Unfilled Polycarbonate (PC)

Reference Information supplied by our sources:

POLYCARBONATE

DESCRIPTION

Unfilled Polycarbonate is a tough, transparent engineering thermoplastic which offers very high impact strength and high modulus of elasticity. It also has a high heat deflection temperature and absorbs very little moisture. These properties, plus good low frequency and high voltage insulating characteristics, make polycarbonate a prime material for electrical and electronic components. Its strength, impact resistance and transparency (unfilled grades only) also make it an ideal material for certain transparent structural applications.

NOTE: Use caution when specifying polycarbonate for applications in which transparency is critical. For example, Westlake Plastics' Zelux® M product is machine-grade polycarbonate, while their Zelux® W is window-clear material for applications where transparency is an important consideration. SABIC (formerly GE) brand Lexan® polycarbonate sheet is available in many different grades, with varying properties and transparency.

GLASS FILLED GRADES

Glass fibers may be added in various amounts (10%, 20%, 30% and 40%) to increase tensile strength, stiffness, compressive strength, and lower the thermal expansion coefficient. NOTE: Glass-filled polycarbonate is typically natural (greenish white) in color, and is sometimes also available in black color. Properties for 30% glass-filled polycarbonate are shown below for reference. Contact us for properties of other grades.

KEY PROPERTIES

• high impact strength • excellent strength retention at elevated temperatures • high tensile, shear, and flexural strength • high modulus of elasticity • low deformation under load • excellent creep and cold flow resistance • low coefficient of thermal expansion • good electrical insulation properties • easy to fabricate & machine

TYPICAL APPLICATIONS

Polycarbonate exhibits a broad range of outstanding properties for applications in: • electrical connectors • brush holders • coil bobbins & forms • insulators • relay components • dialysis equipment parts • medical tubing • gamma sterilizable reusables • instrument covers • covers • handles • rollers • machine guards • fittings

TYPICAL PROPERTIES of POLYCARBONATE

ASTM or UL test	Property	Unfilled	30% Glass
	PHYSICAL		
D792	Density (lb/in³) (g/cm³)	0.043 1.2	0.052 1.43
D570	Water Absorption, 24 hrs (%)	0.12	0.12

	MECHANICAL		
D638	Tensile Strength (psi)	9,500	19,000
D638	Tensile Modulus (psi)	320,000	-
D638	Tensile Elongation at Break (%)	60	10
D790	Flexural Strength (psi)	15,000	23,000
D790	Flexural Modulus (psi)	375,000	1,100,000
D695	Compressive Strength (psi)	12,000	18,000
D695	Compressive Modulus (psi)	240,000	500,000
D785	Hardness, Rockwell	M70 / R118	M92
D256	IZOD Notched Impact (ft-lb/in)	13	2
	THERMAL		
D696	Coefficient of Linear Thermal Expansion (x 10^{-5} in./in./°F)	3.9	1.2
D648	Heat Deflection Temp (°F / °C) at 264 psi	270 / 132	295 / 146
D3418	Glass Transition Temp (°F / °C)	293 / 145	300 / 149
-	Max Operating Temp (°F / °C)	250 / 121	270 / 132
C177	Thermal Conductivity (BTU-in/ft²-hr-°F) (x 10^{-4} cal/cm-sec-°C)	1.3 6.9	1.3 6.9
UL94	Flammability Rating @ less than .45" (11.5mm) thickness @ .45" (11.5mm) thickness and above	H-B V-0	H-B V-0
	ELECTRICAL		
D149	Dielectric Strength (V/mil) short time, 1/8" thick	390	470
D150	Dielectric Constant at 60 Hz	3.17	3.35
D150	Dissipation Factor at 60 Hz	0.0009	0.0011
D257	Volume Resistivity (ohm-cm)at 50% RH	10^{16}	10^{16}

NOTE: The information contained herein are typical values intended for reference and comparison purposes only. They should NOT be used as a basis for design specifications or quality control. Contact us for manufacturers' complete material property datasheets.
All values at 73°F (23°C) unless otherwise noted.

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ZELUX is a registered trademark of Westlake Plastics.