CURATIVES
OVERALL PORTFOLIO
Ethacure® 100, 100-LC, 270, 300, 420, 520, & 534
www.albemarle.com
Developed in the 1980s, ETHA-CURE® curatives are high purity, 100% active curatives that are easy to blend and handle without the use of costly heating steps. With a diverse portfolio of liquid curatives, decades of technical expertise, and a robust global supply chain, Albemarle is a reliable supplier of high quality products and solutions for even the most unique curative applications.

### Value in Polyurea Applications:
Ethacure 100 is the workhorse curative for polyurea and polyurethane applications, particularly spray applications. It is a high quality, liquid product that delivers exceptional product benefits such as:

- Adjustable reaction times
- Ease of processing
- Outstanding mechanical performance
- Zero dust exposure

Integrating Ethacure 100 in polyurea coating engineering equips formulators and end-users with increased versatility, adjustability, and dynamic performance advantages.

### Value in Epoxy Applications:
Ethacure 100 is a viable curative for use in epoxy applications and as an MDA replacement in the production of filament wound pipe. Cured parts display high-grade benefits such as:

- Good “wetting” characteristics
- High glass transition temperatures (Tgs)
- Exceptional chemical resistance
- Low moisture accumulation

#### Epoxy Formulation

| Epoxy Resin (WPE = 783 g/eq) | 100 |
| ETHACURE 100, phr. | 25.5 |

**Cure Cycle**
1.5 hrs. at 175 °C

**Physical Properties**

| Tensile Strength, Mpsi | 11.3 |
| Tensile Modulus, Mpsi. | 390 |
| Elongation, % | 6.3 |
| Flexural Modulus, Mpsi. | 390 |
| Tg,°C | 154 |

**Post Cure**
30 min. 250°C

**Tg, after post, °C**
188

#### Spray Polyurea Formulations

<table>
<thead>
<tr>
<th>Spray Polyurea Formulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDI prepolymer 15.5% NCO (has a high 2,4'-isomer content)</td>
</tr>
<tr>
<td>ETHACURE 100</td>
</tr>
<tr>
<td>ETHACURE 420</td>
</tr>
<tr>
<td>Polyether amine D-2000</td>
</tr>
<tr>
<td>Polyether amine T-5000</td>
</tr>
<tr>
<td>Pigment</td>
</tr>
<tr>
<td>UV absorber</td>
</tr>
<tr>
<td>Gel time, sec.</td>
</tr>
</tbody>
</table>

**Physical Properties**

| Tensile Strength, psi (Mpa) | 2420 (16.7) |
| Elongation, % | 455 |
| Tear Strength, pli (N/mm) | 382 (67) |

#### Gel Times for Ethacure 100 and Epoxy Resin (183 WPE) System

Gel times have been determined at different temperatures as guidance for our potential customers.
Ethacure 100 Applications

**Spray Polyurea Coatings**
- Truck Bed Liners
  - OEM
  - After market
- Water Proofing Membrane
  - Amusement park tanks
  - Bridges
  - Pipe coating
  - High speed rail
  - Concrete
- Secondary Containment
  - Oil and gas

**Epoxy Composites**
- Filament Wound EpoxyPipe
- Syntactic Foam
- Grinding Wheel
- Electrical Laminates

**Polyurethane Cast Elastomer**
- Wheels, Belts, Tools, Rollers

**PU Foam**
- Building Insulation, Roofing

**RIM**
- Vehicle Parts
Value in Low Color Applications:
Ethacure 100-LC is the lowest-colored aromatic diamine commonly available. Specialized production techniques and a proprietary, patented stabilizer system produce a curative with extremely low initial color and increased color stability.

Utilizing Ethacure 100-LC in formulations results in:
- Lower color in final parts
- Reduced pigment loading
- Easier color matching
- Increased shelf life in epoxy coatings, polyurethane, and polyurea spray coatings

Ethacure 100-LC Applications

**Polyurea Cast Elastomer**
- Optically Clear Wheels
- Ballistic-Proof Applications
- Optically Clear Eyeglasses
- Golf Balls
Value in Epoxy Applications:
Ethacure 270 curing agent is strategically formulated to provide longer, adjustable reaction times when cured with epoxy resins.

Polymers cured with Ethacure 270 deliver exceptional properties such as high temperature performance, substantial mechanical strength, and good chemical resistance.

These characteristics make it an excellent curative for fiber reinforced pipe and composites.

Concentration & Performance Optimization:
Optimum level for maximum temperature performance is 24.7 phr for resins with WPEs of 187 g/eq.

Ethacure 270 Applications

- Filament Wound Epoxy Pipe
- Advanced Composites for Aerospace Applications

Epoxy Composites
Value in Cast Elastomer Applications:

Ethacure 300 puts users in control. Incorporating this versatile, easy-to-handle liquid into operations results in immediate benefits:

- A safe alternative to MOCA
- High quality product with reduced odor
- Ability to mix and match prepolymers to fit needs
- Adjustable reaction times
- Elimination of dust exposure and melting
- Reduction in costly, inconvenient heating
- Simplified handling and blending
- Reduced exposure to hazardous materials

Exhibiting outstanding physical performance, Ethacure 300 cured polymers compete favorably with competitive alternatives, making it the leading alternative among MOCA replacements. Cured polymers display excellent strength, hardness, modulus, and elongation at break point.

Utilizing Ethacure 300 in cast elastomer applications allows formulators to fine-tune processing conditions and reaction times, giving users reassurance that they will be able to meet application specification requirements.

Formulation Examples & Performance in Cast Elastomer Applications

<table>
<thead>
<tr>
<th>Prepolymers Type</th>
<th>PTMEG</th>
<th>PTMEG</th>
<th>PPG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepolymer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curative</td>
<td>E300</td>
<td>E300</td>
<td>E300</td>
</tr>
</tbody>
</table>

Processing Data

<table>
<thead>
<tr>
<th></th>
<th>PTMEG</th>
<th>PTMEG</th>
<th>PPG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepolymer, % NCO</td>
<td>4.12</td>
<td>9.46</td>
<td>6.20</td>
</tr>
<tr>
<td>Prepolymer, temp., °C</td>
<td>80</td>
<td>80</td>
<td>50</td>
</tr>
<tr>
<td>Curative, phr.</td>
<td>10.0</td>
<td>22.9</td>
<td>15</td>
</tr>
<tr>
<td>Pour time, min</td>
<td>5.0</td>
<td>0.9</td>
<td>7.0</td>
</tr>
<tr>
<td>Gel time, min.</td>
<td>6.0</td>
<td>1.3</td>
<td>11</td>
</tr>
<tr>
<td>Post-cure, (hrs./100°C)</td>
<td>18</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Curative</td>
<td>E300</td>
<td>E300</td>
<td>E300</td>
</tr>
</tbody>
</table>

Polymer Properties

<table>
<thead>
<tr>
<th></th>
<th>PTMEG</th>
<th>PTMEG</th>
<th>PPG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardness, Shore A</td>
<td>88</td>
<td>--</td>
<td>94</td>
</tr>
<tr>
<td>Hardness, Shore D</td>
<td>--</td>
<td>73</td>
<td>--</td>
</tr>
<tr>
<td>Tensile, psi</td>
<td>5760</td>
<td>7560</td>
<td>4910</td>
</tr>
<tr>
<td>M-100 %, psi</td>
<td>1070</td>
<td>4600</td>
<td>1770</td>
</tr>
<tr>
<td>M-300 %, psi</td>
<td>2140</td>
<td>--</td>
<td>3240</td>
</tr>
<tr>
<td>Elongation</td>
<td>410</td>
<td>260</td>
<td>350</td>
</tr>
<tr>
<td>Die-C tear, pli</td>
<td>260</td>
<td>--</td>
<td>260</td>
</tr>
<tr>
<td>Split tear, pli</td>
<td>80</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>Compression set, %</td>
<td>31</td>
<td>--</td>
<td>34</td>
</tr>
<tr>
<td>Resilience, %</td>
<td>45</td>
<td>51</td>
<td>50</td>
</tr>
</tbody>
</table>
Ethacure 300 Applications

**Polyurethane Cast Elastomers (Hot)**
- Rollers
  - Computer printers
  - Copy machines
  - Boat trailers
- Belts
  - Drive belts
  - Conveyor belts
- Tires
- Wheels
- CMP Polishing Pads
- Golf Balls

**Polyurethane Cast Elastomers (Cold)**
- Athletic Surfaces
- Tire Fill
- Thermal Break

**Epoxy Composites (Cold)**
- Carbon Reinforced Composite for Aerospace Applications
Value in Polyurea Applications:
Ethacure 420 increases versatility for polyurea applicators. It is a liquid curative that boosts polymer performance, particularly in elasticity, surface finish, and adherence capabilities. Formulators can easily produce the soft elastomers needed for caulks and sealants while appreciating tailored reaction times, improved pot life, and enhanced property performance.

Ethacure 420 Applications

- Truck Bed Liners
- Water Proofing Membrane
- Secondary Containment
- Flooring Coatings

Polyurea/Polyurethane
- Sealants and Caulks

PU Foam
- Building Insulation and Roofing
Value in Polyurethane Coatings:
Ethacure 520 & 534 are liquid curing agents for polyurethane and polyurea coatings and elastomers. These easy-to-handle, aromatic diamine blends have favorable reactivity in a wide variety of prepolymers. Incorporating Ethacure 520 & 534 into operations results in a cured material with a long pot life and improved physical properties.

Ethacure 520 & 534 Applications

Polyurethane Coatings
- Two-Component Polyurethane Systems
- Roof Coatings

Technical Service and Support

Our Technical Service team is committed to offering best-in-class support to our customer networks throughout the development process. We make it a priority to add value for our customers by diligently identifying performance optimization strategies and solutions that best suit their individual needs. Our qualified team of professionals share decades of knowledge and experience to support a results-focused approach. We ensure our customers have what they need to create value-added solutions and overcome their most challenging issues.
Core Capabilities and Instrumentation

- Polyurethane Formulation & Testing
  - Starter formulations
  - Optimization strategies utilizing Design of Experiment (DOE)
- Mechanical Testing
  - Tensile, tear, elongation, hardness, compression set, resilience
- Thermal Testing
  - DSC, TGA, R-Value
- Cone Calorimetry
- Polyurea Spraying
- UV Weatherometer
Ethacure curatives are produced in world-class manufacturing facilities that are supported by experienced teams committed to producing the highest quality material. Our global capacity of Ethacure 100 (DETDA) and robust production capabilities across our product portfolio are unmatched, allowing us to be the reliable and sustainable supplier our customers deserve. Together with our customer networks, we are dedicated to supporting continuous innovation and creating solutions for the growing polyurethanes industry.
From Charlotte to Shanghai, Albemarle operates sites in many countries around the globe. Our team is comprised of over 5,400 dedicated employees spread across approximately 100 different countries. As a global supplier of specialty chemicals, we strive to benefit the world in which we all live. As a neighbor to the world, we feel it is our responsibility to address diverse social and environmental issues, and we are committed to making a positive contribution to society at large.

Curatives Manufacturing, Technical Service, and Business Sites:
Louisiana | Arkansas | Texas | North Carolina | Belgium | Brazil | China | Japan | Korea