with foodstuff
SOL	PA FDA A112-WC natural		-40 to +90°C	-	Back-up and guide rings, machined parts Mineral oils, acids and dilute alkaline solutions Applicable for contact with foodstuff
PLASTICS	PEEK natural PK100-CN beige		-50 to +250°C	Shore D 90	Composite seals with elastomer preload elements, Back-up and guide rings high prescision parts Excellent wear, friction and extrusion properties Resistance to almost all common chemicals Applicable for contact with foodstuff
	UHMW - PE PE1000-HD white		-200 to +80°C	Shore D 60 - 65	Back-up and guide rings, spring loaded seals High pressure and extrusion resistance Very low water absorption, excellent friction and wear properties Applicable for contact with foodstuff



The indicated minimum application temperatures are thought as a general guideline, because a seal's function at low temperatures is dependent on the kind of the seal, the general application conditions, and on the kind of the surrounding metal parts the seal is in touch with. The indicated upper temperature limits may be exceeded, but this reduces the service life. Other materials available on request.

In case of doubt you are always welcome to contact our application engineers.

INT. HEADQUARTERS

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