

# Product Information

## NYLON RN6650L

**RN6650L** is a nylon6.6 polymer; suitable for injection molding applications, it is lubricated for ease of mold release.

**RN6650L** is recognized by Underwriters' Laboratories under File No. E148796; details of Relative Thermal Indices, and electrical PLC values, are available from Michael Day enterprises, or on line at [www.ul.com/plastics](http://www.ul.com/plastics).

**RN6650L** has also been evaluated according to the requirements of UL1446 and IEC Standard 61857, and is recognized under U.L. File No. E 1642379 for use as the Ground Insulation in both Class 130 and Class 135 Electrical Insulation Systems. Full details are available from Michael Day Enterprises or from UL at [data.ul.com/systems](http://data.ul.com/systems).

Nylon 6.6 offers a unique combination of strength and toughness, excellent static and dynamic fatigue resistance, natural lubricity and resistance to the effects of a broad range of chemicals, oils and solvents, and is therefore used in such markets as electrical, electronics, communications or appliances where Underwriters' Laboratories Recognition is required.

### TYPICAL PROPERTIES DRY AS MOLDED

PROPERTY	ASTM	ENGLISH		S.I.	
	TEST METHOD	UNITS	VALUE	UNITS	VALUE
Melting Range	D789	°F	482-509	°C	250-265
Specific Gravity	D792	-	1.14	-	1.14
Water Absorption (24 hours immersion)	D570	%	1.2	%	1.2
Heat Deflection Temperature at 264 lbs/in <sup>2</sup> (1.82 MPa)	D648	°F	190	°C	88
Mold Shrinkage Guideline* (Flow Direction)	1/8" section	%	1.4-1.6	%	1.4-1.6
Tensile Strength at Yield	D638	lbs/in <sup>2</sup>	12,000	MPa	83
Elongation at Break	D638	%	40-60	%	40-60
Flexural Strength	D790	lbs/in <sup>2</sup>	15,000	MPa	103
Flexural Modulus	D790	lbs/in <sup>2</sup>	410,000	MPa	2,828
Izod Impact Strength (Notched, 1/8" specimen)	D256	ft. lbs/in of notch	0.9-1.0	J/m	48-53
Tensile Impact Strength (Type S specimen)	D1822	ft lbs/in <sup>2</sup>	100	kJ/m <sup>2</sup>	210
Rockwell Hardness	D785	R scale	R121	-	-
Flammability (all colors)** (0.75mm min. thickness)	UL94				V-2

**\* Please review shrinkage projections for specific applications with an MDE Technical Representative.**

\*\*This laboratory rating of flammability characteristics is not intended either to predict behavior or to reflect hazards that may be presented by this or any other material under actual fire conditions.

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.

# Nylon RN6650L

## Processing Guidelines

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### 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 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>
140-180	560	530-550	520	525	530	535

- 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 pressure of about 50 p.s.i. gauge be applied to the screw to help development of a homogeneous melt, and to ensure 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.**