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Guide values

for the application and processing
of selected thermoplastics

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Guide Data and Processing Information for selected Thermoplastics

Thermoplastic Product

			Processing Properties				Mechanical Properties								Electrical Properties				Thermal Properties				
	Abbreviation	Density DIN EN ISO 1183 g/cm³	Drying Temperature °C	Drying Time (dry air) h	Injection Molding Melt Temperature °C	Injection Molding Mold Temperature °C	Tensile Strength ISO 527 N/mm²	Tensile Elongation at Break ISO 527 *ISO 37 %	Tensile Modulus ISO 527 N/mm²	Ball-Pressure Hardness H (358/30) *H (961/30) EN ISO 2039/1 N/mm²	Impact Strength (Izod, 23 °C) ISO 180/1C kJ/m²	Impact Strength (Izod, -30 °C) ISO 180/1C kJ/m²	Notched Impact Strength (Izod, 23 °C) ISO 180/1A kJ/m²	Notched Impact Strength (Izod, -30 °C) ISO 180/1A kJ/m²	Volume Resistivity IEC 60093 Ω · cm	Surface Resistivity IEC 60093 Ω · cm	Dielectric Strength IEC 60243-2 kV/mm	CTI IEC 60112 -	Max. Temperature in practical use up to several hours (short term) According to IEC 60216-1 °C	Vicat Softening Temperature VST B/50 DIN EN ISO 306	Heat Deflection Temperature HDT/A DIN EN ISO 75 °C	CLTE Parallel (23 - 80 °C) 10⁻⁴/K	Water Absorption (saturated, 23 °C) DIN EN ISO 62 %
Polyethylene (low density)	PE - LD	0.914 - 0.939	70 - 80	1	170 - 240	15 - 60	8 - 20	700 - 100	150 - 450	12 - 25	o. Br.	o. Br.	o. Br.	-	10^{17}	10^{13-14}	22 - 150	600	90	45 - 80	35	2.0 - 2.4	-
Polyethylene (high density)	PE - HD	0.933 - 0.966	80 - 90	1	200 - 280	20 - 60	25 - 35	400 - 800	700 - 1500	30 - 64	o. Br.	o. Br.	2.6 - o. Br.	1.7 - 72	10^{17}	10^{13-15}	22 - 150	600	110	45 - 80	40 - 50	1.2 - 1.8	0.01 - 0.04
Ethylene vinyl acetate polymer	EVA	0.920 - 0.960	60 - 70	1	130 - 240	10 - 50	10 - 20	-	40 - 120	8 - 13	o. Br.	o. Br.	o. Br.	o. Br.	10^{15}	10^{13}	60	600	65	-	34	1.6 - 2.0	-
Polypropylene	PP	0.894 - 0.912	90 - 120	3	200 - 270	20 - 90	15 - 37	400 - 500	1100 - 1600	70 - 83	60 - 82	11 - 12	2.0 - 4.9	1.3 - 2.6	10^{17}	10^{11-14}	70 - 140	600	140	60 - 100	50 - 70	1.1 - 1.6	0.1
Polypropylene + 40 % talc	PP + T40	1.200 - 1.240	90 - 120	3	220 - 270	20 - 90	22 - 40	8 - 20	3600 - 4800	90 - 100	10 - 50	7 - 12	1.8 - 3.6	1.5 - 2.0	10^{14-16}	10^{13-14}	60 - 110	> 600	100	90 - 115	70 - 130	0.4 - 0.9	0.1
Polypropylene + 30 % glass fiber	PP + GF30	1.110 - 1.140	90 - 120	3	220 - 270	20 - 90	60 - 100	2 - 4	4800 - 7000	100	10 - 28	10 - 27	4 - 50	4.0 - 7.3	10^{15-16}	10^{13-15}	30 - 63	600	155	100 - 145	110 - 155	0.2 - 0.4	-
Polyvinyl chloride hard	PVC hard	1.38 - 1.55	-	-	170 - 210	20 - 60	50 - 75	20 - 65	1500 - 3500	100 - 125	240 - o. Br.	40 - 80	3.5 - 6	3 - 4	10^{15-16}	10^{13-14}	30	600	85	70 - 83	60 - 76	0.70 - 0.75	0.1
Polyvinyl chloride soft	PVC soft	1.18 - 1.35	60 - 70	1 - 3	160 - 190	10 - 60	5 - 24	100 - 400	-	-	-	-	-	-	> 10^{11}	10^{11}	-	-	55	35 - 45	-	1.5 - 2.1	-
Polystyrene standard	PS	1.05	80	2 - 3	180 - 260	10 - 70	30 - 59	1.6 - 3	3000 - 3300	140 - 150	9 - 20	9 - 20	1.5 - 2.0	1.5 - 2	> 10^{16}	> 10^{13-14}	120 - 135	375 - 475	90	84 - 101	70 - 86	0.8	0.2 - 0.3
Styrene-butadiene, impact resistant	SB	1.05	60 - 80	2 - 4	190 - 260	10 - 70	20 - 40	20 - 60	1600 - 2800	58 - 120	20 - 90	20 - 60	4 - 12	3 - 6	> 10^{16}	> 10^{13-14}	150 - 155	500	75	75 - 96	75 - 85	0.7	0 - 0.1
Styrene-acrylonitrile polymer	SAN	1.08	80	2 - 4	200 - 260	40 - 80	70 - 84	35	3700 - 3900	165 - 175	-	-	2 - 3	-	10^{16}	> 10^{13}	95	400 - 500	85	95 - 105	98 - 104	0.7	0.2 - 0.3
Acrylonitrile-butadiene-styrene graft copolymer	ABS	1.05 - 1.07	80 - 85	1 - 6	220 - 260	50 - 80	32 - 62	15 - 30	1300 - 3000	65 - 115	60 - o. Br.	30 - 135	8 - 35	3 - 17	10^{14-16}	> 10^{13}	85	450 - 600	100	90 - 106	90 - 100	0.8 - 1.1	0.7
Acrylonitrile-styrene-acrylic ester copolymer	ASA	1.07	85	2 - 4	240 - 280	40 - 80	40 - 56	10 - 25	1100 - 2600	65 - 100	60 - o. Br.	30 - 120	10 - 45	3 - 10	10^{15}	> 10^{13}	90 - 105	600	90	87 - 101	95 - 104	0.8 - 1.1	0.45
Polymethyl methacrylate	PMMA	1.15 - 1.19	60 - 100	2 - 6	220 - 270	50 - 90	49 - 78	3 - 20	1600 - 3400	170 - 200*	12 - 16	11 - 16	2.0 - 2.2	1.8 - 2.0	10^{15}	> 10^{15}	40 - 60	600	90	85 - 110	75 - 100	0.7 - 0.8	1.5 - 2.2
Polyoxymethylene	POM	1.39 - 1.42	100 - 110	1 - 2	180 - 220	60 - 100	55 - 62	25 - 100	2600 - 3000	130 - 150	80 - o. Br.	50 - 160	4 - 7	4 - 7	10^{15}	> 10^{13}	70 - 100	> 600	150	160 - 170	100 - 110	1.1	0.7
Polyoxymethylene + 25 % glass fiber	POM + GF25	1.58	100 - 110	1 - 2	190 - 230	80 - 110	110 - 135	2 - 3	8700 - 9100	185 - 190	28 - 32	30 - 37	5 - 6	6	10^{14-16}	10^{12-13}	50 - 90	600	150	158 - 165	155 - 163	0.3 - 0.4	0.9 - 1.0
Cellulose acetate	CA	1.26 - 1.29	70 - 80	3 - 4	170 - 210	40 - 80	25 - 59	-	2200	39 - 80	o. Br.	250 - o. Br.	10 - 60	-	10^{13}	10^{12}	25 - 30	> 600	90	65 - 100	42 - 59	1.02 - 1.25	3.8 - 5.0
Cellulose propionate	CP	1.17 - 1.21	60 - 90	2 - 4	180 - 220	40 - 80	20 - 48	-	1000 - 2200	35 - 78	o. Br.	o. Br.	-	-	10^{15-16}	10^{15}	32 - 36	> 600	90	69 - 108	62 - 94	1.20 - 1.45	2.0 - 2.5
Cellulose acetobutyrate	CAB	1.17 - 1.21	60 - 90	2 - 4	180 - 220	40 - 80	17 - 42	-	1600	25 - 70	-	-	-	-	10^{16}	10^{13-14}	32 - 34	> 600	90	65 - 102	60 - 94	1.2	2.3 - 2.7
polyamide 6	PA 6	1.13	75 - 100	2 - 4	250 - 290	50 - 120	70 - 85	20 - > 50	1000 - 1700	70	o. Br.	250 - o. Br.	10 - 60	5 - 10	10^{12}	10^{10}	30 - 80	600	160 - 180	180 - 210	50 - 95	0.70 - 1.0	8.0 -10.0
Polyamide 6 + 30 % glass fiber	PA 6 + GF30	1.36	75 - 100	2 - 4	270 - 290	80 - 120	95 - 170	4 - 12	6000 - 10000	150*	44 - 100	55 - 90	20 - 30	10 - 20	10^{12}	10^{12}	20 - 80	400 - 600	180	200 - 220	170 - 210	0.20 - 0.70	6.0 - 7.0
Polyamide 6 + 30 % mineral	PA 6 + MR30	1.34 - 1.37	75 - 100	2 - 4	270 - 290	80 - 100	70 - 80	3 - 10	4500 - 8000	130*	o. Br.	65	14 - 18	4.0 - 4.5	10^{12}	10^{14}	20 - 60	500 - 575	180	200 - 208	150 - 180	0.50 - 0.90	6.0 - 7.0
Polyamide 66	PA 66	1.13	75 - 100	2 - 4	270 - 300	50 - 120	75 - 90	20 - > 50	1400 - 2300	110	21 - o. Br.	30 - 300	8 - o. Br.	3 - 10	10^{12}	10^{10}	50 - 110	500 - 600	200	200 - 255	90 - 110	0.70 - 1.00	6.0 - 9.0
Polyamide 66 + 30 % glass fiber	PA 66 + GF30	1.36	75 - 100	2 - 4	280 - 300	80 - 120	100 - 180	2.5 - 10	7000 - 10000	100 - 200*	32 - 75	40 - 60	15.5 - 50	10 - 11	10^{12-13}	10^{10}	40 - 80	425 - 600	240	200 - 257	220 - 255	0.15 - 0.70	5.0 - 6.0
Polyamide 66 + 40 % mineral	PA 66 + MR40	1.42 - 1.50	75 - 100	2 - 4	280 - 300	80 - 100	55 - 97	5.0 - 15	2800 - 6500	130 - 160*	26 - o. Br.	65	5.2 - 9.0	1.5 - 4.0	10^{12-13}	10^{10-14}	40 - 80	525 - 550	240	200 - 260	120 - 190	0.50 - 0.80	4.9 - 5.3
Polyamide 610	PA 610	1.06 - 1.09	75 - 100	2 - 4	220 - 260	40 - 120	50 - 70	-	1300 - 1500	80	o. Br.	o. Br.	5 - 37	3.5 - 5.0	10^{12}	10^{10}	40 - 60	600	180	193	90	0.80 - 1.00	3.0 - 3.6
Polyamide 11	PA 11	1.02 - 1.06	75 - 100	2 - 4	200 - 270	40 - 80	49 - 60	30 - > 50	1100 - 1400	75	o. Br.	o. Br.	-	-	10^{13}	10^{11-12}	18 - 26	600	140	180 - 190	50 - 65	1.30	1.8
Polyamide 12	PA 12	1.01 - 1.05	75 - 100	2 - 4	200 - 270	30 - 100	52 - 65	30 - > 50	1000 - 2000	90 - 120	60 - o. Br.	45 - o. Br.	4 - 8	2 - 4	10^{13}	10^{11}	28 - 34	575 - 600	140	140 - 160	42 - 80	0.90 - 1.20	1.5 - 1.9
Polyamide 6/6T	PA 6/6T	1.18	80 - 100	2 - 6	310 - 340	60 - 100	90 - 100	10 - 20	3200 - 3500	190			12	5	10^{14-15}	10^{13}	100	600	250	280	100	0.60 - 0.80	6.5 - 7.5
Polyphthalamide + 33 % glass fiber	PPA + GF33	1.46	120	4	320 - 345	135 - 165	180 - 220	2.1	13000 - 14500	-	38.5	-	7.8	-	2 x 10^{15}	-	-	550	-	-	275 - 285	0.24	0.21
Polyphthalamide + 45 % glass fiber	PPA + GF45	1.56	120	4	320 - 345	135 - 165	220 - 260	2.1 - 2.7	16000 - 17200	-	51.7	-	9.9	-	2 x 10^{15}	-	-	550	-	-	280 - 300	0.15	0.12
Polyphthalamide + 65 % glass fiber/mineral	PPA + GF/MR65	1.78	120	4	320 - 345	135 - 165	140 - 200	1.0 - 1.5	20000 - 23700	-	35.4	-	7.2	-	4 x 10^{15}	-	-	600	-	-	270 - 280	0.11	0.10
Polycarbonate	PC	1.20	120	4	270 - 310	80 - 100	55 - 63	95 - 140	1800 - 2400	110	o. Br.	30 - o. Br.	70 - 95	-	> 10^{17}	> 10^{15}	10 - 30	250 - 300	130	140 - 148	125 - 135	0.70 - 0.80	0.35
Polycarbonate + 30 % glass fiber	PC + GF30	1.44	120	4	310 - 330	80 - 130	47	2.0 - 3.5	4000 - 5800	150	30 - 70	25 - 35	2.0 - 7.5	-	10^{15-17}	10^{14}	20 - 45	150 - 175	140	147 - 165	138 - 150	0.28 - 0.30	0.28
Polycarbonate, high heat deflection	PC - HT	1.148 - 1.18	130	4 - 8	300 - 360	100 - 140	65 - 100	-	2250	115	o. Br.	o. Br.	5 - 12	5 - 8	> 10^{16}	> 10^{16}	35	300 - 600	140 - 180	160 - 205	138 - 179	0.25 - 0.75	-
Polyethylene terephthalate	PET	1.38 - 1.40	130	3	250 - 270	130 - 140	55 - 80	-	2200 - 2800	110 - 140	-		2 - 3	-	10^{16}	10^{16}	45 - 50	325 - 350	200	160 - 180	70 - 80	0.40 - 0.80	0.5 - 0.7
Polyethylene terephthalate + 30 % glass fiber	PET + GF30	1.65 - 1.76	130	3	260 - 280	130 - 140	150 - 160	-	10000 - 13000	210 - 250	29 - 40	25 - 35	7 - 10	8 - 10	10^{14-16}	10^{14-16}	22 - 55	250 - 275	220	210 - 240	220 - 230	0.30	0.25
Polybutylene terephthalate	PBT	1.30	100 - 120	3	250 - 270	60 - 100	40 - 60	15 - 60	2500 - 2800	70 - 130	30 - 130	20 - 80	4 - 20	3 - 6	10^{15-16}	10^{13-14}	100 - 140	500 - 600	165	165 - 180	60 - 70	0.60	0.50
Polybutylene terephthalate + 30 % glass fiber	PBT + GF30	1.50 - 1.55	100 - 120	3	250 - 270	60 - 100	120 - 150	2 - 3	9000 - 12000	100 - 220	40 - 160	40 - 70	10 - 40	10 - 15	10^{15-16}	10^{13-14}	80 - 100	500 - 600	220	210 - 220	200 - 210	0.20 - 0.40	0.1 - 0.2
Polyphenylene sulfide + 40 % glass fiber	PPS + GF40	1.65	130 - 140	3 - 4	320 - 340	140 - 170	150 - 190	1.4 - 1.8	14000 - 15000	300	30 - 45	30 - 50	8 - 10	8.0 - 9.5	10^{15-16}	10^{14-16}	15 - 25	125 - 175	240	246 - 260	250 - 265	0.12 - 0.21	< 0.05
Polyphenylene sulfide + 60 % glass fiber	PPS + GF60	1.90	130 - 140	3 - 4	320 - 340	140 - 170	170	1.0 - 1.5	21000 - 25000	-	28	-	-	-	10^{15-16}	10^{14-16}	-	-	-	248 - 260	> 260	-	< 0.05
Polyphenylene sulfide + 60 % mineral/glass fiber	PPS + MR/GF30	1.90	130 - 140	3 - 4	320 - 340	140 - 170	110 - 180	0.6 - 1.7	17000 - 20000	280 - 360	15 - 20	10 - 19	4.0 - 7.5	4 - 8	10^{15-16}	10^{14-16}	15 - 20	200 - 250	240	248 - 260	260 - 270	0.12 - 0.20	< 0.05
Polysulfone	PSU	1.24	130 - 140	3 - 6	330 - 380	120 - 160	80	-	2600	147	o. Br.	o. Br.	5	6	> 10^{16}	> 10^{14}	100	125	170	179 - 183	162 - 169	0.55	0.6
Polysulfone + 30 % glass fiber	PSU + GF30	1.50 - 1.60	130 - 150	3 - 4	350 - 390	130 - 180	125	1.7 - 1.9	9000 - 10000	202*	20	25	7	7	> 10^{16}	> 10^{14}	> 40	150	170	190	183	0.21	0.5 - 1.6
Polyethersulfone	PES	1.37	140	4	340 - 390	140 - 180	90	-	2700	148	o. Br.	o. Br.	6 - 7	7 - 8	> 10^{16}	> 10^{14}	80	150	190	215	195 - 215	0.55	2.1
Polyethersulfone + 30 % glass fiber	PES + GF30	1.60	140	4	350 - 390	150 - 190	140	1.7 - 1.9	9000 - 10000	221*	29	32	8	8	> 10^{16}	> 10^{14}	> 40	125	200	217	210 - 225	0.21	1.5
Thermoplastic polyurethane elastomer	TPU Shore A85	1.20	100 - 110	0.5 - 2.0	190 - 220	5 - 40	-	450 - 550	-	-	-	-	-	-	10^{12}	10^{11}	14 - 22	> 600	80	-	-	-	-
Thermoplastic vulcanizate (PP+EPDM)	TPV Shore A60	0.93 - 0.95	70 - 80	2 - 4	190 - 230	10 - 60	-	350 - 500*	-	-	-	-	-	-	> 10^{12}	> 10^{11}	40	600	130	-	-	-	-
Thermoplastic vulcanizate (PP+EPDM)	TPV Shore D40	0.94 - 0.96	70 - 80	2 - 4	200 - 240	10 - 70	-	575 - 660*	-	-	-	-	-	-	> 10^{12}	> 10^{11}	40	600	130	-	-	-	-
PC/ABS Blend	PC/ABS	1.10 - 1.16	100 - 110	1 - 3	230 - 280	70 - 100	45 - 55	50 - 100	2000 - 2300	80 - 90	o. Br.	o. Br.	35 - o. Br.	16 - o. Br.	10^{15-16}	> 10^{14}	20 - 28	250 - 500	90	100 - 130	90 - 110	0.75 - 0.97	0.20 - 0.50
PC/ABS Blend + 20 % glass fiber	PC/ABS + GF20	1.25	100 - 110	1 - 3	240 - 280	80 - 100	75 - 100	2	6000 - 7500	125	o. Br.	39	15	15	10^{15-16}	> 10^{14}	> 30	200	95	125 - 135	115	0.26	0.20 - 0.40
PC/ASA Blend	PC/ASA	1.10 - 1.15	100 - 110	1 - 3	250 - 290	60 - 90	53 - 63	50 - 100	2300 - 2600	90 - 110	o. Br.	o. Br.	50 - 70	8 - 15	10^{13-14}	10^{13-14}	75 - 95	200 - 250	105	100 - 130	100 - 115	0.70 - 0.90	0.10 - 1.00
PC/PBT Blend	PC/PBT	1.21 - 1.24	110 - 120	2 - 3	260 - 280	60 - 80	40 - 60	> 50	1700 - 2250	82 - 96	o. Br.	o. Br.	46 - 52	18 - 40	10^{16}	-	18 - 19	-	-	120 - 130	80 - 85	0.92 - 1.00	0.35
PPE/SB Blend	PPE/SB	1.06	80 - 100	2	260 - 300	60 - 100	50 - 65	-	2300 - 2800	90 - 135	-	-	30 - 38	7 - 10	10^{15-17}	10^{13-15}	60 - 80	250 - 350	100	115 - 136	100 - 115	0.60 - 0.70	0.10 - 0.15

Electrical and mechanical data measured in atmospheric humidity

Note: The statements in this brochure are based on our current knowledge and experience. They do not exempt the manufacturer from his own verifications and trials as the manufacturing and application of our products might have a substantial influence on production. A legally compulsory guarantee of specific properties or the suitability for a specific application may not be concluded from our statements. The customer himself has to make sure he adheres to any protection rights as well as to current law and regulations.

MOCOM Compounds GmbH & Co. KG
Mühlenhagen 35 | 20539 Hamburg
mocom.eu

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