

Advanced Materials

Araldite® 2014 Structural Adhesive

Structural Adhesives

**Araldite® 2014
Two component epoxy paste adhesive**

Key properties

- Grey paste
- High temperature and chemical resistance
- Low shrinkage
- Very resistant to water and a variety of chemicals
- Gap filling, non sagging up to 0.197 in (5 mm) thickness

Description

Araldite® 2014 structural adhesive is a two component, room temperature curing, thixotropic paste adhesive of high strength with good environmental and excellent chemical resistance. Used for bonding of metals, electronic components, GRP structures and many other items where a higher than normal temperature or more aggressive environment is to be encountered in service. The low out gassing makes this product suitable for specialist electronic telecommunication and aerospace applications.

Product data

Property	2014/A	2014/B	2014 (mixed)
Color (visual)	beige paste	grey paste	grey paste
Specific gravity	ca. 1.6	ca. 1.6	ca. 1.6
Viscosity at 77°F (cP)	ca. 100,000	thixotropic	thixotropic
Pot Life (100 gm at 77°F)	-	-	~ 40 minutes
Shelf life (36°F-104°F)	3 years	3 years	-

Processing

Pretreatment

The strength and durability of a bonded joint are dependant on proper treatment of the surfaces to be bonded. At the very least, joint surfaces should be cleaned with a good degreasing agent such as acetone or other proprietary degreasing agents in order to remove all traces of oil, grease and dirt. Low grade alcohol, gasoline, or paint thinners should never be used. The strongest and most durable joints are obtained by either mechanically abrading or chemically etching ("pickling") the degreased surfaces. Abrading should be followed by a second degreasing treatment.

Mix ratio	Parts by weight	Parts by volume
Araldite 2014/A adhesive	100	100
Araldite 2014/B adhesive	50	50

Araldite 2014 structural adhesive is available in cartridges incorporating mixers and can be applied as ready to use adhesive with the aid of the tool recommended by Huntsman Advanced Materials.

Application of adhesive

The resin/hardener mix may be applied manually or robotically to the pretreated and dry joint surfaces. Huntsman's technical support group can assist the user in the selection of a suitable application method as well as suggest a variety of reputable companies that manufacture and service adhesive dispensing equipment.

A layer of adhesive 0.002 to 0.004 in (0.05 to 0.10 mm) thick will normally impart the greatest lap shear strength to the joint. Huntsman stresses that proper adhesive joint design is also critical for a durable bond. The joint components should be assembled and secured in a fixed position as soon as the adhesive has been applied.

For more detailed explanations regarding surface preparation and pretreatment, adhesive joint design, and the dual syringe dispensing system, visit www.araldite2000plus.com.

Equipment maintenance

All tools should be cleaned with hot water and soap before adhesives residues have had time to cure. The removal of cured residues is a difficult and time-consuming operation.

If solvents such as acetone are used for cleaning, operatives should take the appropriate precautions and, in addition, avoid skin and eye contact.

Times to minimum shear strength

Temperature	°F	50	59	73	104	140	212
Cure time to reach	hours	14	8	3	-	-	-
LSS > 145 psi (1MPa)	minutes	-	-	-	60	15	3
Cure time to reach	hours	20	11	5	-	-	-
LSS > 1450 psi (10MPa)	minutes	-	-	-	80	20	4

LSS = Lap shear strength.

Typical cured properties

Unless otherwise stated, the figures given below were all determined by testing standard specimens made by lap-jointing 4.5 x 1 x 0.063 in (114 x 25 x 1.6 mm) strips of aluminum alloy. The joint area was 0.5 x 1 in (12.5 x 25 mm) in each case. The figures were determined with typical production batches using standard testing methods. They are provided solely as technical information and do not constitute a product specification.

Average lap shear strengths of typical metal-to-metal joints (ISO 4587)

Cured for 16 hours at 104°F(40°C) and tested at 73°F (23°C); Pretreatment - Sand blasting

Substrate	psi
Aluminum	2762
Steel 37/11	2487
Stainless steel V4A	3149
Galvanized steel	1321
Copper	2358
Brass	2347

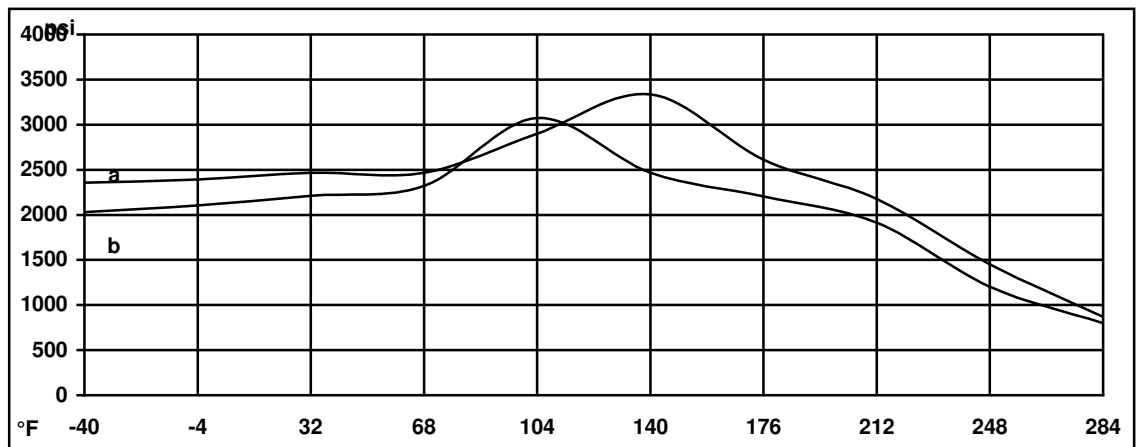
Average lap shear strengths of typical plastic-to-plastic joints (ISO 4587)

Cured for 16 hours at 104°F (40°C) and tested at 73°F (23°C). Pretreatment - Lightly abrade and alcohol degrease.

Substrate	psi
GRP	1247
CFRP	1944
SMC	1204
ABS	450
PVC	421
PMMA	218
Polycarbonate	435
Polyamides	363

Lap shear strength versus temperature (ISO 4587) (typical average values)

Cure: (a) = 7 days / 73°F (23°C); (b) = 24 hours / 73°F (23°C) + 30 minutes / 176°F (80°C)



Roller peel test (ISO 4578)

Cured: 16 hours / 104°F (40°C)

17 pli (3.0 N/m)

Glass transition temperature (DSC)

Cure: 24 hours at 73°F (23°C) plus 1 hour at 176°F (80°C):

ca. 185°F (85°C)

Shear modulus (DIN 53445)

Cure: 16 hours / 104°F (40°C)

122°F (50°C) - 174,045 psi (1.2 GPa)

167°F (75°C) - 58,015 psi (400 Mpa)

212°F (100°C) - 26,107 psi (180 Mpa)

257°F (125°C) - 2,901 psi (20 Mpa)

E - modulus (ISO R527) at 73°F (23°C)

580,151 psi (4 Gpa)

Flexural Properties (ISO 178) Cure 16 hours/ 104°F (40°C) Cure 1 day / 73°F (23°C) + 30mins / 176°F (80°C) tested at 73°F (23°C)

Flexural Strength

8,847 psi (61 Mpa)

Flexural Modulus

631,475 psi (4355 MPa)

Tensile strength (ISO R527) at 73°F (23°C)

3,773 psi (26 Mpa)

Elongation at break

0.7%

Lap shear strength versus immersion in various media (typical average values)

Unless otherwise stated, L.S.S. was determined after immersion for 90 days at 73°F (23°C)

Cure: 16 hour / 104°F (40°C)

	30 days	60 days	90 days
	psi		
As-made value			2764
IMS	222	513	2799
Gasoline	560	1213	3191
Ethyl acetate	2321	2611	3336
Acetic acid, 10%	793	1691	2321
Xylene	1492	1971	2741
Lubricating oil	2176	2031	2357
Paraffin	2321	3336	2756
Water at 73°F			2450
Water at 140°F	3549	2889	2812
Water at 194°F	1015	2715	2094

Lap shear strength versus tropical weathering

(40/92, DIN 50015; typical average values)

Cure: 16 hours / 104°F (40°C) Test: at 73°F (23°C)

	psi
As made value	2708
After 30 days	3078
After 60 days	3191
After 90 days	2901

Lap shear strength versus heat aging

Cure: 16 hours / 104°F (40°C)

	psi
As-made value	2712
30 days / 158°F	2843
60 days / 158°F	2654
90 days / 158°F	3017

Storage

Araldite 2014A and Araldite 2014/B adhesives may be stored for up to three years at room temperature provided the components are stored in sealed containers. The expiry date is indicated on the label.

**Handling
precautions****Caution**

To protect against any potential health risks presented by our products, the use of proper personal protective equipment (PPE) is recommended. Eye and skin protection is normally advised. Respiratory protection may be needed if mechanical ventilation is not available or is insufficient to remove vapors. For detailed PPE recommendations and exposure control options consult the product MSDS or a Huntsman EHS representative.

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