Starting Formulation

SF 7000

Flexibilized, One-Component Electrical Potting and Impregnating Compound

EPON™ Resin 828 / HELOXY™ Modifier 32

Introduction

This single package epoxy/anhydride compound utilizes HELOXY Modifier 32 as a low viscosity flexibilizer for thermal shock resistance and metallic stearates as latent catalysts. The combination of lithium and zinc stearates eliminates surface tack but retains long shelf life and provides good electrical insulating properties at temperatures up to 130 °C. The low volatility of all components permits the use of high vacuum to insure complete impregnation and absence of air voids.

<table>
<thead>
<tr>
<th>Formula</th>
<th>Material</th>
<th>Supplier</th>
<th>Pounds</th>
<th>Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EPON Resin 828</td>
<td>Hexion</td>
<td>60</td>
<td>6.19</td>
</tr>
<tr>
<td></td>
<td>HELOXY Modifier 32</td>
<td>Hexion</td>
<td>40</td>
<td>4.52</td>
</tr>
<tr>
<td></td>
<td>Dodecenylsuccinic Anhydride</td>
<td>Allied Chemical Corp.</td>
<td>70</td>
<td>8.37</td>
</tr>
<tr>
<td></td>
<td>Lithium Stearate #304</td>
<td>Witco Chemical Corp.</td>
<td>1</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>Zinc Stearate Grade H</td>
<td>Metasap Chemical Co.</td>
<td>4</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>175</td>
<td>19.64</td>
</tr>
</tbody>
</table>

Typical Handling / Handling Properties

<table>
<thead>
<tr>
<th>Properties</th>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>lbs/gal</td>
<td>8.92</td>
</tr>
<tr>
<td>Initial Viscosity at 25 °C</td>
<td>cP</td>
<td>900</td>
</tr>
<tr>
<td>Expected Shelf Life at 77 °F</td>
<td>months</td>
<td>&gt;2</td>
</tr>
<tr>
<td>Gel Time at 250 °F</td>
<td>min.</td>
<td>12</td>
</tr>
<tr>
<td>Gel Time at 300 °F</td>
<td>min.</td>
<td>7</td>
</tr>
<tr>
<td>Suggested Cure Schedule</td>
<td></td>
<td></td>
</tr>
<tr>
<td>at 250 °F</td>
<td>hrs</td>
<td>5</td>
</tr>
<tr>
<td>at 300 °F</td>
<td>hrs</td>
<td>3</td>
</tr>
</tbody>
</table>

Compounding

Weigh the Dodecenylsuccinic Anhydride into a mixing vessel and heat to 300 °F to 340 °F. Use an inert gas sparge to prevent hydrolysis of the anhydride. Add lithium stearate and agitate until dissolved. Add zinc stearate and agitate until dissolved. Cool to 100 °F or less prior to blending with the EPON Resin 828.

Application

The compound may be heated to temperatures of 150 °F to 200 °F, if necessary, to lower viscosity and improve air release properties. Most electrical compounds are potted, impregnated or encapsulated under vacuum to insure complete penetration of fine windings and elimination of air voids.
**Table 2 / Cured State Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength, Ultimate</td>
<td>psi</td>
<td>2,100</td>
</tr>
<tr>
<td>Tensile Elongation</td>
<td>%</td>
<td>42</td>
</tr>
<tr>
<td>Izod Impact, notch</td>
<td>ft-lb/in.</td>
<td>1.02</td>
</tr>
<tr>
<td>Weight Loss - 24 Hrs. at 300 °F</td>
<td>%</td>
<td>0.53</td>
</tr>
<tr>
<td>Water Absorption - 24 Hrs. at 77 °F</td>
<td>%</td>
<td>0.19</td>
</tr>
</tbody>
</table>

**Electrical Properties**

**Volume Resistivity**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 °C</td>
<td>ohm-cm</td>
<td>2.9 x 10^{15}</td>
</tr>
<tr>
<td>66 °C</td>
<td>ohm-cm</td>
<td>6.8 x 10^{12}</td>
</tr>
<tr>
<td>93 °C</td>
<td>ohm-cm</td>
<td>3.0 x 10^{11}</td>
</tr>
<tr>
<td>130 °C</td>
<td>ohm-cm</td>
<td>2.1 x 10^{10}</td>
</tr>
<tr>
<td>150 °C</td>
<td>ohm-cm</td>
<td>5.5 x 10^{9}</td>
</tr>
<tr>
<td>180 °C</td>
<td>ohm-cm</td>
<td>&lt;10^{9}</td>
</tr>
</tbody>
</table>

**Capacitance at 60 HZ**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Dielectric Constant</th>
<th>Dissipation Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 °C</td>
<td>3.56</td>
<td>0.024</td>
</tr>
<tr>
<td>40 °C</td>
<td>3.90</td>
<td>0.015</td>
</tr>
<tr>
<td>60 °C</td>
<td>3.25</td>
<td>0.009</td>
</tr>
<tr>
<td>80 °C</td>
<td>3.34</td>
<td>0.001</td>
</tr>
<tr>
<td>100 °C</td>
<td>3.11</td>
<td>0.018</td>
</tr>
<tr>
<td>120 °C</td>
<td>3.00</td>
<td>0.149</td>
</tr>
<tr>
<td>140 °C</td>
<td>3.17</td>
<td>0.458</td>
</tr>
<tr>
<td>160 °C</td>
<td>3.34</td>
<td>0.707</td>
</tr>
<tr>
<td>180 °C</td>
<td>4.26</td>
<td>1.018</td>
</tr>
<tr>
<td>200 °C</td>
<td>Off Scale</td>
<td>Off Scale</td>
</tr>
</tbody>
</table>

*Cure Schedule 16 hrs at 250°F*

**Storage**

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

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**General Information**

These are starting formulations and are not proven in the user’s particular application but are simply meant to demonstrate the efficacy of the products and to assist in the development of the user’s own formulation. It is the user’s responsibility to fully-test and qualify the formulation, along with the ingredients, methods, applications or equipment identified herein (“Information”), by the user’s knowledgeable formulator or scientist, and to determine the appropriate use conditions and legal restrictions, prior to use of any Information.
Safety, Storage & Handling

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

Exposure to these materials should be minimized and avoided, if feasible, through the observance of proper precautions, use of appropriate engineering controls and proper personal protective clothing and equipment, and adherence to proper handling procedures. None of these materials should be used, stored, or transported until the handling precautions and recommendations as stated in the Material Safety Data Sheet (MSDS) for these and all other products being used are understood by all persons who will work with them. Questions and requests for information on Hexion Inc. (“Hexion”) products should be directed to your Hexion sales representative, or the nearest Hexion sales office. Information and MSDSs on non-Hexion products should be obtained from the respective manufacturer.

Contact Information

For product prices, availability, or order placement, please contact customer service:
www.hexion.com/Contacts/

For literature and technical assistance, visit our website at www.hexion.com