

Advanced Materials**Araldite® 2015 Structural Adhesive**

Structural Adhesives

Araldite® 2015**Two component epoxy paste adhesive****Key properties**

- **Toughened paste**
- **Ideal for bonding GRP, SMC and dissimilar substrates**
- **Low shrinkage**
- **Gap filling, non sagging up to 0.394 in (10 mm) thickness**
- **High shear and peel strength**

Description

Araldite 2015 structural adhesive is a two component, room temperature curing paste adhesive giving a resilient bond. It is thixotropic and non-sagging up to 0.394 (10 mm) thickness. It is particularly suitable for SMC and GRP bonding.

Product data

Property	2015 A	2015 B	Mixed Adhesive
Color (visual)	neutral paste	neutral paste	neutral paste
Specific gravity	1.4	1.4	1.4
Viscosity at 77°F (cP)	thixotropic	thixotropic	thixotropic
Pot Life (100 gm at 77°F)	-	-	30 - 40 mins

Processing**Pretreatment**

The strength and durability of a bonded joint are dependent 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, iso-propanol (for plastics) 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 2015/A adhesive	100	100
Araldite 2015/B adhesive	100	100

Araldite 2015 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	12	7.5	4	1	-	-
LSS > 145 psi (1MPa)	minutes	-	-	-	-	17	6
Cure time to reach	hours	21	13	6	2	-	-
LSS > 1450 psi (10MPa)	minutes	-	-	-	-	35	7

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	2408
Steel 37/11	2886
Stainless steel V4A	2640
Galvanized steel	1566
Copper	2872
Brass	3075

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	1334
CFRP	2074
SMC	1015
ABS	580
PVC	580
PMMA	334
Polycarbonate	435
Polyamides	276

Tensile strength at 73°F (23°C) (ISO 527)

4,351 psi (30 Mpa)

Tensile modulus

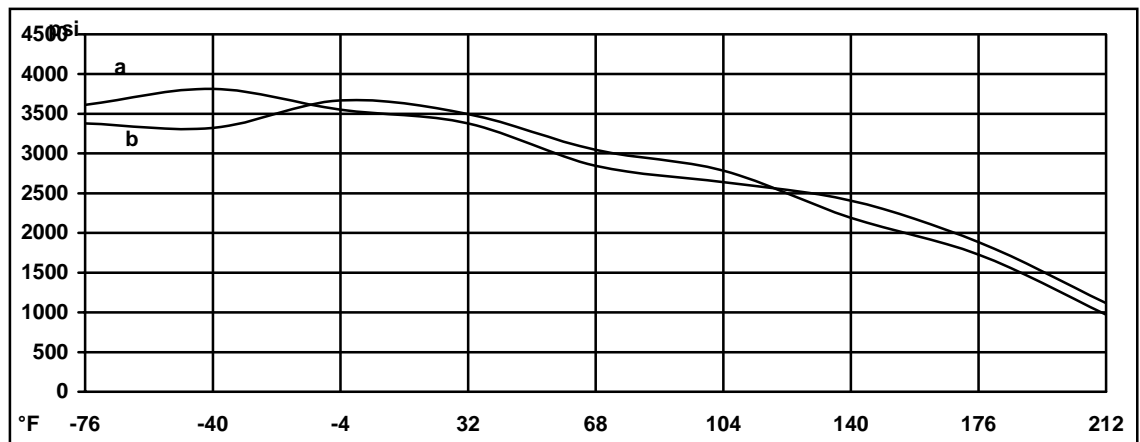
290,075 psi (2 GPa)

Elongation at break

4.4 %

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)

23 psi (4 N/mm)

Glass transition temperature

Cure: 16 hours at 104°F (40°C)

153°F (67°C) by DSC

Cure: 1 hour at 176°F (80°C)

189°F (87°C) by shear modulus DIN 53445

Dielectric constant (500v at 77°F (25°C))

5.6 at 1 kHz

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 at 104°F (40°C)

	30 days	60 days	90 days
	psi		
As-made value			2408
IMS			2002
Gasoline (petrol)			2509
Ethyl acetate			1784
Acetic acid, 10%		827	
Xylene			2045
Lubricating oil			3002
Paraffin			2683
Water at 73°F			1450
Water at 140°F			1900
Water at 194°F	1624		1523

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	2408
After 30 days	1871
After 60 days	1871
After 90 days	2263

Lap shear strength versus heat aging

Cure: 16 hours / 104°F (40°C)

	psi
As-made value	2408
30 days / 158°F	2814
60 days / 158°F	3321
90 days / 158°F	3292
Thermal cycling*	3002

25 cycles -22°F to 158°F (-30°C to + 70°C)

Shear modulus (DIN 53445)

Cure: 1 hour at 176°F (80°C)

Temperature, °F	G'	Δ
32	145,038 psi (1.0 Gpa)	0.25
77	130,534 psi (0.9 Gpa)	0.25
122	116,030 psi (0.8 Gpa)	0.35
167	29,008 psi (0.2 Gpa)	1.9
212	290 psi (2 Mpa)	0.5

Flexural Properties (ISO 178) Cure 16 hours/ 104°F (40°C) tested at 73°F (23°C)

Flexural Strength

6,193 psi (42.7 Mpa)

Flexural Modulus

263,040 psi (1813.6 Mpa)

Resistance to fatigue (40 Hz at 73°F (23°C)) (quoted as cycles to failure)

Maximum applied load	Sandblasted aluminum	Chromate pickled aluminum
20% of static failing load	$>10^7$	$>10^7$
25% of static failing load	$>10^7$	10^7
30% of static failing load	3×10^6	8×10^5

(Static failing load 2321 psi (16 MPa))

Storage

Araldite 2015/A and Araldite 2015/B structural adhesive 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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