Starting Formulation

SF 8014

Hand Lay-up FRP Matrix

EPON™ Resin 862 / HELOXY™ Modifier 68 / EPIKURE™ Curing Agent 3234

Introduction

This hand lay-up system allows for high filler loading due to its low viscosity. This capability allows this system to be used both as a laminating resin and as an adhesive system.

Suggested Uses

- Pipe fittings, flanges, man-ways, etc.
- General aviation parts
- General adhesive applications

Features

- Low viscosity
- Initial room temperature cure
- Post-cure recommended for optimum performance
- Excellent balance of physical and thermal properties

Chemical Description

- EPIKOTE Resin 862 is a bisphenol F epoxy resin
- HELOXY Modifier 68 is a difunctional reactive diluent
- EPIKURE Curing Agent 3234 is an aliphatic amine

Formula

<table>
<thead>
<tr>
<th>Material</th>
<th>Supplier</th>
<th>Pounds</th>
<th>Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPON Resin 862</td>
<td>Hexion</td>
<td>90</td>
<td>9.1</td>
</tr>
<tr>
<td>HELOXY Modifier 68</td>
<td>Hexion</td>
<td>10</td>
<td>1.1</td>
</tr>
<tr>
<td>EPIKURE Curing Agent 3234</td>
<td>Hexion</td>
<td>16</td>
<td>2.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>116.0</td>
<td>12.2</td>
</tr>
</tbody>
</table>

Mixing Instructions

EPON Resin 862 and HELOXY Modifier 68 may be blended in any ratio in order to adjust the processing and performance. The 90/10 blending ratio by weight was selected to provide a balance of processability and performance. Both components are low in viscosity and may easily be blended at room temperature. Once the resin and the modifier have been blended, then the curing agent should be added. Keep in mind that the gel time of EPIKURE Curing Agent 3234 blended with this resin blend in a 100 gram mass is only 27 minutes. Please plan accordingly.

For adhesive applications, the addition and thorough mixing of fillers, thixotropic agents, etc. into the resin blend should be completed prior to the addition of the curing agent.

Composite Fabrication / Hand Lay-up

The initial cure step should be carried out at room temperature. An elevated temperature post cure may not be necessary depending on the requirements of the desired application. However, an elevated temperature post cure is recommended for optimum performance. Four hours at 82 °C (180 °F) was utilized to allow the use of low temperature tooling. The post-cure may be performed freestanding depending on the part geometry and tolerance required.

Typical Handling Properties

Table 1 / Handling Properties

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### Table 2 / Properties of Cast Matrix System ¹

<table>
<thead>
<tr>
<th>Method</th>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tg DSC, dry ²</td>
<td>°C (°F)</td>
<td>107 (225)</td>
</tr>
<tr>
<td>Tg DSC, wet ³</td>
<td>°C (°F)</td>
<td>96 (205)</td>
</tr>
<tr>
<td>Tg DMA ⁴</td>
<td>°C (°F)</td>
<td>105 (221)</td>
</tr>
<tr>
<td>HDT (264 psi)</td>
<td>°C (°F)</td>
<td>93 (200)</td>
</tr>
<tr>
<td>Tensile strength, Ultimate</td>
<td>psi</td>
<td>10800</td>
</tr>
<tr>
<td>Tensile modulus</td>
<td>ksi</td>
<td>442</td>
</tr>
<tr>
<td>Tensile elongation at break</td>
<td>%</td>
<td>9.0</td>
</tr>
<tr>
<td>Flexural strength, Ultimate</td>
<td>psi</td>
<td>17800</td>
</tr>
<tr>
<td>Flexural modulus</td>
<td>ksi</td>
<td>471</td>
</tr>
<tr>
<td>Flexural elongation</td>
<td>%</td>
<td>5.8</td>
</tr>
</tbody>
</table>

¹ Cure Schedule: 12 hours at 25 °C (77 °F), 4 hours at 82 °C (180 °F).
² Glass Transition Temperature; Differential Scanning Calorimetry, 20 °C/minute.
³ Wet conditioning: 7 days immersed in deionized water at 63 °C (145 °F).
⁴ Glass Transition Temperature; Dynamic Mechanical Analysis, 1 °C/minute.

**Typical Cured State Properties**

- **EPON Resin 862** pbw 90
- **HELOXY Modifier 68** pbw 10
- **EPIKURE Curing Agent 3234** pbw 16

**Viscosity at 25 °C** 1

<table>
<thead>
<tr>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>cP</td>
<td>460</td>
</tr>
<tr>
<td>min.</td>
<td>27</td>
</tr>
</tbody>
</table>

¹ Brookfield DV-11, Spindle 31.
² Shyodu Gel Timer, paper cup.

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