

Product Information

Thermoplastic Polyester PBT500G15L

PBT500G15L is a polybutylene terephthalate (thermoplastic polyester) compound reinforced with 15% glass fiber. Designed for processing by injection molding, it is lubricated for ease of mold release.

PBT500G15L exhibits many of the excellent physical, mechanical, and electrical property characteristics of the 30% glass reinforced grades, but with the lower glass fiber content is specifically designed for applications requiring increased flexibility. Typical of reinforced PBT compounds, **PBT500G15L** processes easily to produce parts of excellent surface appearance; rapid crystallization and excellent high temperature rigidity combine to allow fast cycle times.

TYPICAL PROPERTIES

PROPERTY	ASTM TEST METHOD	ENGLISH		S.I.	
		UNITS	VALUE	UNITS	VALUE
Melting Point	D789	°F	442	°C	228
Specific Gravity	D792	-	1.41	-	1.41
Water Absorption (24 hrs. immersion at 23°C/73°F)	D570	%	0.07	%	0.07
Heat Deflection Temperature at 264 lbs/in ² (1.82 MPa)	D648	°F	380	°C	193
Mold Shrinkage Guideline* (Flow Direction)	1/8" section	%	0.5-0.7	%	0.5-0.7
Tensile Strength at Break	D638	lbs/in ²	13,000	MPa	90
Elongation at Break	D638	%	2-3	%	2-3
Flexural Strength	D790	lbs/in ²	20,000	MPa	138
Flexural Modulus	D790	lbs/in ²	750,000	MPa	5,172
Izod Impact Strength (Notched, 1/8" specimen)	D256	ft. lbs/in of notch	0.9 – 1.0	J/m	48 - 53
Tensile Impact Strength (Type S specimen)	D1822	ft.lbs/in ²	20	kJ/m ²	42
Arc Resistance	D495	secs.	125	-	-
Dielectric Strength (1/8" specimen)	D149	volts/.001"	460	-	-

***Please review shrinkage 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.

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PBT500G15L

Processing Guidelines

Drying

Although Thermoplastic Polyester (PBT) compounds from MDE are shipped in moisture resistant packaging, drying before processing is strongly recommended to ensure full realization of part performance, especially toughness. PBT absorbs very little moisture from its surrounding environment, but hydrolysis of the polymer when melted in the molding machine is rapid, causing breakdown of the polymer structure and loss of mechanical properties. Further, unlike other moisture sensitive engineering thermoplastics, such as nylon, there may be no visible evidence (such as splay marking) of unacceptably high moisture levels.

The use of dehumidifying hopper dryers is therefore strongly recommended to ensure that both virgin material and regrind are properly dried. The dew point of the drying air stream should be no more than -20°F , and preferably lower. The drying air temperature required varies with residence time of the material in the hopper at the drying temperature.

<u>Residence Time</u>	<u>Temperature</u>
2-3 hours	260-280°F(Max)
5-6 hours	230-240°F
8 hours-overnight	215°F

If equipment is available to analyze moisture content, the maximum recommended level is 0.05%. PBT can be processed without difficulty at level of 0.1%, but some loss of mechanical properties and part performance will occur.

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 (°F)</u>		
	<u>Max.</u>	<u>Preferred</u>	<u>Min.</u>	<u>Front</u>	<u>Center</u>	<u>Rear</u>
160-200	520	480-490	470	480	480	480

- A "flat" temperature profile helps ensure a homogeneous melt, improves screw recovery and by accelerating the transition from solid pellets to a melt significantly reduces abrasive wear on screw and barrel surfaces.
- 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 fast injection speed maximizes weld line strength and minimizes molded in stress. Good venting of cavities is essential to allow fast fill without burning.

Screw Forward Time

Although PBT compounds "set-up" very rapidly, 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 general 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.**