



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/Tecam gel timer) | - | - | Approx 80 minutes |

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 |



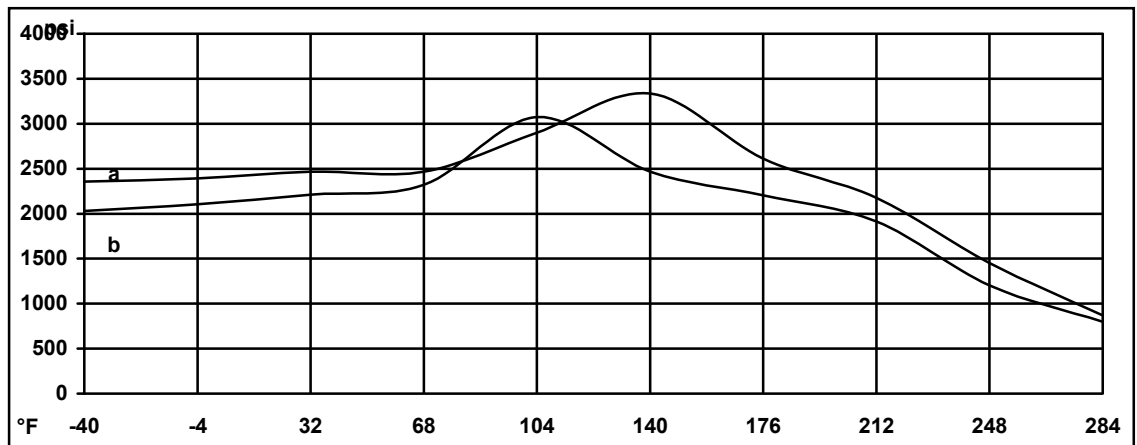
Average lap shear strengths of typical plastic-to-plastic joints (ISO 4587)

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 should be stored in a dry place, in the sealed original container, at temperatures between +2°C and +40°C (+36°F and 104°F). Under these storage conditions, the shelf life is 3 years. The product should not be exposed to direct sunlight.

If stored below 60°F, the adhesive should be brought to 60°F – 77°F and conditioned at this temperature for some time prior to use.

Precautionary Statement

Huntsman Advanced Materials Americas LLC 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.

First Aid!

Refer to MSDS as mentioned above.

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