

## Tg of Low Viscosity Novolacs - EPALLOY™ 8330 / EPALLOY™ GE-30

### Objective

Identify a resin blend with viscosity below 5000 cps (@52°C) with Tg of 150 or better. Previous experience has shown ERISYS GE-30 is best to maximize Tg retention at low viscosity. Evaluate Tg of low viscosity novolacs and similar blends of EPALLOY 8330 and GE-30.

### Procedure

Make blends of GE-30 in 8330 as shown in table. Measure viscosity at 25 and 52°C. Make samples for DSC and run Tg using several different cure schedules as shown.

### 8330/GE-30 Viscosity and Tg

		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
4203121	8330	100	94.25	88.5	82.75	77
1101060	GE-30	0	5.75	11.5	17.25	23
	EEW	178.5	175.8	173.2	170.6	168.2
	phr TETA	13.7	13.9	14.1	14.3	14.5
	25°C Viscosity (cps)	4,720,000	1,240,000	315,000	116,000	53,000
	52°C Viscosity (cps)	19,300	9,700	5,375	3,100	1,950
Ref: CZ4-11	Tg(°C) (gel @RT+2 hr. @ 90°C)	126.7	128.8	117.2	113.8	113.1
Ref: CZ4-20	Tg(°C) (gel @RT+2 hr. @ 90°C+ 2 hr. @ 150°C)	159.6	159.5	158.9	156.3	156.3
Ref: CZ4-19 <sup>1</sup>	Tg(°C) (gel @RT+2 hr. each @ 90°/150°/200°C)	164	159.2	148.4	151.9	143.5

1-Samples were very dark in color – may have been over cured

Note: Formula C corresponds to 8330

### Results

The data shown indicates:

1. The preferred cure schedule is gel @RT+2 hr. @ 90°C+2 hr. @ 150°C.
2. Dilutions of up to 23% GE-30 in 8330 has a minimal effect on Tg while showing a large decrease in viscosity.
3. Curing at temperatures above 150°C is not favorable.