## Developmental Resin Araldite® XU MY 722

A Very Low Viscosity Multifunctional Epoxy Resin

### General

Araldite® XU MY 722 is a new very low viscosity developmental tetrafunctional epoxy resin (8,000-12,000 cP at room temperature) which offers extremely good room temperature stability and excellent thermal/mechanical performance characteristics. The very low viscosity of XU MY 722 makes it suitable for epoxy prepreg and structural adhesives, as well as more automated manufacturing processes such as filament winding, reaction injection molding (RIM), and pultrusion.

### Applications

- Advanced composite structures
- High performance structural adhesives
- Filament winding
- Resin transfer molding
- Reaction injection molding
- Structural laminating
- Casting applications
- Tooling
- High performance coatings

### Advantages

- Low viscosity at room temperature
- Outstanding heat resistance and mechanical properties
- Excellent room temperature storage stability
- Ease of processing
- Flexibility in processing techniques
- Excellent chemical resistance

### Typical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Appearance</td>
<td>Clear orange liquid</td>
</tr>
<tr>
<td>Viscosity @ 25°C (77°F), cP</td>
<td>8,000-12,000</td>
</tr>
<tr>
<td>Epoxy value eq/100g</td>
<td>0.75-0.85</td>
</tr>
<tr>
<td>Pounds per gallon</td>
<td>9.8</td>
</tr>
</tbody>
</table>
**Formulation**

The final properties of Araldite XU MY 722 depend on the hardener and cure cycle selections.

**Caution:** Care should always be taken when working with multifunctional epoxy resins like XU MY 722. Excessive heat can cause violent exothermic reactions. When heating XU MY 722 in any large quantities over extended periods, 80°C (176°F) should be the upper temperature limit. Unfilled batches of significant quantity, i.e., more than 5 kg, should be carefully investigated by the user for possible exotherms. In all cases, hot spots should be avoided when heating. Special care should be exercised when accelerators are used to expedite cure. It is always a good practice to evaluate accelerators using small quantities of resin prior to actual use in a large mass of resin. XU MY 722 can be formulated with a variety of hardeners and accelerators.

A typical formulation of XU MY 722 with an aromatic diamine Hardener HT 976 is used to demonstrate performance characteristics of this resin.

<table>
<thead>
<tr>
<th>Component</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Araldite® XU MY 722</td>
<td>100 pbw</td>
</tr>
<tr>
<td>Hardener HT 976</td>
<td>50 pbw</td>
</tr>
</tbody>
</table>

The resin hardener ratio may be varied within the range of 100-80% of the stoichiometry without serious effect on performance characteristics. For given applications an optimization of this ratio is recommended.

**Mixing Procedure**

Carefully heat XU MY 722 to 140°C (284°F) and slowly stir in Hardener HT 976 until a clear mixture is obtained. Maintain a temperature of 140°C and degas the mixture for 15-30 minutes at 30 inches of mercury. This melt can be used immediately or stored under refrigeration for several months.
Cure Cycle

2 hrs. @ 180°C (356°F) + 2 hrs. @ 210°C (410°F)

Viscosity of XU MY 722/HT 976 mixture

Depending on the temperature and the time required to dissolve the hardener, the mix viscosity can vary. In laboratory test, the following data were obtained:

Araldite® XU MY 722, pbw 100
Hardener HT 976, pbw 50
Hot melt temperature, °C 140
Mix time, min. 15-30

Figure 1 on the following page compares viscosity of XU MY 722/HT 976 and MY 721/HT 976 systems at 100°C

Reactivity (XU MY 722/HT 976 100:50 pbw)

DSC T peak, °C 262
Gel time @ 150°C, minute >120,
    @ 177°C, minute 50

  * Can be accelerated if desired with conventional epoxy catalysts

<table>
<thead>
<tr>
<th>Cured Neat Resin</th>
<th>Mechanical Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25°C (77°F)</td>
</tr>
<tr>
<td>Tensile strength, psi</td>
<td>8,422</td>
</tr>
<tr>
<td>Tensile modulus, psi</td>
<td>605,000</td>
</tr>
<tr>
<td>Tensile elongation, %</td>
<td>1.6</td>
</tr>
<tr>
<td>Flexural strength, psi</td>
<td>18,050</td>
</tr>
<tr>
<td>Flexural modulus, psi</td>
<td>579,000</td>
</tr>
<tr>
<td>Tg, °C (TMA)</td>
<td>240</td>
</tr>
<tr>
<td>Water pick-up, %</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Other Formulation Examples:

Araldite® XU MY 722 can be formulated with various combinations of resins and hardeners to achieve a wide range of processing and performance characteristics.

Table 1 shows examples of use of bisphenol A, bisphenol F and multifunctional epoxy resins to achieve desired processing and performance.
### Table 1

Comparison of Properties for various mixtures of Araldite® XU MY 722/HT 976 (Curing Conditions: 4h/180°C)

<table>
<thead>
<tr>
<th>Resin System</th>
<th>Mix Ratio (pbw)</th>
<th>Gel times (min.)</th>
<th>DSC</th>
<th>TMA</th>
<th>Flex.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>240°C 210°C 180°C</td>
<td>Onset (°C)</td>
<td>Max. (°C)</td>
<td>Tg Max. (°C)</td>
</tr>
<tr>
<td>MY 721/HT 976</td>
<td>100:52</td>
<td>3.0 6.0 20.0</td>
<td>190</td>
<td>233</td>
<td>250</td>
</tr>
<tr>
<td>XU MY 722/HT 976</td>
<td>100:48</td>
<td>9.0 20.0 55.0</td>
<td>202</td>
<td>258</td>
<td>228</td>
</tr>
<tr>
<td>XU MY 722/GY 6010/HT 976</td>
<td>50:50:42</td>
<td>4.0 10.0 30.0</td>
<td>175</td>
<td>257</td>
<td>217</td>
</tr>
<tr>
<td>XU MY 722/GY 281/HT 976</td>
<td>50:50:40</td>
<td>5.0 14.0 35.0</td>
<td>175</td>
<td>257</td>
<td>203</td>
</tr>
<tr>
<td>XU MY 722/GY 281/HT 976</td>
<td>25:75:37</td>
<td>4.3 11.0 23.0</td>
<td>175</td>
<td>230</td>
<td>195</td>
</tr>
<tr>
<td>XU MY 722/MY 0510/HT 976</td>
<td>60:40:55</td>
<td>4.5 9.5 20.0</td>
<td>193</td>
<td>244</td>
<td>262</td>
</tr>
<tr>
<td>MY 722/MY 0510/HT 976</td>
<td>50:50:50:</td>
<td>3.1 6.5 18.0</td>
<td>186</td>
<td>237</td>
<td>244</td>
</tr>
</tbody>
</table>
Araldite® XU MY 772 is currently supplied in 15 lb. pails. The product has a minimum shelf life of one year when stored in unopened sealed containers at or below 40°F. Storage at higher temperatures may adversely affect properties.

**Packaging and Storage**

**Handling/Safety Precautions**

Read Material Safety Data Sheet for further information

**Important**

**Solely for Research and Development Use**

This research chemical is not currently included in the TSCA Chemical Substance Inventory. To be used only by, or directly under the supervision of a technically qualified individual. Health and environmental effects test data are limited or do not yet exist for this chemical. As with all industrial chemicals of unknown toxicity, use prudent laboratory practices when handling.

Avoid contact with eyes, skin or clothing.
Do not inhale.
Avoid breathing vapor, mist or spray.
Do not taste or swallow.
Use only with adequate ventilation.
Promptly remove wet contaminated clothing and wash before reuse.
Destroy contaminated shoes.
Wash thoroughly after handling.
Keep container closed when not in use.

Do not heat in bulk — Dangerous exothermic reaction may occur. Keep away from heat sources. do not cut or weld. Never use drum band heaters. Store at or below 40°F in sealed container. Storage at higher temperatures may adversely affect properties. maximum temperature this product should be subjected to while thawing for use should not exceed 190°F for not more than 12 hours. Heat or contact with other materials may cause an exothermic reaction and rapid decomposition.

**First Aid**

**In case of contact**

**Eyes:** Promptly flush with water for at least 15 minutes. Call a physician.

**Skin:** Promptly wash with mild soap and water.

**Inhalation:** Remove person to fresh air. Give oxygen if necessary.

**Ingestion:** If conscious, give water and get medical attention.

For Industrial Use Only
Important

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