

Polycarbonate - PC

Polycarbonates are strong, stiff, hard, tough, transparent engineering thermoplastics that can maintain rigidity up to 140°C and toughness down to -20°C or special grades even lower. The material is amorphous (thereby displaying excellent mechanical properties and high dimensional stability), is thermally resistant up to 135°C and rated as slow burning. Special flame retardant grades exist which pass several severe flammability tests.

Physical Properties (indicative values)

GENERAL PROPERTIES	Test Method	Units	Value
Density	ISO 1183	g/cm ³	1.2
Water absorption			
- at saturation in air of 23°C / 50% R.H.	ISO 62	%	0.15
- at saturation in water 23°C	ISO 62	%	0.36
MECHANICAL PROPERTIES			
Tensile stress at yield and break	ISO 527	N/mm ²	60
Elongation at break	ISO 527	%	80
Tensile modulus of elasticity	ISO 527	N/mm ²	2200
Compression test			
- 1% strain after 1,000 hrs	ISO 899	N/mm ²	18
Charpy impact strength - Notched	ISO 179-1/1eU	KJ/mm ²	40
Charpy impact strength - Unnotched	ISO 179-1/1eA	KJ/mm ²	no break
Ball indentation hardness	ISO 2039	N/mm ²	110
Shore hardness D	ISO 2039	D	70
Coefficient of friction to steel ⁽¹²⁾	ISO 8295	-	0.55
THERMAL PROPERTIES			
Melting temperature	ISO 3156	°C	149
Thermal conductivity at 23°C	ISO 22007.2	W/(m.K)	0.2
Deformation temperature ⁽¹⁵⁾	ISO 75	°C	135
Coefficient of linear thermal expansion			
- average value between 23 and 60°C	ISO 11359	m(m.K)	65 x 10 ⁻⁶
Max. allowable service temperature in air			
- Continuously ⁽¹⁷⁾	-	°C	115
- Short periods ⁽¹⁸⁾	-	°C	145
Minimum service temperature ⁽¹⁹⁾	-	°C	-60
Flamability			
- Oxygen index	ISO 4589	%	25
- according to UL 94 (3/6 thickness)	UL94	-	HB
ELECTRICAL PROPERTIES			
Dielctrical constant	ISO 250	-	2.9
Dielectric strength	ISO 243	KV/mm	30
Volume resistivity	ISO 93	Ωcm	10 ¹⁵
Dissipation factor tan Δ at 1 MHz	ISO 250	-	0.0011

Legend

- Figures relate to specimen conditioned at 23°C and 50 RH. Figures between brackets relate to dry specimen. Figures for materials marked with * can change according to their moisture content.

- Figures refer to un-coloured samples either injection moulded or machined in the easiest way. Tests made on samples of different sizes give slightly different results.

⁽¹²⁾ Test on ground steel dry specimen load 0.05 N/mm² speed =0.6 m/s

⁽¹⁵⁾ Deformation at temperature . HDT at 1.8 N/mm²

⁽¹⁷⁾ Operating temperature continuously 5000h. From 23°C upwards, the materials' features change in a non-uniform and disproportional way. The quoted limits are indicative and based on a tensile stress of 50% of the value at 23°C.

⁽¹⁸⁾ Operating temperature short period (no load).

⁽¹⁹⁾ The mechanical features decrease with a reduction in temperature and are also influenced by other factors (moisture, etc). The quoted values do not take into consideration impact conditions or heavy loads.

This table, is mainly to be used for comparison purposes. It's a valuable tool to help in the choice of material. The data listed here falls within the normal range of product properties. However, they aren't guaranteed and shouldn't be used to establish material specification limits nor used alone as the basis of design.

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