

Product Information

Polycarbonate PC10G10L

PC10G10L is a polycarbonate compound reinforced with 10% glass fiber, with a viscosity suitable for injection molding applications. It is lubricated for ease of mold release.

Polycarbonate is an engineering thermoplastic widely recognized for outstanding toughness, excellent strength, rigidity and creep resistance, and dimensional stability.

The reinforcement provided by the addition of glass fiber significantly improves tensile strength and rigidity, especially at high temperatures, and further enhances long term creep resistance.

The combination of reduced mold shrinkage and dimensional stability permits the production of complex shape parts to extremely close dimensional tolerances.

Polycarbonate compounds must be dried prior to processing to fully realize the mechanical performance of the molded part.

TYPICAL PROPERTIES

<u>PROPERTY</u>	<u>ASTM TEST METHOD</u>	<u>ENGLISH</u>		<u>S.I.</u>	
		<u>UNITS</u>	<u>VALUE</u>	<u>UNITS</u>	<u>VALUE</u>
Vicat Softening Point	D1525	°F	310-320	°C	155-160
Specific Gravity	D792	-	1.27	-	1.27
Water Absorption (24 hours immersion)	D570	%	0.12	%	0.12
Heat Deflection Temperature at 264 lbs/in ² (1.82 MPa)	D648	°F	275	°C	135
Mold Shrinkage Guideline (Flow Direction)	1/8" section	%	0.3-0.4	%	0.3-0.4
Tensile Strength at Break	D638	lbs/in ²	10,500	MPa	72
Elongation at Break	D638	%	5-10	%	5-10
Flexural Strength	D790	lbs/in ²	14,000	MPa	97
Flexural Modulus	D790	lbs/in ²	500,000	MPa	3,448
Izod Impact Strength (Notched, 1/8" specimen)	D256	ft. lbs/in of notch	2.0	J/m	107
Rockwell Hardness	D785	M scale	92	-	-

***Please review shrinkages projections for specific applications with an MDE Technical Representative.**

All data generated using test specimens injection molded from natural color material. Inclusion of color pigments or other additives may change some or all of these test results. Tests are conducted at 23°C and 50% relative humidity unless otherwise stated.

These mechanical property test data have been developed using injection molded specimens tested under standardized conditions; furthermore, many of the mechanical properties of thermoplastic materials can be influenced by changes in processing conditions, environmental factors such as temperature and humidity, and rate of application of stress. Therefore, these test results, which characterize typical production material, should not be used either to establish specification limits or alone as the basis for engineering design.

PC10G10L

Processing Guidelines

Drying

Although polycarbonate products from MDE are shipped in moisture-resistant packaging, in order to realize best mechanical performance and surface appearance it is critical that they are further dried before processing.

The use of dehumidifying dryers is strongly recommended. The dew point of the drying air stream should be no more than -20°F, and preferably lower. The drying air temperature must be high enough to achieve a pellet temperature of at least 250°F. If using a hopper dryer, depending on air hose length, and insulation of hoses and hopper, the drying air temperature may need to reach 260-270°F to achieve the required material temperature. Insulation of hoses and especially the hopper is strongly recommended. If the material temperature reaches 250°F, a residence time of 4 hours is generally adequate to ensure that the material is ready to be processed. If residence times are shorter, material temperatures should be increased to 280°F, which will normally ensure adequate drying within two hours.

Note that while very high moisture levels will result in visual evidence in molded parts such as splay or silver streaking, it is possible to satisfactorily process material and make parts of acceptable appearance, even though its moisture content is high enough to seriously diminish mechanical performance.

If moisture analysis equipment is available, then acceptable maximum moisture content of polycarbonate materials is 0.02%.

Temperature Guidelines

The following temperature guidelines are suggested for general use if a machine can be selected where shot size is 40-70% of nominal machine capacity.

<u>Tool Surface Temperature (°F)</u>	<u>Melt Temperatures (°F)</u>			<u>Typical Cylinder Temperatures (E°)</u>		
	<u>Max.</u>	<u>Preferred</u>	<u>Min.</u>	<u>Front</u>	<u>Center</u>	<u>Rear</u>
180-200	590	560	540	560	550	540

- Melt temperatures over 600°F have been used successfully to help flow in thin section or long flow-path tools, provided cylinder residence times are short.
- A mold surface temperature in the suggested range improves surface appearance, helps consistency of mold fill and therefore consistency of dimensions, minimizes the effect of weld lines and also helps realize best molded part performance.
- A medium to fast injection speed maximizes weld line strength, minimizes molded-in stress, and also assures achievement of best surface gloss. Good venting of cavities is essential to allow fast fill without burning.

Screw Forward Time

Adequate screw forward time under follow-up pressure is important to ensure proper packing before gate freeze, during which time it is essential to maintain a "cushion" of 1/8"-1/4". Optimum screw forward time can be judged by a part weight vs. forward time plot. Avoid overpacking, which can generate molded-in stresses.

Screw Recovery

It is recommended that back pressure be applied to the screw to help development of a homogenous melt, and to ensure consistent shot volume. For these reinforced grades, limiting back pressure to about 50 psi gauge will minimize the risk of mechanical damage to the glass fibers with consequent loss of part performance. Screw rotation should also be as slow as possible consistent with cycle time goals, usually 40-80 r.p.m.

Mold Shrinkage

Standard ASTM test specimens are used to develop shrinkage guidelines. Test specimens are end-gated, 1/8 inch thickness, and molded at conditions recommended for this formulation. Actual shrinkage in molded parts will depend on several variables including processing conditions, part configuration and gate location, both of which influence material flow direction, and wall section thickness.