

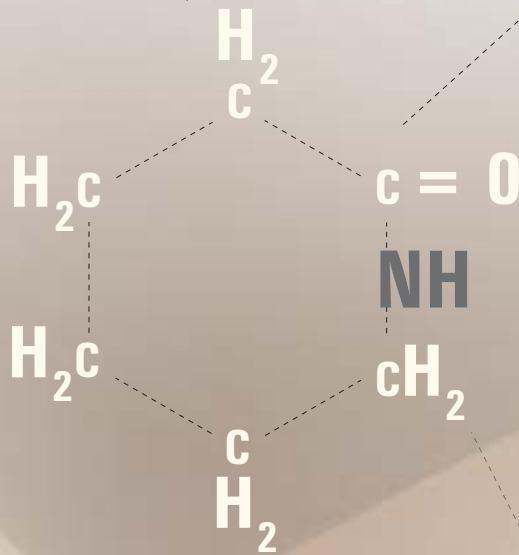
PHYSICAL MATERIAL GUIDING VALUES AND CHEMICAL RESISTANCE OF

PLASTICS

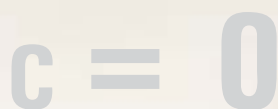
with survey tables

- PA 6 G
- Oilamid®
- Lubramid® 600 T
- Calaumid®
- PA 6
- PA 66
- POM
- PET
- PEEK
- PTFE
- PE-HD
- PE-HMW
- PVC-U
- PP-H
- PVDF
- PC

$$P' = f_w \sqrt{\frac{F}{r \cdot B}} \quad [\text{MPa}]$$



$$P' = f_w \sqrt{\frac{F}{r \cdot B}} \quad [\text{MPa}]$$





DIN EN ISO 9001:2000

Certified quality management system according
to DIN EN ISO 9001 : 2000

Updated 09.2008
Subject to change without
notice!
This list renders all
previous versions null
and void!

Information and conditions concerning the table

“Physical Material Guiding Values”

The information in the list is intended to provide an overview of the properties of our products and to allow a quick comparison of materials. They represent our present standard of knowledge and do not claim to be complete. Because of the high level of dependence on environmental influences and processing methods, the values given here should only be regarded as standard values. In no way do they represent a legally binding assurance in regard to the properties of our products nor to their suitability for specific applications. All the values stated here were determined from average values resulting from many individual measurements and refer to a temperature of 23°C and 50% RH. For specific applications, we recommend that the suitability of the materials be first tested by practical experiments.

The conditions under which the individual values were determined, and any special features in regard to these values, are contained in the following list with the respective footnotes:

Parameter	Condition	Footnote
Impact resistance DIN EN ISO 179	Measured with an impact pendulum testing machine 0.1 DIN 51 222	1
Creep stress DIN 53 444	Stress that leads to 1% overall expansion after 1.000 h	2
Coefficient of sliding friction	Hardened and ground against steel, P = 0.05 MPa, V = 0.6 m/s, t = 60°C in vicinity of running area	3
Linear coefficient of elongation	For temperature range from + 23°C bis + 60°C	4
Temperature range	Experience values, determined on finished parts without load in warmed air, dependent on the type and form of heat, short-term = max. 1 h, long-term = months	5
Dielectric strength IEC 250	at 10 ⁶ Hz	6
Colours	POM-C natural = white PET-natural = white PVDF-natural = white to ivory (translucent) PE-natural = white PP-H natural = white (translucent) PP-H grey ≈ RAL 7032 PVC-grey ≈ RAL 7011 PEEK natural ≈ RAL 7032 PSU-natural = honey yellow (translucent) PEI-natural = amber (translucent)	7
Units and abbreviations	o.B. = without breakage 1 MPa = 1 N/mm ² 1 g/cm ³ = 1.000 kg/m ³ 1 kV/mm = 1 MV/m	none

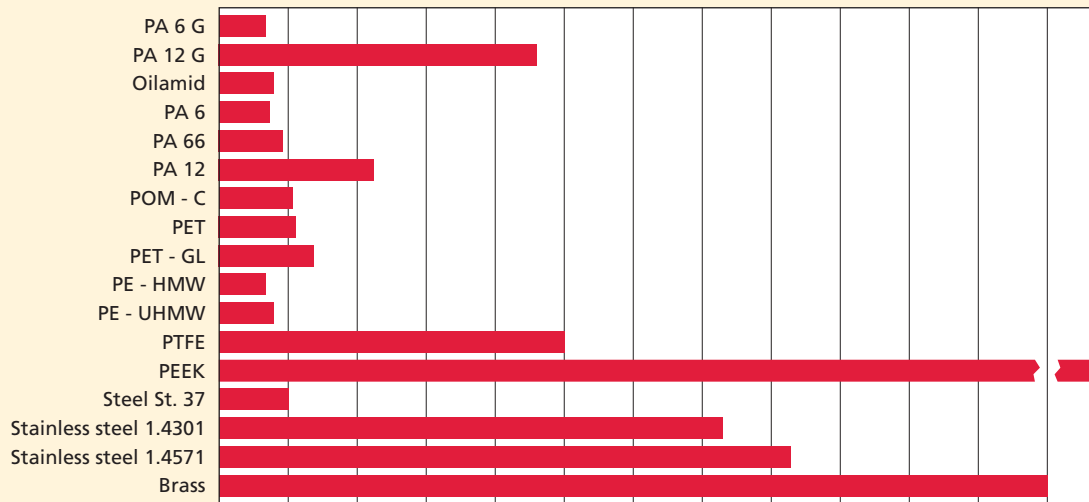
Physical Material Guiding Values

As of 09/2008

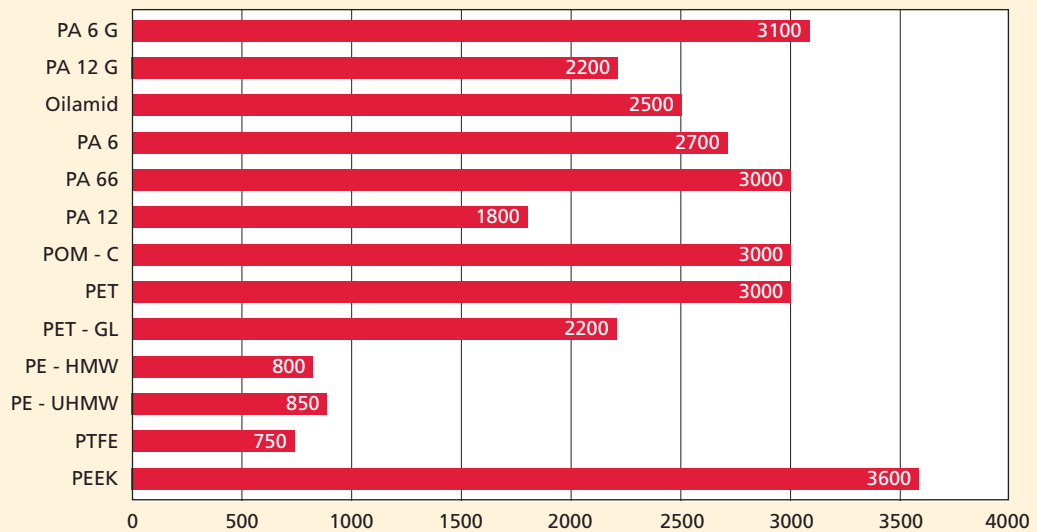
No.	Material	Abbrev.	Colours (standard)	Test specimen condition	Mechanical values												Thermal values									Electrical values							Miscellaneous data	
					Density DIN EN ISO 1183 ρ g/cm ³	Yield stress DIN EN ISO 527 $\sigma_{0.2}$ MPa	Elongation at break DIN EN ISO 527 ϵ_{br} %	E-Module (tensile) DIN EN ISO 527 E_T MPa	E-Module (bending) DIN EN ISO 178 E_{B3} MPa	Flexural strength DIN EN ISO 178 σ_{fb} MPa	Impact strength DIN EN ISO 179 a_{U} kJ/m ²	Notched-bar impact strength DIN EN ISO 179 a_{N} kJ/m ²	Ball indentation hardness $H_{30/30}$ DIN EN ISO 2039-1 MPa	Creep rate stress at 1% elongation DIN 53 444 ²⁾ MPa	Sliding friction coefficient against steel (dry running) μ	Sliding wear against steel (dry running) ³⁾ V µm/km	Melting temperature DIN EN ISO 3146 T_m °C	Thermal conductivity DIN 52 612 λ W/(K m)	Specific thermal capacity c J/(g K)	Coefficient of linear expansion ⁴⁾ α 10 ⁻⁵ K ⁻¹	Operating temperature range, (long-term) ⁵⁾ °C	Operating temperature range, (short-term) ⁵⁾ °C	Fire behaviour after UL	Dielectric constant ⁶⁾ IEC 250 ϵ_r	Dielectric loss factor ⁶⁾ IEC 250 tan δ	Specific volume resistance IEC 93 ρ_{00} Ω cm	Surface resistance IEC 93 R_s Ω	Dielectric strength IEC 243 E_d kV/mm	Creep current resistance IEC 112	Moisture absorption in natural rubber until saturated DIN 53715 w(H ₂ O) %	Water absorption until saturated DIN EN ISO 62 W _s %	Specific properties		
1	Polyamide 6 Cast	PA 6 G	natural/black/blue	dry/humid	1.15	80/55	40/100	3100/1800	3400/2100	140/60	o.B.	>4/>15	160/125	>7	0.36/0.42	0.15	+ 220	0.23	1.7	7 - 8	-40 bis +105	+ 170	HB	3.7	0.03	10 ¹⁵ /10 ¹²	10 ¹³ /10 ¹²	50 / 20	KA 3C / KA 3b	2.2	6.5	hard, pressure and abrasion resistant can be produced in largest dimensions		
2	Polyamide 6 Cast + MoS ₂	PA 6 G + MoS ₂	black	dry/humid	1.15	85/60	40	3200/1850	3500/2200	145/70	o.B.	>5/>15	170/130	>7	0.32/0.37	0.15	+ 220	0.23	1.7	7 - 8	-40 bis +105	+ 170	HB	3.7	0.03	10 ¹⁵ /10 ¹²	10 ¹³ /10 ¹²	50 / 20	KA 3C / KA 3b	2.2	6.5	as PA 6 G, except increased crystallinity		
3	Polyamid 6 Cast-CC	PA 6 G-CC	natural/black	dry	1.15	71	>40	2800	2700	97	o.B.	-	125	-	0.36	-	+ 220	0.23	1.7	8 - 9	-40 bis +105	+ 150	HB	3.7	0.03	10 ¹⁵ /10 ¹²	10 ¹³ /10 ¹²	50 / 20	KA 3C / KA 3b	2.5	7.5	higher impact strength than PA 6 G		
4	Polyamide 6 Cast + Heat stabilised	PA 6 G-HS	black	dry/humid	1.15	90/65	30/80	3000/1700	3300/2300	120/40	o.B.	>4	170	>7	0.36	0.13	+ 220	0.23	1.7	7 - 8	-40 bis +105	+ 180	HB	3.7	0.03	10 ¹⁵ /10 ¹²	10 ¹³ /10 ¹²	50 / 20	KA 3C / KA 3b	2.2	7	as PA 6 G, except heat ageing resistant		
5	Oilamid®	PA 6 G + Öl	natural/black/yellow green/red	dry/humid	1.14	75/60	50/120	2500	2800	135	o.B.	>5	140	>7	0.18	0.05	+ 220	0.23	1.7	7 - 8	-40 bis +105	+ 160	HB	3.7	0.03	10 ¹⁵ /10 ¹²	10 ¹³ /10 ¹²	50 / 20	KA 3C / KA 3b	1.8	5.5	high abrasion resistance, low sliding friction		
6	Lubramid® 600 T	PA 6 G + solid lubricant	grey/red/green/natural	dry/humid	1.14	80/60	40/100	3100/1800	3300/2000	110/60	o.B.	>4/>15	160/125	>7	0.15/0.23	0.08	+220	0.23	1.7	7 - 8	-40 bis +105	+ 160	HB	3.7	0.03	10 ¹⁵ /10 ¹²	10 ¹³ /10 ¹²	50 / 20	KA 3C / KA 3b	2.2	6.5	low stick-slip, very slow sliding friction		
7	Calaumid® 612	PA 6/12 G	natural	dry/humid	1.12	70/55	55/140	2500	2800	135	o.B.	>12	140	>15	0.36	0.12	+ 220	0.23	1.7	7 - 8	-40 bis +105	+ 160	HB	3.7	0.03	10 ¹⁵	10 ¹³	50 / 20	KA 3c	1.9	5.8	as PA 6G, except set for high impact strength		
8	Calaumid® 1200	PA 12 G	natural	dry	1.03	66	56	2200	2400	90	o.B.	>15	100	>11	0.4	-	+ 190	0.23	1.7	10 - 11	-60 bis +110	+ 150	HB	3.7	0.03	10 ¹⁵	10 ¹³	50 / 20	KA 3c	0.9	1.4	low water absorption, very good long-term rupture strength		
9	Polyamide 6	PA 6	natural/black	dry/humid	1.14	70/45	50/180	2700/1800	2500/1400	130/40	o.B.	>3/o.B.	160/70	>8	0.38/0.42	0.23	+ 218	0.23	1.7	8 - 9	-30 bis +100	+ 140	HB	3.7	0.031	10 ¹⁵ /10 ¹²	10 ¹³ /10 ¹⁰	50 / 20	KA 3c	3.0	10.0	tough, good vibration damping		
10	Polyamide 66	PA 66	natural/black	dry/humid	1.15	85/65	30/150	3200/1600	2900/1200	135/60	o.B.	>3/>15	150/100	>8	0.38/0.42	0.1	+ 265	0.23	1.7	9 - 10	-30 bis +100	+ 150	HB	3.2	0.025	10 ¹⁵ /10 ¹²	10 ¹² /10 ¹⁰	50 / 20	KA 3b	2.5	9.0	high abrasion resistance (similar to PA 6 G)		
11	Polyamide 66 + Glass fibre	PA 66 GF 30	black	dry	1.35	160	5	11000	-	-	50	6	240	40	0.45	-	+ 255	0.27	1.5	2 - 3	-30 bis +120	+ 180	HB	3.7	0.02	10 ¹²	10 ¹¹	60 / 30	CTI 475	1.7	5.5	high strength, low thermal expansion		
12	Polyamid 12	PA 12	natural	dry	1.02	50	>200	1800	1500	60	o.B.	>15	100	>4	0.32	0.8	+ 178	0.30	2.09	11 - 12	-70 bis +70	+ 140	HB	3.1	0.03	2 x 10 ¹⁵	10 ¹³	30	KA 3b	0.8	1.5	tough, hydrolysis resistance negligible moisture absorption		
13	Polyacetal Copolymer	POM - C	natural ⁷⁾ /black	dry	1.41	65	40	3000	2900	115	o.B.	>10	150	13	0.32	8.9	+ 168	0.31	1.45	9 - 10	-30 bis +100	+ 140	HB	3.9	0.003	10 ¹⁵	10 ¹³	40	KA 3c KC >600	0.2	0.8	high strength, impact resistance low creep behaviour		
14	Polyethylenterephthalat	PET	natural ⁷⁾ /black	dry	1.38	80	20	3200	2600	125	80	>4	140	13	0.25	0.35	+ 255	0.24	1.1	7 - 8	-20 bis +100	+ 160	HB	3.6	0.008	10 ¹⁶	10 ¹⁴	40	KC 350	0.25	0.5	tough, hard, negligible cold flow dimensionally stable		
15	Polyethylenterephthalat + solid lubricant	PET - GL	lightgrey	dry	1.43	75	5	2200	-	-	30	2	-	-	0.2	0.1	+ 255	0.23	-	7 - 8	-20 bis +110	+ 160	HB	3.6	0.008	10 ¹⁶	10 ¹⁴	-	-	0.2	0.4	as PET, plus highest wear resistance		
16	Polytetrafluorethylen	PTFE	natural	dry	2.18	10	380	750	540	6	o.B.	16	30	1.5	0.08	21.0	+ 327	0.23	1	18 - 20	-200 bis +260	+ 280	V-0	2.1	0.0005	10 ¹⁸	10 ¹⁷	40	KA 3c KB >600	< 0.01	< 0.01	high chemical resistance, low strength		
17	Polytetrafluorethylen + Glass fibre	PTFE + GF 25%	lightgrey	dry	2.23	15	280	1500	1320	4	o.B.	12	31	-	0.14	1.3	+ 327	0.41	-	12 - 13	-200 bis +260	+ 280	V-0	2.85	0.0028	10 ¹⁶	10 ¹⁶	13	-	< 0.01	< 0.01	as PTFE, except higher strength		
18	Polytetrafluorethylen + Carbon	PTFE + C 25%	black	dry	2.12	15	180	-	1275	9	-	8	38	-	0.12	1.0	+ 327	0.7	-	10 - 11	-200 bis +260	+ 280	V-0	-	-	10 ³	10 ³	2.8	-	< 0.01	< 0.01	as PTFE, except lower strength		
19	Polytetrafluorethylen + Brass	PTFE + 40% Brass	brown	dry	3.74	14	140	1400	1375	8	-	11	39	-	0.14	0.5	+ 327	0.7	-	9 - 10	-200 bis +260	+ 280	V-0	-	-	10 ⁸	10 ⁸	-	-	< 0.01	< 0.01	higher strength than PTFE, but chemically less resistant		
20	Polyvinylidendifluorid	PVDF	natural ⁷⁾	dry	1.78	56	22	2000	2000	75	o.B.	>15	120	3	0.3	-	+178	0.19	0.96	13	-40 bis +140	+ 160	V-0	8.0	0.165	5 x 10 ¹⁴	10 ¹³	25	CTI 600	< 0.04	< 0.04	resistant to UV-, b- and λ-Radiation, resistant to abrasion		
21	Polyethylene 300	PE - HD	natural ⁷⁾ /black	dry	0.95	22	300	800	800	32	o.B.	12	40	3	0.29	7.4	+ 128	0.38	1.86	18	-50 bis +50	+ 80	HB	2.4	0.004	> 10 ¹⁶	10 ¹⁴	47	KA 3c KC >600	< 0.01	< 0.01	high chemical resistance low density, high abrasion		
22	Polyethylene 500	PE - HMW	natural ⁷⁾ /black/green	dry	0.95	28	300	850	850	40	o.B.	50	45	3	0.29	1.0	+ 133	0.38	1.88	18	-100 bis +50	+ 80	HB	2.9	0.0002	> 10 ¹⁶	10 ¹⁴	44	KA 3c KC >600	< 0.01	< 0.01	as PE-HD, but far more abrasion resistant		
23	Polyethylene 1000	PE - UHMW	natural ⁷⁾ /black/green	dry	0.94	22	350	800	800	27	o.B.	o.B.	40	-	0.29	0.45	+ 133	0.38	1.84	18	-260 bis +50	+ 80	HB	3.0	0.0004	> 10 ¹⁶	10 ¹⁴	44	KA 3c KC >600	< 0.01	< 0.01	as PE-HMW, but more abrasion resistant at low friction values		
24	Polypropylene Homopolymer	PP - H	natural ⁷⁾ /grey ⁷⁾	dry	0.91	32	70	1400	1400	45	o.B.	7	70	4	0.35	11.0	+ 162	0.22	1.7	16	0 bis +80	+ 100	HB	2.25	0.00033	> 10 ¹⁶	10 ¹⁴	52	KA 3c	< 0.01	< 0.01	as PE-HD, but higher thermal strength		
25	Polyvinylchloride	PVC - U	grey ⁷⁾ /black/red/white	dry	1.42	58	15	3000	-	82	o.B.	4	130	-	0.6	56.0	-	0.156	1.05	8	0 bis +50	+ 70	V-0	3.3	0.025	10 ¹⁶	10 ¹³	39	KA 3b	< 0.01	< 0.01	good chemical resistance hard and brittle		
26	Polyetherketone	PEEK	natural ⁷⁾ /black	dry	1.32	95	45	3600	4100	160	o.B.	7	230	-	0.34	-	+ 340	0.25	1.06	4 - 5	-40 bis +250	+ 310	V-0	3.2	0.002	10 ¹⁶	10 ¹⁶	24	CTI 150	0.2	0.45	high temperature resistance, hydrolysis dimensionally stable		
27	Polyetherketone (modified)	PEEK - GL	black	dry	1.48	118	3	8100	10000	210	25	2.5	270	-	0.11	-	+ 340	0.24	-	3	-40 bis +250	+ 310	V-0	-	-	10 ⁵	-	24.5	-	0.14	0.3	as PEEK, except higher pv-values better sliding properties		
28	Polysulfone	PSU	natural ⁷⁾	dry	1.24	75	>50	2500	2700	106	o.B.	4	150	22	0.4	-	-	0.26	1	5 - 6	-40 bis +160	+ 180	V-0	3.0	0.002	10 ¹⁷	10 ¹⁷	30	KA 1 CTI 150	0.4	0.8	can be sterilised in steam hydrolysis resistant, radiation resistant		
29	Polyether amide	PEI	natural ⁷⁾	dry	1.27	105	>50	3100	3300	145	o.B.	-	165	-	-	-	-	0.22	-	5 - 6	-40 bis +170	+ 200	V-0	3.0	0.003	10 ¹⁸	10 ¹⁷	33	CTI 175	0.75	1.35	high strength and rigidity high thermal resistance		
30	Polycarbonate	PC	transparent	dry	1.20	60	80	2300	2200	95	o.B.	>25	100	40	0.55	22.0	+ 230	0.21	1.17	6 - 7	-40 bis +110	+ 140	V-2	3.0	0.006	10 ¹⁷	10 ¹⁵	32	KA 1	0.20	0.36	transparent, impact resistance, low cold flow		

Physical Material Guiding Values

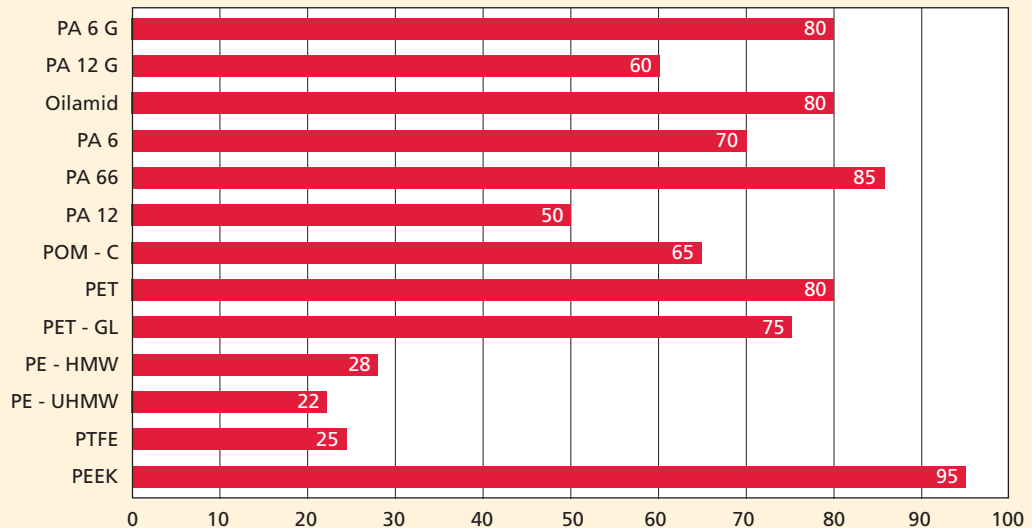
Comparison of material costs (volume prices)



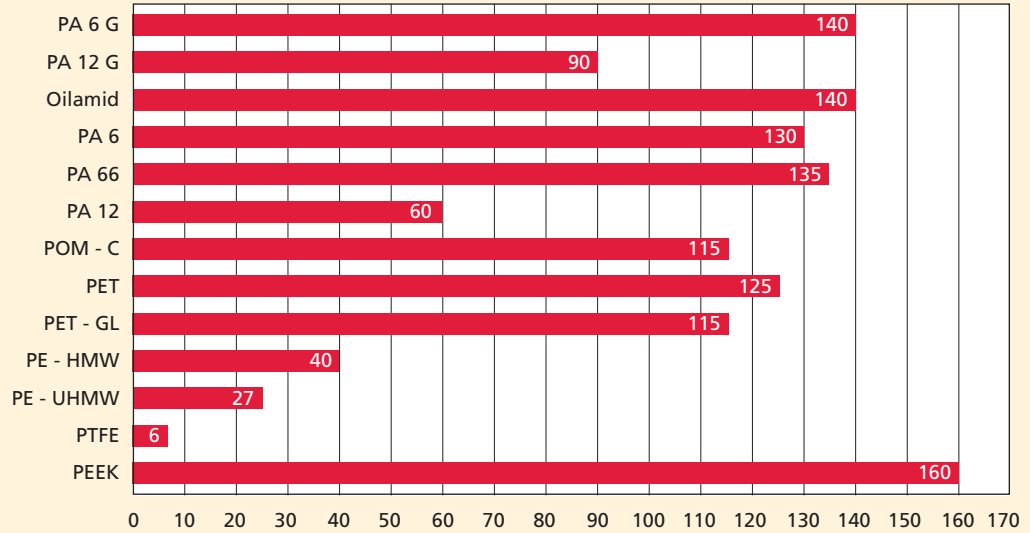
E-modulus from tensile test in MPa (short term value)



Permissible yield stress in MPa (short term value)

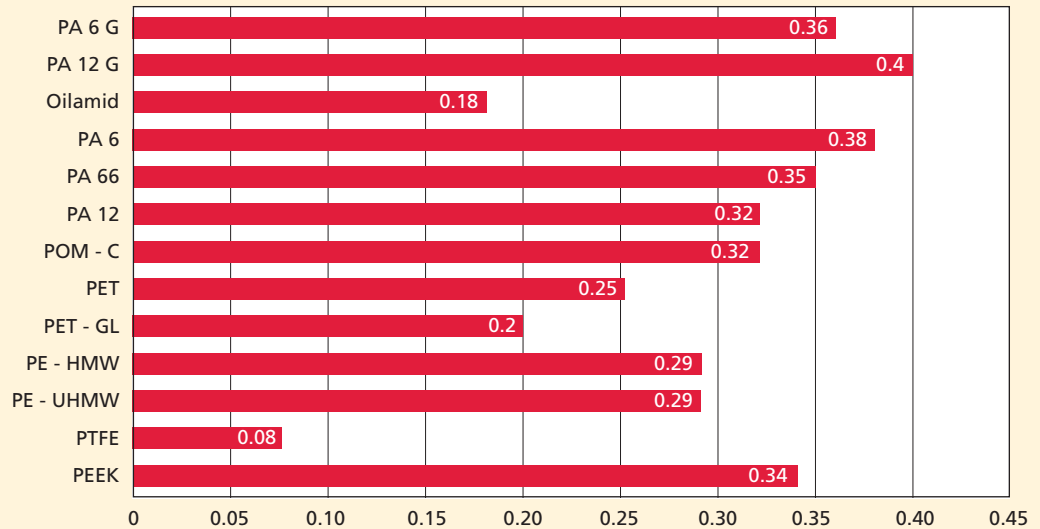


Flexural strength in MPa (short term value)

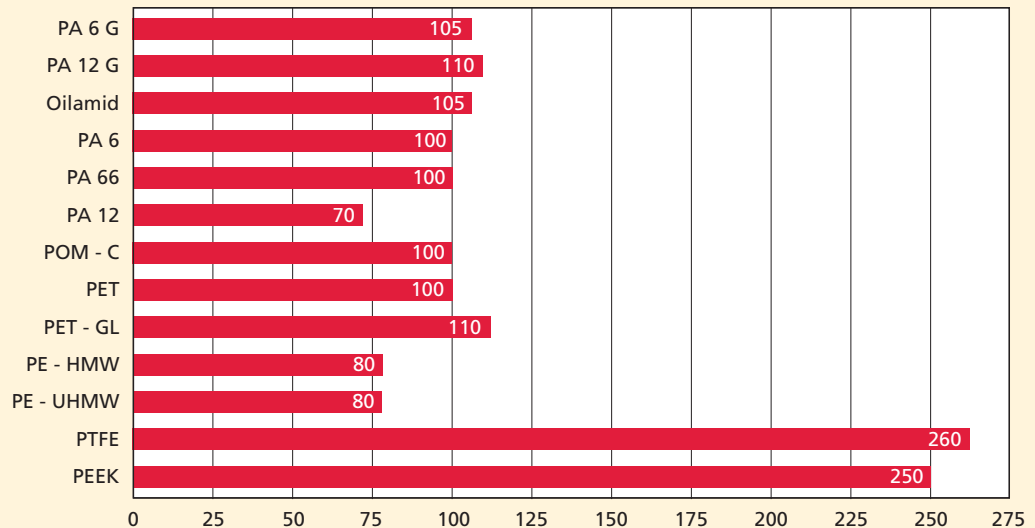


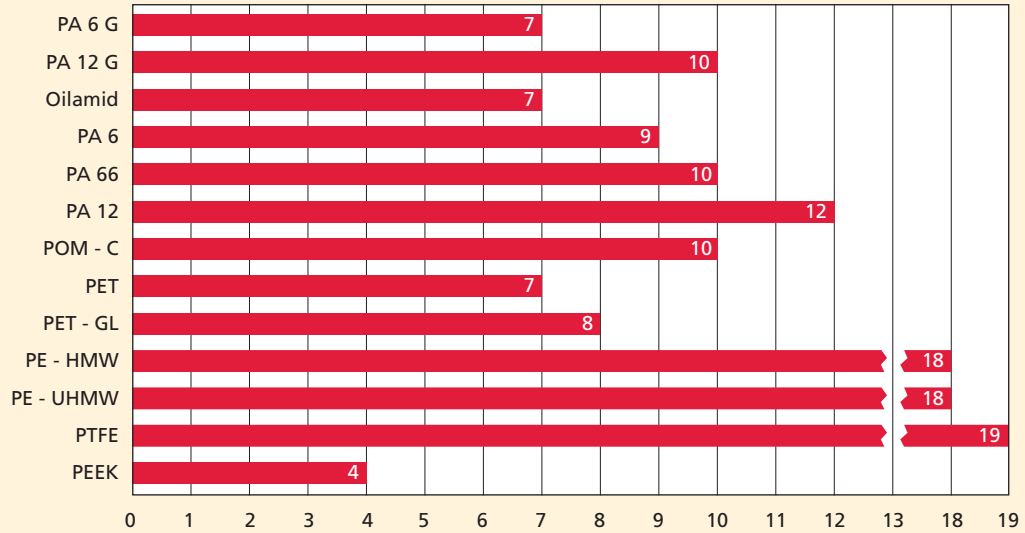
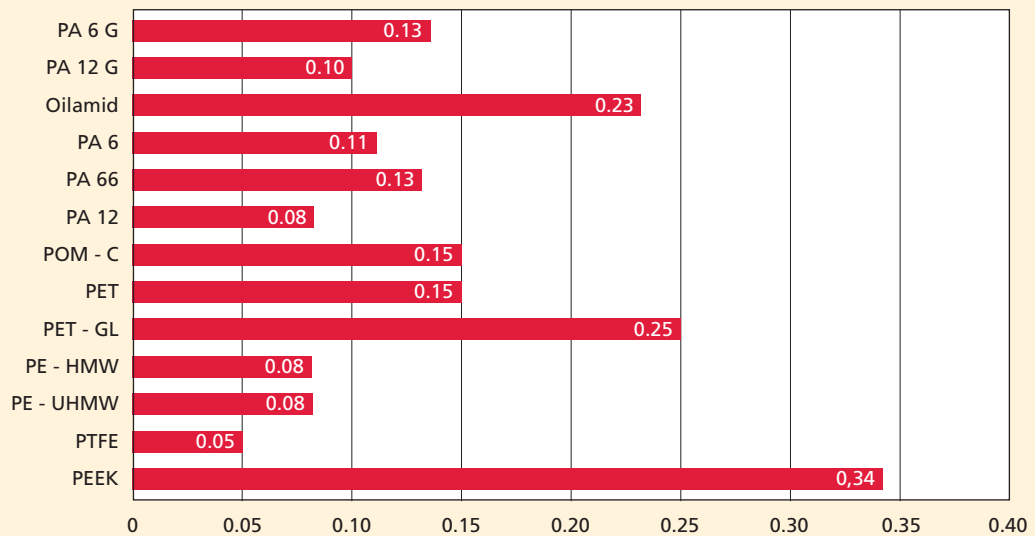
Coefficient of sliding friction against steel

(hardened and ground, P = 0.05 MPa, v = 0.6 m/s, t = 60 °C (in the vicinity of the running surface))

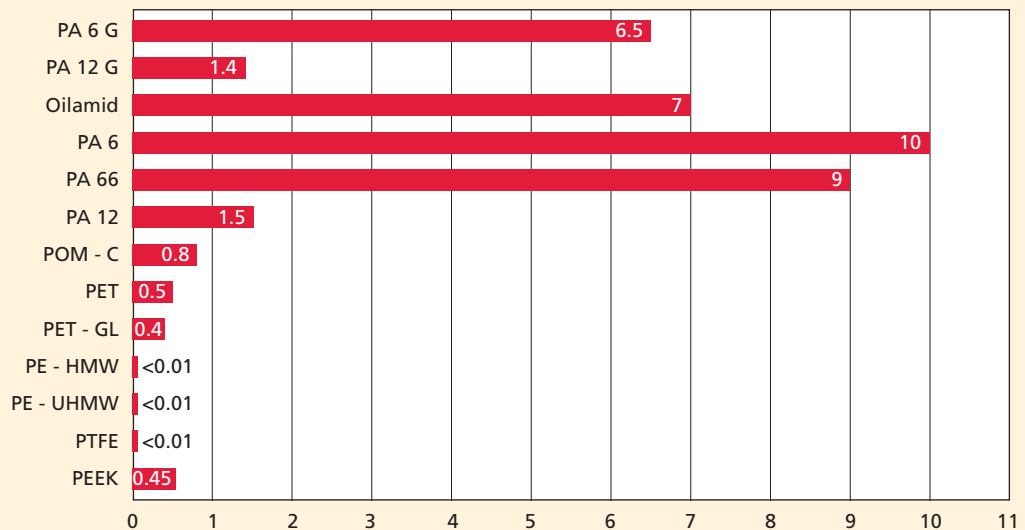


Long term service temperature in °C (in air without static stress)



Coefficient of linear expansion ($10^{-5} \cdot K^{-1}$)pv guiding values in MPa · m/s (dry running with integrated lubrication $v = 0,1$ m/s)

Water absorption until saturated in %



Information on how to use the list

“Chemical resistance”

The information regarding chemical resistance in the following list relates to experiments in which the samples were subjected to the respective media free of external stress and loading. This is supplemented by our practical experience and, in most cases, many years of using plastics in contact with these media. Due to the variety of media, this list is just an excerpt of the data that is available to us. If the list does not contain the medium that you use, we would be happy to provide information on the resistance of our plastics on request.

When using the list, please remember that factors such as:

- deviating degrees of purity of the medium
- deviating concentration of the medium
- temperatures different to those stated
- fluctuating temperatures
- mechanical stress
- part geometries, especially those that lead to thin walls or extreme differences in wall thickness
- stresses that are created by machining
- mixtures that are made up of different media
- combinations of the above factors

can have an effect on the chemical resistance.

Nevertheless, in spite of being rated as a component with »limited resistance«, a plastic component can still be superior to a metal part and can also be more practical from an economic aspect.

In the case of oxidising materials such as nitric acid and polar organic solvents, despite a chemical resistance against the medium, in many thermoplastics there is still a danger of stress cracking. Therefore for the manufacture of parts that come into contact with such media, a process should be chosen that creates as little mechanical stress as possible in the workpiece. An alternative is to decrease the stress by annealing the semi-finished products before and during the manufacturing process.

Generally it is not possible to forecast the level of resistance against mixtures of different media, even if the plastic is resistant to the individual components of the mixture.

Therefore in such a case we recommend that the material is stored and aged with the respective mixed medium under the expected environmental conditions. It is also important to remember that where parts are to be subjected to two or more media there could be an additional temperature load in the area of immediate contact due to the evolving reaction heat.

In spite of the rating »resistant«, in certain cases the surfaces of plastics can become matte or discoloured, and transparent plastics can become opaque when they come into contact with the media. However, the resistance remains intact even after these surface changes.

The information contained in the lists corresponds to our present standard of knowledge and should be regarded as standard values. If in doubt, or in the case of specific applications, we recommend that the material be aged under the expected environmental conditions to test its resistance.

Chemical resistance

	Concentration	Temperature °C	Material																												
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
			PA 6 G	PA 6 G - HS	PA 6 G + MoS 2	PA 6 G + Öl	PA 6 G + solid lubricant	PA 6 / 12 G	PA 12 G	PA 6	PA 66	PA 66 - GF 30	PA 12	POM - C	PET	PET - GL	PTFE	PTFE + GF 25	PTFE + Carbon	PTFE + Brass	PVDF	PE - HD	PE - HMW	PE - UHMW	PP - H	PVC - U	PEEK	PEEK - GL	PSU	PEI	PC
1 Acetaldehyde	40	20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	-	+	+	+	+	-	+	+	-	+	-	
2 Acetamide	50	20	+	+	+	+	+	+	+	+	+	+	+	+	/	/	+	/	/	/	-	+	+	+	+	/	+	+	/	+	/
3 Acetone	UV	RT	+	+	+	+	+	+	+	+	+	+	+	○	○	+	/	/	/	-	+	+	+	+	-	+	+	-	-	-	
4 Acrylnitrile	UV	RT	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	/	/	/	+	+	+	+	+	/	+	+	-	/	/
5 Alkyl alcohol	UV	RT	○	○	○	○	○	○	○	○	○	○	/	+	+	+	/	/	/	/	+	+	+	+	-	+	+	○	/	+	
6 Aluminium chloride	10	RT	+	+	+	+	+	+	+	+	+	+	+	○	+	+	+	/	/	/	+	+	+	+	+	+	+	+	+	+	
7 Formic acid	2	RT	○	○	○	○	○	○	○	○	○	○	+	+	+	+	/	/	/	+	+	+	+	+	+	+	+	/	+	/	
8 Formic acid	UV	RT	L	L	L	L	L	○	L	L	L	○	-	○	○	+	/	/	/	+	+	+	+	+	+	○	○	-	/	-	
9 Ammonia	10	RT	+	+	+	+	+	+	+	+	+	+	+	-	-	-	+	/	/	/	+	+	+	+	+	○	○	○	○	/	
10 Ammonium hydroxide	30	RT	+	+	+	+	+	+	+	+	+	+	+	-	-	-	+	/	/	/	-	+	+	+	+	/	+	+	+	-	
11 Ammoniumnitrate	UV	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	+	+	+	+	+	+	-	-	+	
12 Aniline	UV	RT	-	-	-	-	-	○	-	-	-	○	○	+	+	+	/	/	/	+	+	+	+	○	-	+	+	-	/	-	
13 Anone	100	20	+	+	+	+	+	+	+	+	+	+	+	/	/	+	/	/	/	+	+	+	+	/	/	+	+	-	/	/	
14 Antimontrichloride	10	RT	-	-	-	-	-	-	-	-	-	-	/	/	/	+	/	/	/	+	+	+	+	+	+	+	+	/	/	/	
15 Benzaldehyde	UV	RT	○	○	○	○	○	○	○	○	○	○	+	+	+	+	/	/	/	○	+	+	+	+	-	+	+	-	-	-	
16 Petrol, normal	HÜ	40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	○	+	+	+	○	○	○	○	
17 Petrol, super	HÜ	40	+	+	+	+	+	+	+	+	+	+	+	/	/	+	+	+	+	+	○	○	○	○	-	+	+	○	-	○	
18 Benzene	UV	RT	+	+	+	+	+	+	+	+	+	+	○	+	+	+	/	/	/	+	○	○	○	○	-	+	+	-	-	-	
19 Benzene acid	UV	RT	-	-	-	-	-	+	-	-	-	+	○	+	+	+	/	/	/	+	+	+	+	+	+	+	+	/	/	-	
20 Benzyl alcohol	UV	RT	○	○	○	○	○	○	○	○	○	○	+	+	+	+	/	/	/	+	+	+	+	+	/	+	+	○	-	-	
21 Bleaching lye (12.5% AC)	HÜ	RT	-	-	-	-	-	○	-	-	-	○	-	+	+	+	/	/	/	+	+	+	+	+	+	+	+	-	+	-	
22 Borax	WL	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	+	+	+	/	/	+	+	/	/	+	
23 Boric acid	10	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	+	+	+	+	+	+	+	+	+	+	
24 Hydrobromic acid	10	RT	-	-	-	-	-	-	-	-	-	-	-	○	-	+	/	/	/	+	+	+	+	+	+	+	+	/	/		
25 Hydrobromic acid	50	RT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	/	/	/	+	+	+	+	+	○	○	/	/	/	
26 Butanol	UV	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	+	+	+	+	+	○	+	+		

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			PA 6 G – Polyamide 6 Cast	PA 6 G – HS – Polyamide 6 Cast, heat stabilised	PA 6 G + MoS 2 – Polyamide 6 Cast / MOS	PA 6 G + Öl – Ollamid®	PA 6 G + solid lubricant – Lubramid® 600 T	PA 6 / 12 G – Calauamid® 612	PA 12 G – Calauamid® 1200	PA 6 – Polyamide 6	PA 66 – Polyamide 66	PA 66 – GF 30 – Polyamide 66 + Glass fibre	PA 12 – Polyamide 12	POM – C – Polyacetal – Copolymer	PET – Polyethyleneterephthalat	PET – GL – Polyethylenterephthalat / solid lubricant	PTFE – Polytetrafluoroethylen	PTFE + GF 25 – Polytetrafluoroethylen / Glass fibre	PTFE + Carbon – Polytetrafluoroethylen / Carbon	PTFE + Brass – Polytetrafluoroethylen / Brass	PVDF – Polyvinyl difluorid	PE – HD – Polyethylene 300	PE – HMW – Polyethylene 500	PE – UHMW – Polyethylene 1000	PP – H – Polypropylene	PVC – U – Polyvinylchloride (hard)	PEEK – Polyetherketone	PEEK – GL – Polyetherketone modified	PSU – Polysulfone	PEI – Polyether amide	PC – Polycarbonate
27 Butyl acetate	UV	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	+	+	+	/	/	+	+	-	○	-
28 Calcium chloride	5	RT	+	+	+	+	+	+	+	+	+	+	○	+	+	+	+	/	/	/	+	+	+	+	+	+	+	+	○	+	+
29 Calcium chloride in alcohol	20	RT	-	-	-	-	-	-	L	L	L	-	-	+	+	+	/	/	/	+	+	+	+	+	/	+	+	○	+	/	
30 Calcium hypochloride	GL	RT	-	-	-	-	-	-	-	-	-	-	-	○	○	+	/	/	/	+	+	+	+	+	+	+	+	/	/	+	
31 Chlorobenzene	UV	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	○	○	○	○	-	+	+	L	-	L	
32 Chloroacetic acid	UV	RT	-	-	-	-	-	-	-	-	-	-	-	-	-	+	/	/	/	+	+	+	+	+	/	+	+	/	/	/	
33 Chloroform	UV	RT	○	○	○	○	○	○	○	○	○	○	-	-	-	+	/	/	/	+	○	○	○	○	-	+	+	L	-	L	
34 Chromic acid	1	RT	○	○	○	○	○	○	○	○	○	○	○	+	+	+	/	/	/	+	+	+	+	+	+	+	+	○	+	+	
35 Chromic acid	50	RT	-	-	-	-	-	-	-	-	-	-	-	+	+	+	/	/	/	+	○	○	○	○	+	+	+	○	/	/	
36 Cyclohexane	UV	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	+	+	+	+	+	+	+	○	/	○	
37 Cyclohexanol	UV	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	+	+	+	+	+	+	+	○	-	○	
38 Cyclohexanone	UV	RT	+	+	+	+	+	+	+	+	+	+	+	-	-	+	/	/	/	○	+	+	+	+	+	+	+	L	/	-	
39 Dibutyl phtalate	UV	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	○	○	○	○	/	/	+	+	+	○	-	
40 Dichlorethane	UV	RT	+	+	+	+	+	+	+	+	+	+	+	-	-	+	/	/	/	+	○	○	○	○	-	+	+	L	-	-	
41 Dichlorethylene	UV	RT	+	+	+	+	+	+	+	+	+	+	L	L	L	+	/	/	/	+	-	-	-	○	-	+	+	/	/	/	
42 Iron(II)chlorid	GL	RT	-	-	-	-	-	-	-	-	-	-	○	/	/	+	/	/	/	+	+	+	+	+	+	+	+	-	+	+	
43 Iron(III)chlorid	GL	RT	-	-	-	-	-	-	-	-	-	-	○	/	/	+	/	/	/	+	+	+	+	+	+	+	+	-	+	+	
44 Vinegar	HÜ	RT	-	-	-	-	-	+	-	-	-	+	+	+	+	+	/	/	/	○	+	+	+	+	+	+	+	/	/	/	
45 Acetic acid	5	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	+	+	+	+	+	+	+	+	+	+	+
46 Acetic acid	10	RT	○	○	○	○	○	+	○	○	○	+	○	+	+	+	/	/	/	+	+	+	+	+	+	+	+	+	+	+	+
47 Acetic acid	10	50	-	-	-	-	-	○	-	-	-	○	-	+	+	+	/	/	/	+	+	+	+	+	+	+	+	+	+	○	
48 Acetic acid	95	RT	-	-	-	-	-	-	-	-	-	-	-	-	-	+	/	/	/	+	+	+	+	+	○	+	+	-	-	-	
49 Acetic acid	95	50	-	-	-	-	-	-	-	-	-	-	-	-	-	+	/	/	/	○	○	○	○	○	-	+	+	-	-	-	
50 Ethylether	UV	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	○	○	○	○	-	+	+	○	+	-	
51 Hydrofluoric acid	WL	RT	L	L	L	L	L	L	L	L	L	L	-	-	-	+	/	/	/	+	+	+	+	+	+	L	L	-	○	-	
52 Formaldehde	UV	RT	○	○	○	○	○	○	○	○	○	○	+	+	+	+	/	/	/	+	+	+	+	+	+	+	+	-	-	+	

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		PA 6 G – Polyamide 6 Cast	PA 6 G – HS – Polyamide 6 Cast, heat stabilised	PA 6 G + MoS 2 – Polyamide 6 Cast / MOS	PA 6 G + Öl – Ollamid®	PA 6 G + solid lubricant – Lubramid® 600 T	PA 6 / 12 G – Calauamid® 612	PA 12 G – Calauamid® 1200	PA 6 – Polyamide 6	PA 66 – Polyamide 66	PA 66 – GF 30 – Polyamide 66 + Glass fibre	PA 12 – Polyamide 12	POM – C – Polyacetal – Copolymer	PET – Polyethyleneterephthalat	PET – GL – Polyethyleneterephthalat / solid lubricant	PTFE – Polytetrafluoroethylen	PTFE + GF 25 – Polytetrafluoroethylen / Glass fibre	PTFE + Carbon – Polytetrafluoroethylen / Carbon	PTFE + Brass – Polytetrafluoroethylen / Brass	PVDF – Polyvinyl difluorid	PE – HD – Polyethylene 300	PE – HMW – Polyethylene 500	PE – UHMW – Polyethylene 1000	PP – H – Polypropylene	PVC – U – Polyvinylchloride (hard)	PEEK – Polyetherketone	PEEK – GL – Polyetherketone modified	PSU – Polysulfone	PEI – Polyether amide	PC – Polycarbonate
81	Propanol	UV	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	+	+	+	+	+	+	+	+	+	+
82	Nitric acid	10	RT	-	-	-	-	-	-	-	-	-	-	+	+	+	/	/	/	+	+	+	+	+	+	+	+	+	+	-
83	Nitric acid	10	60	-	-	-	-	-	-	-	-	-	-	-	-	+	/	/	/	+	-	-	-	-	-	+	+	/	/	-
84	Nitric acid	50	RT	L	L	L	L	L	L	L	L	L	-	-	-	+	/	/	/	+	-	-	-	-	-	○	○	+	/	-
85	Nitric acid	80	RT	L	L	L	L	L	L	L	L	L	-	-	-	+	/	/	/	○	-	-	-	-	-	○	○	+	/	-
86	Hydrochloric acid	10	RT	-	-	-	-	-	-	-	-	-	-	○	○	+	/	/	/	+	+	+	+	+	+	+	+	+	+	+
87	Hydrochloric acid	20	RT	-	-	-	-	-	-	-	-	-	-	○	○	+	/	/	/	+	+	+	+	+	+	+	+	+	+	+
88	Hydrochloric acid	30	RT	L	L	L	L	L	L	L	L	L	-	-	-	+	/	/	/	+	+	+	+	+	+	+	+	○	+	○
89	Sulphuric acid	40	RT	-	-	-	-	-	-	-	-	-	-	○	○	+	/	/	/	+	+	+	+	+	+	○	○	+	+	+
90	Sulphuric acid	40	60	-	-	-	-	-	-	-	-	-	-	○	○	+	/	/	/	+	+	+	+	+	○	-	-	○	○	○
91	Sulphuric acid	96	RT	L	L	L	L	L	L	L	L	L	-	-	-	+	/	/	/	+	○	○	○	○	+	L	L	L	-	-
92	Sulphuric acid	96	60	L	L	L	L	L	L	L	L	L	-	-	-	+	/	/	/	+	-	-	-	-	○	L	L	L	-	-
93	Carbon tetrachloride	UV	RT	+	+	+	+	+	+	+	+	+	○	+	+	+	/	/	/	+	-	-	-	-	-	+	+	+	+	-
94	Tolual	UV	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	○	○	○	○	-	+	+	-	-	-
95	Trichlorethylene	UV	RT	○	○	○	○	○	○	○	○	○	○	○	○	+	/	/	/	+	○	○	○	○	-	+	+	L	-	-
96	Hydrogen peroxide	10	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	+	+	+	+	+	+	+	+	+	+
97	Hydrogen peroxide	20	RT	-	-	-	-	-	○	-	-	-	○	+	+	+	/	/	/	+	+	+	+	+	+	+	+	+	+	+
98	Hydrogen peroxide	30	RT	-	-	-	-	-	-	-	-	-	○	+	+	+	/	/	/	+	+	+	+	+	+	+	+	+	+	+
99	Hydrogen peroxide	30	60	-	-	-	-	-	-	-	-	-	-	+	+	+	/	/	/	/	○	○	○	○	○	+	+	/	/	/
100	Xylene	UV	RT	+	+	+	+	+	+	+	+	+	+	+	+	+	/	/	/	+	○	○	○	○	-	+	+	○	○	-
101	Citric acid	10	RT	○	○	○	○	○	+	○	○	○	+	+	+	+	/	/	/	+	+	+	+	+	+	+	+	○	+	+
102	Citric acid	10	50	○	○	○	○	○	○	○	○	○	-	+	+	+	/	/	/	+	+	+	+	+	+	+	○	+	/	

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Our machining capabilities:

- CNC milling machines, workpiece capacity up to max. 3000 mm x 1000 mm
- 5-axis CNC milling machines
- CNC lathes, chucking capacity up to max. 1560 mm diameter and 2000 mm long
- Screw machine lathes up to 100 mm diameter spindle swing
- CNC automatic lathes up to 100 mm diameter spindle swing
- Gear cutting machines for gears starting at Module 0.5
- Profile milling (shaping and molding)
- Circular saws up to 170 mm cutting thickness and 3100 mm cutting length
- Four-sided planers up to 125 mm thickness and 225 mm width
- Thickness planers up to 230 mm thickness and 1000 mm width

We process:

- Polyamide PA
- Polyacetal POM
- Polyethylene terephthalate PET
- Polyethylene 1000 PE-UHMW
- Polyethylene 500 PE-HMW
- Polyethylene 300 PE-HD
- Polypropylene PP-H
- Polyvinyl chloride (hard) PVC-U
- Polyvinylidene fluoride PVDF
- Polytetrafluoroethylene PTFE
- Polyetheretherketone PEEK
- Polysulphone PSU
- Polyether imide PEI

Examples of parts:

- Rope sheaves and castors
- Guide rollers
- Deflection sheaves
- Friction bearings
- Slider pads
- Guide rails
- Gear wheels
- Sprocket wheels
- Spindle nuts
- Curved feed tables
- Feed tables
- Feed screws
- Curved guides
- Metering disks
- Curved disks
- Threaded joints
- Seals
- Inspection glasses
- Valve seats
- Equipment casings
- Bobbins
- Vacuum rails/panels
- Stripper rails
- Punch supports

- Germany:** Licharz GmbH
Industriepark Nord | D-53567 Buchholz | Germany
Telefon: ++49 (0) 2683 - 977 0 | Fax: ++49 (0) 2683 - 977 111
Internet: www.licharz.de | E-Mail: info@licharz.de
- France:** Licharz eurl.
Z.I. de Leveau – Entrée G | F-38200 Vienne | France
Téléphone: ++33 (0) 4 74 31 87 08 | Fax: ++33 (0) 4 74 31 87 07
Internet: www.licharz.fr | E-Mail: info@licharz.fr
- Great Britain:** Licharz Ltd
34 Lanchester Way | Royal Oak Industrial Estate | Daventry, NN11 8PH | Great Britain
Phone: ++44 (0) 1327 877 500 | Fax: ++44 (0) 1327 877 333
Internet: www.licharz.co.uk | E-Mail: sales@licharz.co.uk
- USA:** ZL engineering plastics inc
2 Greentown Rd | Buchanan NY 10511 | USA
Phone: ++1 914 - 736 6066 | Fax: ++1 914 - 736 2154
Internet: www.zlplastic.com | E-Mail: sales@zlplastic.com

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EXACTLY YOUR SOLUTION:

We think with you from the beginning!

We offer advice on how to utilise plastics and develop your component together with you:

- we check application conditions on your machine
- we check your design drawing
- we recommend the material and the process
- we manufacture a prototype for you if required.

You will receive your product quickly and economically, exactly as you need it!