Advanced Materials

HUNTSMAN



Araldite 2000

Structural Adhesives for the Marine Industry

Insights into three powerful ARALDITE® adhesives and their strengths for the marine industry

12/06/2020

MADE POSSIBLE

Reliable solutions for more flexibility in design and production

Structural components in the marine construction must be joined to one another while high **reliability** regarding **durability** and mechanical **stress resistance** of the connection is crucial.

Bonding offers a clear advantage over mechanical fixing and laminating taping in marine. But it is important to choose the right adhesive – one which offers the right balance of high **strength** and high **elongation**.

Huntsman has been developing and engineering **versatile**, **innovative** and **reliable** ARALDITE® solutions for **more than 70 years.** ARALDITE® adhesives for the marine industry focus on manufacturing **efficiencies** and **cost reduction**, while enabling unique **design** features, combining **robustness** for commercial vessels and low weight construction for race yacht programs.



Our powerful trio makes it possible to bond large parts, repair in humid conditions and be ready for high-end performance



ARALDITE® 2023
two-component acrylic adhesive

Extremely flexible for thick bond lines and heavy loads. Simple assembly of large, complex parts



ARALDITE® 2051
two-component acrylic adhesive

Fast repairing in cold & humid conditions. Reliable bond in automated assembly line



Araldite® 2015-1
two component epoxy adhesive

Dynamic loads resistant, high stiffness and high-end performance

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ARALDITE® 2023 adhesive

Extremely flexible for thick bond lines and heavy loads

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ARALDITE® 2023 adhesive combines the properties of high elongation and gap filling, which allows you to firmly join and seal large parts without sagging

MODULAR CURING

Available from 10 to 60 minutes for the right open / cure time ratio

HIGH GAP FILL

Compensates gaps up to 30 mm

FLEXIBLE

Compensates for the thermal expansion of different materials and dynamic loads

NON-SAG

Can be applied to complex geometry, vertical and overhead surfaces

UV STABLE

Maintains a bright gray color that will not yellow with age or sun exposure

LLOYD'S REGISTER

Lloyd's Register marine adhesive in process



Pack sizes (mix ratio 10:1): 380 ml coaxial cartridge / 480 ml side-by-side cartridge / 18 kg pails

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Deck-to-hull bonding with ARALDITE® 2023 adhesive

Fast and efficient parts bonding with long-term resistance to impact and fatigue.



- **The challenge**
  Deck-to-hull bonding requires high elongation and high E-modulus, combined with high-bond-thickness to compensate for large production tolerances.

- **The solution**
  Thanks to its high gap-filling capabilities and elongation of >100%, ARALDITE® 2023 adhesive compensates for production tolerances with no need for primer.

  With enhanced long distance pumpability, the bonding process is fast and efficient. The result is a durable bond that eliminates future maintenance and refitting needs.

Bonding internal partitions with ARALDITE® 2023 adhesive

Create a cleaner bond and reduce production time by up to 50%.



- **The challenge**
  Replace and seal internal lamination.

- **The solution**
  ARALDITE® 2023-30 adhesive is 100% non-sagging, meaning you can easily apply it to complex surfaces, both vertical and overhead. With no need to apply primer, the panel is pre-positioned and the adhesive is injected, acting as structural load carrier and sealant at the same time.

  The combination of primeless application and a one-step bonding process can speed up the process by up to 50% and result in a cleaner assembly compared to the traditional lamination process.

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ARALDITE® 2051 adhesive

Make fast repairs in cold and humid conditions

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ARALDITE® 2051 adhesive allows you to bond from 0°C to 40°C without sensitivity to humidity, enabling repair work in almost any conditions

FAST CURING

Speed up the cure process to save time without compromising on performance

AT ANY TEMPERATURE

Select the open time that is best suited to the operating temperature

EXCELLENT AGEING AND WEATHERING RESISTANCE

Suitable for very stringent service conditions including temperature changes and water exposure

UNDER ANY CONDITIONS

Bond in humid areas, even under saltwater

OUTSTANDING ADHESION

Bond to most substrates such as metals, composites and thermoplastics

VIRTUALLY NO SURFACE PREPARATION

Very high adhesion performance with minimum surface pre-treatment



Pack sizes (mix ratio 1:1): 50 ml cartridge / 380 ml cartridge / 18 kg pails

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Bonding and repair at sea with ARALDITE® 2051 adhesive

Bond fast and on-the-go in harsh and humid conditions and reduce asset downtime by up to 50%.



- **The challenge**
  Repair and finish small to medium-sized components after a ship has left the controlled conditions of the shipyard and is exposed to a wet, cold environment.

- **The solution**
  Packed in handy and safe cartridges, ARALDITE® 2051 adhesive is a valuable tool to keep onboard. This adhesive will help you speed up repairs and get back to operation quickly, reducing your downtime by up to 50%.

  With ARALDITE® 2051 adhesive, you can bond any kind of material outdoors – and even underwater. This non-sagging adhesive is easily applied vertically and overhead for both small fixes and major repairs.

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ARALDITE® 2015-1 adhesive

High dynamic load resistance, high stiffness, and high-end performance

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ARALDITE® 2015-1 adhesive is ideal for bonding dissimilar substrates, and is extremely resistant to weathering and dynamic loading

LONG POT LIFE

Suitable for large structures with an open time of up to 45 min at room temperature

TOUGHENED

Highly resistant to dynamic load, vibration and impact

EXCELLENT AGEING AND WEATHERING RESISTANCE

Suitable for very stringent service conditions including temperature changes and water exposure

NON-SAG

Can be applied to complex geometry, vertical and overhead surfaces

GAP FILL

Compensates gaps up to 10 mm

LLOYD'S REGISTER

Lloyd's Register marine adhesive since March 2020



Pack sizes (mix ratio 1:1): 50 ml cartridge / 200 ml cartridge / 380 ml cartridge / 2 kg working pack / 25 kg pail / 250 kg bulk

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Speedboat deck-to-hull bonding with ARALDITE® 2015-1 adhesive

Create strong bonds that are ready for high speeds.



- **The challenge**
  A primeless deck-to-hull adhesive was needed on an 8.5 m vinylester speedboat meeting Lloyd's Register specifications.

- **The solution**
  ARALDITE® 2015-1 adhesive withstands cruise speeds up to 99 km/h, making it an effective solution for speedboats. The long open time makes this adhesive a cost-effective bonding solution. Application via cartridges is possible, with no need to invest in a dosing unit.

  Additionally, we can help ensure your qualification by providing extensive testing. Our unique simulation capabilities predict outcomes with a 90% success rate, helping you minimize trial and error.

Summary: ARALDITE® adhesives for the marine industry

ARALDITE® 2023 adhesive

Extremely flexible for **thick bond lines** and the **heavy** load. Simple assembly of **large, complex** parts

Performance	Technology **2-component acrylic**
Pot life at RT **10 / 30 / 60** min	Fixture time at RT **40 / 70 / 100** min
Gap-filling **t̄ 30** mm	Resistance **Passes 500 hrs Atlas 500 W/m² accelerated sun test**
Qualification Lloyd's Register (pending for 2020)	
Tensile strength **22** MPa	Tensile modulus **800** MPa
Elongation at break **>100** %	

ARALDITE® 2051 adhesive

Fast **repairing** in warm, cold & **humid** conditions. Reliable bond in automated assembly line

Performance	Technology **2-component acrylic**
Pot life at RT **5** min	Fixture time at RT **15** min
Processing temperature* **0** to **40** °C	Maximum continuous operating temperature** **120** °C
Tensile strength **40** MPa	Tensile modulus **1 700** MPa
Elongation at break ca. **10** %	

ARALDITE® 2015-1 adhesive

Dynamic loads resistant, high **stiffness** and **high-end performance**

Performance	Technology **2-component epoxy**
Pot life at RT **45** min	Fixture time at RT **4** hrs
Qualification Lloyd's Register	Maximum continuous operating temperature** **100** °C
Tensile strength **31** MPa	Tensile modulus **1 600** MPa
Elongation at break ca. **4.2** %	

* Temperatures below 0°C or above 40°C will slow down or increase cure rate significantly.
** For the maximum continuous operating temperature, we consider the maximum temperature for which the residual Lap Shear Strength is 1/3 of the Lap Shear Strength at room temperature or the temperature for which the residual Lap Shear Strength is 5 MPa.

Huntsman supports with more than just high-quality products

ARALDITE® Adhesives for Marine



YOUR PARTNER

for bonding and the suitable composites. Supporting you with development capabilities to make your ideas possible.



Composite Resin Systems

Comprehensive offer for different processes and different esthetical and mechanical requirements

Development Capabilities

(1) SIMULATION to minimize trial and error
(2) PROCESSING support on-site
(3) TESTING facilities with results of a certified lab

Serving more than 1,200 customers in three regions

Americas
Los Angeles
McIntosh
Merrimack
East Lansing
The Woodlands
Taboão da Serra
Akron
Maple Shade

EMEAI
Duxford
Basel
Bergkamen
Bad Sackingen
Monthey
Pamplona

Asia Pacific
Panyu
Shanghai
Ho Chi Minh City
Hong Kong
Nanjing

▲ = Synthesis site
■ = Formulation site
● = Offices



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More information

Additional information, more products or technical data sheets are available.

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We make things possible

Huntsman Advanced Materials serves many of the world's leading businesses across virtually every industry.
We enable greater innovation, performance, and sustainability to address global engineering challenges and contribute towards a better quality of life.

With a legacy of over 70 years, we are committed to working with our customers to develop solutions enabling production process improvements, weight savings, and reduced maintenance costs.

Our team is here to talk about the challenges you're facing today in these uncertain times, or may be facing in the future when normal operations resume. To get in touch
or for more information, please contact us at **www.huntsman.com**

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