

Thermoplastic Polyester PBT82G30L RC

PBT82G30L RC is a polybutylene terephthalate (thermoplastic polyester) alloy, based upon post industrial recycled feedstocks and reinforced with 30% glass fiber. This alloy is designed to reduce the anisotropic shrinkage characteristics of unmodified PBT without the use of inorganic additives, thus minimizing tendency to warp while maintaining the excellent combination of physical and mechanical properties and resistance to chemicals, solvents, oils and greases of the base formulation. **PBT82G30L RC** can be used for applications in the automotive, electrical/electronics, communications and appliance industries, which require its exceptional property profile, complimented by easy processing, combined with low warpage, fast cycling, and excellent surface appearance.

TYPICAL PROPERTIES

PROPERTY	ASTM TEST METHOD	ENGLISH		S.I.	
		UNITS	VALUE	UNITS	VALUE
Melting Range	D789	EF	432	EC	222
Specific Gravity	D792	-	1.50	-	1.50
Water Absorption (24 hrs. at 23EC/73EF)	D570	%	0.07	%	0.07
Heat Deflection Temp. at 264 lbs/in ² (1.82MPa)	D648	EF	375	EC	190
Mold Shrinkage Flow Direction	1/8" section	%	0.4-0.6	%	0.4-0.6
Transverse Direction		%	0.5-0.7	%	0.5-0.7
Tensile Strength at Break	D638	lbs/in ²	18,000	MPa	124
Elongation at Break	D638	%	2-3	%	2-3
Flexural Strength	D790	lbs/in ²	27,000	MPa	186
Flexural Modulus	D790	lbs/in ²	1,200,000	MPa	8,275
Izod Impact Strength (Notched, 1/8" specimen)	D256	ft. lbs/in of notch	1.3	J/m	69

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

All data generated using test specimens injection molded from black pigmented material. Inclusion of other additives may change some or all of these test results. Test are conducted at 23EC 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.

PBT82G30L RC

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 and polycarbonate, 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	235-245°F
8 hours-overnight	225°F

If equipment is available to analyze moisture content, the maximum recommended level is 0.05%. PBT can be processed without difficulty at levels 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</u> <u>Temperature (°F)</u>	<u>Melt Temperatures (°F)</u>			<u>Typical Cylinder</u> <u>Temperatures (°F)</u>		
	<u>Max.</u>	<u>Preferred</u>	<u>Min.</u>	<u>Front</u>	<u>Center</u>	<u>Rear</u>
170-200	530	510-520	480	500	500	510

- A "reverse" 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, 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

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 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 this reinforced grade, 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.**