

Product Information

Nylon NST60G33L and NST60G33HSL

NST60G33L is a high impact (“super-tough”) nylon 6 polymer, reinforced with 33% glass fiber. For molded parts which are to be exposed to high temperatures for prolonged periods of time, the use of **NST60G33HSL**, which contains an effective heat stabilizer, is recommended. Each product incorporates a lubricant for ease of mold release.

These compounds have been developed for applications which demand exceptional practical toughness, combined with high strength and rigidity. Typical of the performance of semi-crystalline polymers, they exhibit excellent resistance to the effects of exposure to a wide range of chemicals, solvents, oils and greases and therefore can be used in harsh or aggressive environments.

NST60G33HSL formulations exhibit excellent melt stability during injection molding and can be processed successfully using a wide range of melt and molding tool temperatures to suit a variety of tool configurations and production requirements.

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	410-428	°C	210-220
Specific Gravity	D792	-	1.33	-	1.33
Water Absorption (24 hours immersion)	D570	%	1.0	%	1.0
Heat Deflection Temperature at 264 lbs/in ² (1.82 MPa)	D648	°F	388	°C	198
Mold Shrinkage Guidelines* (Flow Direction)	1/8" section	%	0.3-0.5	%	0.3-0.5
Tensile Strength at Break	D638	lbs/in ²	20,000	MPa	138
Elongation at Break	D638	%	4-5	%	4-5
Flexural Strength	D790	lbs/in ²	28,000	MPa	193
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	4.0	J/m	214

***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 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 must be high enough to achieve a pellet temperature of $175\text{-}180^{\circ}\text{F}$. If using a hopper dryer, depending on air hose length and insulation of hoses and hopper, the drying air temperature may need to reach $200\text{-}220^{\circ}\text{F}$ 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.**

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Tool Surface
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Temperature ($^{\circ}\text{F}$)
170-220

Melt Temperatures ($^{\circ}\text{F}$)

<u>Max.</u>	<u>Preferred</u>	<u>Min.</u>
550	510-530	480

Typical Cylinder

Temperatures ($^{\circ}\text{F}$)

<u>Front</u>	<u>Center</u>	<u>Rear</u>
500	510	520

- 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, 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 $1/8\text{-}1/4\text{'}$. 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

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It is recommended that back pressures of 50 p.s.i gauge to used to help development of a homogeneous melt, and to ensure consistent shot volume. For the reinforced grade, limiting back pressure to about 50 p.s.i. 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

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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.**