

Materials and Semi-Finished Products









Trygonal Materials and Semi-Finished Products

We are a dynamic international organisation of independent seal manufacturers and plastics processors. In our group, we produce all types of gaskets and plastic parts such as O-rings, moulded rubber parts, metal rubber compounds, foam moulded parts, semi-finished products and machines for machining seals. We use the latest production techniques.

We produce semi-finished products of polyurethane and rubber materials. In cooperation with industry and universities we are continually developing and upgrading our materials and processes. All materials are tailored to your needs, tested under the harshest conditions by recognised institutions for compliance such as the FDA, KTW, W270, 3-A Sanitary. As different as the demands on seals often are, we have the right material for you. Currently we have more than 45 different material selections and we can offer for each of them over 600 different dimensions. In addition special sizes in various materials are also possible.

Specific properties of the Trygonal polyurethanes

- Hydrolysis resistant
- Low temperature
- Food approval
- Reduces friction
- High hardness
- High temperature

Up to a diameter of 2000mm, in different levels of hardness and a variety of colours

Trygonal rubber elastomers

FPM, EPDM, NBR, HNBR, VMQ, FVMQ, TFE, and so on up to a diameter of 1500mm

Approvals

DVGW, KTW D1 D2, FDA, NSF, UL, MIL

Applications

Automotive, construction, mining, railways, power generation, aerospace, semiconductor, power plant, solar and wind power, food & beverage, engineering, medical, mobile hydraulics, oil & gas, paper, pharmaceutical, steel works.

- We are a sealing and plastic parts manufacturer
- We see ourselves as a partner to our customers
- We are independent, holistic and solution-oriented
- We are an international network company and we work world-wide
- We see our company culture like life: varied, complex and exciting
- We value greatly the individuality and the expertise of the staff
- We are committed to high professional ethics and integrity in all we do

All this creates a passionate, innovative and dynamic team to support your business.



Elastomers

Elastomers are plastics that keep their shape but are flexible under pressure. These plastics can be elastically deformed under heat and tensile or compressive load, but after that they return back to their original shape. Elastomers are materials that can be easily deformed but they return to their original shape without any permanent effect. Principally the elastomers can be subdivided in two main groups:

- Chemically crosslinked elastomers (rubber materials)
- Thermoplastic elastomers (polyurethane materials)

Conventional elastomers don't melt. On the other hand, in certain temperatures and conditions, thermoplastic elastomers are malleable. It must be understood that at very cold temperatures elastomers become as hard as glass and loose these reversable properties.

Applications

Rod seals, piston seals, wipers, rotary seals, gaskets, o-rings, damping elements, springs, coupling elements, rollers, moulded parts, etc.

Thermoplastics

Thermoplastics are also called plastomers, and these are plastics which can be deformed in certain temperature ranges. This process is reversible and can be repeated by cooling and reheating; being careful to ensure the temperature does not affect the material's molecular properties which change when the material melts.

This is the major difference between thermoplastics and elastomers. Another unique feature is the ability of thermoplastics to be used in welding.

Applications

Sealing elements, back-up rings, guide rings, pressure and back-up rings and bushes, etc.





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With our flexible production process, we are in a position to produce for our customers any desired inner and outer diameter raw material:

- Elastomers (rubber) up to 2000mm in diameter
- Thermoplastic elastomers (polyurethane) up to 2000mm in diameter
- Plastomers and PTFE Materials up to 2000mm in diameter

Other special sizes are available on request

Material development

All standard materials can be modified to your specific application so that the ideal material compound can always be found. Other materials, including colour selection and approvals, can be developed with our material technologists.

Manufacturing processes

For different materials different manufacturing processes are available:

- injection molding process
- vulcanisation process
- casting process

Availability

Most materials are available in rod, sheet or tubes. Due to our production philosophy we are able to produce from 1 piece to very large series of tubes, according to our customers wishes.

For more detailed information please contact our specialists



Operating limits and capabilities



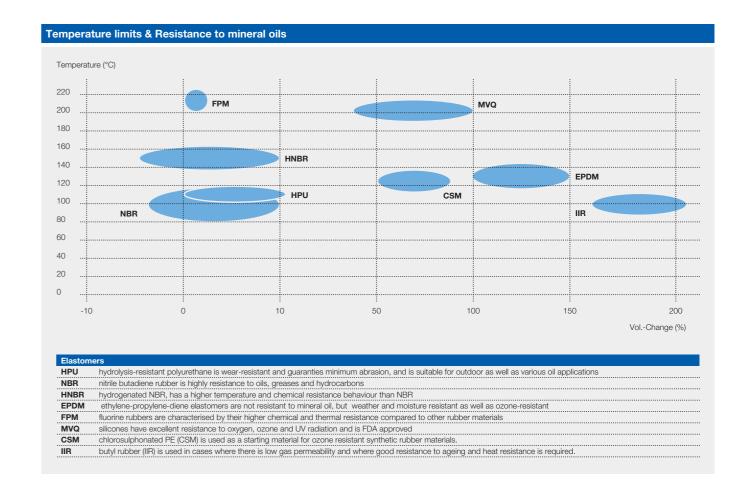
This illustration shows what materials are produced and are available to be produced by Trygonal.

The diagram below shows the temperature limits as well as the volume change expected when the material is placed in mineral oil. This is shown as a percentage for each respective material.

Unlike other manufacturers Trygonal can also offer many other modified materials, each with properties to match your needs.

Because of this customer-centric approach Trygonal can offer our customers a tailor-made range of elastomers as well as thermoplastics.

On the following pages the main physical, chemical and ecological features of the materials used in sealing technology are demonstrated.



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Designation	Approvals	Color	ဂို min. operating temperature	characoperating temperature temperature characoperating characoperating temperature short	temperature short	Shore A hardness DIN 53505 DIN ISO 7619-1 Shore D hardness DIN 53505 DIN ISO 7619-1	hardness bulled by bulled	% Compression set 70 °C/22 h DINISO 815-1 DINISO 815-1	\$\int \text{Compression set} \ 70 \cdot \text{7.0 h} \ \text{DIN ISO 815-1} \ \$\int \text{Compression set} \ \text{100 \cdot \cdot \cdot \text{2.2 h}} \ \text{DIN ISO 815-1} \ \$\int \text{Compression set} \ \text{150 \cdot \cdot \cdot \cdot \text{2.2 h}} \ \text{DIN ISO 815-1} \ \$\int \text{Compression set} \ \text{150 \cdot \cdot \cdot \cdot \cdot \text{2.2 h}} \ \text{DIN ISO 815-1} \ \$\int \text{Compression set} \ 150 \cdot \	DIN ISO 815-1 Tensile strength at 50% elongation B IN 53504 Tensile strength at 7 Tensile strength at 7 Tensile strength at 7 Tensile strength at 50% elongation 5 Tensile strength at 5 Tensile str	m 100% elongation DIN 53504 Tensile strength at 300% elongation	b DIN 53504 Tensile strength DIN 53504 A ASTM D 4745-79	% Elongation at break DIN 53504	Plexural E-modulus Bolin 53542 Tear strength Din ISO 34-1 A	Rebound resilience	// Impact strength J DIN 53453	B DIN ISO 4649 B Coefficient of friction	Thermal conductivity M DIN 52612	On Bartesistance DIN 53461 Lin. expansion coefficient DIN 52328	Melting temperature DIN 53736 Water absorption DIN 53495	Fire behavior UL 94 Test MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM		Diluted acids	Concentrated acids Diluted alkalis	Concentrated alkalis Hot water / steam	Cold water UV radiation Gamma radiation	Food contact Mineral oils Acid oils and gases	HFC HFD-U	HETG = biological basis Rod and piston seals Wipers	Rotary seals Static sealing systems	elements Backup and guide rings
HPU premium - hydrolysis-resistant polyurethane, food grade - resistant to mineral oils, HFD-U and HETG liquids, acid oils and gases, cold water and diluted acids and alkalis - applicable as rod- and piston seals, wipers, rotary seals, as well as backup- and guiding rings, also in static sealing systems	– FDA	• red	-30	+115		94 +/- 3 49 +/- 3	1.192	14.1	27.0 35.1	12	23.7	38.0	413	97.0	39.0		26						•	•	•	• •	• •	• •	• •	• •	•
HPU gecco - hydrolysis resistant polyurethane - resistant to mineral oils, HFD-U and HETG liquids, acid oils and gases, cold water and diluted acids and alkalis - applicable as rod- and piston seal, wiper, rotary seal, as well as backupand guiding rings, also in static sealing systems		green	-30	+115		94 +/- 3 49 +/- 3	1.194	23.0	27.0 40.0	10	0.9 20.6	36.0	460	100.0	-		26						•	•	• •	• •	• •	• • •	• •	• •	•
HPU taiga - hydrolysis resistant polyurethane - polyurethane for low temperature applications - resistant to mineral oils, HETG liquids as well as diluted acids and alkalis - applicable as rod- and piston seal, wiper, rotary seal, as well as backupand guide rings, also in static sealing systems		night blue	-50	+115		94 +/- 3 47 +/- 3	1.162	26.0	38.0 21.0	9.:	2 12.3	23.5	525	91.0	-		75						•	•	•	• •	• •	• •	• •	• •	•
X-HPU solid - hydrolysis-resistant hard polyurethane - HPU in a harder setting, also for backup rings - resistant to mineral oils, HFD-U and HETG liquids, acid oils and gases, cold water and diluted acids and alkalis - applicable as rod- and piston seals, wipers, rotary seals, as sealing rings with preload element and as backup element, guiding ring and in static sealing systems		● dark red	-30	+110		58 +/- 3	1.200	22.0	25.0 –	19	9.9 40.7	40.7	302	100.0	18.0		47						•	•	• •	• •	• •	• • •	• •	• •	•
HPU lubric - hydrolysis-resistant polyurethane modified with lubricants - polyurethane with a reduced friction coefficient - resistant to mineral oils, HFD-U and HETG liquids, acid oils and gases, cold water and diluted acids and alkalis - applicable as rod- and piston seal, wiper, rotary seal, as a backupand guiding ring and in static sealing systems		◆ black	-30	+110		94 +/- 3 49 +/- 3	1.195	30.0	17.0 31.0	11	.8 22.8	40.9	464	94.0	-		29						•	•	• •	• •	• •	• •	• •	• •	•
X-HPU lubric - hydrolysis-resistant, hard polyurethane, modified with lubricants - HPU in a harder setting, with a reduced friction coefficient, also for backup rings - resistant to mineral oils, HFD-U and HETG liquids, acid oils and gases, cold water and diluted acids and alkalis - applicable as rod- and piston seal, wiper, rotary seal, as a backupand guiding ring and in static sealing systems		● black	-30	+110		58 +/- 3	1.210	4.0	18.0 10.0	19	38.0	42.5	364	96.0	21.0		10						•	•	• •	• •	• •	• • •	• •	•	•
HPU diet - hydrolysis-resistant polyurethane, food grade according to EU standards - food grade HPU, for critical hygienic applications - resistant to mineral oils, HFD-U and HETG liquids, acid oils and gases, cold water as well as diluted acids and alkalis - applicable as rod- and piston seals, wipers, as backup- and guiding rings and in static sealing systems	- FDA - EU1935/2004 - EU10/2011	O white	-30	+110		93 +/- 3 46 +/- 3	1.200	24.0	28.0 33.0	12	2.8 37.7	43.7	445	38.0	45.0		35						•	•	• •	• •	• •	• • •	• •	• •	•
HPU mellow - hydrolysis resistant polyurethane - HPU in a softer setting, with very good machining properties - resistant to mineral oils, HFD-U and HETG liquids, acid oils and gases, cold water and diluted acids and alkalis - applicable as rod- and piston seals, wipers and in static sealing systems		light green	-30	+95		86 +/- 3	1.188		17.0 21.0	6.4	5 33.3	44.2	355	69.0	41.0		51						•	•	•	• •	• •	• •	• •	• •	•
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																						Chemical a	nd environmental	l resistance					Sealing systems	is	
Designation	Approvals	Color	္တံ min. operating temperature	S max. operating temperature	temperature short	Shore A hardness DIN 53505 DIN ISO 7619-1 Shore D hardness DIN 53505 DIN ISO 7619-1 E Ball indentation	multipling by the property of	Compression set 23 °C/70 h DIN ISO 815-1 % Compression set 70 °C/20 h	Compression set 70 °C/70 h DIN ISO 815-1	\$\text{Compression set} \\ 100 \cdot \cdot 2 \text{h} \\ \DINISO 815-1 \\ \text{\$\cdot Compression set} \\ 125 \cdot \cdot 2 \text{h} \\ \DINISO 815-1 \\ \DINISO 815-1 \\ \text{\$\cdot Compression set} \\ \$\cdot Compression se	## Compression set	Tensile strength at 100% elongation DIN 53504	Tensile strength at 300% elongation DIN 53504	M ASTM D 4745-79 S Elongation at break DIN 63504	DIN 53504 BIN 53542 DIN 53542 Tear strength DIN ISO 34-1 A	Rebound resilience	DIN 53512 Impact strength	M Thermal conductivity J DIN 52612	Heat resistance DIN 53461 Lin. expansion coefficient DIN 52328 ON Melting temperature CON 52328	DIN 53736 Water absorption DIN 53495 Fire behavior UL 94 Test	Electrical resistance	Diluted acids Concentrated acids	Diluted alkalis Concentrated alkalis	Hot water / steam Cold water	UV radiation Gamma radiation	Food contact Mineral oils	Acid oils and gases	HFD-U HETG = biological basis	Rod and piston seals Wipers	Static sealing systems Seals with preload	Backup and guide rings
NBR standard - for general applications - resistant to mineral oils, HFC and cold water		● black	-35	+110		85 +/- 5	1.317	6.4 6.2		12.0		8.8	15	2 226	5.4	25.0	.0 82					• 1	• •	•	. • (. • •	• •	• •	• •	• • •	•
NBR solid NBR in a harder setting resistant to mineral oils, HFC and cold water		black	-30	+110		90 +/- 5	1.229	9.5 17.8		18.5	11.1		18	82	3.0	26.0	.0 165					• 1	•	•	• •	• •	• •	• •	• •	• • •	•
NBR diet - NBR with a food conformity - resistant to mineral oils, HFC and cold water	- FDA - EU 1935/2004	O white	-30	+105		88 +/- 5	1.340	29.4 20.6	3	23.2		3.9	7.8 7.6	387	5.7	21.0	.0 320					•	• •	•	•	•	• •	• •	• •	• • •	
NBR mellow - NBR in a softer setting, for general applications - resistant to mineral oils, HFC and cold water		black	-35	+110		73 +/- 5	1.220	3.3 5.9		9.9		6.1	14.	238	38 4.4	31.0	.0 136					•	•	•	•	•	• •	• •	• •	• • •	•
NBR taiga - NBR especially for applications at low temperatures - resistant to mineral oils, HFC and cold water		black	-50	+105		82 +/- 5	1.293	7.7 9.9		13.7		12.2	16	3 147	4.5	45.0	.0 79.5					•	•	•		•	• •	• •	• •	• • •	
NBR detec - NBR with a food conformity, metal detectable - resistant to mineral oils, HFC and cold water	– FDA – EU 1935/2004	blue	-30	+105		89 +/- 5	1.69	30.4 38.3	3	49.5		3.7	5.1 5.2	317	17 12.8	24.0	.0 290					•	• •	•	•	•	• •	• •	• •	• • •	•
X-NBR solid - carboxylated acrylic nitrile butadiene rubber - X-NBR in a harder setting, with improved elasticity and a higher abrasion resistance - resistant to mineral oils, HFC and cold water		● black	-30	+110		89 +/-5	1.260	13.1 9.9		12.9		16.1	21.	144	3.9	19.0	.0					•	•	•	• •	•	• •	• •	• •	• • •	•
H-NBR diet - hydrogenated acrylic nitrile butadiene rubber - H-NBR with a food conformity - resistant to mineral oils, HFC and cold water	- FDA - EU 1935/2004	green	-30	+150		82 +/-5	1.436		13.0	31.0	40.7	4.4	9.9 9.5	499	99 12.8	29.0	.0 110					•	•	•	•	•	•	•	• •	• • •	•
H-NBR solid - hydrogenated acrylic nitrile butadiene rubber - H-NBR in a harder setting - resistant to mineral oils, HFC and cold and sea water		black	-20	+150		95 +/- 5	1.243		15.0	34.9	36.9	19.2	22	137	5.1	25.0	.0 117					•	• •	•	• •		•	•	• •	• • •	•
H-NBR ED - hydrogenated acrylic nitrile butadiene rubber - developed against explosive decompression - resistant to mineral oils, HFC and cold water		black	-30	+150		88 +/- 5	1.297		6.0	18.6	23.3	8.0	21.	2 221	21 5.3	36.0	.0 117					•	• •	•	•	•	•	•	• •	• • •	•
H-NBR mellow - hydrogenated acrylic nitrile butadiene rubber - H-NBR in a softer setting, for general applications - resistant to mineral oils, HFC and cold water		black	-35	+150		75 +/- 5	1.170		2.0	11.4		7.1	23	240	4.2	40.0	.0 83					•	•	•	• •	•	•	•	• •	• • •	•
H-NBR detec - hydrogenated acrylic nitrile butadiene rubber, with a food conformity, metal detectable - H-NBR in a softer setting, for general applications - resistant to mineral oils, HFC and cold water	– FDA – EU 1935/2004	blue	-30	+150		82 +/- 5	1.360			(35.5	4.7	11.	232	32	36.0	.0					•	• •	•	•	•	•	•	• •	• • •	•
EPDM standard - excellent resistance to brake fluids like DOT3, DOT4 and DOT5.1 - resistant to HFC, cold water and hot water or water vapour, diluted acids and alkalis		black	-45	+135		87 +/- 5	1.160	28.0 24.0)	10.0		10.0	11.	263	9.1	43.0	.0 167					•	• •	•	•	•	•	• •	• •	• • •	•
EPDM spring - sulfur crosslinked EPDM - EPDM with a drinking water approval, release recommendation - resistant to HFC, cold water and hot water or water vapour, diluted acids and alkalis	- W270 D1 - WRAS BS6920-1:2 - EU 1935/2004	● black	-50	+135		87 +/- 5	1.270	12.1 16.3	3	8.0		9.7	15	249	6.4	32.0	.0 230					•	• •	•	•	•	• •	• •	• •	• • •	•
EPDM diet - peroxide crosslinked EPDM - EPDM with a food conformity - resistant to HFC, cold water and hot water or water vapour, diluted acids and alkalis	– FDA – EU 1935/2004	O white	-55	+135		88 +/- 5	1.210	32.6 32.3	3	19.3		5.1	6.6	160	50 4.9	45.0	.0 435					•	•	•	•	, •	•	• •	•	• • •	•
EPDM mellow - peroxide crosslinked EPDM - excellent resistance to brake fluids like DOT3, DOT4 and DOT5.1 - resistant to HFC, cold water and hot water or water vapour, diluted acids and alkalis		● black	-53	+135		76 +/- 5	1.390	14.6		13.6 21.6		4.3	15	3 340	7.8	39.1	.0 154					•	•	•	•	•	• •	• •	• •	• • •	•
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Fig. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.																											Chemical and e	environmenta	l resistance					Sealing syste	tems	
## Minimage And Anticomposition of the Minimage Anticompositio	Designation	Approvals	Color	c min. operating temperature max. operating	temperature δ max. operating temperature short	Shore A hardness DIN 53505 DIN ISO 7619-1 Shore D hardness	DIN 53505 DIN ISO 7619-1 Multiple Ball Indentation hardness DIN 53456	bonsity boln EN ISO 1183-1	% Compression set 23 °C/70 h DIN ISO 815-1	70°C/22 h DIN ISO 815-1 % Compression set	© Compression set 100 °C/22 h DINISO 815-1	% Compression set 150 °C/24 h DIN ISO 815-1 % Compression set 175 °C/24 h DIN ISO 815-1	Z Tensile strength at 50% elongation B DIN 53504 Tensile strength at Tensile strength at	u DIN 53504 Tensile strength at 300% elongation blin 53504	A Tensile strength UM DIN 53504 R ASTM D 4745-79 S Elongation at break	\$000 0.0000 0.000 000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.	B DIN 53542 DIN 53542 Tear strength	mm DINISO 34-1 A % Rebound resilience	DIN 53512 Pinpact strength DIN 53453	B Abrasion B DIN ISO 4649 B T Coefficient of friction	M Thermal conductivity M DIN 52612	O Heat resistance DIN 53461 X Lin. expansion	coefficient DIN 52328 c Melting temperature DIN 53736	% Water absorption DIN 53495 Fire behavior UL 94 Test	M/A Electrical resistance		Diluted acids Concentrated acids	Diluted alkalis Concentrated alkalis	Hot water / steam Cold water	UV radiation Gamma radiation	Food contact Mineral oils	Acid oils and gases HFC	HFD-U HETG = biological basis	Rod and piston seals Wipers	Rotary seals Static sealing systems	Seals with preload elements Backup and guide rings
The section of the se	EPDM diet mellow - peroxide crosslinked EPDM - EPDM with a food conformity in a soft setting - resistant to HFC, cold water and hot water or water vapour, diluted acids and alkalis	– FDA – EU 1935/2004	O white	-50 +13	5 –	77 +/- 5		1.170	25.0 2	0.3			2.5	-	6.1 380		3.6	53.	.0								• •	• •	• •	• •	•	•	• •	• •	• •	• •
Figure 1. The proper should be supplied to the proper should be su	EPDM detec - peroxide crosslinked EPDM - EPDM with a food conformity in a soft setting, metal detectable - resistant to HFC, cold water and hot water or water vapour, diluted acids and alkalis		blue	-50 +13	5	84 +/- 5		1.250	25.6 3	1.5			3.9		5.9 186		3.5	5 40.	.0								• •	• •	•	•	•	•	• •	• •	• •	• •
For exponential control contro	MVQ diet white - MVQ with a food conformity - resistant to mineral oils, HDF-U, and cold water	– FDA – EU 1935/2004	O white	-60 +21	0	84 +/- 5		1.499	12.2		18.8		4.9		6.1 185		14.9	.5 51.	.0	728							•	•	•	•	• •	•	•	•	•	•
## Section 1	MVQ diet blue - MVQ with a food conformity - resistant to mineral oils, HDF-U, and cold water		b lue	-60 +21	0	84 +/- 5		1.503		5.0	33.7		5.3		6.4 192		10.:	.2 51.	.0	657							•	•	•	•	• •	• •	• •	•	•	• •
## ACCUPATION CONTROL	MVQ diet red - MVQ with a food conformity - resistant to mineral oils, HDF-U, and cold water		coral red	-60 +21	0	83 +/- 5		1.510	7.9		6.1	18.5	6.3		7.4 120		10.0	.0 39.	.0	358							•	•	•	• •	• •	• •	• •	•	•	• •
## 1	MVQ diet transparent - MVQ with a food conformity - resistant to mineral oils, HDF-U, and cold water		O transparent	-60 +21	0	79+/- 5		1.190	11.6		10.8	20.0	2.7	5.0	8.9 320		18.0	.0 38.	1.0	137							•	•	•	• •	• •	• •	• •	•	•	• •
## PART OF THE PAR	MVQ detec - MVQ with a food conformity, metal detectable - resistant to mineral oils, HDF-U, and cold water		blue	-60 +21	0	88+/- 5		1.670	2	6.0			6.0		6.8 122		12.4	.4 52		847							•	• •	•	•	• •	• •	•	•	•	•
## Case	FPM diet brown - copolymer, bisphenolic crosslinked FPM - FPM with food conformity - resistant to mineral oils, HFD-U, HETG and cold water		brown	-25 +22	20	85 +/- 5		2.512			9.8	17.4 17.7	6.5		10.3 207		6.3	8.0)	205							• •	•	•	•	• •	• •	• •	•	•	• •
## Comparison of the control of the	FPM diet white - tetrapolymer, with a food conformity - resistant to mineral oils, HFD-U, HETG, cold and hot water and steam	- 3A-Sanitary Class I	O white	-25 +21	0	84 +/-5		2.590			36.8	48.5 61.8	3.9	5.0	10.5 452		11.7	7 7.0)	200							• •	•	•	•	• •	•	• •	• •	• •	•
Marked Ma	FPM ED - terpolymer anti-explosive decompression material - resistant to mineral oils, HFD-U, HETG, acid oils and gases, cold water		black	-25 +21	5	88 +/- 5		1.835			22.3	40.3 42.20	6.6		13.0 279		6.6	3 11.	.0	133							• •	•	•	•	• •	•	• •	• •	• •	• •
## detac FPM in a softer setting, with a food conformity, metal detectable resistant to mineral oils, HFD-U, HETG and cold water FDA	FPM BS3 - tetrapolymer, economically priced, high-quality FPM - resistant to mineral oils, HFD-U, HETG and cold water		black	-20 +22	10	80 +/- 5		1.960			4.6	23.0 38.6	5.6		11.9 123		4.2	2		211							• •	• •	•	•	• •	•	• •	• •	• •	•
## Standard ## Sta	FPM mellow - terpolymer, FPM in a softer setting - resistant to mineral oils, HFD-U, HETG and cold water		black	-25 +22	20	74 +/- 5		2.130			8.6	16.2 15.2	3.9		10.3 252	2	5.1	8.0	0	209							• •	•	•	•	• •	• •	• •	• •	• •	• •
For standard applications resistant to mineral oils, HFD-U and cold water Set Standard 10.0 1	FPM detec - terpolymer, FPM in a softer setting, with a food conformity, metal detectable - resistant to mineral oils, HFD-U, HETG and cold water	– FDA – EU 1935/2004	b lue	-25 +21	10	87 +/- 5		2.310				17.0			10.6 82		4.2	2 8.0	0	319							• •	•	•	•	• •	• •	• •	• •	• •	•
EM standard	FVMQ standard - fluorosilicone for standard applications - resistant to mineral oils, HFD-U and cold water		tomato red	-55 +23	10	90 +/- 5		1.580				18.1	5.3		6.6 160		25.	.4 32.	.0								•	•	•	•	•	• •	• •	•	•	•
	AEM standard - especially to seal operating fluids in vehicles - resistant to acid oils, gases and cold water, chemical resistant and heat resistant		black	-30 +15	0	87 +/- 5		1.305					10.	0	192		5.9) 22.	.0								•	• •	• •	•	• •	•	• •	• •	•	•
resistant to refrigerants, ozone and UV radiation, alcohols and salt water,	CR standard - resistant to refrigerants, ozone and UV radiation, alcohols and salt water, medium resistance in oils		black	-40 +10	0	81 +/- 5		1.450	10.2 1	0.8	17.0		9.5		14.7 163		17.0	0 41.	.0	163							•	• •	•	•	•	•	•	• •	•	•
tetra-fluoro-ethylene-propylene rubber (TFE-P), developed to withstand explosive decompression resistant to mineral oils, HFD-U and HETG, acid oils and gases and cold water	Aflas® ED - tetra-fluoro-ethylene-propylene rubber (TFE-P), developed to withstand explosive decompressio - resistant to mineral oils, HFD-U and HETG, acid oils and gases and cold water and hot water or water vapour	n	● black	-10 +22	20	87 +/- 5		1.590	57.7		39.0	40.0	11.8	5	18.9 207		3.7	8.0)	144													•	•	•	•







																												Chemic	cal and en	ironmental r	resistance					5	Sealing syste	tems	
Designation	Approvals	Golor	ລໍ min. operating temperature	ဂွ် max. operating temperature	cemperature short	Shore A hardness DIN 53605 DIN 53607	Shore D hardness DIN 53505 DIN ISO 7619-1	N Ball indentation m hardness n DIN 53456	Lensity Language Languag	© Compression set 70 ° C/22 h DIN ISO 815-1	% Compression set 70°C/70 h DIN ISO 815-1 % Compression set 100°C/22 h	DIN ISO 815-1 % Compression set 125 °C/22 h DIN ISO 815-1	mm/N Tensile strength DIN 53504	strength DIN 53455 b. DIN EN ISO 604:2003 A Yield stress	LUIN 53455 % Ultimate elongation DIN 53455	Z Tensile strength DIN 53564 B ASTM D 4745-79	© Elongation at break	K Flexural E-modulus DIN 53542	Z Tension E-Modul B DIN 53457	% Rebound resilience DIN 53512 Frame Impact strength Ju DIN 53453	Abrasion B DIN ISO 4649 B	Coefficient of friction	A Thermal conductivity B DIN 52612 A Heat resistance	DIN 53461 Lin. expansion coefficient DIN 52328	Melting temperature DIN 53736 Water absorption	DIN 53495 Fire behavior	UL 94 Test UL 94 Test Biectrical resistance	Diluted acids	Concentrated acids	Concentrated alkalis	Hot water / steam Cold water	UV radiation Gamma radiation	Food contact	Mineral oils Acid oils and gases	HFC HFD-U	HETG = biological basis	Rod and piston seals Wipers	Rotary seals Static sealing	Systems Seals with preload elements Backup and guide
2004 11 4		O					05 / 0	160		,,,	, , ,	,,,		70				3000																					
POM diet - Polyacetal, POM-C - excellent bearing material - low moisture absorption - resistant to mineral oils, HFC, HFD-U, HETG, acid oils and gases, cold water as well as acids and diluted alkalis - applicable as backup- and guiding rings	– FDA	O white	-50	+90			85 +/- 3	160	1.420					70	40			3000		no bre	ik	0.27	. 11	0 11	164–168 0	.25 94	14 H					,					•		• •
PA6G wear - Polyamide 6 casted - from 280 mm OD, replacement for POM - resistant to mineral oils as well as acids and diluted alkalis - high water absorption - applicable as backup- and guiding rings		beige	-40	+110			85 +/- 3	163	1.150					88-	-90 40			3900-42	1200	no bre	ık	0.4	0.28	8	220 6	.0 94	14 V-2	•	•	•	•	•	•	•	•	•	•	•	• • •
PTFE virgin diet - Poly-Tetra-Fluoro-Ethylene, unfilled - PTFE with a food conformity - resistant to mineral oils, HFC, HFD-U, HETG, acid oils and gases, cold water, hot water and steam as well as acids and diluted alkalis - applicable in static sealing systems	– FDA	O white	-200	+260			55 +/- 3	≥ 26	2.160				2	: 4		≥ 27	≥ 350		540			0.08	0.08	19				•	•	•	•	, •	•	•	•	•	•	•	• • •
PTFE glass wear - Poly-Tetra-Fluoro-Ethylene +15% glass fibres, +5% MoS2 - glass-fibre reinforced, low-wear PTFE, friction-modified - resistant to mineral oils, HFC, HFD-U, HETG, acid oils and gases, cold water, hot water and steam as well as acids and diluted alkalis - applicable as sliding rings with preload elements		dark grey	-200	+260			58 +/- 3	≥ 26	2.244				2	:8		≥ 16	≥ 185		1320			0.13	0.13	11				•	•	•	•	•	•	•	•	•	•	•	• •
PTFE bronze wear - Poly-Tetra-Fluoro-Ethylene +40% Bronze - low-wear PTFE - resistant to mineral oils, HFC, HFD-U, HETG, acid oils and gases, cold water, hot water and steam as well as acids and diluted alkalis - applicable as sliding rings with preload elements		bronze	-200	+260			60 +/- 3	≥39	3.150				2	: 10		≥ 22	≥ 216		1375			0.13	4.0	8.5				•	•	• •	• •)	•	•	•	•	•	•	• • •
PTFE carbon slide - Poly-Tetra-Fluoro-Ethylene +25% Carbon - friction modified PTFE - resistant to mineral oils, HFC, HFD-U, HETG, acid oils and gases, cold water as well as acids and diluted alkalis - applicable as sliding rings with preload elements		black	-200	+200			62 +/- 3		2.080				11.6 1	0	75			-					0.44 65		335			•	•	• •	•		•	•	•	•	•	•	• •
PEEK diet - polyether ether ketone - very good chemical and mechanical properties - resistant to mineral oils, HFC, HFD-U, HETG, acid oils and gases, cold water, hot water and steam as well as acids and diluted alkalis - applicable as rod- and piston seals	– FDA	beige	-65	+240	+300				1.320								≥60		3600				0.25 15	2 47	340			•	•	•	•)	•	•	•	•	•	•	• •
UHMW-PE diet - ultra-high molecular weight polyethylene - very good chemical and mechanical properties - resistant to mineral oils, HFC, HFD-U, HETG, acid oils and gases, cold water as well as acids and diluted alkalis - applicable as rod- and piston seals as well as in static sealing systems and sliding rings with preload elements		O white	-200	+80				38	0.930					17			≥ 50		720				0.42	200								•			•	•	•	•	• • •



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Germany

Trygonal Group GmbH

Neue Heimat 22 D-74343 Sachsenheim-Ochsenbach

Phone: +49 (0) 7046-9610-0 Fax: +49 (0) 7046-9610-33

info@trygonal.com

Switzerland

Trygonal Schweiz AG

Joweid Zentrum 2 CH-8630 Rüti ZH

Phone: +41 (0) 55 212 45 00 rueti@trygonal.com

Spain

Trygonal Iberia SL

Polígono Borda Berri, nº 13 Módulo C4 E-20140 Andoain (Gipuzkoa)

Phone: +34 (0) 943 303 900 iberia@trygonal.com

France

Technical consulting & sales

Phone: +33 (0) 6 44 39 61 80 france@trygonal.com

Austria

Trygonal GmbH

Industriering 5 A-9020 Klagenfurt

Phone: +43 (0) 463/310095 klagenfurt@trygonal.com

Trygonal Kunststoffinnovationen GmbH

Tragösser Straße 53 A-8600 Bruck an der Mur

Phone: +43 (0) 3862 27722-0 office@trygonal.com

Trygonal ATYP SERVICE

Beethoven Straße 1 A-2231 Strasshof

Phone: +43 (0) 2287/22235 atyp@atyp.com

Your Contact