



Amicure[®] UR-41 Cure Accelerator

Description

Amicure UR-41 cure accelerator is designed for use as an accelerator for dicyandiamide (DICY) cured epoxy systems. It can provide longer pot life than standard substituted urea accelerators without an increase in activation temperature.

Amicure UR-41 cure accelerator cures rapidly above its activation temperature and provides similar adhesion characteristics to urea accelerated one-component (1K) epoxy formulations.

Applications

- One-Component (1K) Paste Adhesives
- Film Adhesives
- Composite Prepreg

Advantages

- Long formulation shelf stability
- Rapid cure above its activation temperature
- Excellent adhesion properties

Typical Cure Schedule

30 minutes at 150 °C (302 °F)

Storage and Handling

At least 24 months from the date of manufacture in the original sealed container at ambient temperature. Store away from excessive heat and humidity in tightly closed containers.

Material may crystallize or solidify upon exposure to low temperatures. Crystallized or solidified material can be utilized after melting at elevated temperatures without impacting handling or physical properties. It is recommended that the material be heated to 50-70 °C while mixing continuously for 1 hour.

Refer to the Material Safety data sheet for Amicure UR-41 Cure Accelerator.

Typical Properties	SI	English
Appearance	White Micronized Powder	
Equivalent Wt{H}	N/A	
Particle Size Distribution:	D50 < 20 µm	
	D90 < 35 µm	
Typical Formulation, in parts		
DGEBA (EEW=190) Epoxy	77.5	
CTBN Epoxy Adduct	37.5	
Amicure [®] CG1200G	6.0	
Amicure UR-41	2.0	
Fumed Silica	1.0	
Typical Handling Properties		
DSC Activation Temperature, (X °C/min Scan Rate)	140 °C	284 °F
Time to 2X Initial Viscosity @ 40 °C / (104 °F)	120 Days	
Temperature Resistance		
Glass Transition Temperature (DSC second scan)	132 °C	270 °F
Adhesion Strength		
Lap Shear Strength after 15 minute cure at 150 °C	1103 N/cm ²	1600 psi
Lap Shear Strength after 20 minute cure at 177 °C	1547 N/cm ²	2244 psi

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Model Formulation

Amicure UR-41 cure accelerator was evaluated for reactivity and formulation shelf stability along

with other commercially available substituted ureas in a model formulation. Figure 1 describes the formulations studied.

Figure 1: Model Formulation

Formulation, % by weight	A	B	C	D	E
DGEBA (EEW=190) Epoxy Resin	100	100	100	100	100
Amicure [®] CG1200G	6.0	6.0	6.0	6.0	6.0
Amicure [®] UR-M	1.0 to 5.0				
Amicure [®] UR2T		1.0 to 5.0			
Amicure [®] UR			1.0 to 5.0		
Amicure [®] UR-D				1.0 to 5.0	
Amicure UR-41					1.0 to 5.0
Fumed Silica	1.0	1.0	1.0	1.0	1.0

Reactivity

The 5 ureas above were evaluated in formulations at 1, 3, and 5 parts loading to determine the impact of loading and urea selection on activation temperature. The reactivity of these formulations was studied using a Differential Scanning Calo-

rimeter (DSC) at a 10 °C/min scan rate. Figure 2 describes the Amicure UR-41 based formulations demonstrated the lowest onset temperatures of the ureas studied across all loadings.

Figure 2: Amicure UR-41 Demonstrates Lower Onset Temperatures of standard substituted ureas

Activation Temperature, in °C	1 PHR	3 PHR	5 PHR
Amicure UR2T	150	146	143
Amicure UR-M	144	138	135
Amicure UR	148	143	141
Amicure UR-D	148	144	142
Amicure UR-41	143	131	130

Formulation Shelf Stability

Viscosity increase as a function of time was studied at both 40 °C (warehouse conditions) using a standard Brookfield viscometer and also at 80° C using dynamic mechanical analysis (DMA). Each sample was measured for initial viscosity 24 hours after preparation at 25 °C. The formulations were then stored at 40 °C with weekly measurements

taken after the material was brought back to 25 °C. Figure 3 indicates that formulations containing Amicure UR-41 cure accelerator showed significantly longer stability than the other substituted ureas evaluated. Amicure UR-41 based formulations also show a negligible increase in viscosity vs. the ureas studied when evaluated at 80 °C.

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Figure 3: Amicure UR-41 demonstrates superior shelf stability at 40 °C (Warehouse Conditions)

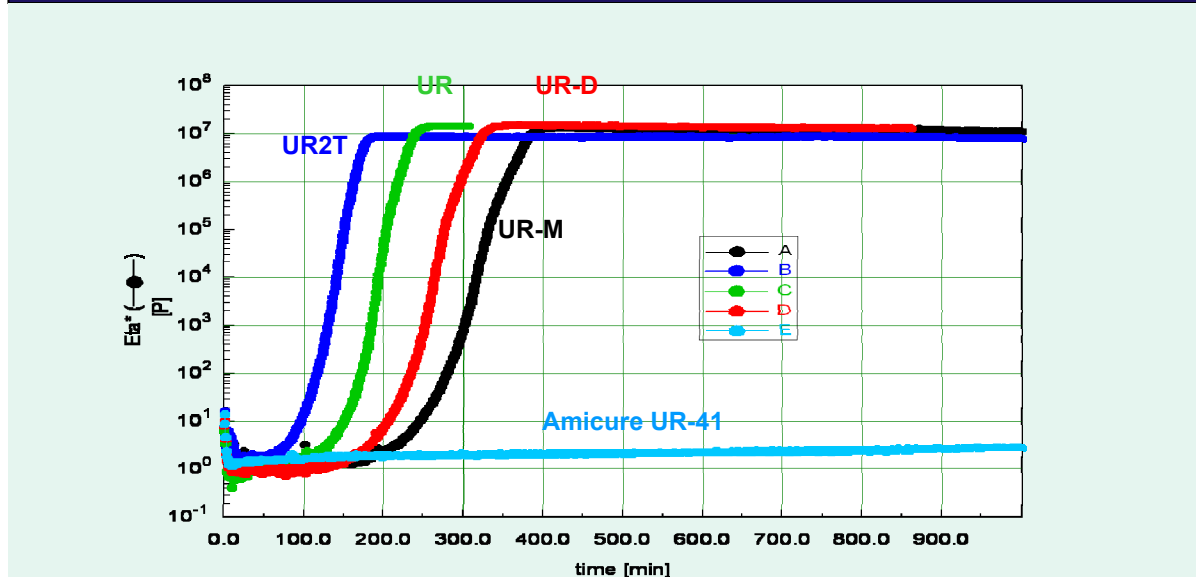
Product	Initial (mPa.s)	1 week	2 weeks	3 weeks	1 month	4 months
Amicure UR2T	21620	■	■	■	■	■
Amicure UR	16430	54410	■	■	■	■
Amicure UR-D	16430	108500	■	■	■	■
Amicure UR-M	20340	22560	37660	■	■	■
Amicure UR-41	19930	18920	23600	22610	23470	40970

Formulation: DGEBA (EEW=190) Epoxy Resin / 2PHR Curing agent / 6PHR Dicy / 1% fumed silica

■ - Gelled

Figure 4: Amicure UR-41 demonstrates superior shelf stability at 80 °C

Formulation: DGEBA (EEW=190) Epoxy Resin / 2PHR Curing agent / 6PHR Dicy / 1% fumed silica



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