Rolling stock adhesives selector guide

Reliable and comprehensive bonding solutions
We have a strong worldwide network working with regional development centers to support cross-national developments. Our regional headquarters allow us to act quickly, work flexibly, focus on local needs, and be cooperative. We work closely with suppliers and we network with market influencers to identify of the required technology of tomorrow. We look forward to offering you total solutions that fit your business.

We’re determined to not only understand your business and your interests, but also to embrace your vision, serve your needs, and solve your problems. We would like to partner with you and share knowledge in order to improve your productivity, maximize your returns, and help you succeed. We are the best choice of partners.

We will build a deep understanding of your needs so that we can use our knowledge to meet and exceed your expectations. We are passionate and committed to building lasting relationships of mutual benefit to sustain and progress towards a greener future.

Our people are from diverse backgrounds. They are curious and perseverant, enthusiastic and energetic, and continually seeking new technological and green solutions to create advanced materials for you.
High performance adhesives for rolling stock

Huntsman’s recognised expertise in research and development allows us to offer a uniquely wide range of innovative solutions for rolling stock. With one of the most trusted brands – Araldite®, bonding materials from different substrates is no longer an arduous problem.

Glorious history for over 60 years

1946 Araldite® adhesives launched into the market as the first epoxy resin product.
1955 The first toothpaste type DIY Araldite® adhesive was launched into the market.
1966 Araldite® adhesives were used for the construction of Sydney Opera House in Australia.
1977 Araldite® adhesives helped a rescue boat to complete a mission.
1983 Araldite® structural adhesives were used to bond key structure of TGV high speed train.
1995 Araldite® rapid adhesives launched to the market in a new small package.
1999 Araldite® adhesives were used in China’s aerospace engineering for its self-developed spaceship – “Shenzhou”, which was successfully launched and returned.
2002 Araldite® adhesives were used to build first Maglev train made in Germany for Shanghai Pudong line.
2004 Araldite® adhesives were chosen to be used on A380, the most advanced passenger plane at that time, for composite materials bonding.
2006 Araldite® adhesives were used for the bonding of Barcelona landmark – Torre Agbar’s circle roof.
2008 Araldite® epoxy adhesives were selected for the renovation and extension of Beijing Worker Stadium.

Reliable adhesives which meet stringent requirements

Provide reliability and efficiency in the production of mass transit vehicles, which can meet the stringent requirement of fire retardant regulation including BS 6853*, code of practice for the precautions in the design and construction of passenger carrying trains and DIN5510-2*, preventive fire protection in railway vehicles.

* Certain products have met the standards already while others are applying the tests.
Reliable and comprehensive bonding solutions for rolling stock

Sandwich panel laminating

**Bonding honeycomb/foam core** to metal panel

- Metal sandwich panel
- Honeycomb/foam core

**Bonding fire retardant wooden panel** to metal panel

- Fire retardant wooden panel
- Steel or Aluminum panel

**Bonding elastic rubber** to fire retardant wooden/metal panel

- Elastic rubber
- Metal or fire retardant wood

**Araldite® adhesive solutions**

- Araldite® AW 146/HV 957
- Araldite® AW 2105/XD 4419-1
- Araldite® XD 4495/XB 5304
- Araldite® AV 4854/HV 4854
- Araldite® 420 A/B

- Araldite® AW 146/HV 957
- Araldite® AW 2105/XD 4419-1
- Araldite® XD 4495/XB 5304

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- Araldite® AV 4854/HV 4854
Araldite® adhesive solutions

Araldite® 2015 • Araldite® AV / HV 4854 • Araldite® 2015-1 Black FR • Araldite® 2021 • Araldite® 2013 • Agomet® P79 A/B
1 Rail joint bonding
   Bonding applications
   • Metal to metal bonding
   Araldite® adhesive solutions
   Araldite® 2013
   Araldite® 2014-1
   Araldite® AV 138M-1 / HV 998

2 Outer door and inner door
   Bonding applications
   • Door fringe sealing
   • Metal parts bonding
   • Sandwich panel laminating
   • Sandwich panel assembly
   Araldite® adhesive solutions
   Araldite® 2015
   Araldite® AV 4854 / HV 4854
   Araldite® AW 146 / HV 957
   Araldite® 2027
   Agomet® P 79 A/B

3 Luggage carrier
   Bonding applications
   • Luggage metal parts setting
   • FR-wooden panel bonding
   Araldite® adhesive solutions
   Araldite® 2015
   Araldite® AV 4854 / HV 4854
   Agomet® P 79 A/B

4 Air pipeline
   Bonding applications
   • Aluminum panel with metal frame bonding
   • FRP air pipeline setting
   Araldite® adhesive solutions
   Araldite® 2011
   Araldite® 2015
   Araldite® 2027
   Araldite® AV 4854 / HV 4854

5 Air dam
   Bonding applications
   • Top FRP air dam with metal parts setting
   • Low FRP air dam with metal frame bonding
   Araldite® adhesive solutions
   Araldite® 2012
   Araldite® 2015
   Araldite® AV 4854 / HV 4854

6 Rolling stock's transformer bonding
   Bonding applications
   • Transformer sealing
   Araldite® adhesive solutions
   Araldite® 2013
   Araldite® 2014-1

7 Driving cabin
   Bonding applications
   • FRP cab bonding
   • Driving platform bonding
   Araldite® adhesive solutions
   Araldite® 2015
   Araldite® 2021
   Araldite® AV 4854 / HV 4854

8 Window
   Bonding applications
   • SMC window sheet bonding
   • SMC window with metal frame bonding
   • Window fringe sealing
   Araldite® adhesive solutions
   Araldite® 2015-1 Black FR
   Araldite® 2015
   Araldite® 2027
   Araldite® AV 4854 / HV 4854

9 Table and chair
   Bonding applications
   • Metal and SMC bonding
   • SMC and SMC bonding
   Araldite® adhesive solutions
   Araldite® 2015
   Araldite® AV 4854 / HV 4854
   Agomet® P 79 A/B

10 FRP, metal and wood made kitchen
    Bonding applications
    • Metal and SMC bonding
    • Metal and metal bonding
    • SMC and SMC bonding
    • Panel assembly
    Araldite® adhesive solutions
    Araldite® 2011
    Araldite® 2015
    Araldite® 2015-1 Black FR
    Araldite® AV 4854 / HV 4854
    Agomet® P 79 A/B
11 Sandwich panels bonding

**Bonding applications**
- Aluminum-honeycomb floor panel laminating
- Elastic rubber floor panel laminating
- Inner door FR-wooden panel laminating
- Metal parts setting in wall and door panel

**Araldite® adhesive solutions**
- Araldite® AW 146/HV 957
- Araldite® 2011
- Araldite® 2015
- Araldite® 2021
- Araldite® AW2105/XD 4419-1
- Araldite® XD 4495/XB 5304
- Araldite® AV 4854/HV 4854

12 FRP and metal toilet

**Bonding applications**
- FRP toilet shell with metal parts bonding
- Metal parts setting in washing platform
- SMC parts with metal bonding

**Araldite® adhesive solutions**
- Araldite® 2011
- Araldite® 2012
- Araldite® 2015
- Araldite® 2021
- Araldite® AV 4854/HV 4854

13 Maglev train panel bonding

**Bonding applications**
- Bonding sandwich structure panel on Maglev train body
- Bonding aluminum panel to core insulation foam

**Araldite® adhesive solutions**
- Araldite® 420 A/B
- Araldite® 2015
5 Air dam
6 Transformer
11 Sandwich panels
12 Toilet
## Sandwich panel laminating

### Chemical type
|---------------|----|-----|----|----|----|----|----|----|

### Fast curing
- - - - - - - -

### Gap filling
- - - - Yes Yes Yes

### Bonding materials
<table>
<thead>
<tr>
<th>Bonding materials</th>
<th>Metal</th>
<th>Plastics</th>
<th>Glass</th>
<th>Ceramics</th>
<th>Wood</th>
<th>SMC</th>
<th>GRP</th>
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### Key properties

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<th>Viscosity (25°C)</th>
<th>15 Pa.s</th>
<th>10 Pa.s</th>
<th>30-45 Pa.s</th>
<th>35-45 Pa.s</th>
<th>Thixotropy</th>
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<tr>
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<td>Blue</td>
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### Benefits and applications

#### Benefits
- Long pot life
- Good environmental resistance
- Can cure at ambient or elevated temperatures

#### Applications
- Panel laminating
- Panel laminating
- Panel laminating
- Panel laminating
- Panel assembly
- Panel assembly
- Panel assembly
- Panel assembly

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EP = Epoxy; PUR = Polyurethane; MMA = Methacrylate
- is excellent; ⫸ is good; ⫸ is moderate

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Reliable and comprehensive bonding solutions for rolling stock
## Parts bonding, sealing and assembly

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### Properties

- **Rapid curing**
- **High peel strength**
- **Suitable for service at up to 100°C**
- **Good shear strength**
- **Good thermal & moisture resistance**
- **Flow behavior**
- **Low volatile loss**
- **Excellent chemical resistance**
- **High temperature resistance**
- **Long working life**
- **Low shrinkage**
- **Good resistance to dynamic loading**
- **Fast curing**
- **Low shrinkage**
- **Tough & resilient**
- **Very resistant to water & a variety of chemicals**
- **Non Sagging up to 5mm thickness**
- **Toughened paste**
- **Ideal for GRP, SMC and dissimilar substrates**
- **Bond well to most thermoplastics**
- **Short assembly time**
- **Excellent gap fill & SMC bonding capability**

### Applications

- **Panel assembly**
- **FRP parts bonding**
- **Metal parts bonding**
- **Panel assembly**
- **Panel fringe sealing**
- **Metal parts bonding**
- **SMC parts bonding**
- **Rail joint bonding**
- **Metal parts bonding**
- **SMC parts bonding**
- **Rail joint bonding**
- **Metal parts bonding**
- **SMC parts bonding**

### Appearance

- **Pale yellow**
- **Blue grey**
- **Grey**
- **Pale yellow**
- **Pale yellow**
- **Grey**
- **Black**
- **Beige**

### Flow behavior

- **45 Pa.s**
- **100-140 Pa.s**
- **Thixotropic**
- **30-45 Pa.s**
- **25-35 Pa.s**

### Bonding applications

- **Panel assembly**
- **FRP parts bonding**
- **Metal parts bonding**
- **Panel assembly**
- **Panel fringe sealing**
- **Metal parts bonding**
- **SMC parts bonding**
- **Rail joint bonding**
- **Metal parts bonding**
- **SMC parts bonding**
- **Rail joint bonding**
- **Metal parts bonding**
- **SMC parts bonding**
We see a better world

We focus on developing products and solutions to solve new challenges, such as global demand for alternative energy. We enable our customers to be active in green technologies and introduce new eco-friendly processes as well as alternative materials to help reduce carbon footprint and preserve resources. By leveraging our core competencies, which include synthesis and formulation, testing and analysis, process manufacturing technology and technical service, we can develop sustainable products that benefit our customers, consumers and planet as a whole.

Huntsman Advanced Materials

We are a leading global supplier of synthetic and formulated polymer systems for customers requiring high-performance materials which outperform the properties, functionality and durability of traditional materials. Over 2200 associates at 13 locations worldwide, work to fulfill this promise day by day.

More than 9000 companies around the world use Huntsman Advanced Materials technologies in key markets such as adhesives and inks, aerospace, automotive, coatings, construction, electronics, medical, marine, power transmission and distribution, sports equipment and wind power generation.

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