

Preliminary Product Information

Nylon N60MAG30L and N60MAG30HSL.

N60MAG30L is a nylon 6 compound, reinforced with 30% by weight of a combination of a high aspect ratio mineral and glass fiber, both surface-treated to enhance adhesion to the polymer matrix. **N60MAG30L** is therefore characterized by excellent strength and rigidity even at high temperatures, combined with good toughness even dry, as molded. This compound is especially suited for automotive, appliance and general industrial applications where this property profile, in combination with much improved control of warp and sinking in large area or complex shape parts, is required.

For applications requiring resistance to the effects of extended exposure to high temperatures, the use of **N60MAG30HSL.RC**, which contains an effective heat stabilizer package, is recommended. As with all nylon 6 formulations, both grades process very easily to produce parts of excellent gloss, even with only moderate molding tool surface temperatures.

PRELIMINARY PROPERTIES

DRY AS MOLDED

PROPERTY	ASTM TEST METHOD	ENGLISH		S.I.	
		UNITS	VALUE	UNITS	VALUE
Melting Range	D789	°F	420-437	°C	215-225
Specific Gravity	D792	-	1.38	-	1.38
Water Absorption (24 hours immersion)	D570	%	1.2	%	1.2
Heat Deflection Temperature at 264 lbs/in ² (1.82 MPa)	D648	°F	392	°C	200
Tensile Strength at Break	D638	lbs/in ²	17,500	MPa	121
Elongation at Break	D638	%	2-4	%	2-4
Flexural Strength	D790	lbs/in ²	26,000	MPa	179
Flexural Modulus	D790	lbs/in ²	1,200,000	MPa	8,275
Izod Impact Strength (Notched, 1/8" specimen)	D256	ft. lbs/in of notch	0.9	J/m	48

* These properties are based on a limited number of developmental/scale-up lots and are therefore listed as preliminary data, and may be adjusted with additional production experience.

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.

N60MAG30L and N60MAG30HSL

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 175-180°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 200-220°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 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.

<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>
170-200	560	550-525	480	505	515	525

- 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 should be limited to 50 p.s.i. gauge to minimize mechanical damage to the reinforcing glass fibers and consequent loss of part performance, while still generating a homogeneous melt, and ensuring consistent shot volume. 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.**