Thermal Properties of Polymers

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Polymer type	Name	Glass Transition Temperature (°C)	Density[1] (g/cm³)	Melting Temperature (°C)	Thermal Conductivity[1] (W/(m·K))	Melting Enthalpy (J/g)	Decomposition Temperature[2] (°C)	Young's Modulus[1] (MPa)	Coefficient of Linear Thermal Expansion[1] (*10⁻⁶/K)	Specific Heat Capacity[1] (J/(g·K))
ABS	Acrylonitrile-butadiene-styrene copolymer	-85/95 to 105/(125)	1.03 to 1.07	-	0.15 to 0.20	-	420 to 435	2200 to 3000	80 to 100	1.26 to 1.68
SAN	Styrene-acrylonitrile copolymer	95 to 110/(125)	1.08	-	[illegible]	-	415 to 425	3500 to 3700	[illegible]	[illegible]
ASA	[illegible]	-50 to -40 / 95 to 105	1.04 to [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	-90 to -50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PE-LD	Polyethylene low density	[illegible]	0.91 to 0.93	[illegible]	0.3 to 0.34	[illegible]	[illegible]	200 to 400	400	1.8 to 3.4
PE-LLD	Polyethylene linear low density	-130 to -100 / -70 to -25	0.91 to 0.94	122 to 127	(na)	(na)	475 to 485	250 to 700	200	(na)
PE-HD	Polyethylene high density	-130 to -100	0.94 to 0.96	125 to 135	0.33 to 0.53	293	480 to 498	600 to 1400	200 to 250	1.8 to 2.7
PE-UHMW	Polyethylene ultra high molecular weight	-130 to -100	0.93 to 0.94	130 to 145	0.41 to 0.51	(na)	480 to 490	570 to 790	200	1.84
EVA	Polyethylene-co-vinyl acetate	-40 to +20	0.92 to 0.95	30 to 110	0.35	10 to 100	345 to 360 / 470 to 480	7 to 120	160 to 200	2.3
PP (isotactic)	Polypropylene	-20 to 20	0.90 to 0.91	160 to 165	0.17 to 0.25	207 to 209	450 to 470	1300 to 1800	130 to 180	1.8
PB	Polybutene	-30 to -20	[illegible]	115 to 135	[illegible]	128	450 to 460	240/600 to 700	[illegible]	[illegible]
PVDC	Polyvinylidene chloride	[illegible]	1.63	[illegible]	0.13	[illegible]	[illegible]	[illegible]	190	[illegible]
[illegible]	[illegible]	70 to [illegible]	1.21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PLA	Polylactide	45 to 65	1.21 to 1.43	150 to 160	(na)	[illegible]	350	350 to 2800	(na)	(na)
PA11	Polyamide 11	40 to 55[3]	1.03 to 1.05	180 to 190	0.23 to 0.28	224	430 to 455	1400[3]	85 to 120	1.26
PA12	Polyamide 12	40 to 50[3]	1.01 to 1.04	170 to 180	0.22 to 0.24	210	465 to 475	1400[3]	120 to 140	1.17 to 1.26
PA46	Polyamide 46	70 to 94[3]	1.18 to 1.21	290 to 295	0.3	(na)	440 to 450	3300[3]	70 to 80	2.1
PA6	Polyamide 6	45 to 80[3]	[illegible]	225 to 235	[illegible]	190	445 to 460	2800[3]	80 to 90	[illegible] to 1.70
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	117 to 227	450 to 470	2200[3]	70 to 90	1.6
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(na)	450 to 465	2100[3] to 2250	120 to 130	1.91
PA66	Polyamide 66	[illegible]	[illegible]	225 to 265	0.24 to 0.33	195	430 to 473	3000[3]	35 to 45	[illegible]
[illegible]	[illegible]	60 [illegible]	1.20 to 1.24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PMMA	Polymethylmethacrylate	115 (synd.), 105 (atact.), 45 (isotac.)	1.15 to 1.19	-	0.16 to 0.25	-	360 to 390	3100 to 3300	90 to 110	1.45 to 1.47
POM (homo)	Polyoxymethylene (homopolymer)	-85 to -75	1.39 to 1.43	175 to 190	0.30 to 0.37	316 to 335	365 to 390	2600 to 3200	160 to 180	1.48 to 1.50
POM (copo)	Polyoxymethylene (copolymer)	-75 to -60	1.39 to 1.43	140 to 175	0.23 to 0.31	181 to 220	385 to 400	2600 to 3200	110 to 150	1.48 to 1.50
PPS	Polyphenylenesulfide	85 to 100	1.34 to 1.36	275 to 290	(na)	80	510 to 550	3700	50 to 70	(na)
PSU	Polysulfone	185 to 190	1.24 to 1.25	-	0.15	-	530 to 540	2500 to 2700	50 to 60	1.37
PTFE	Polytetrafluoroethylene	120 to 130	2.13 to 2.23	325 to 330	0.23 to 0.25	82	575 to 590	400 to 750	100 to 150	1.0
PVDF	Polyvinylidene fluoride	-40	[illegible]	170 to 175	[illegible]	105	440 to 480	2000 to 2900	[illegible]	[illegible]
PA6/3T	Polyamide 6/3T	[illegible]	1.12	[illegible]	0.23	[illegible]	[illegible]	2000	80	1.6
PA6/6T	Polyamide 6/6T	60 to 100	1.18	250 to 300	(na)	(na)	460 to 480	3500 to 3600	70	(na)
PEI	Polyetherimide	215 to 230	1.27	-	0.22	-	540 to 550	2900 to 3000	50	(na)
PESU	Polyethersulfone	225 to 230	1.37	-	0.18	-	580 to 595	2600 to 2800	60	1.37
PEEK	Polyetheretherketone	145 to 155	1.32 (semi-cr) 1.27 (am)	335 to 345	0.25	130	600 to 620	3700	50 to 60	(na)
PEKEKK	Polyacryletherketone-etherketoneketone	165 to 175	1.3	380 to 390	0.29	60	580 to 600	4300	45	(na)
PFA	Perfluoroalkoxy	(na)	[illegible]	285 to 305	[illegible]	20 to 30	535 to 550	800	[illegible]	[illegible]
TPC	Ester-Ether based TPE	0 to 60	1.0 to 1.2	190 to 230	0.10 to 0.19	30	395 to 420	50 to 1000	165 to 200	1.90 to 2.22
TPA	Amide based TPE	-70 to 45	0.99 to 1.10	145 to 200	0.2	20 to 65	400 to 420	20 to 500	120 to 240	2.4 to 2.8
TPS	Styrene based TPE	-80 to -50 (butadiene) 85 to 100 (styrene)	0.88 to 1.30	150 to 160 (PP)	(na)	20	440 to 455	10 to 200	(na)	(na)
BR	Butadiene rubber	-106 to -95 (1,4 cis) -107 to -83 (1,4 trans) -15 (1,2)	0.9 to 1.0	-25 to 12 (1,4 cis), 97/145 (1,4 trans), 126 (1,2)	0.25	46/170 (1,4 cis) 70 to 140 (1,4 trans)	370 to 385 / 460 to 475	(na)	(na)	1.76 to 1.96
CM	Chlorinated polyethylene rubber	-25 to -5	[illegible]	(na)	0.11 to 0.13	(na)	320 to 340 / 465 to 480	2 to 15	175 to 200	(na)
NBR	Acrylonitrile-butadiene rubber	-44 to 5	1.0	-	(na)	-	450 to 475	2 to 5	150 to 180	1.93 to 1.96
NR	Natural rubber	-72 to -55	0.91 to 0.93	28 to 40	0.13 to 0.15	67	375 to 400	1 to 5	180 to 260	1.91 to 2.08
Q	Silicone rubber	-135 to -120	1.25	-50 to -40	0.22	35	530 to 600	1 to 10	190 to 255	1.3 to 1.5
SBR	Styrene-butadiene rubber	-55 to -35	0.94	(-20)	0.20 to 0.25	170 (cis)	435 to 470	2 to 10	180	1.88 to 2.00
EP	Epoxy resin	50 to 200[5]	1.15	-	0.17 to 0.52	-	380 to 450	3000 to 5000	60	1.67 to 2.10
MF	Melamine-formaldehyde resin	70 to 130[5]	[illegible]	-	0.35 to 0.40	-	340 to 400	5000 to 10000	40 to 60	1.2
[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible] to 0.70	-	450 to 555	3000 to 4000	15 to 50	1.0 to 1.3
PUR	Polyurethane	[illegible]	1.10 to 1.70	-	< 0.19	-	240 to 350	(na)	130 to 200	1.70 to 2.10
UF	Urea-formaldehyde resin	60 to 110[5]	1.5	-	0.35 to 0.40	-	260 to 355	7000 to 10500	40 to 60	1.2 to 1.3
UP	Unsaturated polyester resin	60 to 170[5]	1.17 to 1.26	-	0.3 to 0.7	-	340 to 350 / 470 to 490	3000 to 4800	20 to 40	1.26 to 2.30

Key: Glass Transition Temperature – 4) DSC, STA, TMA, DMA; Melting Temperature – 4) DSC, STA; Density 1); Thermal Conductivity – 4) LFA, HFM, GHP 1); Melting Enthalpy – 4) DSC, STA; Decomposition Temperature – 4) TGA, STA 2); Young's Modulus – 4) DMA 1); Coefficient of Linear Thermal Expansion – 4) DIL, TMA 1); Specific Heat Capacity – 4) DSC, STA, LFA 1)

(1) at room temperature
(2) DTG peak temperature, determined at 10 K/min under nitrogen
(3) dry conditions
(4) thermoanalytical technique
(5) for cured sample, depending on degree of curing
(na) not available

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