Thermoplastic Polyester PET200G30LU

PET200G30LU is a utility polyethylene terephthalate (thermoplastic polyester) compound reinforced with 30% glass fibers.

Developed for processing by injection molding, the PET is modified to accelerate crystallization during solidification of the polymer in the mold, enabling fast cycle times to be realized using conventional equipment.

PET200G30LU exhibits high rigidity and strength combined with good practical toughness. With very low moisture absorption characteristics, and extremely low creep under stress, dimensional stability is excellent, and due to its semi-crystalline structure, **PET200G30LU** offers resistance to the effects of exposure to a very wide range of chemicals, solvents, oils and greases.

As with all polyesters, drying prior to processing is critical to realize best molded part mechanical performance - reference should be made to the Processing Guidelines attached.

Due to rapid crystallization and exceptional high temperature rigidity, very fast cycle times can be expected, with production of parts of exceptional surface gloss.

PRELIMINARY PROPERTIES

PROPERTY	ASTM TEST METHOD	ENGLISH UNITS	ENGLISH VALUE	S.I. UNITS	S.I. VALUE
Melting Point	D789	ºF	475	ºC	246
Specific Gravity	D792	-	1.55	-	1.55
Water Absorption(24 hrs. immersion at 23ºC/73ºF)	D570	%	0.05	%	0.05
Heat Deflection Temp. at 264 lbs/in^2 (1.82 MPa)	D648	ºF	428	ºC	220
Mold Shrinkage (Flow/Transverse Direction)	1/8" section	%	0.2/0.6	%	0.2/0.6
Tensile Strength, at Break	D638	lbs/in^2	18,000	MPa	124
Elongation, at Break	D638	%	2	%	2
Flexural Strength	D638	lbs/in^2	35,000	MPa	241
Flexural Modulus	D790	lbs/in^2	1,300,000	MPa	8,966
Izod Impact Strength (Notched, 1/8" specimen)	D256	ft. lbs/in of notch	1.4	J/m	74
Rockwell Hardness	D785	R scale	121	-	-

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 23ºC 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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PET200G30LU
Processing Guidelines

Drying

Although Thermoplastic Polyester (PET) compounds from MDE are shipped in moisture resistant packaging, drying before processing is essential to ensure full realization of part performance, especially toughness. PET resins absorb very little moisture from their 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 critical to ensure that both virgin material and regrind are properly dried. The dew point of the drying air stream should be no more than -20ºF, and preferably lower. Air flow should be at least 1 CFM per lb/hr of material processed. The drying air temperature required varies with residence time of the material in the hopper at the drying temperature:

Residence Time	Material Temperature
2-3 hours	275°F
5-6 hours	240°F
8 hours - overnight	225°F

Prolonged exposure to temperatures of 250ºF or more should be avoided. If equipment is available to analyze moisture content, the recommended maximum level is 0.02%. PET can be processed at levels in excess of 0.05%, but significant 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.

Tool Surface	Melt Temperatures (°F)			Typical Cylinder Temperatures (°F)		
Temperature	Max.	Preferred	Min.	Front	Center	Rear
190-220	600	540-570	530	540	550	560

- 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. If minimum warpage is the sole requirement; temperature can be reduced to 150ºF.
- 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 fill without burning.**

Screw Forward Time

Although PET 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 strongly recommended to maintain a cushion of 1/8"-1/4". Optimum screw forward time can be judged by part weight vs. forward time plot. Avoid overpacking, which can generate molded-in stresses.

Screw Recovery

Low back pressure - nominal 50 psi gauge - is normally sufficient to help development of a homogeneous melt, and to ensure consistent shot volume, while minimizing 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.