Technical Data

Technicure® IDH

Description:

Technicure® IDH, isophthalic dihydrazide, a benzyl backboned dihydrazide, is commonly used as a curing agent for epoxy resins in one-component formulations. Technicure® IDH provides cure above 160°C, high glass transition temperature, and high acid resistance. IDH can be used with accelerators to increase reactivity at lower temperatures. Some suggested accelerators for IDH include Technicure® LC-80, substituted ureas like Technicure® PDU-250, TDU-20, and MDU-11. These accelerators lower the activation temperature of IDH without any adverse impact on performance properties.

IDH is approved by the FDA for indirect food contact under 21 CFR Chapter 175.300

Jet milled grade of Technicure® IDH is available as Technicure® IDH –J.

Advantages:

- High glass transition temperature
- High acid resistance
- Good toughness

Typical Applications:

- One-component adhesives
- Hot-melt pre-pregs

Handling Precautions:

Refer to the product Safety Data Sheet

Typical Properties:

Appearance:	White powder
Molecular Weight:	194.5
Melting point:	220-230°C
Moisture content:	<0.5%
Assay:	97% min.
Recommended use level with liquid epoxy resin (EEW=190)	26 PHR

Typical Formulations (by wt.):

Liquid epoxy resin (EEW=190)	100	100
Technicure® IDH-J	26	26
Technicure® LC-80[1]	0	3
Fumed silica (H 200U)[2]	1	1
Reactivity by DSC[3]		
Onset Temp., °C	187	119
Peak Temp., °C	192	148
Heat of Reaction, J/gm	346	312
Glass Transition Temp[4]., °C		
After 30 minutes cure at 140°C	-	148
After 60 minutes cure at 140°C	-	169
Shelf stability[5] at 40°C		
Weeks	>4	>3

1. Accelerator– Product of ACCI Specialty Materials
2. Fumed silica – Product of OCI Company Ltd.
3. 10°C/min. scan rate
4. By DMA
5. Time to double the viscosity

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Supplemental Technical Information:

Technicure® LC-80 as an accelerator for IDH:

Technicure® LC-80 can be used as an accelerator for Technicure® IDH. Three formulations (Table 1) containing Technicure® IDH-J (Jet milled IDH) and Technicure® LC-80 were prepared to study reactivity, glass transition temperature and shelf stability.

Differential scanning calorimeter data (Table 1) suggests that onset temperature (indication of reactivity) lowers as a function of increasing loading of Technicure® LC-80. After 60 minutes cure at 140°C, formulation without LC-80 did not cure. However, formulations with 1 PHR and 3 PHR of LC-80 as an accelerator IDH cured and developed high glass transition temperature without significant impact on latency.

Table 1. Formulations (by wt.), reactivity, glass transition temperature and shelf stability of Technicure® IDH containing formulations

Liquid epoxy resin (EEW=190)	100	100	100
Technicure® IDH-J	26	26	26
Technicure® LC-80	0	1	3
Fumed silica (H 200U)	1	1	1
Reactivity by DSC			
(10°C/min scan rate)			
Onset Temp., °C	187	152	119
Peak Temp., °C	192	169	148
Heat of Reaction, J/gm	346	242	312
Glass Transition Temp., °C			
After 30 mins. cure at 140°C	No cure	No cure	148
After 60 mins. cure at 140°C	No cure	148	169
Shelf stability at 40°C			
Weeks	>4	>4	>3

Solubility of Technicure® IDH:

Solubility of IDH was studied in various solvents at various temperatures. The following table shows solubility as the grams of IDH dissolved in 100 gm of solvent to make a saturated solution at a given temperature.

Temp.(°C)	15	20	25	30	35	40	50	60
H_2O	0.352	-	0.656	-	0.931	-	1.768	-
Ethanol	0.027	-	0.027	-	0.047	-	0.091	-
DMF[1]	-	-	-	0.89	-	-	-	1.8
DMSO[2]	-	-	-	11.7	-	-	-	17.7
Toluene	-	<0.01	-	<0.01	-	<0.01	-	-
Ethyl Acetate	-	<0.01	-	<0.01	-	<0.01	-	-
Butoxyethanol	-	<0.01	-	0.011	-	0.025	-	-
PGMEA[3]	-	<0.01	-	<0.01	-	<0.01	-	-

[1]Dimethylformamide, [2]Dimethylsulfoxide, [3]Propyleneglycol monomethyl etheraceta

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