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Advanced Materials

ARALDITE® 2014 A/B

(ARALDITE AW 139/HARDENER XB 5323)

HEAT/CHEMICAL-RESISTANT EPOXY ADHESIVE

Description

ARALDITE 2014 A/B epoxy adhesive is a two-component, thixotropic, room-temperature curing paste. It features high strength and toughness as well as good environmental stability and chemical resistance.

ARALDITE 2014 A/B epoxy adhesive is well suited for bonding electronic components, GRP structures, and other parts that may be exposed to elevated temperatures and/or aggressive environments.

Applications

ARALDITE 2014 A/B epoxy adhesive is suitable for bonding:

Metals
Ceramics
GRP
Electronic components

Advantages

Heat resistant to 248°F (120°C)
Withstands exposure to water and a wide variety of chemicals
Gap-filling, non-sagging up to 0.2 inch (5 mm) thickness
Bonds well to a wide variety of substrates

Typical Properties

Property	Test Method	Test Values[1] Resin	Test Values[1] Hardener
Color/appearance	Visual	Beige Paste	Gray Thixotropic Paste
Specific Gravity	ASTM D-792	1.60	1.60
Viscosity, cP @ 77°F (25°C)	ASTM D-2393	70,000	130,000

[1] Tested at 77ºF (25ºC)

Typical Mixed Properties

Property	Test Method	Test Values[1]
Reaction Ratio (by weight)		100R/50H
Reaction Ratio (by volume)		100R/50H
Pot Life, minutes @ 77°F (25°C), 4 fl. oz. mass	ASTM D-2471	40
Mixed viscosity, cP @ 77°F (25°C)	ASTM D-2393	90,000

[1] Tested at 77ºF (25ºC)

Recommended Cure Schedules

Temperature	Handling Strength	Minimum Cure Time
50ºF (10ºC)	16 hours	24 hours
59ºF (15ºC)	9 hours	11.5 hours
77ºF (25ºC)	3.5 hours	6 hours
104ºF (40ºC)	75 minutes	105 minutes
140ºF (60ºC)	26 minutes	30 minutes
212ºF (100ºC)	6 minutes	6 minutes

[1]Tested @ 77°F (25°C)

Processing

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.

Typical Physical Properties

Lap Shear Strength, psi (MPa) — **Test Method**: DIN 53283

Effect of Cure Time and Test Temperature

Cure Cycle	Test Values[1]
7 days @ 77ºF (25ºC)	2400 (16.5)
24 hrs. @ 77ºF (25ºC) + 30 min. @ 176ºF (80ºC)	2600 (17.9)

[1]Tested @ 77°F (25°C)

Lap Shear Strength, psi (MPa) — **Test Method**: DIN 53283

Effect of Test Temperature

Load applied 10 minutes after specimens reach test temperature.

Cure Cycle	Test Temp.	Test Values[1]
7 days @ 77ºF (25ºC)	-40ºF (-40ºC)	1900 (13.1)
	-4ºF (-20ºC)	2000 (13.8)
	68ºF (20ºC)	2400 (16.5)
	104ºF (40ºC)	2900 (20)
	140ºF (60ºC)	2500 (17.2)
	176ºF (80ºC)	2400 (16.5)
	212ºF (100ºC)	1900 (13.1)
	248° F (120ºC)	1300 (8.9)
	284° F (140ºC)	800 (5.5)
24 hrs @ 77ºF (25ºC) + 30 min @ 176°F (80°C)	-40ºF (-40ºC)	2400 (16.5)
	-4ºF (-20ºC)	2500 (17.2)
	68ºF (20ºC)	2600 (17.9)
	104ºF (40ºC)	2500 (17.2)
	140ºF (60ºC)	3000 (20.6)
	176ºF (80ºC)	2600 (17.9)
	212ºF (100ºC)	2100 (14.5)
	248° F (120ºC)	1400 (9.6)
	284° F (140ºC)	900 ((6.2)

Typical Physical Properties continued

Lap Shear Strength, psi (MPa)
Effect of Immersion
Cure cycle 16 hours @ 104ºF (40ºC). Immersion for 90 days in media listed.

Media	Test Values [1]
Standard - As prepared	2700 (18.6)
IMS	2750 (18.9)
Gasoline	3200 (22)
Ethyl Acetate (30 days)	3300 (22.7)
Acetic Acid 10%	2300 (15.8)
Xylene	2650 (18.2)
Lubricating Oil - HD30	2300 (15.8)
Paraffin	2600 (17.9)
Water @ 68°F (20°C)	2750 (18.9)
@ 194°F (90°C)	2000 (13.8)

Lap Shear Strength, psi (MPa)
Effect of Tropical Exposure
(104ºF/40ºC/92% R.H.)

Cure Cycle	Exposure Time	Test Values
16 hrs @ 104ºF (40ºC)	0 days	2700 (18.6)
	30 days	3050 (21)
	60 days	3100 (21.3)
	90 days	2900 (20)

Lap Shear Strength, psi (MPa)
Effect of Heat Aging
Cured 16 hours @ 104°F (40°C).

Test Method: DIN 53283

Aging Temperature	Exposure Time	Test Values
158 ºF (70ºC)	0 days	2700 (18.6)
	30 days	2800 (19.3)
	60 days	2600 (17.9)
	90 days	3000 (20.6)

Typical Physical Properties continued

Lap Shear Strength, psi (MPa)
Tested on Metal Substrates
Cured 16 hours @ 104ºF (40ºC)

Metal	Substrate Thickness (in./mm)	Test Values
Carbon Steel	0.039/1.0	2500 (17.2)
Stainless Steel	0.039/1.0	3200 (22)
Galvanized Steel[1]	0.06/1.5	1300 (8.9)
Copper	0.06/1.5	2300 (15.8)
Brass	0.06/1.5	2300 (15.8)

[1]Surface degreased only, not roughened.

Property	Test Method	Test Values
Tg per DMA, °F (°C)	ASTM D-4065	230 (110)
Roller Peel Test, pli (N/mm)	ISO 4578	17 (3)

Electrical Properties	Test Values
Dielectric Strength, volt/mil	450
Volume Resistivity, ohms-cm	6.1 E+15
Dielectric Constant, at 1KHz	1.0
Loss Tangent, % at 1KHz	3.9

Storage and Shelf Life

ARALDITE epoxy adhesive components should be stored in their original, sealed containers at room temperature. When stored at temperatures from 59-77°F (15-25°C), the resin and hardener will remain in useable condition for 12 months from date of shipping from Huntsman.

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 888-564-9318 or emailing your request to adhesives@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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