

# Starting Formulation

## SF 7014

### Low Exotherm, Electrical Encapsulating Compound EPON™ Resin 1001F

**Introduction** This is a heat curing, low exotherm encapsulating compound particularly useful for potting of large coils and stators.

**Suggested Uses**

- Encapsulating of electrical components, particularly large units, requiring large resin volumes and low exotherm characteristics.

Formula	<u>Material</u>	<u>Supplier</u>	<u>Pounds</u>	<u>Gallons</u>
	Resin Portion			
	EPON Resin 1001F	Hexion	31.9	3.19
	Silica	Whitaker, Clark & Daniels, Inc.	40.7	1.87
	Mica	J.M. Huber Corp.	<u>27.4</u>	<u>1.16</u>
	Total		100.0	6.22
	Converter Portion			
	Phthalic Anhydride	Stepan Chemical Co.	<u>9.57</u>	<u>0.752</u>
	Total		9.57	0.752

**Typical Handling Properties** Table 1 / Handling Properties

	<u>Units</u>	<u>Value</u>
Pot Life at 250 °F		
1 pint mass	hrs	>4
1 gallon mass	hrs	>3
Viscosity at 250 °F	cP	55,000
Density	lbs/gal	15.7

**Compounding Procedure** Heat EPON Resin 1001F by means of an oil bath, oven or heating mantle to 125-130 °C until liquid. Maintain the resin at this temperature during addition of fillers (optional).  
**Note:** Fillers should be dried at 130 °C to remove all moisture prior to incorporation in the resin. After filler addition, the resin/filler mixture should be stirred until homogeneous. It is preferable to melt the phthalic anhydride at 130 °C before adding to the resin/filler mixture.

Additional viscosity reduction with less thixotropy can be accomplished by replacement of the mica filler portion with additional silica. A reduced viscosity would be desirable for applications where impregnation qualities are needed. The use of other type fillers may be dictated for applications requiring specific loading, handling and performance.

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be utilized for applications requiring specific loading, handling and performance characteristics.

**Application** Some sublimation may occur if the resin mixture temperature exceeds 130 °C, but such losses are considered insignificant. Thoroughly blend the phthalic anhydride/resin mixture. Vacuum evacuation of the system is recommended before use. Components to be encapsulated should be thoroughly cleaned and dried. It is preferable to evacuate the component under heat and vacuum during the encapsulation process.

**Cure Schedule** Sixteen hours at 250 °F is adequate for complete cure. A shorter cure of 4 hours at 300 °F may also be used, providing increased shrinkage can be tolerated.

**Typical Properties** Table 2 / Physical and Electrical Properties <sup>1</sup>

	<u>Units</u>	<u>Value</u>
Heat Distortion Temperature	°C	106
Tensile Strength, Ultimate	psi	10,100
Tensile Elongation	%	1.0
Flexural Strength, Ultimate	psi	16,500
Flexural Modulus, Initial	ksi	1,350
Izod Impact, notch	ft•lbs/inch	0.42
Linear Shrinkage <sup>2</sup>	inch/inch	0.008
Thermal Shock <sup>3</sup>		passed
Hardness	Shore D	91
Weight Loss, 24 hours at 300 °F	%	0.26
Exotherm Temperature, 1 gallon mass at 250 °F	°F	273
Exotherm Temperature, 1 pint mass at 250 °F	°F	258
Chemical Resistance <sup>4</sup>		
Water	%	0.07
5% Acetic Acid	%	0.07
50/50 Xylol/Isopropanol	%	-0.03
<b>Electrical Properties</b>		
Dielectric Strength <sup>5</sup>	volts/mil	426
Dissipation Factor, 1 megacycle at 77 °F		0.02
Dielectric Constant, 1 megacycle at 77 °F		4.4
<b>Volume Resistivity</b>		
at 77 °F	ohm•cm	2.1 x 10 <sup>15</sup>
at 150 °F	ohm•cm	1.5 x 10 <sup>15</sup>
at 200 °F	ohm•cm	7.5 x 10 <sup>14</sup>
at 266 °F	ohm•cm	8.9 x 10 <sup>11</sup>
at 300 °F	ohm•cm	8.9 x 10 <sup>11</sup>

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at 302 °F	ohm•cm	9.3 x 10 <sup>10</sup>
at 356 °F	ohm•cm	6.5 x 10 <sup>9</sup>
at 392 °F	ohm•cm	<10 <sup>9</sup>

- <sup>1</sup> Cure Schedule: 16 hours at 250 °F.
- <sup>2</sup> ERF Method 12-64 1/2 cylinder mold, 10 inches long x 0.88 inch radius. mil Teflon film lined.
- <sup>3</sup> Hex bar, 10 cycles -55 °C plus 130 °C
- <sup>4</sup> Weight gain after 24 hours immersion
- <sup>5</sup> Obtained on 1/8-inch thick test specimen.

Storage Recommendations regarding storage conditions can be obtained by visiting our web site at [www.hexion.com](http://www.hexion.com)

#### General Information

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#### Safety, Storage & Handling

Please refer to the MSDS for the most current Safety and Handling information.

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