Thermal Properties of Polymers

NETZSCH

-85/ 95 to 105 /(125) °C	**ABS** Acrylonitrile-butadiene-styrene copolymer				1.03 to 1.07 g/cm³
- °C					0.15 to 0.20 W/(m·K)
- J/g	420 to 435 °C	2200 to 3000 MPa	80 to 100 *10⁻⁶/K	1.26 to 1.68 J/(g·K)	
95 to 110/(125) °C	**SAN** Styrene-acrylonitrile copolymer				1.08 g/cm³
- °C					0.15 to 0.17 W/(m·K)
- J/g	415 to 425 °C	3500 to 3700 MPa	60 to 80 *10⁻⁶/K	1.18 to 1.20 J/(g·K)	
-50 to -40 / 95 to 105 °C	**ASA** Acrylonitrile-styrene-acrylate copolymer				1.04 to 1.07 g/cm³
- °C					0.17 to 0.19 W/(m·K)
- J/g	415 to 425 °C	2300 to 2900 MPa	85 to 105 *10⁻⁶/K	1.3 to 1.4 J/(g·K)	
-90 to -50 / 80 to 110 °C	**SB** Styrene/Polybutadiene copolymer				1.05 g/cm³
- °C					0.17 to 0.18 W/(m·K)
- J/g	440 to 455 °C	1800 to 2500 MPa	70 *10⁻⁶/K	1.2 to 1.3 J/(g·K)	
80 to 105 °C	**PS** Polystyrene				1.05 g/cm³
- °C					0.14 to 0.18 W/(m·K)
- J/g	415 to 425 °C	3100 to 3300 MPa	50 to 70 *10⁻⁶/K	1.3 J/(g·K)	
-130 to -100 / -30 to -10 °C	**PE-LD** Polyethylene low density				0.91 to 0.93 g/cm³
100 to 115 °C					0.3 to 0.34 W/(m·K)
(na) J/g	475 to 490 °C	200 to 400 MPa	400 *10⁻⁶/K	1.8 to 3.4 J/(g·K)	
-130 to -100 / -70 to -25 °C	**PE-LLD** Polyethylene linear low density				0.91 to 0.94 g/cm³
122 to 127 °C					(na) W/(m·K)
(na) J/g	475 to 485 °C	250 to 700 MPa	200 *10⁻⁶/K	(na) J/(g·K)	
-130 to -100 °C	**PE-HD** Polyethylene high density				0.94 to 0.96 g/cm³
125 to 135 °C					0.33 to 0.53 W/(m·K)
293 J/g	480 to 498 °C	600 to 1400 MPa	200 to 250 *10⁻⁶/K	1.8 to 2.7 J/(g·K)	
-130 to -100 °C	**PE-UHMW** Polyethylene ultra high molecular weight				0.93 to 0.94 g/cm³
130 to 145 °C					0.41 to 0.51 W/(m·K)
(na) J/g	480 to 490 °C	570 to 790 MPa	200 *10⁻⁶/K	1.84 J/(g·K)	
-40 to +20 °C	**EVA** Polyethylene-co-vinyl acetate				0.92 to 0.95 g/cm³
30 to 110 °C					0.35 W/(m·K)
10 to 100 J/g	345 to 360 / 470 to 480 °C	7 to 120 MPa	160 to 200 *10⁻⁶/K	2.3 J/(g·K)	
-20 to 20 °C	**PP (isotactic)** Polypropylene				0.90 to 0.91 g/cm³
160 to 165 °C					0.17 to 0.25 W/(m·K)
207 to 209 J/g	450 to 470 °C	1300 to 1800 MPa	130 to 180 *10⁻⁶/K	1.8 J/(g·K)	
-30 to -20 °C	**PB** Polybutene				0.89/0.91 to 0.94 g/cm³
115 to 135 °C					0.17 to 0.22 W/(m·K)
128 J/g	450 to 460 °C	240/600 to 700 MPa	110 to 140 *10⁻⁶/K	1.8 to 2.0 J/(g·K)	
-70 to -60 °C	**PIB** Polyisobutylene				0.91 to 0.93 g/cm³
(na) °C					0.12 to 0.20 W/(m·K)
(na) J/g	390 to 400 °C	(na) MPa	120 *10⁻⁶/K	1.97 J/(g·K)	
-50 to 80 °C	**PVC-P** Polyvinylchloride (with plasticizer)				1.16 to 1.35 g/cm³
- °C					0.13 to 0.20 W/(m·K)
- J/g	290 to 315 / 460 to 475 °C	25 to 1600 MPa	60 to 120 *10⁻⁶/K	0.8 to 0.9 J/(g·K)	
80 to 90 °C	**PVC-U** Polyvinylchloride (without plasticizer)				1.38 to 1.55 g/cm³
- °C					0.126 to 0.293 W/(m·K)
- J/g	285 to 315 / 460 to 475 °C	2700 to 3000 MPa	60 to 80 *10⁻⁶/K	0.84 to 1.17 J/(g·K)	
-18 to +15 °C	**PVDC** Polyvinylidene chloride				1.63 g/cm³
140 to 210 °C					0.13 W/(m·K)
(na) J/g	245 to 255 °C	300 to 550 MPa	190 *10⁻⁶/K	(na) J/(g·K)	
70 to 100 °C	**PVAL** Polyvinylalcohol				1.21 g/cm³
220 to 260 °C					(na) W/(m·K)
156 J/g	260 to 320 / 420 to 450 °C	(na) MPa	(na) *10⁻⁶/K	1.55 J/(g·K)	
45 to 65 °C	**PLA** Polylactide				1.21 to 1.43 g/cm³
150 to 160 °C					(na) W/(m·K)
93 to 140 J/g	350 to 375 °C	350 to 2800 MPa	(na) *10⁻⁶/K	(na) J/(g·K)	
40 [3] to 55 °C	**PA11** Polyamide 11				1.03 to 1.05 g/cm³
180 to 190 °C					0.23 to 0.28 W/(m·K)
224 J/g	430 to 455 °C	1400 [3] MPa	85 to 120 *10⁻⁶/K	1.26 J/(g·K)	
40 [3] to 50 °C	**PA12** Polyamide 12				1.01 to 1.04 g/cm³
170 to 180 °C					0.22 to 0.24 W/(m·K)
210 J/g	465 to 475 °C	1400 [3] MPa	120 to 140 *10⁻⁶/K	1.17 to 1.26 J/(g·K)	
70 [3] to 94 °C	**PA46** Polyamide 46				1.18 to 1.21 g/cm³
290 to 295 °C					0.3 W/(m·K)
(na) J/g	440 to 450 °C	3300 [3] MPa	70 to 80 *10⁻⁶/K	2.1 J/(g·K)	
45 [3] to 80 °C	**PA6** Polyamide 6				1.12 to 1.15 g/cm³
225 to 235 °C					0.22 to 0.33 W/(m·K)
190 J/g	445 to 460 °C	2800 [3] MPa	80 to 90 *10⁻⁶/K	1.59 to 1.70 J/(g·K)	
40 [3] to 70 °C	**PA610** Polyamide 610				1.07 to 1.09 g/cm³
210 to 230 °C					0.2 W/(m·K)
117 to 227 J/g	450 to 470 °C	2200 [3] MPa	70 to 90 *10⁻⁶/K	1.6 J/(g·K)	
40 [3] to 65 °C	**PA612** Polyamide 612				1.06 g/cm³
210 to 220 °C					(na) W/(m·K)
(na) J/g	450 to 465 °C	2100 [3] to 2250 MPa	120 to 130 *10⁻⁶/K	1.91 J/(g·K)	
65 [3] to 90 °C	**PA66** Polyamide 66				1.13 to 1.16 g/cm³
225 to 265 °C					0.24 to 0.33 W/(m·K)
195 J/g	430 to 473 °C	3000 [3] MPa	35 to 45 *10⁻⁶/K	1.67 to 1.70 J/(g·K)	
40 [3] to 60 °C	**PBT** Polybutylene terephthalate				1.30 to 1.32 g/cm³
220 to 230 °C					0.25 to 0.29 W/(m·K)
142 J/g	400 to 420 °C	2500 to 2800 MPa	80 to 100 *10⁻⁶/K	1.3 J/(g·K)	
70 [3] to 85 °C	**PET** Polyethylene terephthalate				1.33 to 1.45 g/cm³
245 to 260 °C					0.24 W/(m·K)
140 J/g	425 to 445 °C	2100 to 3100 MPa	80 to 100 *10⁻⁶/K	1.04 to 1.17 J/(g·K)	
140 to 150 °C	**PC** Polycarbonate				1.20 to 1.24 g/cm³
- °C					0.19 to 0.21 W/(m·K)
- J/g	480 to 535 °C	2200 to 2400 MPa	75 to 80 *10⁻⁶/K	1.17 to 1.50 J/(g·K)	
115 (synd.), 105 (atact.), 45 (isotac.) °C	**PMMA** Polymethylmethacrylate				1.15 to 1.19 g/cm³
- °C					0.16 to 0.25 W/(m·K)
- J/g	360 to 390 °C	3100 to 3300 MPa	90 to 110 *10⁻⁶/K	1.45 to 1.47 J/(g·K)	
-85 to -75 °C	**POM (homo)** Polyoxymethylene (homopolymer)				1.39 to 1.43 g/cm³
175 to 190 °C					0.30 to 0.37 W/(m·K)
316 to 335 J/g	365 to 390 °C	2600 to 3200 MPa	160 to 180 *10⁻⁶/K	1.48 to 1.50 J/(g·K)	
-75 to -60 °C	**POM (copo)** Polyoxymethylene (copolymer)				1.39 to 1.43 g/cm³
140 to 175 °C					0.23 to 0.31 W/(m·K)
181 to 220 J/g	385 to 400 °C	2600 to 3200 MPa	110 to 150 *10⁻⁶/K	1.48 to 1.50 J/(g·K)	
85 to 100 °C	**PPS** Polyphenylenesulfide				1.34 to 1.36 g/cm³
275 to 290 °C					(na) W/(m·K)
80 J/g	510 to 550 °C	3700 MPa	50 to 70 *10⁻⁶/K	(na) J/(g·K)	
185 to 190 °C	**PSU** Polysulfone				1.24 to 1.25 g/cm³
- °C					0.15 W/(m·K)
- J/g	530 to 540 °C	2500 to 2700 MPa	50 to 60 *10⁻⁶/K	1.37 J/(g·K)	
120 to 130 °C	**PTFE** Polytetrafluoroethylene				2.13 to 2.23 g/cm³
325 to 330 °C					0.23 to 0.25 W/(m·K)
82 J/g	575 to 590 °C	400 to 750 MPa	100 to 150 *10⁻⁶/K	1.0 J/(g·K)	
-40 °C	**PVDF** Polyvinylidene fluoride				1.76 to 1.78 g/cm³
170 to 175 °C					0.19 W/(m·K)
105 J/g	440 to 480 °C	2000 to 2900 MPa	110 to 130 *10⁻⁶/K	0.96 to 1.40 J/(g·K)	
(na) °C	**FEP** Tetrafluoroethylene/ hexafluoropropylene copolymer				2.12 to 2.17 g/cm³
253 to 282 °C					0.25 W/(m·K)
(na) J/g	510 to 600 °C	350 MPa	80 *10⁻⁶/K	1.12 J/(g·K)	
75 to 85 °C	**ETFE** Ethylene-tetrafluoroethylene				1.7 g/cm³
225 to 275 °C					0.23 W/(m·K)
46 to 50 J/g	500 to 530 °C	1100 MPa	40 *10⁻⁶/K	0.9 J/(g·K)	
-20 to +40 °C	**PVF** Polyvinylfluoride				1.37 to 1.39 g/cm³
190 to 200 °C					(na) W/(m·K)
164 J/g	430 to 450 °C	2100 to 2600 MPa	50 to 97 *10⁻⁶/K	1.0 to 1.8 J/(g·K)	
145 to 153 °C	**PA6/3T** Polyamide 6/3T				1.12 g/cm³
- °C					0.23 W/(m·K)
- J/g	460 to 470 °C	2000 MPa	80 *10⁻⁶/K	1.6 J/(g·K)	
60 to 100 °C	**PA6/6T** Polyamide 6/6T				1.18 g/cm³
250 to 300 °C					(na) W/(m·K)
(na) J/g	460 to 480 °C	3500 to 3600 MPa	70 *10⁻⁶/K	(na) J/(g·K)	
215 to 230 °C	**PEI** Polyetherimide				1.27 g/cm³
- °C					0.22 W/(m·K)
- J/g	540 to 550 °C	2900 to 3000 MPa	50 *10⁻⁶/K	(na) J/(g·K)	
225 to 230 °C	**PESU** Polyethersulfone				1.37 g/cm³
- °C					0.18 W/(m·K)
- J/g	580 to 595 °C	2600 to 2800 MPa	60 *10⁻⁶/K	1.37 J/(g·K)	
145 to 155 °C	**PEEK** Polyetheretherketone				1.32 (semi-cr) 1.27 (am) g/cm³
335 to 345 °C					0.25 W/(m·K)
130 J/g	600 to 620 °C	3700 MPa	50 to 70 *10⁻⁶/K	(na) J/(g·K)	
165 to 175 °C	**PEKEKK** Polyacryletherketone-etherketoneketone				1.3 g/cm³
380 to 390 °C					0.29 W/(m·K)
60 J/g	580 to 600 °C	4300 MPa	45 *10⁻⁶/K	(na) J/(g·K)	
(na) °C	**PFA** Perfluoroalkoxy				2.14 to 2.16 g/cm³
285 to 305 °C					(na) W/(m·K)
20 to 30 J/g	535 to 550 °C	800 MPa	120 *10⁻⁶/K	(na) J/(g·K)	
90 to 120 °C	**(HBA/HNA)-LCP** Hydroxybenzoic acid-2,6-hydroxynaphthenic acid (liquid crystalline polymer)				1.38 to 1.82 g/cm³
208 to 295 °C					(na) W/(m·K)
3 to 4 J/g	510 to 530 °C	7000 to 20000 MPa	0 to 25 (parall.) 25 to 50 (perpen.) *10⁻⁶/K	(na) J/(g·K)	
-60 to -50 °C	**TPO, TPV** Polyolefine based TPE				0.87 to 1.20 g/cm³
-20 to 40 (EPDM), 150 to 160 (PP) °C					(na) W/(m·K)
10 (EPDM) 20 (PP) J/g	460 to 480 °C	90 to 1400 MPa	15 to 130 *10⁻⁶/K	(na) J/(g·K)	
-50 to -30 / 0 to 60°C	**TPU** Urethane based TPE				1.10 to 1.25 g/cm³
135 to 220 °C					0.19 W/(m·K)
3 to 15 J/g	390 to 415 °C	20 to 400 MPa	130 to 180 *10⁻⁶/K	1.85 J/(g·K)	
0 to 60 °C	**TPC** Ester-Ether based TPE				1.0 to 1.2 g/cm³
190 to 230 °C					0.10 to 0.19 W/(m·K)
30 J/g	395 to 420 °C	50 to 1000 MPa	165 to 200 *10⁻⁶/K	1.90 to 2.22 J/(g·K)	
-70 to 45 °C	**TPA** Amide based TPE				0.99 to 1.10 g/cm³
145 to 200 °C					0.2 W/(m·K)
20 to 65 J/g	400 to 420 °C	20 to 500 MPa	120 to 240 *10⁻⁶/K	2.4 to 2.8 J/(g·K)	
-80 to -50 (butadiene) 85 to 100 (styrene) °C	**TPS** Styrene based TPE				0.88 to 1.30 g/cm³
150 to 160 (PP) °C					(na) W/(m·K)
20 J/g	440 to 455 °C	10 to 200 MPa	(na) *10⁻⁶/K	(na) J/(g·K)	
-106 to -95 (1,4 cis) -107 to -83 (1,4 trans) -15 (1,2) °C	**BR** Butadiene rubber				0.9 to 1.0 g/cm³
-25 to 12 (1,4 cis), 97 / 145 (1,4 trans) 126 (1,2) °C					0.25 W/(m·K)
46 / 170 (1,4 cis) 70 to 140 (1,4 trans) J/g	370 to 385 / 460 to 475 °C	(na) MPa	(na) *10⁻⁶/K	1.76 to 1.96 J/(g·K)	
-25 to -5 °C	**CM** Chlorinated polyethylene rubber				1.08 to 1.27 g/cm³
(na) °C					0.11 to 0.13 W/(m·K)
(na) J/g	320 to 340 / 465 to 480 °C	2 to 15 MPa	175 to 200 *10⁻⁶/K	(na) J/(g·K)	
-45 to -30 °C	**CR** Chloroprene rubber				1.25 g/cm³
40 to 75 °C					0.18 to 0.20 W/(m·K)
1 to 10 J/g	365 to 380 / 445 to 460 °C	(na) MPa	185 to 250 *10⁻⁶/K	(na) J/(g·K)	
-55 to -30 °C	**EPDM** Ethylene-propylene-diene rubber				0.86 g/cm³
-20 to 60 °C					0.26 W/(m·K)
5 to 20 J/g	470 to 487 °C	2 to 10 MPa	180 *10⁻⁶/K	1.80 to 2.00 J/(g·K)	
-30 to -10 °C	**HNBR** Hydrogenated acrylo-nitrile-butadiene rubber				0.95 to 1.00 g/cm³
- °C					(na) W/(m·K)
- J/g	465 to 480 °C	15 to 25 MPa	225 to 260 *10⁻⁶/K	(na) J/(g·K)	
-44 to 5 °C	**NBR** Acrylonitrile-butadiene rubber				1.0 g/cm³
- °C					(na) W/(m·K)
- J/g	450 to 475 °C	2 to 5 MPa	150 to 180 *10⁻⁶/K	1.93 to 1.96 J/(g·K)	
-72 to -55 °C	**NR** Natural rubber				0.91 to 0.93 g/cm³
28 to 40 °C					0.13 to 0.15 W/(m·K)
67 J/g	375 to 400 °C	1 to 5 MPa	180 to 260 *10⁻⁶/K	1.91 to 2.08 J/(g·K)	
-135 to -120 °C	**Q** Silicone rubber				1.25 g/cm³
-50 to -40 °C					0.22 W/(m·K)
35 J/g	530 to 600 °C	1 to 10 MPa	190 to 255 *10⁻⁶/K	1.3 to 1.5 J/(g·K)	
-55 to -35 °C	**SBR** Styrene-butadiene rubber				0.94 g/cm³
(-20) °C					0.20 to 0.25 W/(m·K)
170 (cis) J/g	435 to 470 °C	2 to 10 MPa	180 *10⁻⁶/K	1.88 to 2.00 J/(g·K)	
50 [5] to 200 °C	**EP** Epoxy resin				1.15 g/cm³
- °C					0.17 to 0.52 W/(m·K)
- J/g	380 to 450 °C	3000 to 5000 MPa	60 *10⁻⁶/K	1.67 to 2.10 J/(g·K)	
70 [5] to 130 °C	**MF** Melamine-formaldehyde resin				1.48 to 1.50 g/cm³
- °C					0.35 to 0.40 W/(m·K)
- J/g	340 to 400 °C	5000 to 10000 MPa	40 to 60 *10⁻⁶/K	1.2 J/(g·K)	
70 [5] to 250 °C	**PF** Phenol-formaldehyde resin				1.40 to 1.80 g/cm³
- °C					0.35 to 0.70 W/(m·K)
- J/g	450 to 555 °C	3000 to 4000 MPa	15 to 50 *10⁻⁶/K	1.0 to 1.3 J/(g·K)	
10 [5] to 180 °C	**PUR** Polyurethane				1.10 to 1.70 g/cm³
- °C					< 0.19 W/(m·K)
- J/g	240 to 350 °C	(na) MPa	130 to 200 *10⁻⁶/K	1.70 to 2.10 J/(g·K)	
60 [5] to 110 °C	**UF** Urea-formaldehyde resin				1.5 g/cm³
- °C					0.35 to 0.40 W/(m·K)
- J/g	260 to 355 °C	7000 to 10500 MPa	40 to 60 *10⁻⁶/K	1.2 to 1.3 J/(g·K)	
60 [5] to 170 °C	**UP** Unsaturated polyester resin				1.17 to 1.26 g/cm³
- °C					0.3 to 0.7 W/(m·K)
- J/g	340 to 350 / 470 to 490 °C	3000 to 4800 MPa	20 to 40 *10⁻⁶/K	1.26 to 2.30 J/(g·K)	

ガラス転移温度 4) DSC, STA, TMA, DMA	ポリマーの種類 正式名称			密度 1)
融点 4) DSC, STA				熱伝導率 4) LFA, HFM, GHP 1)
融解エンタルピー 4) DSC, STA	分解温度 4) TGA, STA 2)	ヤング率 4) DMA 1)	線膨張係数 4) DIL, TMA 1)	比熱容量 4) DSC, STA, LFA 1)

1) 室温
2) 窒素雰囲気下、10 K/分で測定したDTGピーク温度
3) 乾燥条件
4) 熱分析手法（熱分析技術）
5) 架橋（硬化）試料の場合、硬化度に依存
(na) 利用不可（または：該当データなし）

- 熱可塑性プラスチック
- エンジニアリング熱可塑性樹脂
- 高耐熱性熱可塑性樹脂
- 熱可塑性エラストマー
- エラストマー
- 熱硬化性樹脂

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Leading Thermal Analysis ■

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www.materialdatacenter.com

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