

Product Information

Nylon N66G20L, N66G20HSL, N66G20HL

N66G20L is a nylon 6.6 compound, reinforced with 20% glass fiber, which improves strength and rigidity especially at high temperatures, while maintaining good practical toughness.

Typical of semi-crystalline polymers, glass fiber 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. For molded parts, which are to be exposed to high temperature for extended periods of time, the use of **N66G20HSL**, which contains an effective heat stabilizer package, is recommended. Slight color variations can occur when this type of heat stabilizer is used. For parts that need to be heat stabilized and color variations aren't tolerated, the use of **N66G20HL** is recommended. This product contains a non-discoloring heat stabilizer.

These compounds are recommended for use in applications where improved strength and rigidity characteristics are required, especially if performance at high temperature is critical.

Both compounds are internally lubricated for improved mold release. Particular attention should be paid to processing conditions and mold design to minimize both the risk of glass fiber breakage to fully realize mechanical performance, and also abrasive wear to machine and mold. Due to the high temperature rigidity of these compounds, fast cycle times can be expected.

TYPICAL 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	⁰ F	491	⁰ C	255
Specific Gravity	D792	-	1.27	-	1.27
Water Absorption (24 hours immersion)	D570	%	1.0	%	1.0
Heat Deflection Temperature at 264 lbs/in ² (1.82 MPa)	D648	⁰ F	470	⁰ C	243
Mold Shrinkage Guideline* (Flow Direction)	1/8" section	%	0.4	%	0.4
Tensile Strength at Break	D638	lbs/in ²	20,000	MPa	138
Elongation at Break	D638	%	2-4	%	2-4
Flexural Strength	D790	lbs/in ²	29,000	MPa	200
Flexural Modulus	D790	lbs/in ²	1,000,000	MPa	6,896
Izod Impact Strength (Notched, 1/8" specimen)	D256	ft. lbs/in of notch	1.2	J/m	64
Rockwell Hardness	D785	M scale	M95	-	-

***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 to less than 0.25% moisture. Most processors will further dry nylon resins and compounds, especially after exposure of virgin resin to ambient air for more than an hour, or when a proportion of reground material is being used.

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 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 of natural color and loss of part performance.

Nylon compounds usually demonstrate visual evidence of unacceptably high moisture levels. This includes splay or silver streaking on the molded part surface, or an unstable melt or nozzle drool at the machine. Additional drying time is indicated if these characteristics are observed.

If moisture analysis equipment is available, an acceptable moisture content range for normal processing is 0.1% to 0.25% maximum. Mold-in-color parts with critical cosmetic requirements may require drying to < 0.1%.

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>
160-180	590	560-570	550	540	560	565

- 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 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

Low back pressures - nominal 50 p.s.i. gauge - are strongly recommended 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 flow direction, and wall section thickness.**