

Material Information



Polycarbonate

Introduction

Polycarbonate (PC) is an amorphous engineering thermoplastic known for its high impact strength, good strength and stiffness, dimensional stability, and transparency. It also offers good machinability and low moisture absorption, making it a versatile material for CNC-machined components that require both mechanical performance and low weight.

Advantages

High impact strength, good strength and stiffness, excellent dimensional stability, good machinability, and low moisture absorption. Polycarbonate also provides good electrical insulating properties and can be used for transparent components where impact resistance is more important than the optical clarity and scratch resistance of acrylic.

Disadvantages

Polycarbonate has limited resistance to some chemicals and solvents and can be susceptible to stress cracking under certain environmental conditions. Its surface is also relatively easy to scratch, and machining can leave a matte or frosted appearance on transparent surfaces unless additional polishing is performed.

Tolerance

3DSPRO can manufacture and inspect to tight tolerances, including sub +/- 0.001" tolerances, per your drawing specifications and GD&T callouts.

Recommendation

The combination of high impact strength, stiffness, dimensional stability, transparency, and machinability makes Polycarbonate suitable for CNC-machined housings, protective covers, optical components, machine guards, and structural parts. It is particularly appropriate for applications where impact resistance and transparency are both important.

Material Specifications (For reference only.)	
Tensile strength	40 to 154MPa
Elongation at Break	3% to 233%
Hardness	90 to 95 HD

Heat deflection temperature	57°C to 208°C
Glass transition temperature	142°C to 152°C

Attention

Transparent Polycarbonate parts may show visible machining marks or a matte surface after CNC machining. Additional polishing may be required when optical clarity is important. The material should also be protected from aggressive chemicals and solvents that may cause stress cracking, especially when the part is under mechanical stress. Appropriate cutting conditions and sharp tooling should be used to maintain dimensional accuracy and surface quality.

Applications

3DSPRO finds people using Polycarbonate to make functional parts and prototypes in the following industries and applications.

Automotive parts and supplies:

Protective covers, light bezels, housings, brackets, instrument components, and other impact-resistant parts.

Electronics and electrical equipment:

Electrical housings, protective covers, enclosures, display windows, connectors, and other insulating components.

Industrial equipment:

Machine guards, equipment covers, housings, gears, rollers, pumps, and other components requiring strength and impact resistance.

Optical and consumer products:

Transparent covers, lenses, light guides, display components, protective panels, and other CNC-machined parts where transparency and impact resistance are important.