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Advanced Materials

ARALDITE® 2012 A/B

(ARALDITE AW 2104/Hardener HW 2934)

RAPID, MULTI-PURPOSE EPOXY ADHESIVE

Description

ARALDITE 2012 A/B epoxy adhesive is a two-component, multi-purpose system that cures fast at room-temperature. It features high strength and toughness and is suitable for bonding a wide variety of substrates including metals, ceramics, glass, rubbers and rigid plastics. ARALDITE 2012 A/B epoxy adhesive is a versatile material designed for use by craftsmen as well as for industrial/aerospace applications. It is qualified to ABR 2-1086.

Applications

ARALDITE 2012 A/B epoxy adhesive is suitable for bonding:

Metals
Ceramics
Glass
Wood
Vulcanized rubber
Plastics

Advantages

High shear and peel strengths
Tough and resilient
Rapid curing
Bonds well to a wide range of substrates

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Typical Properties

Property	Test Method	Test Values[1] Resin	Hardener
Color/appearance	Visual	Opaque Viscous Liquid	Light Yellow Paste
Specific Gravity	ASTM D-792	1.17	1.17
Viscosity, cP @ 77°F (25°C)	ASTM D-2393	35,000	30,000

Typical Mixed Properties

Property	Test Method	Test Values[1]
Reaction Ratio (by weight)		100R/100H
Reaction Ratio (by volume)		100R/100H
Pot Life, minutes @ 77°F (25°C), 4 fl. oz. mass	ASTM D-2471	4
Mixed viscosity, cP @ 77°F (25°C)	ASTM D-2393	30,000

[1]Tested @ 77°F (25°C)

Recommended Cure Schedules

Temperature	Handling Strength	Minimum Cure Time
50ºF (10ºC)	35 minutes	2 hours
59ºF (15ºC)	20 minutes	70 minutes
77ºF (25ºC)	20 minutes	60 minutes
104ºF (40ºC)	5 minutes	25 minutes
140ºF (60ºC)	2 minutes	10 minutes
212ºF (100ºC)	1 minute	2 minutes

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

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

Effect of Cure Time and Test Temperature

Cure Cycle	Test Values[1]
7 days @ 77ºF (25ºC)	2600 (17.9)
24 hours @ 77ºF (25ºC) + 30 minutes @ 176ºF (80ºC)	5000 (34.4)

[1]Tested @ 77°F (25°C)

Cure Cycle	Test Temp.	Test Values[1]
7 days @ 77ºF (25ºC)	68ºF (20ºC)	2100 (14)
	140ºF (60ºC)	525 (3.6)
	212ºF (100ºC)	275 (1.9)
24 hours @ 77ºF (25ºC) + 30 minutes @ 176ºF (80ºC)	68ºF (20ºC)	3650 (25)
	140ºF (60ºC)	1330 (9.1)
	212ºF (100ºC)	450 (3.1)

[1]Tested @ 77°F (25°C)

Lap Shear Strength, psi (MPa)

Effects 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)	1600 (11)
	-4ºF (-20ºC)	1500 (10)
	32ºF (0ºC)	1500 (10)
	68ºF (20ºC)	2400 (16.5)
	104ºF (40ºC)	2700 (18.6)
	140ºF (60ºC)	1100 (7.6)
	176ºF (80ºC)	500 (3.4)
24 hours @ 77ºF (25ºC) + 30 min. @ 176ºF 80ºC)	-40ºF (-40ºC)	3500 (24)
	-4ºF (-20ºC)	3600 (24.8)
	32ºF (0ºC)	3900 (26.8)
	68ºF (20ºC)	5000 (34.4)
	104ºF (40ºC)	4300 (29.6)
	140ºF (60ºC)	2000 (13.7)
	176ºF (80ºC)	800 (5.5)

Typical Physical Properties

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

Properties	Test Values [1]
Standard - As prepared	2700 (18.6)
IMS	2000 (13.7)
Gasoline	2400 (16.5)
Ethyl Acetate (30 days)	2000 (13.7)
Acetic Acid 10%	2200 ((15.1)
Xylene	2500 (17.2)
Lubricating Oil - HD30	2400 (16.5)
Paraffin	2300 (15.8)
Water @ 68°F (20°C)	200 (1.4)
Water @ 194°F (90°C)	800 (5.5)

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

Cure Cycle	Exposure Time	Test Values [1]
16 hrs @ 104ºF (40ºC)	0 days	2700 (18.6)
	30 days	3500 (24.1)
	60 days	3000 ((20.6)
	90 days	2400 (16.5)

Lap Shear Strength, psi (MPa)
Effect of Heat Aging
Cured 16 hours @ 104ºF (40ºC).

Aging Temperature	Exposure Time	Test Values
158ºF (70ºC)	Standard-as prepared	2700 (18.6)
	30 days	5000 (34.4)
	60 days	4800 (33.1)
	90 days	5000 (34.4)

Lap Shear Strength, psi (MPa)
Tested on Metal Substrates
(Cured 20 min @ 212ºF (100ºC)

Metal	Substrate Thickness (in./mm)	Test Values
Carbon Steel	0.039/1.0	3000 (20.6)
Stainless Steel	0.039/1.0	4000 (27.5)
Galvanized Steel[2]	0.6/1.5	1800 (12.4)
Copper	0.6/1.5	2800 (19.3)
Brass	0.6/1.5	3100 (21.3)

[2]Surface degreased only; not roughened

Typical Physical Properties

Electrical Properties	Test Values
Thermal Conductivity, W/mK	0.22
Surface Resistivity, ohms	1.5 E+15
Dielectric Strength, volt/mil	425
Volume Resistivity, ohms-cm	5.7 E+14
Dielectric Constant, at 50Hz/1KHz/10KHz	4.4/4.4/4.3
Loss Tangent, % at 50Hz/1KHz/10KHz	0.8/0.7/1.0

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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