ROTOMOLDING NYLON 6

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September 24, 2016

What is Nylon 6

- Nylon 6 (PA6) is an Engineered Thermo Plastics Polymer

Why Nylon 6

- Impact Resistance
- High Physical Properties
- Heat Resistant to 250 F
- Chemical Resistance
- Low Fuel Permeation
- Toughness

Advantages

Why Nylon 6

Advantages

- Abrasion Resistant
- Paintable
- Low Coefficient of Friction
- Excellent Environmental Stress Cracking Resistance
- Recyclable

Why NOT Nylon 6

Disadvantages

- Higher Cost Than PE
- Narrow Processing Window
- Higher Processing Temperature Than PE
- Poor With Strong Acids
- Hydroscopic

Material Comparison

Property	Units	XLPE*	Nylene 494	Nylene 494 IM	PA 11*	PA 12*
Cost Factor	$	1	4	4	7	12
Specific Gravity		0.95	1.13	1.09	1.04	1.02
Melt Temp	F		420	420	367	347
Max H2O @ 50%	%		2.7	1.8	0.8	0.7
Tensile Yield	Ksi	2.6 3.5	11.5	7.7	6.5 9.0	3.6 5.8
Flex Mod	Ksi	70.0 115.0	370	265	170	170 180

*Ref Glenn Beal “Rotational Molding—Design, Materials, Tooling, and Processing

Material Comparison

Property	Units	XLPE*	Nylene 494	Nylene 494 IM	PA 11*	PA 12*
HDT F @ 66 psi	F	149 151	390	356	302	277 302
HDT F @ 264 psi	F	115 152	140	113	113	122 125
ARM Impact @ RT	Ft-lbs		75 (1/8”)	125 (1/8”)		
ARM Impact @ -20F	Ft-lbs	100 (1/4")	20 (1/8”)	50 (1/8”)	66 (1/4”)	
IZOD Notched	Ft-lbs/in	1.0 2.0	0.9	22	1.4	0.6

*Ref Glenn Beal “Rotational Molding—Design, Materials, Tooling, and Processing

Processing Nylon 6

- Typical PE Molds Are Satisfactory
- Moisture
  - All material from Nylene is sold pre-dried in moisture resistant packaging
  - Good housekeeping practices will keep material dry during production

Processing Nylon 6

- Process
  - Oven Temperatures 550F to 650F
  - Internal Pressure 0.5 to 2 psi
    - Improves impact
    - Reduces warpage
    - Inert gas improves color and degradation
  - Hydrating Parts Will Speed Up Moisture Absorption
    - Increase impact
    - Decrease tensile
    - Decrease flex mod

Processing Nylon 6

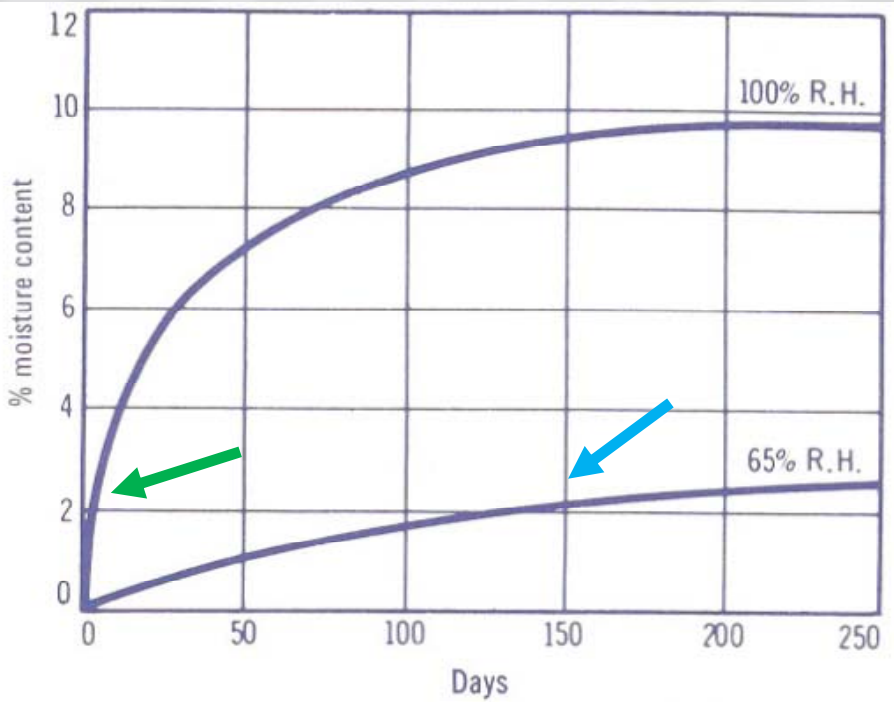


Figure 1. Rate of moisture absorption - Custom Resins
Nylon bars (5 in. x ½ in. x ¼ in.) at room temperature.

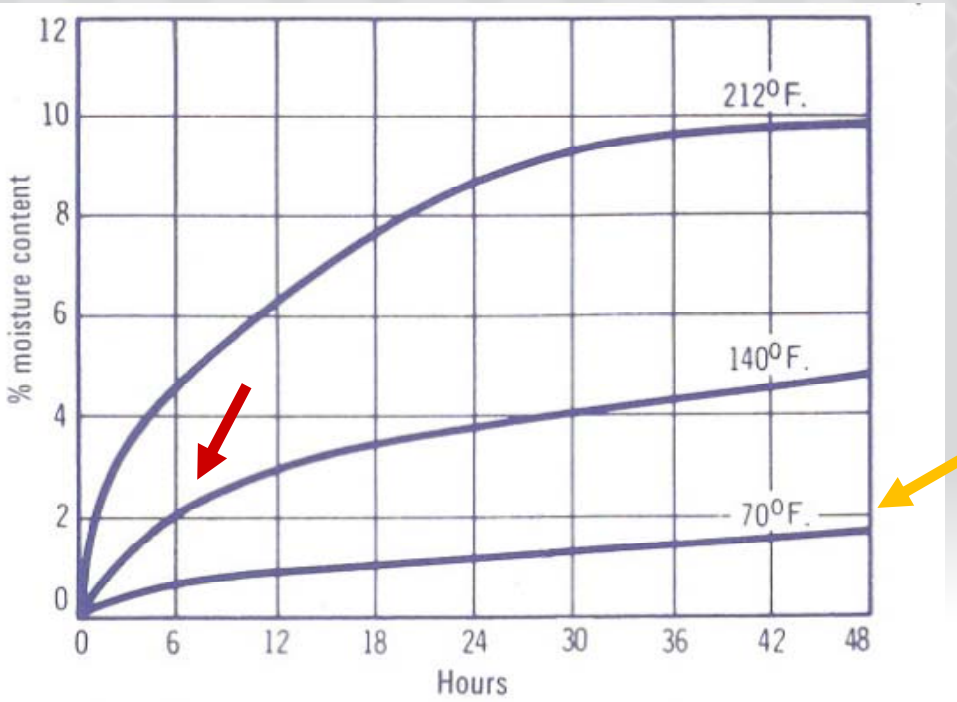


Figure 2. Rate of moisture absorption - Custom Resins ars
Nylon bars (5 in. x ½ in. x ¼ in.) immersed in water
at different temperatures.

Processing Nylon 6

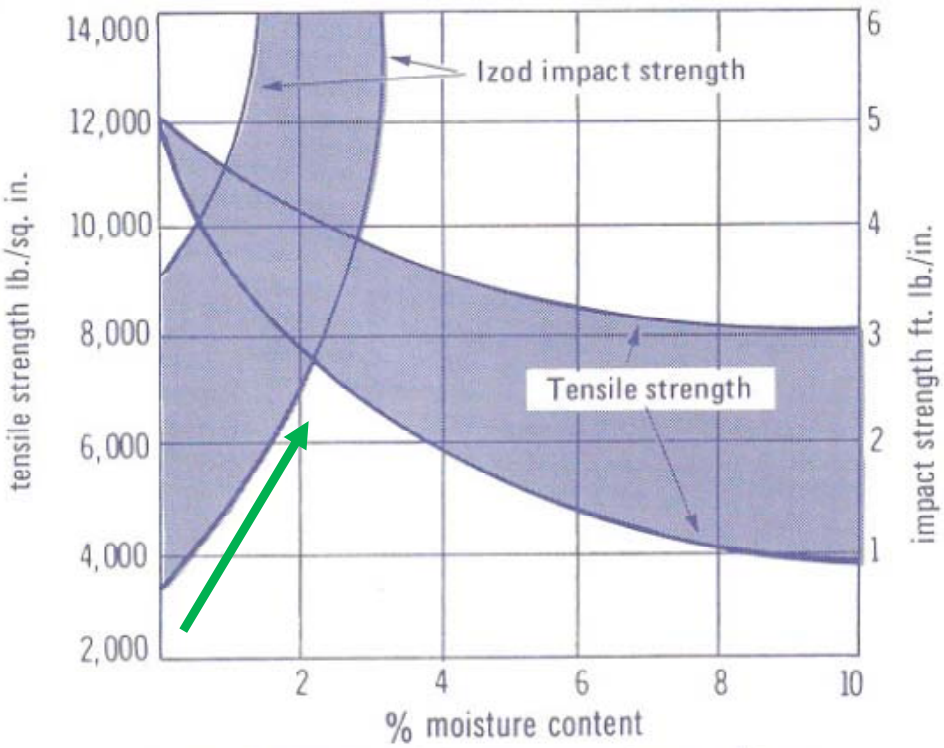


Figure 3. Tensile and impact strength vs. moisture content - range (Custom Resins Nylon at 73° F.)

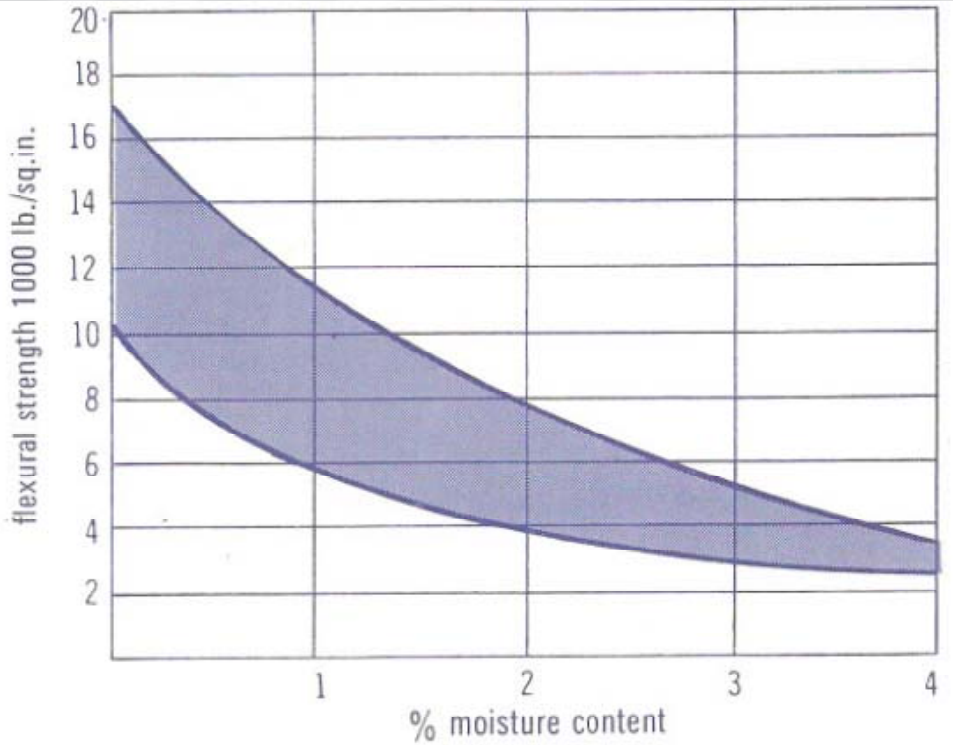


Figure 4. Flexural strength vs. moisture content range (Custom Resins Nylon at 73° F.)

Typical Nylon 6 Applications

- Hydraulic Tanks
- Hot Air Ducts
- Chemical Storage Tanks
- Hot Liquid Tanks
- Blower Housings
- Fenders

Typical Nylon 6 Applications

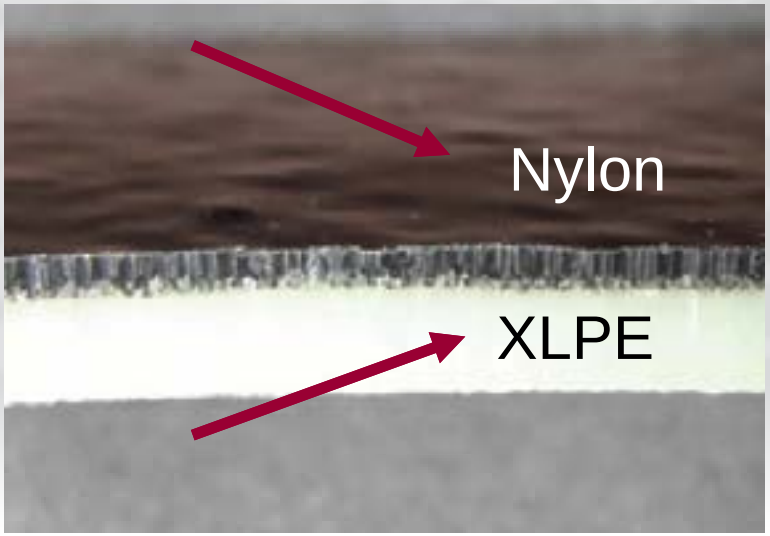
- Fuel Tanks
  - Diesel
  - Gasoline – Low Permeation
    - Single Layer
    - Two Layer

Fuel Tank Construction

- Single Layer
  - Cost effective for small tanks
  - Integrity easily verified
  - 100% recyclable

Fuel Tank Construction

- Two Layer
  - Cost effective on large tanks
  - Integrity easily verified
  - No adhesive layer required
  - Excellent burn test performance



Materials

- Material Nylon 6
  - Two Families from Nylene
    - Nylene 494
    - Nylene 494 IM – Impact modified nylon 6
  - Form
    - Powder – 20 mesh
    - Pellets- small diameter, “rice pellet”
  - Colors
    - Black and natural standard
    - Custom colors available

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