

# Developmental Product Information

## Nylon N60GB20G10HSL

**N60GB20G10HSL** is a nylon 6 compound, reinforced with a combination of 20% glass beads and 10% glass fiber. This formulation exhibits high strength and rigidity, and good control of warpage and sinking, combined with excellent surface appearance. A stabilizer has been added to protect the resin during processing and an internal lubricant has also be added to aid in processability

### 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 Range	D789	°F	420-428	°C	215-220
Specific Gravity	D792	-	1.36	-	1.36
Heat Deflection Temperature at 264 lbs/in <sup>2</sup> (1.82 MPa)	D648	°F	394	°C	201
Tensile Strength at Break	D638	lbs/in <sup>2</sup>	14,000	MPa	97
Elongation at Break	D638	%	2-3	%	2-3
Flexural Strength	D790	lbs/in <sup>2</sup>	23,000	MPa	159
Flexural Modulus	D790	lbs/in <sup>2</sup>	774,000	MPa	5339
Izod Impact Strength (Notched, 1/8" specimen)	D256	ft. lbs/in of notch	1.1	J/m	59

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 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.

7:344smw

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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 steam should be no more than 0°F, and preferably lower. The drying air temperature must be high enough to achieve a pellet temperature of 175-180°F. If using a hopper drier, depending on air hose length and insulation of hoses and hopper, the drying air temperature may need to reach 200-220°F to achieve the required material temperature.

If the pellet temperature reaches 180°F, a residence time of 4 hours is generally adequate to ensure that the material is ready to be processed. Only if residence times are limited to 2 hours should a pellet temperature of 200°F be considered; at 200°F, there is a risk of material oxidation, with associated yellowing and loss of part performance.

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 observed.

If moisture analysis equipment is available, an acceptable moisture content range 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.

**Tool Surface  
Temperature (°F)**  
160-200

**Melt Temperatures (°F)**  
Max.   Preferred   Min.  
540   510-520   480

**Typical Cylinder  
Temperatures (°F)**  
Front   Center   Rear  
490   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 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 can generate molded-in stresses.

### Screw Recovery

It is recommended that back pressures of 50 p.s.i. gauge be used to help development of a homogeneous melt, and to ensure consistent shot volume, while minimizing the risk of 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.