EN

uni Material and Color Overview

uni chains

Colors and Materials

LB	Light Blue	Y	Yello	G	Grey
B	Blue	O	Orange	DG	Dark Grey
DB	Dark Blue	BR	Brown	EG	Extra Grey
P	Purple	T	Tan	K	Black
D	Red	I	Ivory	N	Natural
DD	Dark Red	W	White		
DE	Dark Green	LG	Light Grey		

Material	Density g/cm³	Color	Description
POM	1.41		POM is a thermoplastic material with very good mechanical and thermal properties. The material can also be characterized by great strength, stiffness and dimensional stability. POM is resistant to a wide selection of chemicals. POM has good bearing qualities, low coefficient of friction and good resistance to wear.
POM-D	1.41	B P D DE Y O BR T W LG G DG K N	POM polymers with self-lubricating components.
POM-DI	1.41	B P D DE Y O BR T W LG G DG K N	POM polymers with self-lubricating components and improved impact resistance.
POM-DK	1.41	O K Y	POM-DK is a reinforced POM polymer designed for applications where high wear resistance is needed and/or high conveyor speeds are required. The material is typically used for wear parts on sideflexing belts or in applications where very high wear resistance is required.
POM-LF	1.41	B P D DE Y O BR T W LG G DG K N	POM polymers with improved self-lubricating components.
POM-SLF	1.41	B P D DE Y O BR T W LG G DG K N	POM polymers with self-lubricating additives to obtain the lowest possible coefficient of friction.
POM-NL	1.41	B P D DE Y O BR T W LG G DG K N	POM polymers with no lubricant suitable for applications where you want to ensure that no lubricant may affect the product adhesion or the like.

Material	Density g/cm³	Color	Description
POM-DAS	1.40	B Y O LG G K	Antistatic POM with self-lubricating components is used in applications where you want to avoid build-up of static electricity. POM-DAS is normally used for manrider belts avoid to discomfort due to static electricity; it can also be used in applications where sticking of products must be avoid. Eg. products wrapped in plastic foil.
POM-NLAS	1.41	B Y O LG G K	A non-lubricated antistatic POM, used in applications where static electricity must be avoid, due to human comfort, but where lubricants must be avoid, due to specific processes.
POM-S	1.39	B P D DE Y O BR T W LG G DG K N	POM polymers that contain low noise components, mainly used for the new uni Snap Link® without pins.
POM-SI	1.40	B P D DE Y O BR T W LG G DG K N	High impact-resistant POM polymers that contain low noise components, mainly used for the new uni Snap Link® without pins.
POM-SX	1.44	B W	POM polymers with self-lubricating components. POM-SX will be the right solution where lower friction, higher load and lower noise (compared to standard POM) are required. POM-SX will mainly be used for high load capacity uni Snap Link® without pins. *Please note that POM-SX blue is not according to the standard color quality for blue. Small variations may occur.*
POM-EC	1.39	K	Electrically conductive POM is normally used in explosive areas where sparks and static must be avoided, such as areas with filling aerosol, camping gas, or the like. uni-chains standard EC holds a surface resistivity ≤ 1 x 10^6 Ohm according to IEC 60093/ASTM D257.
POM-MD	1.47	B	POM-MD is a metal detectable polyoxymethylene, which mainly are used for belts to increase food safety. Possible belt breakages might lead to product contamination, which can be detected by use of this material.
POM-XRD	1.75	W	POM-XRD is an X-ray detectable polyoxymethylene, which mainly are used in belts to increase food safety. Possible belt breakages might lead to product contamination, which can be detected by use of this material. POM-XRD is especially suitable for products were the food packaging is metalliferous, like tinfoil and metal lids.

Material	Density g/cm³	Color	Description
PP	0.91	B P D DE Y O T W LG G K N	Polypropylene is a thermoplastic material with very good chemical resistance properties. PP is an economical material for applications with high temperatures.
PP-I	0.91	B P D DE Y O T W LG G K N	Polypropylene with improved impact resistance and improved properties at low temperatures. Use of PP-I in hot water should be avoided.
PP-MI	0.97	DB DD	PP-MI is a metal detectable polypropylene, which mainly are used for belts to increase food safety. Possible belt breakages might lead to product contamination, which then can be detected by use of this material.
PP-HW	0.90	LB B W	PP-HW is a polypropylene which contains additives that reduce decomposition over time due to oxidization caused by metal ions in hot water applications like blanchers and cookers.
PP-AR	1.14	B W LG K N	PP-AR is an acid resistant material which is used where very high chemical resistance is required.
PP-FREC	1.22	K	PP-FREC is a polypropylene with both flame retardant and electrically conductive properties. The material holds a surface resistivity of 1 x 103 Ohm according to IEC60093/ASTM D257 and it is V0 rated according to UL94 at 3.2 mm.

Material	Density g/cm³	Color	Description
PE	0.96	B P D DE Y O T W G K N	Polyethylene is used in low temperature applications and where high impact resistance is required.
PE-I	0.95	B P D DE Y O T W G K N	Polyethylene with improved impact resistance.
PE-MI	1.02	DB	PE-MI is a metal detectable polyethylene, which mainly are used in belts to increase food safety. Possible belt breakages might lead to product contamination, which can be detected by use of this material.

Material	Density g/cm³	Color	Description
PBT	1.31	LG N	PBT is a polybutylene terephthalate material. This material has good friction and wear properties as well as excellent hardness and stiffness.
PBT-GR	1.45	K N	Glass reinforced polyester is a material with an extremely high resistance to wear and heat.

Material	Density g/cm³	Color	Description
PA6-FR	1.16	N	Flame retardant polyamide is a fire restricting material used in surroundings where there is a danger of the chain being ignited. The PA6-FR material is rated as V-0 which is the best classification according to UL 94 standard to avoid burning.
PA6	1.13	B D O T W LG K N	Polyamide PA6 is a thermoplastic material. The combination of mechanical properties and chemical resistance makes this material suitable for many applications. Polyamide has a high resistance to wear and dynamic loads. This material is primarily used for sprockets.
PA6-GF	1.28	B K	This polyamide is reinforced with glass fiber. PA6-GF will be the right solution where higher stiffness and higher strength are required, compared to standard polyamide. The combination of mechanical properties and chemical resistance makes this material suitable for many applications. Polyamide has a high resistance to wear and dynamic loads. Polyamide also has a larger working temperature range.
PA6.6	1.13	B D O W K N	Polyamide PA6.6 is a thermoplastic material with many fine properties. The material has a high resistance to wear, high strength and great stiffness. Furthermore, polyamide has a wide temperature range.
PA6.6-H	1.14	B D W N	PA6.6-H is a polyamide with the same properties as PA6.6. PA6.6-H improves upon PA6.6 in applications where higher temperature resistance is needed (e.g. shrink tunnels).
PA6.6-GFH	1.35	B O K	PA6.6-GFH is a special heat-stabilized polyamid PA6.6 with glass fiber reinforcement. The base material is still the PA6.6 with its important properties, as high strength and great stiffness. The base material has a high resistance to wear, and the glass fiber contributes to increase these properties. The unique PA6.6-GFH is heat resistant, and thus especially suitable for applications that are exposed to strong heat for extended time periods. *Note: PA materials will absorb water in wet environments which will cause expansion of the dimension with approx. 1-2%, depending on the temperature level and the humidity of the air. This is valid for all polyamide variations.*

Material	Density g/cm³	Color	Description
PVDF	1.78	N	Polyvinylidenfluoride is characterized by an especially high chemical resistance. Furthermore, PVDF has high wear resistance and good friction properties.

Material	Density g/cm³	Color	Description
PC	1.20	N	Polycarbonate is characterized by being extremely impact resistant, even at low temperatures. The natural colour of PC is grey.

Material	Density g/cm³	Color	Description
POX-FREC	1.34	K	POX-FREC is a relatively strong material with both flame retardant and electrically conductive properties. The material holds a surface resistivity of 1 x 10^3 Ohm according to IEC60093/ASTM D257 and it is V0 rated according to UL94 at 3 mm. Several products made of POX-FREC are B1 fire rated according to DIN 4102.
POX-FR	1.15	B D O W EG K	POX-FR is flame retardant material with high strength and very good wear resistance. The POX-FR material is B1 fire rated according to DIN 4102, for some products.

Material	Density g/cm³	Color	Description
NBWR	1.22	B Y W K	NBWR is material with extremely high impact strength and very good wear resistance. The material is resistant towards UV light and ozone cracking, which makes it suitable for outdoor applications. NBWR is a very good noise-absorbing material as well.

UV-additives	Description
UV-A/B	The UV-A/B stabilizer is an additive recommended for plastic materials used for outdoor applications. The UV-A/B stabilizer is able to protect materials against direct sunlight, is FDA approved and will increase the lifetime of plastic materials. The UV-A/B stabilizer is available for the most common materials such as POM, PP and PE.
UV-C	This UV-C stabilizer is specially developed for applications that are exposed to UV-C light. The special UV-C lights are used in the meat industry, where UV-C light is served to kill bacteria and microbes. The UV-C stabilizer holds an FDA approval and will increase the lifetime of the plastic material. This solution is only available in combination with POM material.

Expansion due to water absorption

All plastic materials absorb water from the surroundings, but very often it is not a major factor, except when dealing with Nylon (PA) material. With Nylon there can be a considerable change in dimension depending on the environment where the part is placed. The absorption of water causes the plastic part to swell and thus leads to a volume increase. The chart below shows the dimensional expansion of different materials due to moisture absorption (ISO 62 / ASTM D570 is based on changes in mass).

Code	Water Absorption ISO 62 / ASTM D570		Linear Dimensional Expansion Water Absorption	
	Equilibrium 23°C / 50% RH (%)	Saturation 23°C (%)	Equilibrium 23°C / 50% RH (%)	Saturation 23°C (%)
PP	0.02	0.03	0.01	0.01
PE	0.02	0.03	0.01	0.01
POM	0.22	0.8	0.1	0.37
PA6	2.8	8 – 10	1.05	3 – 3.8
PA6.6	2.5	7 – 8.5	0.95	2.7 – 3.2
PA6.6-GFH	2.0	6.0	0.8	2.36
PBT	0.2	0.5	0.09	0.22
PBT-GR	0.15	0.4	0.07	0.19
NBWR	0.2	0.6	0.08	0.24

Please note that the expansion shown above does not necessarily translate into belt/chain dimensions as there are many other factors involved.

Expansion due to temperature

Coefficient of linear thermal expansion between 23 and 55 °C		
Material	$\frac{mm}{(m \times °C)}$	$\frac{in}{(ft \times °F)}$
POM	0.12	0.0008
PP	0.13	0.0009
PE	0.18	0.0012
PA6/PA6.6	0.11	0.0007
PBT	0.11	0.0007

$\Delta L = L \times e_c \times (T2 - T1)$

ΔL: Length/width expansion, mm (in)
L: Length/width of belt at temperature T1, m (ft)
T2: Working temperature, °C (°F)
T1: Start temperature, 23°C (73.4°F)
e_c: Coefficient of linear thermal expansion. See table above.

Friction

Values provided in the tables below are dynamic coefficient of friction under clean conditions. Values will normally be 0.1 to 0.2 higher at the starting moment.

Material	PE Dry	PE Wet	Lubricated PE Dry	Lubricated PA Dry	Stainless steel Dry	Stainless steel Wet
POM-NL	0.20	0.15	0.12	0.22	0.25	0.21
POM-D	0.19	0.14	0.12	0.21	0.24	0.20
POM-LF	0.18	0.13	0.12	0.20	0.23	0.19
POM-SLF	0.17	0.12	0.12	0.19	0.22	0.18
POM-SX	0.15	0.10	0.11	0.17	0.20	0.16
PP	0.25	0.20	0.15	0.28	0.30	0.27
PP-AR	0.26	0.22	0.18	0.28	0.32	0.27
PE	0.25	0.20	0.15	0.22	0.25	0.20
PA6/6.6	0.20	n/a	0.15	0.22	0.30	n/a
PA6.6-GFH	0.26	n/a	0.18	0.24	0.30	n/a

Compounds and Polymer Materials

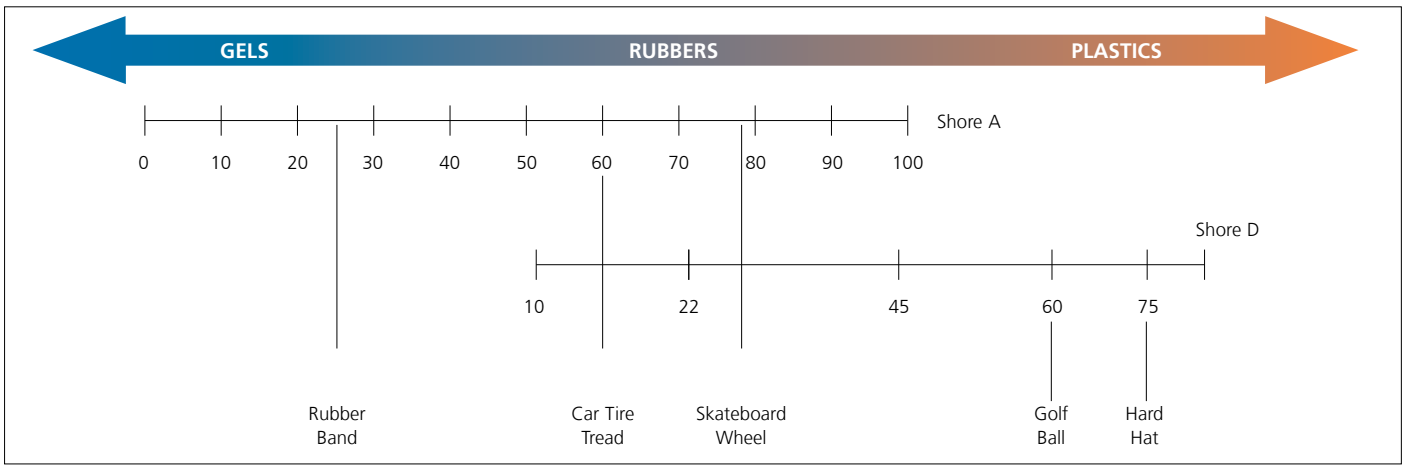
Polymers and compounds	Temperature range in atmospheric air		Load index[1]	Food Grade[5]
	°C	°F		
POM – Polyoxymethylene (D, DI, LF, LFI, SLF, SLFI, S, SI, SX and NL)	-40 to 90	-40 to 194	100	✓
POM DK – Wear-resistant polyoxymethylen	-40 to 90	-40 to 194	100	-
POM DAS and NLAS – Antistatic polyoxymethylene	-40 to 90	-40 to 194	100	-
POM EC – Electrically conductive polyoxymethylene	-40 to 90	-40 to 194	60	-
POM MD – Metal detectable polyoxymethylene	-40 to 90	-40 to 194	100	✓
POM XRD – X-ray detectable polyoxymethylene	-40 to 90	-40 to 194	100	✓
PP – Polypropylene[2] [3]	1 to 104	34 to 219	50	✓
PPI – Impact-resistant polypropylene	-10 to 80	14 to 176	40	✓
PPMI – Metal-detectable polypropylene	-10 to 80	14 to 176	35	✓
PPHW – Hot water polypropylene	1 to 104	34 to 219	50	✓
PP AR – Acid resistance and glass-filled polypropylene	1 to 104	34 to 219	50	-
PP-FREC – Flame retardant and electrical conductive polypropylene	1 to 104	34 to 176	30	-
PE – Polyethylene	-50 to 80	-58 to 176	40	✓
PE I – High impact resistant polyethylene	-50 to 80	-58 to 176	30	✓
PEMI – Metal-detectable polyethylene	-50 to 80	-58 to 176	30	✓
PBT – Polyester[4]	-40 to 100	-40 to 212	-	✓
PBT GR – Glass-reinforced polyester[4]	-40 to 125	-40 to 257	70	-
PA6 – Polyamide	-40 to 120	-40 to 248	100	✓
PA6 GF – Glass-filled polyamide	-40 to 120	-40 to 248	100	-
PA6.6 – Polyamide	-40 to 140	-40 to 284	100	✓
PA6.6 H – Heat-stabilized polyamide	-40 to 160	-40 to 320	100	-
PA6.6 GFH – Glass-filled and heat-stabilized polyamide	-40 to 180	-40 to 356	100	✓
PA FR – Flame-retardant polyamide	-40 to 120	-40 to 248	90	-
PVDF – Polyvinylidenfluoride	-40 to 100	-40 to 212	100	✓
PC – Polycarbonate	-20 to 130	-4 to 266	50	-
POX-FREC – Flame retardant and electrically conductive material	-30 to 110	-40 to 230	65	-
POX-FR – Flame retardant material	-40 to 125	-40 to 257	100	✓
NBWR – High impact and wear-resistance material	-30 to 80	-22 to 176	30	✓

[1] The load indexation values are only indicative, the geometry of the items will also have an effect. Load index is for 23°C 50%RH.
[2] Avoid impact below 8°C (46.4°F)
[3] Dry. In wet hot applications use PPHW
[4] Max. temperature in water 60°C (140°F)
[5] Not all colors are tested according to EC1935

Elastomer Materials

Code	Type	Color	Density g/cm³	Hardness		Temperature Range		FDA	Attachment to Base Link
				Shore A	Shore D	°C	°F		
00K	TPE-O	Black	0.97	55	-	-40 to 100	-40 to 212	-	Mechanical
01N	TPE-V	Natural	0.93	64	-	-40 to 125	-40 to 257	✓	Mechanical
01K	TPE-V	Black	0.93	64	-	-40 to 125	-40 to 257	✓	Mechanical
03N	TPE-S	Natural	1.19	60	-	-40 to 80	-40 to 176	✓	Co-molding
03K	TPE-S	Black	1.19	60	-	-40 to 80	-40 to 176	✓	Co-molding
03B	TPE-S	Blue	1.19	60	-	-40 to 80	-40 to 176	✓	Co-molding
04N	TPE-A	Natural	1.00	-	25	-40 to 80	-40 to 176	-	Mechanical
04K	TPE-A	Black	1.00	-	25	-40 to 80	-40 to 176	-	Mechanical
04W	TPE-A	White	1.00	-	25	-40 to 80	-40 to 176	-	Mechanical
05I	TPE-U	Ivory	1.19	85	-	-40 to 80	-40 to 176	✓	Mechanical
05K	TPE-U	Black	1.19	85	-	-40 to 80	-40 to 176	✓	Mechanical
06N	TPE-O	Natural	0.94	-	40	-40 to 70	-40 to 158	-	Mechanical
06K	TPE-O	Black	0.94	-	40	-40 to 70	-40 to 158	-	Mechanical
09K	TPE-V	Black	0.97	55	-	-40 to 125	-40 to 257	-	Mechanical
10W	TPE-U	White	1.22	-	60	-30 to 80	-22 to 176	✓	Mechanical
10K	TPE-U	Black	1.22	-	60	-30 to 80	-22 to 176	✓	Mechanical
10B	TPE-U	Blue	1.22	-	60	-30 to 80	-22 to 176	✓	Mechanical
11N	TPE-S	Natural	1.10	30	-	-40 to 80	-40 to 176	✓	Co-molding
11K	TPE-S	Black	1.10	30	-	-40 to 80	-40 to 176	✓	Co-molding
11B	TPE-S	Blue	1.10	30	-	-40 to 80	-40 to 176	✓	Co-molding
12K	TPE-S FR [1)]	Black	1.12	60	-	-40 to 104	-40 to 219	-	Co-molding
13N	TPE-U	Transparent	1.07	75	-	-30 to 70	-22 to 158	✓	Mechanical
13B	TPE-U	Blue	1.07	75	-	-30 to 70	-22 to 158	✓	Mechanical
21N	TPE-S	Natural	1.13	86	-	-40 to 104	-40 to 219	✓	Co-molding
21K	TPE-S	Black	1.13	86	-	-40 to 104	-40 to 219	✓	Co-molding

[1)] FR = Flame Retardant



Steels and cast Iron

Werkstoff no.	AISI or DIN	Steel type	Magnetic	Recommended Temperature Range		FDA / EC1935	Stainless sustainability
				˚C	˚F		
1.4305	303	Stainless Austenitic	N*	-70 to 420	-95 to 790	Y	++
1.4301	304	Stainless Austenitic	N*	-70 to 420	-95 to 790	Y	++
1.4404	316	Stainless Austenitic	N*	-70 to 420	-95 to 790	Y	+++
1.4021	420	Stainless Martensitic	Y	-70 to 420	-95 to 790	Y	+
1.4016	430	Stainless Ferritic	Y	-70 to 420	-95 to 790	N	++
1.0503	1045	Hardened Carbon Steel	Y	-70 to 500	-95 to 930	N	-
1.0122	St37-2	Carbon Steel	Y	-70 to 500	-95 to 930	N	-
1.0570	St52-3	Carbon Steel	Y	-70 to 500	-95 to 930	N	-
0.6025	GG-25	Cast Iron	Y	-20 to 250	-4 to 480	N	-

* Machined items can be weak magnetic (AISI 316 will remain almost nonmagnetic in many cases).

Composition (Weight %)

Werkstoff no.	AISI or DIN	Steel type	Max/min	C Carbon	Cr Chromium	Ni Nickel	Mo Molybdenum	Mn Manganese	P Phosphor	S Sulphur	N Nitrogen	Si Silicone	Cu Copper
1.4305	303	Stainless Austenitic	min	-	17	8	-	-	-	0.15	-	-	-
			max	0.1	19	10	-	2	0.045	0.35	0.1	1	1
1.4301	304	Stainless Austenitic	min	-	17	8	-	-	-	-	-	-	-
			max	0.07	19.5	10.5	-	2	0.045	0.015	0.1	1	-
1.4404	316	Stainless Austenitic	min	-	16.5	10	2	-	-	-	-	-	-
			max	0.07	18.5	13	2.5	2	0.045	0.015	0.1	1	-
1.4021	420	Stainless Martensitic	min	0.16	12	-	-	-	-	-	-	-	-
			max	0.25	14	-	-	1.5	0.04	0.015	-	1	-
1.4016	430	Stainless Ferritic	min	-	16	-	-	-	-	-	-	-	-
			max	0.08	18	-	-	1	0.04	0.015	-	1	-
1.0503	1045	Hardened Carbon Steel	min	0.42	-	-	-	0.5	-	-	-	-	-
			max	0.5	0.4	0.4	0.1	0.8	0.045	0.045	-	0.045	-
1.0122	St37-2	Carbon Steel	min	-	-	-	-	-	-	-	-	-	-
			max	0.17	-	-	-	1.4	0.045	0.045	0.009	-	-
1.0570	St52-3	Carbon Steel	min	-	-	-	-	-	-	-	-	-	-
			max	0.2	-	0.3	0.08	1.6	0.035	0.035	-	0.5	-
0.6025	GG-25	Cast Iron	min	3.0	-	-	-	0.5	0.5	-	-	1.5	-
			max	3.5	-	-	-	1	0.7	0.15	-	2.5	-

C: Carbon is a harmful component in all non-martensitic stainless steels, is should be kept as low as possible. For martensitic steels that are hardened, high carbon content will give a high surface hardness.

Cr: Chromium will together with the surrounding oxygen, create the invisible passive layer, which is the hallmark for stainless steels. It also adds to the yield strength and heat resistance, so in general will high chromium content give a better corrosion and heat resistance, plus higher yield strength.

Ni: Nickel toughens the steel and increase the resistance against stress corrosion cracking.

Mo: Molybdenum increases the corrosive resistance, especially in environments with low pH values. Furthermore is it a contributor to the passive layer, even better than chromium.

Mn: Manganese is in most cases a pollutant, but for some steels it is used as a cheap replacement for nickel.

P: Phosphor is an unwanted contaminant with negative effects regarding corrosion resistance, hence is should be kept as low as possible.

S: Sulphur is definitely unwanted with respects to the corrosion resistance; it can bond with manganese and form manganese sulfide (MnS), which is very corrosive. But MnS will make the steel short-chipped and give it better machine processing properties. E.g. is AISI 303 much easier to machine than AISI 304, but it is not near as corrosion resistant.

N: Nitrogen is a high valuable element regarding corrosion resistance; even in very low quantities it has significant positive effects. The adding of nitrogen in the steel manufacturing is a very difficult process.

Si: Silicone is like manganese a pollutant in most cases; it does not have any greater effect on the corrosive characteristics.

Cu: Copper is an element, which will increase the corrosion resistance in anaerobic and acidic environments.

Pitting corrosion is the most common type of corrosion in application where our products will be present. Based on an empirical equation can the corrosion resistance be determined by the PREN (Pitting Resistance Equivalent Number) – The higher PREN, the better corrosion resistance.

PREN = 1 x %Cr + 3.3 x %Mo + 16 x %N