Araldite®
Reliable bonding and void-filling solutions

Raising performance in aerospace industry
Driven by increasing demand for mobility, energy consumption efficiency, and concerns over climate change, a high priority is placed on developing aerospace as a key transport mode by promoting step-change innovations for aircraft manufacturers who serve commercial airlines and general aviation throughout the world.

Whilst the level of global business competition is high, aircraft manufacturers need solutions to help sustain their competitive edge and secure long-term growth. Production process improvement, innovation in design, weight savings, compliance to stringent aerospace safety standards, and low maintenance costs have become vital to success.

In this context, adhesives and syntactics can play an even greater role, providing well established solutions as well as more advanced and innovative developments for all kinds of bonding and void-filling applications.

The adhesives and syntactics serving worldwide aerospace industry for more than 70 years

**Araldite®**
**Epocast®**
**Epibond®**
**Uralane®**

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**Epocast®**
**Epibond®**
**Uralane®**

**Rely on us with confidence**

For more than 70 years, as a global provider, Huntsman Advanced Materials has developed innovative solutions and high performance materials for the fabrication, assembly and repair of interior and exterior aircraft components.

Huntsman’s versatile adhesives and syntactics are used by aircraft manufacturers who serve commercial airlines and general aviation throughout the world. Many of the epoxies and polyurethanes are flame retardant and exhibit the low flame, smoke and toxicity characteristics required to comply with regulations such as FAR 25.853 that govern materials used in large civil aircraft.

In our efforts to develop innovative solutions for the aerospace market, we strive to meet the high product standards set forth by the industry and federal regulations that govern the performance properties of materials used in aircraft, such as: strength, weight, toughness, flexibility, low coefficient of thermal expansion, high resistance to corrosion and fatigue, flame retardancy, halogen-free formulations, noise and vibrational damping.

**We deliver more than just products**

Our Research & Development team continuously experiment with new chemistries and technologies to fulfill today’s requirements, anticipate tomorrow’s needs and comply with ever more stringent health, safety and environmental regulations.

Our process control from raw material qualification to the delivery of finished products enables us to produce advanced materials known for their quality and reliability.

**Aircraft manufacturers’ specifications**

Our products are extensively qualified to meet aircraft manufacturers’ specifications and are used in every new airborne design in the airplane life cycle, from designers, formulators and prepreggers to part manufacturers in large civil aircrafts, helicopters, regional jets, aerospace engines, general aviation.
Syntactics for edge and void-filling

Araldite® and Epocast® epoxy syntactics, together with pre-cured Eposert® syntactics provide solutions for edge sealing, forming of honeycomb, metallic and plastic insert potting applications and for honeycomb reinforcement and repairs.

Honeycomb reinforcement

Reinforcement of sandwich composites where high loading is required can be made by two means. Epocast® products can be applied directly into the honeycomb or pre-cured and molded to the desired insert dimension. Huntsman also offers a unique range of pre-formed and cured inserts available under the Eposert® brand that can be installed rapidly in a honeycomb core before fasteners are added.

These low-density inserts are well suited to aircraft manufacturing techniques and repair applications for reinforcing composite floor panels, galley walls, bulkheads and lavatory cabinets. Epocast® solutions meet stringent requirements of numerous aircraft specifications.

Honeycomb edge sealing

Aircraft manufacturers and repair stations use these materials to build and refurbish cabin components such as overhead baggage bins, floor panels and lavatory cabinets as well as flight control surfaces, nacelles and landing gear doors. Huntsman edge sealing syntactics are produced in a range of densities to meet the handling and performance requirements of customers.

Suitable products for edge sealing include: Araldite® 1644-A/B ultra-low density syntactic, Epocast®1617-A/B and 1618-B/D low-density syntactics and Epocast® 9627-A/B and 1652-A/B medium density syntactics. Huntsman also supplies a one-component epoxy designated Epocast® 1610-A2 ultra-low density syntactic. The majority of Huntsman edge sealing materials are self-extinguishing and feature easy to apply viscosities, sag-resistance for use on vertical surfaces and high strength.

Insert potting or bonding

Medium and low-density grades of Epocast® epoxy syntactic and Uralane® polyurethane adhesive comprise the range of products for insert potting, providing a dependable reinforcement for honeycomb composite panels before inserting fasteners. Typical applications include composite floor panels, galley walls, bulkheads or lavatory cabinets.

The Epocast® syntactics range, particularly the fast curing and self-extinguishing Epocast® 1618- B/D, is relevant in the most conventional metal inserts applications.

Uralane® 5774-A/C, a two-component polyurethane adhesive, has been specifically developed to meet the new designs with thermoplastic inserts (e.g. polyamide-imide based inserts), where standard epoxy syntactics are inappropriate.

Adhesives for joining and bonding

Our extensively qualified Araldite®, Epibond® and Uralane® adhesives provide superior joining and bonding solutions for plastics, metals, composite materials and other substrates.

Epoxy adhesives

> Excellent adhesion to metals and thermoset composites
> High strength and high stiffness
> High creep resistance
> High fatigue resistance
> High temperature resistance
> Excellent chemical resistance and long-term durability

Polyurethane adhesives

> Excellent adhesion to most composite materials and plastics
> Good adhesion to metals
> Mechanical properties from rigid to flexible
> High fatigue resistance
> Good long-term durability
We value your challenge

By providing unique, certified or patented technologies, combined with high quality and reliability, our chemists and experts bring enhanced value to our customers, ensuring their success.

With innovation

Every day, all over the world, our Technical Competence centers engage in intensive research and development focusing on one goal - to deliver innovative solutions by working hand-in-hand with our business partners. Together through a continual exchange of ideas, supported by an experienced team of sales and technical specialists, we strive to deliver innovative and regulatory compliant (e.g. REACH compliant) solutions.

We track both new market expectations and changing regulations. Protection of the environment, as well as health and safety are paramount concerns, playing an integral part in our development projects.

With customer intimacy

We market a unique product portfolio and a broad range of forward-looking solutions for our customers. Customers and partners benefit from an advanced level of service in:

> product selection and quality
> product trials in-house and with customers
> customer seminars and trainings
> technical service and solution-providing

Partnership with our customers is more than simply «putting them first». It requires long-term commitment to forging close relationships that create synergies of knowledge, security and adaptability to create a successful, shared future.

With care

Sustainability is a fundamental part of our corporate and business strategy. We see a better world in which our innovations help reduce consumption of natural resources and improve the quality of life for people everywhere. We are identifying the long-term trends that affect our markets and looking to see how products and applications can play a part in supporting and providing solutions to the challenges those markets face.
1. Edge fill and close-out

Your needs
> Good impact & vibration resistance
> High protection against chemicals and moisture
> Low density
> Paintable

Our solutions
Araldite® 252 A/B
Araldite® 1644 A/B
Araldite® 1641 A/B
Epocast® 1614-A1
Epocast® 1614-A2
Epocast® 1633 A/B

2. Panel forming

Your needs
> Core splicing and strengthening of radii and corners
> Good environmental resistance
> Low density

Our solutions
CG 1305 A/B
Epocast® 1652 A/B
Epocast® 1656 A/B
Epocast® 89537 A/B

3. Panel and core reinforcement

Your needs
> Reinforce high stress areas in honeycomb structures
> Improve mechanical performance including compression resistance
> Fill voids
> Secure long shelf life of the composite parts

Our low density solutions
Araldite® 252 A/B
Araldite® 1644 A/B
Epocast® 1610-A2

Our high density solutions
Epocast® 1635 A/B
Epocast® 1636 A/B
Epocast® 927-1
Epocast® 1627-2

4. Insert potting

Your needs
> Easy to apply
> Fill voids
> Provide good vibration and shock resistance
> Good multimaterial compatibility

Our solutions
Epocast® 1618 D/B
Epocast® 1619 A/B
Epocast® 1626 A/B
CG 1305 A/B

5. Panel bonding

Your needs
> Enhance the fatigue resistance of the assemblies
> Good weathering resistance
> Allow assembly of dissimilar materials
> Non sagging
> Easy to mix

Our solutions
Araldite® 1570 FST A/B
Araldite® AW 4859 / HW 4859
Araldite® 2015
Araldite® AV 138M-1 / HV 998
Epibond® 100 A/C
Epibond® 8000 FR A/B

6. Component bonding

Your needs
> Assemble dissimilar substrates
> Sustainable and high performance assemblies
> Aesthetical design
> Ease of application

Our solutions
Araldite® 1570 FST A/B
Araldite® AW 4859 / HW 4859
Araldite® 2011
Araldite® 501 A/B
Uralane® 5774 A/C
Epibond® 1217 A/B

7. Repair

Your needs
> High strength and durable assemblies
> Room temperature curing
> Good weathering and chemical resistance
> Ease of use

Our solutions
Epocast® 1635 A/B
Epocast® 1511 A/B
Araldite® 501 A/B
Araldite® 2011

Non exclusive selection
Ask our experts for other solutions.
1. Edge fill and close-out
2. Panel forming
3. Panel / core reinforcement
4. Insert potting
5. Panel bonding
6. Component bonding
7. Repair
### Ultra low density

<table>
<thead>
<tr>
<th>Product designation</th>
<th>Work life</th>
<th>Curing class</th>
<th>Typical service temperature</th>
<th>Typical compressive strength</th>
<th>Density</th>
<th>Key characteristics / applications</th>
<th>Flame retardant properties</th>
<th>Packaging / Supply form</th>
<th>Available in</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Can be co-cured with composites, for insert potting, no mark-off.</td>
<td></td>
<td></td>
<td>EU US</td>
</tr>
<tr>
<td>One-component pre-mix syntaxics</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epocast® 1610-A2</td>
<td>30 days</td>
<td>120</td>
<td>90</td>
<td>15</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epocast® 1614-A1</td>
<td>8 h</td>
<td>120 - 180</td>
<td>180</td>
<td>100</td>
<td>0.75</td>
<td>Structural syntactic, high compression strength.</td>
<td></td>
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</tr>
<tr>
<td>Epocast® 1614-A2</td>
<td>24 h</td>
<td>120 - 180</td>
<td>180</td>
<td>110</td>
<td>0.75</td>
<td>Long shore life, high compression strength.</td>
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<tr>
<td>Two-component syntactics</td>
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<td></td>
</tr>
<tr>
<td>Araldite® 252 A/B</td>
<td>60</td>
<td>RT</td>
<td>70</td>
<td>35</td>
<td>0.65</td>
<td>Easily sandable, gap filling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Araldite® 1026 A/B</td>
<td>60</td>
<td>RT</td>
<td>70</td>
<td>-</td>
<td>0.65</td>
<td>Toughened, impact and vibration resistant.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Araldite® 1017 A/B</td>
<td>60 - 90</td>
<td>RT</td>
<td>70</td>
<td>40</td>
<td>0.70</td>
<td>Easy to handle, sealing for honeycomb structures, insert bonding, floor panel applications.</td>
<td></td>
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</tr>
<tr>
<td>Araldite® 1018 D/B</td>
<td>15</td>
<td>RT</td>
<td>90</td>
<td>35</td>
<td>0.70</td>
<td>Pumpable, quick-setting.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Araldite® 1019 A/B</td>
<td>20 - 50</td>
<td>RT</td>
<td>70</td>
<td>40</td>
<td>0.70</td>
<td>Porous, resistance to water, fungus and most aircraft fluids.</td>
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<tr>
<td>Araldite® 1033 A/B</td>
<td>2 - 5</td>
<td>RT</td>
<td>70</td>
<td>45</td>
<td>0.73</td>
<td>Easily extruded, non-flowing after application.</td>
<td></td>
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</tr>
</tbody>
</table>

* **Eposert** = Preformed, cured syntactic. Other Eposert® types can be made available on request. **ISO 604** I **CTE:** Coefficient of Thermal Expansion. I **RT:** Room Temperature = (23 ± 2)°C. I **Curing class**: 1) for RT curing class post-cure will improve performance.
## Medium density

<table>
<thead>
<tr>
<th>Product designation</th>
<th>Work life</th>
<th>Curing class</th>
<th>Typical service temperature</th>
<th>Typical compressive strength</th>
<th>Density</th>
<th>Key characteristics / applications</th>
<th>Packaging / Supply form</th>
<th>Available in</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG 1305 A/B</td>
<td>&gt; 60</td>
<td>RT</td>
<td>180</td>
<td>0.90</td>
<td></td>
<td>Poursable, good handling</td>
<td></td>
<td>EU US</td>
</tr>
<tr>
<td>Epocast® 1656 A/B</td>
<td>50 - 90</td>
<td>RT</td>
<td>120</td>
<td>0.80</td>
<td></td>
<td>Thick paste consistency</td>
<td></td>
<td>EU US</td>
</tr>
<tr>
<td>Epocast® 1652 A/B</td>
<td>30 - 60</td>
<td>RT</td>
<td>180</td>
<td>0.80</td>
<td></td>
<td>Low exotherm, core splicing, used in helicopter blades.</td>
<td></td>
<td>EU US</td>
</tr>
<tr>
<td>Epocast® 89537 A/B</td>
<td>70</td>
<td>RT</td>
<td>180</td>
<td>0.90</td>
<td></td>
<td>With glass fiber reinforcement, non sagging up to 12.5 mm.</td>
<td></td>
<td>EU US</td>
</tr>
<tr>
<td>Epocast® 938-A2</td>
<td>18 h</td>
<td></td>
<td>120 - 180</td>
<td>180</td>
<td>150</td>
<td>Structural syntactic designed for reinforcing honeycomb structures.</td>
<td>*</td>
<td>EU US</td>
</tr>
<tr>
<td>Epocast® 927-1</td>
<td>&gt; 24 h</td>
<td></td>
<td>120 - 180</td>
<td>180</td>
<td>125</td>
<td>Structural syntactic designed for reinforcing honeycomb structures.</td>
<td>*</td>
<td>EU US</td>
</tr>
<tr>
<td>Epocast® 1636 A/B</td>
<td>120</td>
<td>RT</td>
<td>180</td>
<td>1.72</td>
<td></td>
<td>Aluminum filled, easy to handle, machinable.</td>
<td>*</td>
<td>EU US</td>
</tr>
<tr>
<td>Epocast® 1635 A/B</td>
<td>&gt; 60</td>
<td>RT</td>
<td>180</td>
<td>1.80</td>
<td></td>
<td>Miss-drilled hole refiller, fatigue resistant.</td>
<td>*</td>
<td>EU US</td>
</tr>
</tbody>
</table>

## High density

<table>
<thead>
<tr>
<th>Product designation</th>
<th>Work life</th>
<th>Curing class</th>
<th>Typical service temperature</th>
<th>Typical compressive strength</th>
<th>Density</th>
<th>Key characteristics / applications</th>
<th>Packaging / Supply form</th>
<th>Available in</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG 1305 A/B</td>
<td>&gt; 60</td>
<td>RT</td>
<td>180</td>
<td>0.90</td>
<td></td>
<td>Poursable, good handling</td>
<td></td>
<td>EU US</td>
</tr>
<tr>
<td>Epocast® 938-A2</td>
<td>18 h</td>
<td></td>
<td>120 - 180</td>
<td>180</td>
<td>150</td>
<td>Structural syntactic designed for reinforcing honeycomb structures.</td>
<td>*</td>
<td>EU US</td>
</tr>
<tr>
<td>Epocast® 927-1</td>
<td>&gt; 24 h</td>
<td></td>
<td>120 - 180</td>
<td>180</td>
<td>125</td>
<td>Structural syntactic designed for reinforcing honeycomb structures.</td>
<td>*</td>
<td>EU US</td>
</tr>
<tr>
<td>Epocast® 1637-2</td>
<td>24 h</td>
<td></td>
<td>120 - 180</td>
<td>180</td>
<td>200</td>
<td>Low CTE.</td>
<td>*</td>
<td>EU US</td>
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</tbody>
</table>

### Notes:
- *ISO 164*
- **Eposert® = Preformed, cured syntactics. Other Eposert® types can be made available on request**
- *+* Depending on thawing method
- RT: Room Temperature = (23 ± 2°C)
- CTE: Coefficient of Thermal Expansion
- °C for RT curing class post-cure will improve performance
### Adhesives for aerospace industry

<table>
<thead>
<tr>
<th>Product designation</th>
<th>Mixed viscosity</th>
<th>Work life</th>
<th>Curing class 1)</th>
<th>Typical service temperature</th>
<th>Typical lap shear strength [Al/Al]</th>
<th>Key characteristics / applications</th>
<th>Packaging</th>
<th>Available in</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conditions</strong></td>
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<td></td>
<td>RT</td>
<td>RT</td>
<td>RT</td>
<td>RT</td>
<td>80°C</td>
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<tr>
<td><strong>Norms</strong></td>
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<td>ASTM D - 1502 or ISO 4002</td>
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<tr>
<td><strong>Use</strong></td>
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<td></td>
<td>RT</td>
<td>RT</td>
<td>RT</td>
<td>RT</td>
<td>80°C</td>
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</tr>
</tbody>
</table>

#### One-component epoxy adhesives

- **Araldite® 204**: 200, 120, 90, 15, 10. Foaming.  • • • •

#### Two-component epoxy adhesives

- **Araldite® 1570 FST A/B**: 300, 60. RT. 60, 15, 5. Self-extinguishing adhesive. (Far-Jar/co 25, ap. F, part 1 and 5).  • • • •
- **Araldite® 2011**: viscous liquid. 100. RT. 60, 25, 10. Tough.  • • •
- **Araldite® 2013**: paste. 65. RT. 60, 20, 5. Non sagging up to 5 mm.  • • •
- **Araldite® 2015**: non-sag paste. 35. RT. 80, 20, 10. Non sagging up to 10 mm, tough.  • • •
- **Araldite® 420 A/B**: viscous liquid. 60. RT. 70, 35, 5. Tough adhesive, good peel strength.  • • •
- **Araldite® 501 A/B**: viscous liquid. 4. 90. RT. 100, 15, 15. Low viscosity, temperature resistant system designed for repair of composite parts and Insert bonding.  • • •
- **Araldite® 4859 / HW 4859**: thixotropic. 100. 80. 140, 33, 20. Resistant to high temperature, high strength and toughness, designed for bonding of composite parts.  • • •
- **Araldite® 138M-1 / HV 908**: thixotropic. 35. RT. 120, 15, 15. Low out-gassing, gap-filling properties, high chemical resistance, good fatigue behavior.  • • •
- **Epibond® 1217 A/B**: paste. 4 - 8. RT. 55, 15, 3. Translucent, fast setting.  • • •
- **Epibond® 8543 C/B**: non-aug paste. 3. RT. 55, 15, 3. Fast setting, 1:1 mixing ratio.  • • •
- **Epibond® 1539 A/B**: paste. 120. RT. 65, 15, 5. High performance composite bonding.  • • •
- **Epibond® 1534 A/B**: 2. 120. RT. 65, 20, 5. Long work life, good properties in the presence of distilled water, salt water, JP-4, hydraulic fluids, etc.  • • •
- **Epibond® 1210 A/B**: soft paste. 50 - 75. RT. 55, 15, 2. Flexible bond line.  • • •
- **Epibond® 1544-1 A-82 /D**: semi-paste. 70. RT. not determined. 90, no data. Self-extinguishing, good chemical resistant, gap-filling properties.  • • •
- **Epibond® 155-1 A/B**: soft paste. 20 - 50. RT. 95, 20, 15. High compression resistance, wipe-on paste adhesive.  • • •
- **Epibond® 1559-1 A/B**: 65. 4 - 10. RT. 55, 20, 3. Quick set time, flame retardant epoxy paste.  • • •
- **Epibond® 1210 A/3681**: semi-paste. 35 - 60. RT. 150, 20, 15. Ideal for spacecraft applications with low out-gassing.  • • •
- **Epibond® 100 A/C**: thixotropic. 110. 90. 150, 35, 25. High temperature, long working time structural adhesive for composite bonding.  • • •
- **Epibond® 8000 FR A/B**: thixotropic. 55. RT. 80, 25, 10. Structural adhesive for interior applications, FR & FST meeting requirements of FAR 25.853.  • • •

#### Polyurethane adhesive

- **Uralane® 5774-A/C**: semi-paste. 15 - 25. RT. 80, 15, 10. High peel strength, impact resistant, flame retardant.  • • •

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1) for RT curing class post-cure will improve performance  |  RT: Room Temperature = (23 ± 2)°C
Huntsman Advanced Materials

Our Advanced Materials division is a leading global chemical solutions provider with a long heritage of pioneering technologically advanced epoxy, acrylic, phenolic and polyurethane-based polymer products.

Our capabilities in high-performance adhesives and composites, delivered by more than 1,600 associates, serve over 2,000 global customers with innovative, tailor-made solutions and more than 1,500 products which address global engineering challenges.

We operate synthesis, formulating and production facilities around the world