

Developmental Product Information

Nylon N66GB20G15HSL

N66GB20G15HSL is a nylon 6.6 compound reinforced with 20% solid glass spheres and 15% glass fiber. The glass spheres improve rigidity especially at higher temperatures and decrease the amount of part shrinkage. The glass fiber increases strength, toughness, and stiffness.

Typical of semi-crystalline polymers, glass reinforced nylons exhibit outstanding resistance even at elevated temperatures to the effects of a wide range of chemicals, solvents, oils and greases and are therefore suitable for such harsh environments as automotive under-hood. An internal lubricant has been added to improve processability and a heat stabilizer has been incorporated to protect the resin during processing.

Compared with glass fiber reinforcement, the use of glass beads results in almost isotropic shrinkage characteristics. These formulations are therefore recommended for use in large area or complex shape parts to minimize warpage, and for applications where good rigidity, and compressive strength are required.

PRELIMINARY PROPERTIES DRY AS MOLDED

<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>
Melting Point	D789	°F	491	°C	255
Specific Gravity	D792	-	1.40	-	1.40
Water Absorption (24 hrs. immersion)	D570	%	0.9	%	0.9
Mold Shrinkage Guidline* (Flow Direction)	1/8" section	%	0.2	%	0.2
Tensile Strength at Break	D638	lbs/in ²	18,500	MPa	127
Elongation at Break	D638	%	2	%	2
Flexural Strength	D790	lbs/in ²	26,500	MPa	183
Flexural Modulus	D790	lbs/in ²	1,000,000	MPa	6,897
Izod Impact Strength (Notched, 1/8" specimen)	D256	ft. lbs/in of notch	1.0	J/m	54

***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. Test specimens are stored in a moisture proof container immediately after molding and contain less than 0.2% moisture; 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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Processing Guidelines

Drying

Nylon compounds from MDE are shipped in moisture resistant packaging, dried and ready to be processed. If drying is required after, for example, exposure of virgin resin to humid air for more than one hour, or for reground material, the use of dehumidifying dryers is strongly preferred.

The dew point of the drying air stream should be no more than -20°F, and preferably lower. The drying air temperature should normally be no more than 175°F; higher temperatures risk discoloration of natural color material, degradation and loss of properties, especially toughness. Only if residence times are short (maximum 2 hours) should temperatures to 200°F be considered.

Nylon compounds usually demonstrate visual evidence of unacceptably high moisture levels, such as uncontrollable nozzle drool, or splay or silver streaks on the molded part. Additional drying time is indicated if these characteristics are seen.

If moisture analysis equipment is available, an acceptable range of moisture content for processing is 0.1% to 0.25% maximum.

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>
170-190	590	565-575	555	550	565	570

- 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 medium to fast injection speed maximizes weld line strength and minimizes molded in stress, and also contributes to 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 generates molded in stresses.

Screw Recovery

It is strongly recommended that only low back pressures - nominal 50 p.s.i. gauge - be used to minimize mechanical damage to the reinforcing glass fibers and 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.**