



GENERAL POLYMERS

THERMOPLASTIC MATERIALS

Coefficient of Linear Thermal Expansion

Under the effects of increasing temperature any material will expand. This can lead to significant changes in dimensions, to part warpage or to internal stress. The Coefficient of Linear Thermal Expansion (CLTE often referred to as "α") characterizes the ability of a plastic to expand under the effect of temperature elevation. It tells engineers how much the part they will develop will remain dimensionally stable under temperature variations.

Most widely used standards to measure Water Absorption in plastics are ASTM D696, ASTM E831, ASTM E228 and ISO 11359.

Polymer		Min Value (10-5 /°C)	Max Value (10-5 /°C)	Polymer		Min Value (10-5 /°C)	Max Value (10-5 /°C)
ABS	Acrylonitrile-Butadiene Styrene	7	15	PEI 30% GF	Polyetherimide 30% glass fiber	2	2
ABS FR	Acrylonitrile-Butadiene Styrene flame retardant	6	9	PEI mineral filled	Polyetherimide mineral filled	2	5
ABS High Heat	Acrylonitrile-Butadiene Styrene High Heat	6	10	PEKK-Low crystallinity grade	Polyetherketoneketone-Low crystallinity grade	77	77
ABS High Impact	Acrylonitrile-Butadiene Styrene High Impact	6	13	PESU	Polyethersulfone	5	6
ABS/PC	Acrylonitrile-Butadiene Styrene/Polycarbonate	4	5	PESU 10-30% GF	Polyethersulfone 10-30% glass fiber	2	3
ABS/PC 20% GF	Acrylonitrile-Butadiene Styrene/Polycarbonate 20% glass fiber	1.8	2	PET	Polyethylene Terephthalate	6	8
ABS/PC FR	Acrylonitrile-Butadiene Styrene/Polycarbonate flame retardant	3	4	PET 30% GF	Polyethylene Terephthalate 30% glass fiber	2	5
ASA	Acrylonitrile Styrene Acrylate	6	11	PET 30/35% GF Impact modified	Polyethylene Terephthalate 30/35% glass fiber impact modified	1.5	2
ASA/PC	Acrylonitrile Styrene Acrylate/Polycarbonate	7	9	PET G	Polyethylene Terephthalate Glycol	8	8
ASA/PC FR	Acrylonitrile Styrene Acrylate/Polycarbonate flame retardant	7	8	PE-UHMW	Polyethylene-Ultra High Molecular Weight	13	20
ASA/PVC	Acrylonitrile Styrene Acrylate/Polyvinyl Chloride	0	9	PFA	Perfluoroalkoxy	8	12
CA - Cellulose Acetate	Cellulose Acetate	8	18	PI	Polyimide	5.5	5.5
CAB - Cellulose Acetate Butyrate	Cellulose Acetate Butyrate	10	17	PLA-injection molding	Poly lactide-injection molding	8.5	8.5
COC	Cyclic Olefin Copolymer	6	7	PMMA	Polymethylmethacrylate (Acrylic)	5	9
CP - Cellulose Propionate	Cellulose Propionate	10	17	PMMA high heat	Polymethylmethacrylate (Acrylic) high heat	4	9
CPVC - Chlorinated Polyvinyl Chloride	CPVC - Chlorinated Polyvinyl Chloride	6	8	PMMA impact modified	Polymethylmethacrylate (Acrylic) impact modified	5	9
ECTFE	Ethylene Tetrafluoroethylene	6	9	POM	Polyoxymethylene (acetal)	10	15
EVA	Ethylene Vinyl Acetate	16	20	POM impact modified	Polyoxymethylene (acetal) impact modified	12	13
FEP	Fluorinated Ethylene Propylene	8	10	POM low friction	Polyoxymethylene (acetal) low friction	10	12
HDPE - High Density Polyethylene	HDPE - High Density Polyethylene	6	11	POM mineral filled	Polyoxymethylene (acetal) mineral filled	8	9
HIPS - High Impact Polystyrene	HIPS - High Impact Polystyrene	5	20	PP 10-20% GF	Polypropylene 10-20% glass fiber	4	7
HIPS FR VO	High Impact Polystyrene flame retardant VO	5	15	PP 10-40% mineral filled	Polypropylene 10-40% mineral filled	3	6
Ionomer (EMAC)	Ionomer (Ethylene-Methyl Acrylate Copolymer)	10	17	PP 10-40% TALC	Polypropylene 10-40% talc	4	8
LCP	Liquid Crystal Polymer	0.3	7	PP 30-40% GF	Polypropylene 30-40% glass fiber	2	3
LCP CF	Liquid Crystal Polymer carbon fiber	0.1	6	PP copo	Polypropylene copolymer	7	17
LCP GF	Liquid Crystal Polymer glass fiber	0.1	6	PP homo	Polypropylene homopolymer	6	17
LCP MINERAL	Liquid Crystal Polymer mineral	0.9	8	PP impact modified	Polypropylene impact modified	7	17
LDPE - Low Density Polyethylene	LDPE - Low Density Polyethylene	10	20	PPA	Polyphtalamide	5.4	5.4
MABS	Transparent Acrylonitrile Butadiene Styrene	8	11	PPA - 30% mineral	Polyphtalamide - 30% mineral	7.1	7.2
PA 11 30% Glass fiber reinforced	Polyamide 11 30% Glass fiber reinforced	3	15	PPA - 33% glass fiber	Polyphtalamide - 33% glass fiber	1	1.2
PA 11 conductive	Polyamide 11 conductive	9	15	PPA - 33% glass fiber - high flow	Polyphtalamide - 33% glass fiber - high flow	0.9	1.1
PA 11 flexible	Polyamide 11 flexible	9	15	PPA - 45% glass fiber	Polyphtalamide - 45% glass fiber	0.73	0.75
PA 11 rigid	Polyamide 11 rigid	9	15	PPE	Polyphenylene Ether	3	7
PA 12 conductive	Polyamide 12 conductive	9	15	PPE 30% GF	Polyphenylene Ether 30% glass fiber	1.5	2.5
PA 12 fiber reinforced	Polyamide 12 fiber reinforced	9	15	PPE FR	Polyphenylene Ether flame retardant	3	7
PA 12 flexible	Polyamide 12 flexible	9	15	PPE impact modified	Polyphenylene Ether impact modified	4	8
PA 12 glass filled	Polyamide 12 glass filled	9	15	PPE mineral filled	Polyphenylene Ether mineral filled	2	5
PA 12 rigid	Polyamide 12 rigid	9	15	PPS	Polyphenylene Sulfide	3	5
PA 46 30% GF	Polyamide 46 30% glass fiber	2	2	PPS 20-30% GF	Polyphenylene Sulfide 20-30% glass fiber	1	4
PA 6	Polyamide 6	5	12	PPS 40% GF	Polyphenylene Sulfide 40% glass fiber	1	3
PA 6-10	Polyamide 6-10	6	10	PPS conductive	Polyphenylene Sulfide conductive	1	9
PA 66	Polyamide 6-6	5	14	PPS GF & mineral	Polyphenylene Sulfide glass fiber & mineral	1	2
PA 66 30% GF	Polyamide 6-6 30% glass fiber	2	3	PS 30% GF	Polystyrene 30% glass fiber	3.5	3.5
PA 66 30% mineral filled	Polyamide 6-6 30% mineral filled	4	5	PS crystal	Polystyrene crystal	5	8
PA 66 IM 15-30% GF	Polyamide 6-6 impact modified 15-30% glass fiber	2	3	PS high heat	Polystyrene high heat	6	8
PA 66 impact modified	Polyamide 6-6 impact modified	5	14	PSU	Polysulfone	5	6
PAI	Polyamide-Imide	3	4	PSU 30% GF	Polysulfone 30% glass fiber	2	3
PAI 30% GF	Polyamide-Imide 30% glass fiber	1	2	PSU mineral filled	Polysulfone mineral filled	3	4
PAI low friction	Polyamide-Imide low friction	2	3	PTFE	Polytetrafluoroethylene	7	20
PAN	Polyacrylonitrile	6	7	PTFE 25% GF	Polytetrafluoroethylene 25% glass fiber	7	10
PAR	Polyarylate	5	8	PVC 20% GF	Polyvinyl Chloride 20% glass fiber	2	4
PARA 30-60% GF	Polyarylamide 30-60% glass fiber	1.4	1.8	PVC plasticized	Polyvinyl Chloride plasticized	5	20
PBT	Polybutylene Terephthalate	6	10	PVC plasticized filled	Polyvinyl Chloride plasticized filled	7	25
PBT 30% GF	Polybutylene Terephthalate 30% glass fiber	2	5	PVC rigid	Polyvinyl Chloride rigid	5	18
PC 20-40% GF	Polycarbonate 20-40% glass fiber	2	4	PVDC	Polyvinylidene Chloride	10	20
PC 20-40% GF FR	Polycarbonate 20-40% glass fiber flame retardant	2	4	PVDF	Polyvinylidene Fluoride	8	15
PC high heat	Polycarbonate high heat	7	9	SAN	Styrene Acrylonitrile	6	8
PCL - Polycaprolactone	Polycaprolactone	16	17	SAN 20% GF	Styrene Acrylonitrile 20% glass fiber	2	4
PCTFE	Polymonochlorotrifluoroethylene	4	7	SMA	Styrene Maleic Anhydride	7	8
PE 30% GF	Polyethylene 30% glass fiber	5	5	SMA 20% GF	Styrene Maleic Anhydride 20% glass fiber	2	4
PEEK	Polyetheretherketone	4.7	10.8	SMA FR VO	Styrene Maleic Anhydride flame retardant VO	2	6
PEEK 30% CF	Polyetheretherketone 30% carbon fiber	1.5	1.5	SRP	Polypheylene (Self reinforced)	3	3
PEEK 30% GF	Polyetheretherketone 30% glass fiber	1.5	2.2	XLPE - Crosslinked Polyethylene	XLPE - Crosslinked Polyethylene	10	10
PEI	Polyetherimide	5	6				

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