Araldite®
Reliable and comprehensive bonding solutions

Raising performance in automotive industry
Our mission: provide unique bonding technologies that create value for our customers

Whilst the level of global business competition in automotive is high, 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 safety and environmental standards, and low process costs have become vital to success.

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

Adhesives deliver long term performance and durability

Adhesive bonding enables the most efficient use of materials, maximising their long-term potential while optimising manufacturing methods with easy handling and processing.

Compared to mechanical joining, adhesive bonding allows the assembly of dissimilar substrates and higher weight loads to be carried while offering more uniform stress distribution across the entire bonded joint and superior fatigue resistance.

Adhesives facilitate the integrity and strength of materials as there are no holes, rivets or fastening elements to weaken the structure. Without any visible joining elements, nothing detracts from the aesthetics of the finished parts and greater lightweight design flexibility can be achieved.

Additionally, adhesives offer the potential to reduce costs in parts production through streamlined assembly processes and hence faster cycle times.

Therefore adhesives have become essential in manufacturing exterior and interior parts in order to deliver superior performance, durability, and aesthetic.

We deliver more than just products

Huntsman offers a wide range of high performance structural adhesives for automotive suppliers and repair shops who require high strength in their assemblies at reduced production process costs without compromising on safety requirements.

Our products help overcome a variety of challenges such as low emission, fast curing cycles with high initial green strength, durability under dynamic stress, impact resistance, and multi-substrate joining.

As a strategic partner to the automotive industry for many years, we tailor our products and services to the evolving needs of this market. Based on state-of-the-art epoxy, polyurethane, methyl methacrylate and phenolic technologies, our adhesives have specific characteristics that help end-users improve their manufacturing processes, secure long-term performance and safety of assemblies, and use materials that enable car lightweighting. This results in higher productivity rates, increased design freedoms and a better energy efficiency of the cars.

All our products are tested in-house in certified mechanical and electrical testing laboratories to ensure they provide the desired properties. Moreover Huntsman’s global manufacturing footprint, local technical support and commercial teams ensure close proximity with our customers.
**Strength in bonding**

The Araldite® adhesives range for automotive contains a selection of adhesives from the latest epoxy, polyurethane, methacrylate and phenolic technologies to meet the great majority of high-performance bonding applications.

### Araldite® adhesives range for automotive

From adhesives with long open times for large area applications to fast-curing adhesives for early removal from fixtures and rapid through-put, this range includes adhesives which are resistant to high temperature, water and chemicals. Liquid adhesives as well as thixotropic adhesives for gap-filling or vertical applications can be found in this range. Adhesives with highest strength can be selected from this range as well as tough and impact-resistant adhesives with a well-balanced combination of strength and flexibility and also elastic adhesives to cope with different thermal expansions when bonding larger structures of dissimilar materials.

Products from the Araldite® adhesives range for automotive are available in a variety of packaging including easy-to-use cartridges with static mixers and working packs for manual applications as well as hobbocks and drums for higher volume applications. The Araldite® adhesives range for automotive will continuously be updated to meet the newest demands of innovative design using the bonding technology.

### Epoxies

**1-C epoxy adhesives**
- Excellent adhesion to metals, thermoset and thermoplastic composites
- Outstanding lap shear strength and peel strength
- Very high impact resistance
- Excellent chemical resistance
- Easy processing

**2-C epoxy adhesives**
- Excellent adhesion to metals and thermoset composites
- High strength and high stiffness
- High creep resistance
- High temperature resistance
- Excellent chemical resistance
- Low shrinkage

### Methacrylates

**2-C methyl methacrylate adhesives**
- Excellent adhesion to metals and thermoset composites
- Good adhesion to metals
- Very high impact resistance
- Excellent chemical resistance
- Good long-term durability

**No-mix methyl methacrylate adhesives**
- Long open-time and rapid cure
- Good adhesion with minimum surface preparation
- High process flexibility
- Suitable for high production speed
- High toughness
- Good long-term durability

### Polyurethanes

**2-C polyurethane adhesive**
- Excellent adhesion to most thermoplastics and composite materials
- Good adhesion to metals
- Mechanical properties from rigid to flexible
- Good long-term durability
- Good combination of strength and flexibility

### Phenolics

**Phenolics**
- Excellent adhesion to metals and friction materials
- Outstanding temperature resistance
- Excellent chemical resistance
- Easy to apply
- Virtually infinite open time once applied
<table>
<thead>
<tr>
<th>Product designation</th>
<th>Structural / semi-structural assemblies</th>
<th>Exterior finishers / interior modules</th>
<th>Lights / headlamps</th>
<th>Brake / clutch bonding</th>
<th>Electronics</th>
<th>Filters</th>
<th>Repair / aftermarket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Araldite® 2011</td>
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<td>Agomet® F 300 A/B</td>
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<tr>
<td>Agomet® F 330 hardener lacquer</td>
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<td>Araldite® 71</td>
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</tr>
</tbody>
</table>

- **Recommended**  |  **Suitable**  |  **FRPMA, ASA, SAN**  |  **Housing**  |  **Non-exclusive selection - Ask our experts for other solutions.**
1 Structural / semi-structural assemblies
Door modules, composite shells, transmission shafts, structural modules

Your needs
> Improve the fatigue resistance of the metal assemblies
> Reduce the overall weight of the structure
> Prevent and reduce corrosion of metal
> Uniform stress distribution and larger stress bearing areas
> Very high fatigue, and thermal shock resistance
> Excellent moisture and chemical resistance
> Easy automation

Our solutions
Araldite® 2014-2
Araldite® 2015
Araldite® 2031
Araldite® 2052-1
Araldite® AW 4858 / HW 4858
Araldite® AW 4859 / HW 4859
Araldite® AV 4600

2 Exterior finishers / interior modules
Spoiler, door capping, side blade, exterior trim, seat, cockpit

Your needs
> Multimaterial assemblies
> Ease of application
> Toughness, shock resistance
> Aesthetical design
> Weathering resistance

Our solutions
Araldite® 2012
Araldite® 2015
Araldite® 2021-1
Araldite® 2047-1
Araldite® 2048-1
Agomet® F300 A/B
Araldite® AV 4600

3 Lights / headlamps
Headlights, brake lights, reflector housings

Your needs
> Multimaterial assemblies
> Good adhesion to glass, PC, acrylics and thermoplastics
> Minimal fogging
> Aesthetical design, transparent adhesives

Our solutions
Araldite® 2018
Araldite® 2021-1
Araldite® 2022-1
Araldite® 2026
Araldite® 2028-1

4 Brake / clutch
Brake shoes, brake pads, friction lining material for clutches, dip-coating

Your needs
> Very high temperature resistance
> Very good adhesion to friction material
> Very good adhesion to steel and aluminum

Our solutions
Araldite® 64-1
Araldite® 71

5 Electronics
Control units, climate controls, navigation systems

Your needs
> Multimaterial assemblies (copper, ferite, PCB …)
> Good thermal resistance
> Weathering resistance
> Electrical insulation
> Low outgassing
> Flame retardancy

Our solutions
Araldite® 2014-2
Araldite® 2033
Araldite® 2048-1
Araldite® AW 2101 / Hardener HW 2951

6 Filters
Hydraulic filters, oil filters, air filters

Your needs
> High chemical resistance
> High temperature resistance
> Self-leveling adhesives

Our solutions
Araldite® 2014-2
XD 4567 / XD 4568
Araldite® AW 4752 / HW 4753
XB 5090-1 / Arathane® HY 5611-1

7 Repair / aftermarket
Cracks repair, metal bonding, SMC bonding

Your needs
> Multimaterial assemblies
> Very good weathering resistance
> High fatigue and vibration resistance
> Easy to use packaging

Our solutions
Araldite® 2011
Araldite® 2013-1
Araldite® 2022-1
Araldite® 2029-1
Araldite® 2048-1
Araldite® AW 2101 / Hardener HW 2951

Non exclusive selection - Ask our experts for other solutions.
### Products for Automotive Industry

<table>
<thead>
<tr>
<th>Products</th>
<th>Technology</th>
<th>Mix ratio</th>
<th>Color</th>
<th>Pot life</th>
<th>Fixture time</th>
<th>Gap filling</th>
<th>Lap shear strength on aluminum**</th>
<th>Tensile modulus**</th>
<th>Elongation at break**</th>
<th>Key benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Araldite® 2011</td>
<td>Araldite® AW 105 / Hardener HV 95U</td>
<td>EP 100 : 100</td>
<td>pale yellow</td>
<td>100</td>
<td>400</td>
<td>1</td>
<td>200</td>
<td>1000</td>
<td>10</td>
<td>Multipurpose, medium viscosity, long open-time.</td>
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<tr>
<td>Araldite® 2012</td>
<td>Araldite® AW 2104 / Hardener HW 9334</td>
<td>EP 100 : 100</td>
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<td>6</td>
<td>20</td>
<td>0.5</td>
<td>18</td>
<td>2000</td>
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<td>Multipurpose, medium viscosity, fast cure.</td>
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<tr>
<td>Araldite® 2013-1</td>
<td>Araldite® AW 144-2 / Hardener HV 997-1</td>
<td>EP 100 : 100</td>
<td>grey</td>
<td>80</td>
<td>300</td>
<td>5</td>
<td>20</td>
<td>1400</td>
<td>2</td>
<td>Grey metal colored, non sagging paste, high toughness.</td>
</tr>
<tr>
<td>Araldite® 2014-1</td>
<td>Araldite® AW 130-1 / Hardener HW 5333-1</td>
<td>EP 100 : 50</td>
<td>dark grey</td>
<td>110</td>
<td>300</td>
<td>5</td>
<td>17</td>
<td>3000</td>
<td>1</td>
<td>Resistance to high temperature, excellent chemical resistance, room temperature cure.</td>
</tr>
<tr>
<td>Araldite® 2015</td>
<td>Araldite® AV 5308 / Hardener HV 5301-1</td>
<td>EP 100 : 100</td>
<td>beige</td>
<td>40</td>
<td>240</td>
<td>10</td>
<td>17</td>
<td>2000</td>
<td>5</td>
<td>High toughness, excellent weathering resistance, good temperature resistance.</td>
</tr>
<tr>
<td>Araldite® 2021-1</td>
<td>Araldite® AW 4070-1 BK / Hardener HW 5301-1 BK</td>
<td>EP 100 : 100</td>
<td>black</td>
<td>60</td>
<td>240</td>
<td>10</td>
<td>18</td>
<td>1000</td>
<td>1</td>
<td>High toughness, excellent weathering resistance, non sagging paste.</td>
</tr>
<tr>
<td>Araldite® 2022-1</td>
<td>Araldite® AW 2101 / Hardener HW 2951</td>
<td>EP 100 : 100</td>
<td>grey</td>
<td>6</td>
<td>60</td>
<td>5</td>
<td>20</td>
<td>500</td>
<td>1</td>
<td>Fast cure, non sagging paste, high strength, sandable.</td>
</tr>
<tr>
<td>Araldite® AW 4858 / Hardener HV 4858</td>
<td>Araldite® AW 4858 / Hardener HV 4858</td>
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<td>150</td>
<td>300</td>
<td>10</td>
<td>38</td>
<td>1800</td>
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<td>High lap shear strength, high peel strength, high toughness.</td>
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<tr>
<td>Araldite® AW 4859 / Hardener HV 4859</td>
<td>Araldite® AW 4859 / Hardener HV 4859</td>
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<td>100</td>
<td>270</td>
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<td>33</td>
<td>1500</td>
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<td>High temperature resistance, high peel strength, gap filling.</td>
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<tr>
<td>Araldite® 2033</td>
<td>Araldite® AV 4833 / Hardener HW 4833</td>
<td>EP 100 : 100</td>
<td>black</td>
<td>120</td>
<td>240</td>
<td>5</td>
<td>16</td>
<td>2000</td>
<td>1</td>
<td>Self extinguishing, UL 94-V0 (4.5 mm), gap filling, long open-time.</td>
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<tr>
<td>Araldite® AV 4600</td>
<td>Araldite® AV 4600</td>
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<td>n.a.</td>
<td>1 component epoxy</td>
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<td>40</td>
<td>420</td>
<td>5</td>
<td>16</td>
<td>500</td>
<td>1</td>
<td>Self levelling, fast gelling, outstanding chemical resistance.</td>
</tr>
<tr>
<td>XD 5030-1</td>
<td>Araldite® HY 5611-1</td>
<td>PU 100 : 25</td>
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<td>100</td>
<td>360</td>
<td>&lt;1</td>
<td>20</td>
<td>27</td>
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<td>Easy to spread, long profile, good environmental and chemical resistance.</td>
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<td>Araldite® AV 4446 / Hardener HY 4446</td>
<td>PU 100 : 100</td>
<td>opaque</td>
<td>40</td>
<td>240</td>
<td>1</td>
<td>7</td>
<td>15</td>
<td>45</td>
<td>UV stable, flexible, suitable for bonding thermoplastics.</td>
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<tr>
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<td>PU 100 : 100</td>
<td>crystal clear</td>
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<td>150</td>
<td>1</td>
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<td>Self levelling, fast gelling, outstanding chemical resistance.</td>
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<td>Transparent clear, UV stable, fast curing.</td>
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<td>PU 100 : 100</td>
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<td>550</td>
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<td>High elongation at break, high strength, non sagging paste.</td>
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<td>Very fast cure, high strength, high toughness.</td>
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<td>25</td>
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<td>Fast cure, high strength, high toughness.</td>
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<td>MMA 100 : 100</td>
<td>brown</td>
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<td>10</td>
<td>15</td>
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<td>850</td>
<td>30</td>
<td>Good adhesion on difficult to bond metals, fast cure, good flexibility.</td>
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<td>8</td>
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<td>350</td>
<td>90</td>
<td>High flexibility, gap filling, fast cure, low chlorine content.</td>
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<td>MMA 100 : 100</td>
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<td>20</td>
<td>3</td>
<td>24</td>
<td>1700</td>
<td>10</td>
<td>High temperature resistance, high strength, fast cure, toughened.</td>
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<td>Agomet® F 300 AB</td>
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<td>2</td>
<td>23</td>
<td>2300</td>
<td>7</td>
<td>&lt;No max&gt; system, very fast handling strength, high strength and toughness, medium viscosity.</td>
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<td>Agomet® 64-1</td>
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<td>n.a.</td>
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<td>n.a.</td>
<td>n.a.</td>
<td>&lt;0.5</td>
<td>8</td>
<td>n.a.</td>
<td>n.a.</td>
<td>Very high temperature resistance, &lt;infinite&gt; open time, suitable for use as an adhesive or dilution to primer viscosity.</td>
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<td>Agomet® 71</td>
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<td>8</td>
<td>n.a.</td>
<td>n.a.</td>
<td>Very high temperature resistance, &lt;infinite&gt; open time, extrudable.</td>
</tr>
</tbody>
</table>
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.
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.

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