

Lit. N-604 (09/06)

Nanocomposites Using Nanomer® I.30T Nanoclay
General Description:

Nanomer® I.30T nanoclay is a surface modified montmorillonite intended for use with nylon 6. Nanomer® I.30T is designed specifically for extrusion compounding. When properly compounded, it creates a filled nylon belonging to a new class of resin materials called nanocomposites. The mineral and resin form a molecular blend with enhanced mechanical properties, especially in the area of heat distortion. Low loadings of this nanoclay (2-6% wt/wt) nearly double HDT in most nylon 6 grades.

Loading Levels:

Unlike conventional mineral fillers, I.30T 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.

Nanocomposite Properties:
Table 1 – Mechanical Properties Extrusion Compounding

Material	I.30T % (wt/wt)	Flex. Str. (MPa)	Flex. Mod. (MPa)	Ten. Str. (MPa)	Ten. Mod. (MPa)	HDT @ 264 psi (°C)	Notch Izod Impact (ft-lb/in)	Unnotched Izod Impact (ft-lb/in ²)
Nylon 6 *Capron 8202 (Control)	0	114	3110	75	3140	59	1	No break
Nylon 6 Nanocomposite	5.0	136	4340	88	4300	99	0.6	21

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

Gas permeability is reduced significantly by introduction of Nanomer® I.30T. Table 2 gives oxygen transmission rate reductions for two nanoclay loadings at 65% relative humidity.

Table 2 – Oxygen Transmission Rate (OTR) Extrusion Compounding

Material	I.30T %(wt/wt)	OTR (cc-mil/100 in ² /day)	Improvement (%)
Nylon 6 Control *	0	2.9	-
Nanocomposite	2.0	2.0	31%
Nanocomposite	5.0	1.4	52%

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Twin screw compounders or intensive mixers are required for complete dispersion. For clear films and bottles equipment of this type is a necessity. Consult Tech Data N-608 for guidance on extruder set-up and screw configuration.

Limitations:

Because Nanomer nanoclays disperse to very fine particles with high surface area, melt flow will decrease. Nanomer addition above 2-3% loading reduces toughness somewhat. Standard impact modifiers can minimize or eliminate the reduction.

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.

Physical Properties

Appearance	White Powder
Mean Dry Particle Size (microns)	18-23
+ 325 Mesh Residue (%)	0.1
Specific Gravity	1.90
Moisture (%)	3.0 max
Bulk Density (pounds/ft ³) (gms/cc)	34 0.55
Purity (% min)	98.5

Product Availability:

Nanomer® I.30T nanoclays is available in 20 kg. (44 lb) polylined bags.

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

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