Starting Formulation

SF 4010 Equal Volume Adhesive 828 505 3125 and 3271 Equal Volume Adhesive – Binds to Oily Surfaces

EPON™ Resin 828 / HELOXY™ Modifier 505 / EPIKURE™ Curing Agents 3125 and 3271

Introduction

The equal volume combining ratio of this adhesive facilitates proportioning in the field and reduces the effect of small measuring errors on cured state properties. Good adhesion to metal surfaces which have not been specially prepared is the primary feature of this formulation.

Maximum bonding strength is obtained on freshly cleaned substrates, usually within 24 hours at normal room temperature. Good adhesion to polystyrene foam, paper honeycomb and other low density insulating materials suggests use in sandwich panel construction.

Suggested Uses

- Bonding of metals at room temperature. Also bonds well to wood, concrete, ceramics and many rigid plastics.

Features

- One-to-one mix ratio by volume
- Tolerance to trace amounts of residual oil on metal bond surfaces
- 40 minute room temperature gel time (180 grams)

Formula

<table>
<thead>
<tr>
<th>Material</th>
<th>Supplier</th>
<th>Pounds</th>
<th>Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part A</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPON Resin 828</td>
<td>Hexion</td>
<td>54.0</td>
<td>5.60</td>
</tr>
<tr>
<td>HELOXY Modifier 505</td>
<td>Hexion</td>
<td>6.0</td>
<td>0.70</td>
</tr>
<tr>
<td>ASP-101 (kaolin clay)</td>
<td>ENGELHARD Corp.</td>
<td>40.0</td>
<td>1.86</td>
</tr>
<tr>
<td><strong>Total A</strong></td>
<td></td>
<td>100.0</td>
<td>8.16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Supplier</th>
<th>Pounds</th>
<th>Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part B</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPIKURE Curing Agent 3125</td>
<td>Hexion</td>
<td>54.0</td>
<td>6.66</td>
</tr>
<tr>
<td>EPIKURE Curing Agent 3271</td>
<td>Hexion</td>
<td>4.5</td>
<td>0.52</td>
</tr>
<tr>
<td>Dyhard 100SF (dicyandiamide micronized)</td>
<td>Degussa Corp., Fine Chemicals</td>
<td>1.5</td>
<td>0.13</td>
</tr>
<tr>
<td>ASP-101 (kaolin clay)</td>
<td>ENGELHARD Corp.</td>
<td>16.0</td>
<td>0.75</td>
</tr>
<tr>
<td>Titanium Dioxide</td>
<td>DuPont</td>
<td>2.0</td>
<td>0.05</td>
</tr>
<tr>
<td>Cab-O-Sil M5 (fumed amorphous silica)</td>
<td>CABOT Corp.</td>
<td>1.0</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Total B</strong></td>
<td></td>
<td>79.0</td>
<td>8.16</td>
</tr>
</tbody>
</table>

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Mixing Instructions Part A

Combine the ASP-101 clay filler with the EPON Resin 828 and HELOXY Modifier 505 and mix using a high shear or planetary mixer until the filler is thoroughly dispersed.

Part B

Dissolve the dicyandiamide into the EPIKURE 3271 Curing Agent with heat and agitation.  
Add EPIKURE 3125 Curing Agent and blend until homogeneous.  Add ASP-101 and titanium dioxide, and disperse with a high shear or planetary mixer.  Add Cab-O-Sil and continue mixing until all fillers are thoroughly dispersed.  Package the converter portion in sealed metal, polyolefin plastic, or glass containers and store at normal room temperatures.

Typical Handling Table 1 / Handling Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin : Curing Agent mix ratio</td>
<td>by weight</td>
<td>100 : 80</td>
</tr>
<tr>
<td></td>
<td>by volume</td>
<td>1 : 1</td>
</tr>
<tr>
<td>Gel Time @ 77°F (180 grams)</td>
<td></td>
<td>40 minutes</td>
</tr>
<tr>
<td>Form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part A</td>
<td>Thixotropic paste</td>
<td></td>
</tr>
<tr>
<td>Part B</td>
<td>Thixotropic paste</td>
<td></td>
</tr>
<tr>
<td>Pounds per gallon</td>
<td></td>
<td>11.0</td>
</tr>
</tbody>
</table>

Application All surfaces to be bonded should be free of dirt, grease, oil or other contaminants to ensure maximum adhesion. Coat both substrates and press together. Contact pressure is sufficient to achieve maximum bond strength. When bonding surfaces which have not been etched, abraded or vapor degreased, apply adhesive to both surfaces and continue the coating process until the adhesive wets the substrates as indicated by “grab.” This coating action helps to displace the surface film of contamination.

Cure Schedule Room Temperature: 2-3 days @ 77°F. or Elevated Temperature: Adhesive can be heat cured to shorten cure time. Maximum cure temperature should not exceed 250°F.

Typical Cured State Table 2 / Adhesive Properties

<table>
<thead>
<tr>
<th>Test Property</th>
<th>ASTM</th>
<th>Tested at</th>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Shear</td>
<td>D-1002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alloy</td>
<td></td>
<td>67°F</td>
<td>psi</td>
<td>2000</td>
</tr>
<tr>
<td>Etched Aluminum</td>
<td></td>
<td>77°F</td>
<td>psi</td>
<td>2900</td>
</tr>
<tr>
<td>Cured 3 days @ 77°F</td>
<td></td>
<td>125°F</td>
<td>psi</td>
<td>1500</td>
</tr>
<tr>
<td>Cured 1 days @ 77°F</td>
<td></td>
<td>150°F</td>
<td>psi</td>
<td>890</td>
</tr>
<tr>
<td>Oil Treated Specimens¹</td>
<td></td>
<td>77°F</td>
<td>psi</td>
<td>2500</td>
</tr>
</tbody>
</table>

¹ Etched aluminum tensile shear specimens wiped with a cloth saturated with RPM Aviation Oil No. 2; adhesive

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Revision:
applied with spatula to both surfaces prior to joining and curing under contact pressure.

Storage
Recommendations regarding storage conditions can be obtained by visiting our web site at www.hexion.com.

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