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## Product Data

# ARALDITE<sup>®</sup> 2013 A/B METAL-BONDING EPOXY ADHESIVE

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**DESCRIPTION:** Araldite 2013 A/B epoxy adhesive is a two-component, thixotropic system that cures at room-temperature. Once cured, the adhesive exhibits high strength and toughness as well as good environmental stability and chemical resistance.

Although it is primarily designed for metal bonding, Araldite 2013 A/B epoxy adhesive is also suitable for joining materials such as ceramics, glass, rubbers and rigid plastics.

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**APPLICATIONS:**

- Metals
- Ceramics
- Glass
- Vulcanized rubber

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**ADVANTAGES:**

- Metallic appearance
- Thixotropic
- Good environmental stability and chemical resistance
- Gap-filling, non-sagging up to 0.2 inch (5mm) thickness
- Bonds a wide variety of materials including metals, ceramics, Rubbers and rigid plastics

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TYPICAL PROPERTIES:	<u>Property</u>	<u>Test Method</u>	<u>Test Values<sup>(1)</sup></u>	
			<u>Resin</u>	<u>Hardener</u>
	Color/appearance	Visual	Gray soft paste	Beige soft paste
	Specific Gravity	ASTM D-792	1.40	0.90
	Viscosity (cP) @ 77°F (25°C)	ASTM D-2393	75,000	Thixotropic paste

TYPICAL MIXED PROPERTIES:	<u>Property</u>	<u>Test Method</u>	<u>Test Values<sup>(1)</sup></u>
			Reaction Ratio (by weight)
Reaction Ratio (by volume)	100R/100H		
Pot Life, minutes @ 77°F (25°C), 4 fl. oz. mass	ASTM D-2471	65	
Mixed viscosity (cP) @ 77°F (25°C)	ASTM D-2393	Thixotropic Paste	

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RECOMMENDED CURE SCHEDULES:	<u>Temperature</u>	<u>Handling Strength</u>	<u>Minimum Cure Time</u>
	50°F (10°C)	17 hours	27 hours
	59° (15°C)	10 hours	13 hours
	77°F (25°C)	4 hours	10 hours
	104°F (40°C)	90 minutes	2 hours
	140°F (60°C)	20 minutes	40 minutes
	212°F (100°C)	6 minutes	6 minutes

**TYPICAL CURED PROPERTIES:**

**Application of Adhesive**

The resin/hardener mix is applied with a spatula to the pretreated and dry joint surfaces.

A layer of adhesive 0.002 to 0.004-inches (0.05 to 0.10-mm) thick will normally impart the greatest lap shear strength to a joint.

The joint components should be assembled and clamped as soon as the adhesive has been applied. Even contact throughout suffices to ensure proper cure.

**Standard Test Specimens**

Unless otherwise stated, the figures given below were all determined by testing standard specimens made up by lap-jointing 4-inch x 1-inch x 0.06-inch (10-cm x 2.5-cm x 1.5-mm) strips of aluminum. The joint area was 0.5 x 1 inch (12.5 mm x 2.5 cm) in each case.

<u>Property</u>	<u>Test Method</u>	<u>Test Values<sup>(1)</sup></u>
Lap Shear Strength, psi (MPa)	DIN 53283	
<i>Effects of Cure time and temperature</i>		
<b>Cure Cycle</b>		
7 days @ 77°F (25°C)		3000 (20.6)
24 hours @ 77°F (25°C) + 30 min @ 176°F (80°C)		3200 (22)

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<b>Property</b>	<b>Test Method</b>	<b>Test Values<sup>(1)</sup></b>
Lap Shear Strength, psi (MPa)	DIN 53283	

**Effect of Test Temperature**

(Load applied 10 minutes after specimens reach test temperature.)

<b>Cure Cycle</b>	<b>Test Temp.</b>	
7 days @ 77°F (25°C)	-40°F (60°C)	2600 (17.9)
	-4°F (-20°C)	2700 (18.6)
	32°F (0°C)	2800 (19.3)
	68°F (20°C)	3000 (20.6)
	104°F (40°C)	3100 (21.3)
	140°F (60°C)	1200 (8.2)
	176°F (70°C)	700 (4.8)
	212°F (100°C)	500 (3.4)
20 min @ 212°F (100°C)	-40°F (60°C)	3100 (21.3)
	-4°F (-20°C)	3150 (21.7)
	32°F (0°C)	3200 (22)
	68°F (20°C)	3200 (22)
	104°F (40°C)	2800 (19.3)
	140°F (60°C)	1450 (10)
	176°F (70°C)	800 (5.5)
	212°F (100°C)	550 (3.8)

**Lap Shear Strength, psi (MPa)**

**Effect of Immersion**

(Cure cycle 16 hours @ 104°F (40°C). Immersion for 90 days in media listed.)

**Media**

Standard - As prepared	2600 (17.9)
IMS	1900 (13.1)
Gasoline	2500 (17.2)
Ethyl Acetate (30 days)	3000 (20.6)
Acetic Acid 10%	300 (2)
Xylene	2600 (17.9)
Lubricating Oil - HD30	3000 (20.6)
Paraffin	3000 (20.6)
Water @ 68°F (20°C)	1600 (11)
Water @ 194°F (90°C)	600 (4)

**Lap Shear Strength, psi (MPa)**

**Effect of Tropical Exposure**

(104° (40°C)/92% R.H.)

<b>Cure Cycle</b>	<b>Exposure Time</b>	
16 hrs @ 104°F (40°C)	0 days	2600 (17.9)
	30 days	2700 (18.6)
	60 days	2500 (17.2)
	90 days	2300 (15.8)

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<u>Property</u>	<u>Test Method</u>	<u>Test Values</u> <sup>(1)</sup>
Lap Shear Strength, psi (MPa) <i>Effect of Heat Aging</i> (Cured 16 hours @ 104°F (40°C).	DIN 53283	

<u>Age Temperature</u>	<u>Exposure Time</u>	
158 °F (70°C)	0 days	2600 (17.9)
	30 days	2900 (20)
	60 days	2400 (16.5)
	90 days	3000 (20.6)

Lap Shear Strength, psi (MPa)  
*Tested on Metal Substrates*  
(Cured 16 hours @ 104°F (40°C)

<u>Metal</u>	<u>Substrate Thickness (in./mm)</u>	
Carbon Steel	0.039/1.0	2100 (14.5)
Stainless Steel	0.039/1.0	3400 (23.4)
Galvanized Steel <sup>2</sup>	0.06/1.5	2000 (13.8)
Copper	0.06/1.5	2600 (17.9)
Brass	0.06/1.5	2600 (17.9)

Tg per DMA, °F (°C)	ISO 4578	149 (65)
Roller Peel Test, pli (N/mm)		23 (4)

## CAUTION:

Huntsman Advanced Materials Americas Inc. maintains up-to-date Material Safety Data Sheets (MSDS) on all of its products. These sheets contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products. Users should review the latest MSDS to determine possible health hazards and appropriate precautions to implement prior to using this material. Copies of the latest MSDS may be requested by calling our customer service group at 800-367-8793 or emailing your request to [adhesives\\_group@huntsman.com](mailto:adhesives_group@huntsman.com).

## FIRST AID!

Eyes and skin: Flush eyes with water for 15 minutes. Contact a physician if irritation persists. Wash skin thoroughly with soap and water. Remove and wash contaminated clothing before reuse.

Inhalation: Remove subject to fresh air.

Swallowing: Dilute by giving water to drink and contact a physician promptly. Never give anything to drink to an unconscious person.

## KEEP OUT OF REACH OF CHILDREN

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