

Lit. N-605^(11/08) Nylon Nanocomposites Using Nanomer® I.34TCN Nanoclay

General Description:

Nanomer® I.34TCN nanoclay is a surface modified montmorillonite intended for use with Nylon 6. It is specifically designed for extrusion compounding. I.34TCN creates a filled nylon belonging to a new class of resin materials called nanocomposites. The mineral and resin form a near-molecular blend with enhanced mechanical properties, especially in the area of heat distortion. A 5% addition of I.34TCN increases HDT by 73%.

Loading Levels:

Unlike conventional mineral fillers, Nanomer I.34TCN nanoclay enhances performance at low loadings, generally 3-8% wt/wt. This unique feature provides improved performance with minimal added weight. Low loadings minimize toughness loss and surface imperfections often encountered with conventional fillers.

Material	Specific Gravity
Neat nylon	1.13
I.34TCN @ 5.0%	1.14

Nanocomposite Properties:

I.34TCN can be used in both low and high viscosity nylons. A twin screw compounder was used to generate the results in Tables 1 and 2. Consult Tech Data N-608 for guidance on extruder set-up and screw configuration.

Table 1 - Mechanical Properties

Material	I.34TCN % (wt/wt)	Flexural Strength (Mpa)	Flexural Modulus (Mpa)	Tensile Strength (Mpa)	Tensile Modulus (Mpa)	HDT @ 264 psi (°C)
Nylon 6 Capron 8202* (Control)	-	114	3112	75	3140	59
Nylon 6 Nanocomposite	5.0	132	4223	80	4200	102

* Capron® is a registered trademark on Honeywell Polymers, Inc.

Table 2 - Toughness Properties

Material	I.34TCN % (wt/wt)	% Elongation At-Break	Notched Impact (ft-lb/in)	Unnotched Impact (ft-lb/in ²)
Nylon 6 Capron 8202* (Control)	-	>120	1	No break
Nylon 6 Nanocomposite	5.0	6.2	0.7	30

Limitations:

Because Nanomer nanoclays disperse to very fine particles with high surface area, melt flow will decrease. Nanomer addition above 2% loading reduces toughness somewhat. Standard impact modifiers can minimize or eliminate the reduction.

Physical Properties

Appearance	White Powder
Mean Dry Particle Size (microns)	16-22
+ 325 Mesh Residue (%)	0.1
Specific Gravity	2.0
Moisture (%)	3.0
Bulk Density (pounds/ft ³)	19-23
(gms/cc)	0.30-0.36
Purity (% min)	98.5

Use with Other Fillers:

Nanoscale montmorillonite gives the compounder many options for filler combinations to further customize products. One approach is in combination with glass fiber. When combining Nanoclay with glass fiber, reduction some glass fiber loading can be achieved while maintaining equivalent mechanicals. This gives lower specific gravity material.

Product Availability:

Nanomer I.34TCN nanoclay is available in 20 kg. bags or drums and one ton bulk bags.

For more information on how Nanomer® nanoclays can work for you, contact Nanocor's Technical Service Group.

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