

## Resicure™ 4

### Description:

Resicure 4 is a liquid imidazole, commonly used as a sole curing agent or as a dicy and anhydride cure accelerator in epoxy resin based formulations. Typical loading level as a sole curing agent is about 1-5 phr and as a dicy and anhydride cure accelerator is about 0.5 – 3.0 phr.

Resicure 4 is one of the most reactive imidazole based accelerators for dicyandiamide and anhydrides.

### Advantages:

- Very reactive at elevated temperature
- Excellent low temp. reactivity as an accelerator of sole curing agent
- High glass transition temperature
- Excellent adhesion to a variety of substrates

### Typical Applications:

- One-component adhesives for auto, aerospace and electronics applications
- Composites such as prepregs

### Handling Precautions:

Refer to the product Safety Data Sheet

### Typical Properties:

Appearance:	Liquid
Viscosity @ 25°C:	145 cPs
Imidazole content:	>99%
Moisture content:	<0.5%

### Recommended use level:

As dicy or anhydride accelerator:	1-3 PHR
As a sole curing agent:	3-5 PHR

### Typical Formulations (by wt.):

Liquid epoxy resin (EEW=190)	100	100
Technicure D-10 <sup>1</sup>	6	0
Resicure 4	2	5

### Reactivity by DSC<sup>3</sup>

Onset Temp., °C	96	101
Peak Temp., °C	129	109
Heat of Reaction, J/gm	385	397

<u>Glass Transition Temp.<sup>4</sup>, °C</u>	154	159
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### Shelf stability<sup>5</sup> at 25 °C

hours	8	3
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1. Dicy accelerator – Product of ACCI Specialty Materials
3. 10°C/min. scan rate
4. By DMA, after 120 minutes cure at 90°C
5. Time to double the viscosity

### **A&C Catalysts, Inc.**

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### Supplemental Technical Information:

Four one-pack formulations as shown in Table 1 were prepared to study reactivity, glass transition temperature and formulations shelf stability.

Resicure EMI-24 was used as a control accelerator. Technicure D-10 is dicyandiamide having avg. particle size of 10 micron.

### Reactivity:

DSC data shows that Resicure 4 containing formulations offer lower onset and peak temperatures as compared to the Resicure EMI-24 containing formulations under the same loading levels indicating higher reactivity of Resicure 4.

### Glass Transition Temperature:

Samples were prepared by curing the formulations at 90°C for two hours and tested for Tg by DMA. The results show that formulations containing Resicure 4 offer glass transition temperature similar to Formulations containing Resicure EMI-24.

### Formulations Shelf Stability:

Time to double the formulations viscosity was evaluated at 25°C. Results indicate that Resicure 4 and Resicure EMI-24 offer nearly identical shelf stability.

**Table 1. Formulations (by wt.), reactivity, glass transition temperature and shelf stability**

Liquid epoxy resin (EEW=190)	100	100	100	100
Technicure D-10	6	6	6	6
Resicure 4	1	2	0	0
Resicure EMI-24	0	0	1	2
<b>Reactivity by DSC</b>				
(10°C/min scan rate)				
Onset Temp., °C	102	95	111	108
Peak Temp., °C	125	129	130	134
Heat of Reaction, J/gm.	524	580	506	506
<b>Glass Transition Temp., °C</b>				
<b>(by DMA)</b>				
After 120 min. cure at 90°C	169	163	165	160
<b>Shelf stability<sup>2</sup> at 25°C</b>				
hours	24	8	24	8

1. 120 minutes cure at 90°C
2. Time to double formulation viscosity

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