Lit. T-13 (10/04) Dispersion Guidelines For Nanomer® I.30E Nanoclay

General Information:

Nanomer® I.30E nanoclay is an onium ion surface modified montmorillonite mineral. It is designed to be easily dispersed into amine-cured epoxy resins to form nanocomposites. A number of properties are improved, including modulus, Tg and chemical resistance.

Amine-cured epoxy nanocomposites with 10 ~ 20 phr of Nanomer I.30E nanoclay exhibit significantly increased glass transition temperatures 10 to 20 ºC (DMA method). Nanocomposites with higher loadings demonstrate further increased modulus over a broad temperature range but nearly identical glass transition temperatures when compared to 10 phr loaded nanocomposites.

Nanoclay Dispersion and Nanocomposite Preparation Methods:

Nanomer I.30E nanoclay can be incorporated into resin systems using one of three methods:

1) Resin Dispersion . Mix the desired amount of Nanomer I.30E nanoclay with epoxy resin at 40 ~ 60 ºC. Lower resin viscosity will promote more rapid dispersion. Amine curing agent and curing accelerator are then added to the resin-Nanomer I.30E mixture. After thoroughly mixing and degassing, cure according to normal procedures.

2) Curing Agent Dispersion. I.30E can also be dispersed in amine curing agents, provided at least 40 phr curing agent are employed. This method allows one to disperse at room temperature. Mix the desired amount of Nanomer into the curing agent. Add epoxy resin and accelerator, if desired. After thoroughly mixing and degassing, cure using normal procedures.

3) Combination Dispersion. Mix the desired amount of Nanomer I.30E nanoclay with pre-mixed epoxy resin, curing agent and accelerator at room temperature. Degass the combination and cure according to normal procedures.

Quick Dispersion Measurements:

There are two simple tests to determine when you have made a proper dispersion. The glass slide test is the fastest. Place a few drops of dispersion between two glass laboratory slides and press them firmly together. Hold the slides up to light and look through them. If no agglomerates are seen, the dispersion is complete.

The second test is sedimentation. Place the dispersion in a jar or beaker. Wait 10 minutes, then look at the bottom of the container. No sediment means the dispersion is complete.

In the rare case where agglomerates or sediment is observed, remix the dispersion and retest.

Nanocor® Nanocor, Inc. 2870 Forbs Avenue, Hoffman Estates, IL 60192
847.851.1918, 800.426.5564, Fax: 847.851.1375,

Lit. T-13 (10/04) Dispersion Guidelines For Nanomer® I.30E Nanoclay

Important Points:

Although Nanomer I.30E nanoclay is designed for easy dispersion, it is important to add it gradually while the mixer is running. For most equipment an addition rate of 20 pounds per minute will suffice.

All three dispersion methods will introduce and entrap air bubbles. The level of air entrapment will vary with the viscosity of the system and type of mixer used. Adequate degassing is required in order to capture the enhanced properties of nanocomposite formation.

If you use method 1 expect a viscosity increase and adjust mixer speed accordingly. The viscosity may nearly double for some resins.

The shelf life of the nanoclay resin mixtures created through methods 1 and 3 will be reduced somewhat by the presence of the nanoclay. For dispersions made using method 3 cure as soon as practical. The gelltime of a typical mixture, e. g., Epon 828-Jeffamine D400, is about half that of an unfilled resin system.

Curing temperatures should be below 120°C to avoid self-polymerization.

Nanomer I.30E nanoclay is not suitable for anhydride-cured systems. Nanocor makes additional grades for these systems.

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

Nanocor®

Nanocor, Inc. 2870 Forbs Avenue, Hoffman Estates, IL 60192
847.851.1918, 800.426.5564, Fax: 847.851.1375,