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Product Data

ARALDITE[®] AW 106 Resin Hardener HV 953U MULTI-PURPOSE EPOXY ADHESIVE

DESCRIPTION: Araldite AW 106 resin/Hardener HV 953U epoxy adhesive is a multi-purpose, viscous material that is suitable for bonding a variety of materials including metal, ceramic, and wood. The electrically insulating adhesive is easy to apply either manually by spatula and stiff brush or mechanically with meter/mix and coating equipment. Araldite AW 106 resin/Hardener HV 953U epoxy adhesive cures at temperatures from 68°F (20°C) to 356°F (180°C) with no release of volatile constituents.

APPLICATIONS:

- Metal
- Ceramics
- Wood
- Vulcanized Rubber
- Foams
- Plastics

ADVANTAGES:

- Long open time
- High shear and peel strength
- Easy to apply
- Good resistance to static and dynamic loads
- Electrically insulating

TYPICAL PROPERTIES:	<u>Property</u>	<u>Test Method</u>	<u>Test Values⁽¹⁾</u>	
			<u>Resin</u>	<u>Hardener</u>
	Color/appearance	Visual	Creamy, viscous/liquid	Amber Liquid
	Specific Gravity	ASTM D-792	1.17	0.92
	Viscosity (cP) @ 77°F (25°C)	ASTM D-2393	50,000	35,000

TYPICAL MIXED PROPERTIES:	<u>Property</u>	<u>Test Method</u>	<u>Test Values⁽¹⁾</u>
			Reaction Ratio (by weight)
Reaction Ratio (by volume)	100R/100H		
Pot Life, hours @ 77°F (25°C) (4.fl. oz. mass)	ASTM D-2471	2	
Mixed viscosity (cP) @ 77°F (25°C)	ASTM D-2393	45,000	

¹Tested @ 77°F (25°C)

RECOMMENDED CURE SCHEDULES:	<u>Temperature</u>	<u>Handling Strength</u>	<u>Minimum Cure Time</u>
	68°F (20°C)	12 hours	15 hours
77°F(25°C)	7 hours	12 hours	
104°F (40°C)	2 hours	3 hours	
158°F (70°C)	30 minutes	50 minutes	
212°F (100°C)	6 minutes	10 minutes	
302°F (150°C)	4 minutes	5 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</u>⁽¹⁾
Lap Shear Strength, psi (MPa)	ASTM D-1002	
<i>Effects of cure time and temperature</i>		

<u>Cure Temperature</u>	<u>Time</u>	
77°F (25°C)	8 hours	710 (4.9)
	15 hours	1990 (13.7)
	24 hours	2130 (14.7)
	72 hours	2280 (15.7)
	5 days	2560 (17.6)
158°F (70°C)	1 hour	3130 (21.5)
	2 hours	3410 (23.5)
	3 hours	3200 (22)
212°F (100°C)	10 minutes	3700 (25.5)
	20 minutes	3980 (27.4)
	30 minutes	4120 (28.4)
302°F (150°C)	5 minutes	4270 (29.4)
	10 minutes	4410 (30.4)
	20 minutes	4410 (30.4)

<u>Property</u>	<u>Test Method</u>
Lap Shear Strength, psi (MPa)	ASTM D-1002
<i>Effect of Test Temperature</i>	
(Load applied 10 minutes after specimens reach test temperature.)	

<u>Cure Cycle</u>	<u>Test Temp.</u>	
5 days @ 77°F (25°C)	-76°F (-60°C)	2840 (19.5)
	-4°F (-20°C)	2840 (19.5)
	68°F (20°C)	2560 (17.6)
	104°F (40°C)	1420 (9.8)
	140°F (60°C)	570 (3.9)
20 min @ 212°F (100°C)	-76°F (-60°C)	3560 (24.5)
	-4°F (-20°C)	3410 (23.5)
	68°F (20°C)	3980 (27.4)
	104°F (40°C)	1990 (13.7)
	140°F (60°C)	1000 (6.9)

¹Tested @ 77°F (25°C)

Property

Lap Shear Strength, psi (MPa)

Effect of Immersion

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

<u>Media</u>	<u>Test Values</u>⁽¹⁾
Standard - As prepared	2560 (17.6)
Acetone (30 days)	570 (3.9)
Acetylene	430 (2.9)
Gasoline	2410 (16.6)
Ethyl Acetate (30 days)	570 (3.9)
Acetic Acid 10%	Degraded
Methanol	Degraded
Lubricating Oil - HD30	2560 (17.6)
Kerosene	Degraded
Trichloroethylene	Degraded
Water @ 68°F (20°C)	1420 (9.8)
Water @ 194°F (90°C)	430 (2.9)

Lap Shear Strength, psi (MPa)

Effect of Tropical Exposure

(104°F/40°C at 92% R.H.)

<u>Cure Cycle</u>	<u>Exposure Time</u>	<u>Test Values</u>⁽¹⁾
16 hrs @ 104°F (40°C)	0 days	2560 (17.6)
	10 days	2560 (17.6)
	30 days	1710 (11.8)
	60 days	1560 (10.7)
	90 days	570 (3.9)
20 min @ 212°F (100°C)	0 days	3980 (27.4)
	10 days	2560 (17.6)
	30 days	1710 (11.8)
	60 days	1560 (10.7)
	90 days	1280 (8.8)

¹Tested @ 77°F (25°C)

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

Test Method
 ASTM D-1002

<u>Aging Temperature</u>	<u>Exposure Time</u>	<u>Test Values⁽¹⁾</u>
68°F (20°C)	0 days	2560 (17.6)
	1 years	2560 (17.6)
	2 years	2280 (15.7)
	3 years	1710 (11.8)
	4 years	1990 (13.7)
	5 year	1990 (13.7)
140°F (60°C)	3 days	2560 (17.6)
	10 days	2420 (16.6)
	30 days	2130 (14.7)
176°F (80°C)	3 days	2130 (14.7)
	10 days	2130 (14.7)
	30 days	2130 (14.7)
	60 days	2130 (14.7)
	1 year	1280 (8.8)
	2 years	710 (4.9)
	3 years	710 (4.9)
	4 years	430 (2.9)
	5 years	280 (1.9)
	248°F (120°C)	3 days
10 days		2280 (15.7)
30 days		2280 (15.7)
60 days		2130 (14.7)

Property
Lap Shear Strength, psi (MPa)
Tested on Metal Substrates
 (Cured 20 min @ 212°F (100°C))

<u>Metal</u>	<u>Substrate Thickness</u> <u>(in./mm)</u>	<u>Test Values⁽¹⁾</u>
Carbon Steel	0.039/1.0	3840 (26.4)
Stainless Steel	0.039/1.0	3270 (22.5)
Galvanized Steel ²	0.06/1.5	1990 (13.7)
Copper	0.06/ 1.5	3270 (22.5)
Brass	0.06/ 1.5	2990 (20.6)

¹Tested @ 77°F (25°C)

²Surface degreased only, not roughened.

Property**Fatigue Strength**

Tested using a load frequency of 90 Hz and a 1 inch (25 mm) joint overlap
(Cured 20 min @ 212°F (100°C))

Fatigue Limit Load

<u>% Static Shear Strength</u>	<u>Cycles to Failure⁽¹⁾</u>
50	10 ³ -10 ⁴
40	10 ⁴ -10 ⁵
30	10 ⁵ -10 ⁶
25	10 ⁵ -10 ⁶
20	10 ⁶ -10 ⁷
15	10 ⁷

Property**Test Method****Test Values⁽¹⁾**

Ultimate Tensile Strength, psi (MPa)	ASTM D-638	4800 (33)
Elongation, %	ASTM D-638	9
Tg per DMA, °F (°C)	ASTM D-4065	146 (63)
Hardness, Shore D	ASTM D-2240	80
Coefficient of Thermal Expansion (in/in/°C)	ASTM E-831	8.5 x 10 ⁻⁵
Roller Peel Test, pli (N/mm)	ISO 4578	28 (4.9)

¹Tested @ 77°F (25°C)

Electrical Properties

Thermal Conductivity, W/mK	0.22
Surface Resistivity, ohms	1.2 E+16
Dielectric Strength, volt/mil	400
Volume Resistivity, ohms-cm	7.1 E+14
Dielectric Constant, at 50Hz/1KHz/10KHz	3.4/3.2/3.2
Loss Tangent, % at 50Hz/1KHz/10KHz	1.7/1.8/2.6

**STORAGE/
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 800-367-8793 or emailing your request to 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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