Nylon NST66G33LU BK and NST66G33HSLU BK

NST66G33LU BK is a black pigmented nylon 6.6 compound, reinforced with 33% glass fiber and impact modified using "super-tough" technology. This formulation therefore exhibits outstanding toughness, but uniquely combined with unusually high retention of strength and rigidity, even at high temperatures. The combination of physical and mechanical properties typical of nylon's semi-crystalline structure is retained, including excellent resistance to the effects of exposure to a wide range of chemicals, oils, solvents and greases, including the automotive under-hood environment. For applications requiring resistance to the effects of exposure to high temperatures for extended periods of time, the use of **NST66G33HSLU BK**, which contains an effective heat stabilizer package, is recommended.

TYPICAL PROPERTIES

DRY AS MOLDED

PROPERTY	ASTM TEST METHOD	ENGLISH UNITS	ENGLISH VALUE	S.I. UNITS	S.I. VALUE
Melting Point	D789	ºF	491	ºC	255
Specific Gravity	D792	-	1.34	-	1.34
Water Absorption (24 hours immersion)	D570	%	0.7	%	0.7
Heat Deflection Temperature at 264 lbs/in^2 (1.82 MPa)	D648	ºF	478	ºC	248
Mold Shrinkage Guideline* (Flow Direction)	1/8” section	%	0.2	%	0.2
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	31,000	MPa	214
Flexural Modulus	D790	lbs/in^2	1,150,000	MPa	7,931
Izod Impact Strength (Notched, 1/8” specimen)	D256	ft. lbs/in of notch	3.3	J/m	176

***Please review shrinkage projections for specific application with an MDE Technical Representative**

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 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.

NST66G33LU BK and NST66G33HSLU BK 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 –20ºF, and preferably lower. The drying air temperature must be high enough to achieve a pellet temperature of 175-180ºF. If using a hopper dryer, depending on air hose length and insulation of hoses and hopper, the drying air temperature may need to reach 200-220ºF to achieve the required material temperature.

If the pellet temperature reaches 180ºF, 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 200ºF be considered; at 200ºF, 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. The viscosity of these "super-tough" modified grades is higher than that of general purpose nylons. However, melt stability is excellent, and the use of melt temperatures at the higher end of the range is suggested to improve flow when required, in thinner wall section or multi-cavity tooling.

Tool Surface Temperature (ºF)	Melt Temperatures (ºF)			Typical Cylinder Temperatures (ºF)		
	Max.	Preferred	Min.	Front	Center	Rear
160-200	590	560-575	550	550	560	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 can generate molded-in stresses.

Screw Recovery

It is recommended that back pressure be applied to the screw to help development of a homogenous melt, and to ensure consistent shot volume. For these reinforced grades, limiting back pressure to about 50 psi 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

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.**