One and Two Part Epoxy

Application Note

Significant Issue:

A uniform network of Interfibe cellulose fibers in an epoxy matrix maintains performance properties while reducing formulation costs. The physical properties evaluated include appearance, viscosity, slump resistance and shear overlap.

Customer Objectives:

The customer will benefit by reducing formulation Costs while maintaining performance properties and physical appearance. High cost thixotropes can be reduced, as the fibers contribute both thixotropy and reinforcement.

Interfibe Solution:

The use of Interfibe RT as an extender for some of the more commonly used fillers and thixotropes allows for overall cost reduction in any epoxy system without sacrificing any of the important properties, and in some cases, some properties were enhanced by the introduction of Interfibe. Secondly, flexural properties and crack resistances were dramatically improved with the incorporation of Interfibe into the epoxy systems.

Summary:

Interfibe RT is compatible with commonly used Fillers and thixotropes and contributes supplemental Thixotropy requirements to a wide variety of product formulations at reduced costs.

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Application Note

One Part Epoxy Formulation Using Interfibe RT

DESCRIPTION

The incorporation of Interfibe cellulose fibers allows for increased tensile and lap shear strength lower costs when compared to other thixotropes such as fumed silica and aluminum oxide. Interfibe also helps to increase thermal shock resistance and decrease the coefficient of thermal expansion. Other properties that can be achieved are reduced shrinkage, increased comprehensive strength viscosity and density of the cured system. A typical one-part epoxy system using Interfibe RT would be as follows:

RT Fibers in an Epoxy Adhesive Formulations

	E-1 (control)	E-2
Epoxy resin-1	47	40
Epoxy resin-2	22	18.7
Dicy	3.7	3.1
Cure accelerator	1.3	1.1
Ground limestone	20	28.4
Fumed silica, surface treated	6	3
RT fibers	----	5.6

Experimental Results

	E-1 (control)	E-2
Appearance		
Surface	8.5	8
Gloss	9	9
Uniformity	9	8
Viscosity, initial	86	91
Viscosity, aged	105	120
Slump resistance (1/2 x _ x 4 in.)	No mov.	No mov.
Shear overlap:		
Initial	1770 psi 100% cf	1801 psi 100% cf
250 hr. humidity	1579 psi 62% cf	1727 psi 95% cf
250 hr. salt spray	1288 psi 62% cf	1592 psi 97% cf

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Two Part Epoxy Formulation Using Interfibe RT

Table I shows the tensile and lap shear strength of two-part systems using Interfibe RT.

Formulation-Table I

Resin Portion		Curative Portion	
DEN	45.0	Capcure 3-800	77.0
DER 33	10.0	Tertiary Amine	5.0
Interfibe RT	15.0	Titanium Dioxide	3.0
		Interfibe RT	15.0

These two components, when mixed at a 1:1 ratio, give the following properties after 3 days at room temperature:

Tensile Strength (psi)	10.2
Lap Shear Strength (psi)	1900
Hardness (Shore D @ 1 Day)	70

Table II shows these same properties in two-part systems where other thixotropes and fillers have been substituted for Interfibe RT.

Formulation-Table II

Filler	Lap Shear	Tensile Strength	Shore D Hardness
TiO_2	1950	10.0	70
Aluminum Oxide	1900	9.6	70
Silica (Fumed)	1740	9.2	65

The results reported in the Table above show that it is possible to achieve properties with Interfibe that are as good as, and in some cases, better than those achieved with the more familiar fillers. It should also be pointed out that crack resistance and flexural strength are improvements which may also be noted.

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