

# Ara<sup>®</sup>Cool 1047 W 80 Epoxy Curing Agent

### **Modified Amine Hardener for Low Temperature Cure Systems**

Ara<sup>®</sup>Cool 1047 W 80 can be formulated using a variety of epoxy resins (i.e., liquid, semi-solid or solid epoxy resins in solution) for high solids, low temperature curing, anti-corrosion coatings for metals. These coating show excellent protection properties even on steel substrates having minimal surface profile, such as cold rolled steel. It can also be formulated using poly-functional epoxy resins, such as Araldite<sup>®</sup> EPN 1180 X 80, for coatings with improved chemical resistance. Ara<sup>®</sup>Cool 1047 W 80 is supplied as an 80% solids solution in n-butanol.

### **Applications**

- Low temperature curable anti-corrosion coatings for marine and maintenance
- Anti-corrosion coatings for minimally prepared steel substrates
- A multitude of general-purpose protective applications

### Features

- Does not contain benzyl alcohol, nonylphenol, phenol or bisphenol-A
- Low VOC systems with good adhesion on substrates with minimal surface profile
- Rapid hardness development even at 0 5°C
- No induction time needed
- Good blush resistance and water resistance
- Long recoat window, up to 4 weeks
- Adjustable mixing ratio for ease of formulating

### **Typical Properties\***

| Property                                     | Ara <sup>®</sup> Cool 1047 W 80 Epoxy Curing Agent |
|--|--|
| Visual Appearance                            | Clear, amber liquid                                |
| Color, Gardner, max.                         | 7  |
| H+ Active Equivalent Weight (g/eq.)          | 135 - 185  |
| Amine Value (mg KOH/g)                       | 255 - 285  |
| Viscosity at 25°C (cP)                       | 1800 - 2700  |
| Solids Content (% by wt.), solvent           | 80 ± 1, n-butanol                                  |
| Density at 25°C (g/cm <sup>3</sup> , lb/gal) | 1.02, 8.5  |
| Flash Point, Closed Cup (°C)                 | 35   |

\* Product data are based on Huntsman's test methods. Copies are available upon request.

### **Formulation Data**

Unless otherwise stated, the data were determined with typical production batches using standard test methods. They are typical values only, and do not constitute a product specification.

### **Clear Coating Formulation Data**

| Formulation  |               | Parts by weight |               |
|--|---------------|-----------------|---------------|
| Araldite <sup>®</sup> GY 250 Epoxy Resin           |               | 100             |               |
| Ara <sup>®</sup> Cool 1047 W 80 Epoxy Curing Agent |               | 99.5            |               |
| Coating Properties                                 | Test Method   | 23°C / 50% RH   | 5°C / 40% RH  |
| Pot life, 100g at 23°C / 50% RH                    | Tecam         | 18              | -             |
| Dust free / Through cure drying time (hr)          | Landolt       | 2 / 2.5         | 3 / 10        |
| Transparency after 24h                             | Visual        | OK              | OK            |
| Persoz Hardness, 1 / 2 / 7 days (s)                | ANSI/ISO 1522 | 181 / 182 / 195 | 35 / 65 / 175 |

#### Direct-to-Metal Anti-Corrosion Starter Formulation, MF-136

| Part A (Epoxy Resin)                | Pounds  | Gallons | Comments                   |
|-------------------------------------|---------|---------|----------------------------|
| Araldite <sup>®</sup> GZ 540 X 90   | 258.44  | 27.49   | Epoxy resin solution       |
| Araldite <sup>®</sup> GZ 7071 OX 65 | 139.16  | 15.81   | Solid epoxy resin solution |
| Disperbyk <sup>®</sup> 111          | 23.06   | 2.88    | Pigment dispersant         |
| Byk <sup>®</sup> 1752               | 3.98    | 0.62    | Defoamer                   |
| 2-Heptanone                         | 39.76   | 5.93    | MnAK Solvent               |
| n-Butanol                           | 35.78   | 5.28    | Solvent                    |
| Tioxide <sup>®</sup> TR93           | 159.04  | 4.77    | Titanium Dioxide           |
| Vansil <sup>®</sup> W-40            | 99.40   | 4.11    | Calcium Metasilicate       |
| Minex <sup>®</sup> 7                | 79.52   | 3.66    | Nepheline Syenite          |
| C-1000 <sup>™</sup> Mica            | 99.40   | 4.23    | Muscovite Mica             |
| Garamite <sup>®</sup> 1958          | 21.87   | 1.64    | Thixotrope                 |
| Xylenes                             | 12.92   | 1.80    | Solvent                    |
| Byk <sup>®</sup> A530               | 3.18    | 0.47    | Deaerator                  |
| Byk <sup>®</sup> 333                | 6.96    | 0.80    | Surface agent              |
| Byk <sup>®</sup> 361N               | 5.96    | 0.70    | Surface agent              |
| Total (Part A)                      | 988.43  | 80.22   |                            |
| Part B (Hardener)                   |         |         |                            |
| Ara <sup>®</sup> Cool 1047 W 80     | 139.19  | 16.77   | Epoxy curing agent         |
| Xylenes                             | 22.87   | 3.19    | Solvent                    |
| Total (Part B)                      | 162.06  | 19.96   |                            |
| Formulation Total                   | 1150.49 | 100.18  |                            |

# **Advanced Materials Technical Datasheet**

#### **Formulation Properties**

| Property  | MF-136   |
|---|--|
| Mix Ratio, A : B<br>- by volume<br>- by weight                              | 4.0 : 1<br>6.1 : 1   |
| Pot Life, 23°C, hr  | 1-1.5  |
| Solids Content, wt%   | 80.9   |
| Solids Content, vol%  | 68.5   |
| VOC, g/L  | 263.1  |
| PVC, %  | 28.8   |
| Suggested dilution for application by conventional air spray; volume solids | 23.5% mixed solvent <sup>1</sup> , by volume, of Pt. A;<br>57.8% NVV |

#### Coating Properties by Cure Condition (4 mil DFT; 7 day cure on cold rolled steel)

| Cure Condition                         | 22°C / 50% RH                     | 5°C / 70% RH | 0°C / 50% RH |
|--|-----------------------------------|--------------|--------------|
| Tack-free / Dry Through, hr            | Tack-free / Dry Through, hr 2 / 6 |              | 9 / 19       |
| Crosshatch Adhesion                    | 5B                                | 5B           | 5B           |
| Impact Resistance (D/R), in-lb         | 20 / 0                            | 40 / 2       | 50 / 2       |
| Gloss (60°), %                         | 76                                | 87           | 82           |
| Persoz Hardness, s                     | 119                               | 50           | 31           |
| Mandrel Bend, in                       | Fail 1"                           | Pass ½"      | Pass ½"      |
| Pull-Off Adhesion <sup>2</sup> , psi   |                                   |              |              |
| - cold rolled steel                    | 452                               | 410          | 452          |
| <ul> <li>grit-blasted steel</li> </ul> | 1656                              | 1599         | 1490         |

#### Recoat Window at 5°C (2 coats of MF-136; grit-blasted steel, Sa2.5)

| Recoat time | Pull-Off Adhesion <sup>2</sup> , psi | Failure Mode        |
|-------------|--------------------------------------|---------------------|
| 1 Week      | 1591                                 | Inter-coat adhesion |
| 2 Week      | 1608                                 | Inter-coat adhesion |
| 3 Week      | 1536                                 | Inter-coat adhesion |
| 4 Week      | 1475                                 | Inter-coat adhesion |

#### Corrosion Resistance by Cure Condition (ASTM B-117; Cold rolled steel and grit-blasted steel, Sa2.5, 4-5 mil DFT)

| Exposure<br>Period | Cure Condition | Substrate | Rust<br>Rating <sup>3</sup> | Blister<br>Rating⁴ | Scribe Rating <sup>5</sup> |
|--------------------|----------------|-----------|-----------------------------|--------------------|----------------------------|
| 2000 hr            | 22°C / 50% RH  | CRS       | 10                          | 2M                 | 10                         |
|                    |                | GBS       | 10                          | 6M                 | 5                          |
|                    | 5°C / 70% RH   | CRS       | 10                          | 4F                 | 10                         |
|                    |                | GBS       | 9                           | 4M                 | 9                          |
|                    | 0°C / 50% RH   | CRS       | 10                          | 2F                 | 9                          |
|                    |                | GBS       | 10                          | 4F                 | 6                          |

<sup>1</sup> Dilute Part A with 3.7:1:1 MnAK/Xylene/n-Butanol mixture, then add Part B

<sup>&</sup>lt;sup>2</sup> ASTM D4541

<sup>&</sup>lt;sup>3</sup>ASTM D610. 10=best

<sup>&</sup>lt;sup>4</sup> ASTM D0714. 10-best; VF=very few, F=few, M=medium, D=dense <sup>5</sup> ASTM D1654. 10=best

### Storage

Ara<sup>®</sup>Cool 1047 W 80 epoxy curing agent should be stored in a dry place, in its sealed original container, at temperatures between 2°C - 40°C (36°F - 104°F). Under these storage conditions the shelf life is 24 months from date of manufacture. The product should not be exposed to direct sunlight.

### **Precautionary Statement**

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#### First Aid!

Refer to SDS as mentioned above.

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