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Advanced Materials
Technical Datasheet

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Araldite® 2040 Polyurethane Adhesive

Product Description

Araldite® 2040 polyurethane adhesive is a general-purpose, two-part system for bonding a wide variety of substrates. The cured material is very flexible. Araldite® 2040 polyurethane adhesive is well suited for bonding polycarbonate and polyamides as well as primed metals.

Features

- Ideal for bonding plastics
- Low shrinkage
- Good flexibility
- Ideal for thick bondlines
- Gap filling properties

Typical Properties*

Property	Araldite® 2040 A	Araldite® 2040 B	Mixed System
Appearance	White	Black	Gray paste
Density, g/cm^3	1.1	1.2	~1.2
Viscosity at 25°C, cP	~48,000	~50,000	~50,000
Pot life at 25°C, 100 g, min	--	--	~15

*Properties are based on Huntsman test methods. Copies are available upon request

Processing

Mix Ratio

Product	Parts by weight	Parts by volume
Araldite® 2040 A Resin	92	100
Araldite® 2040 B Hardener	100	100

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.

Araldite® 2040 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.

Cure times to reach minimum shear strength

Temperature, °F	50	59	73	104	140	212
Cure time to reach LSS* > 145 psi (1 MPa),						
hours	17	10	6	-	-	-
minutes	-	-	-	90	45	8
Cure time to reach LSS > 1160 psi (8 MPa),						
hours	80	55	35	16	4	-
minutes	-	-	-	-	-	25

*LSS = Lap shear strength

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Typical Physical Properties

Unless otherwise stated, the data were determined with typical production batches using standard test methods. They are typical values only, and do not constitute a product specification.

Unless a different specification is given, the figures 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.

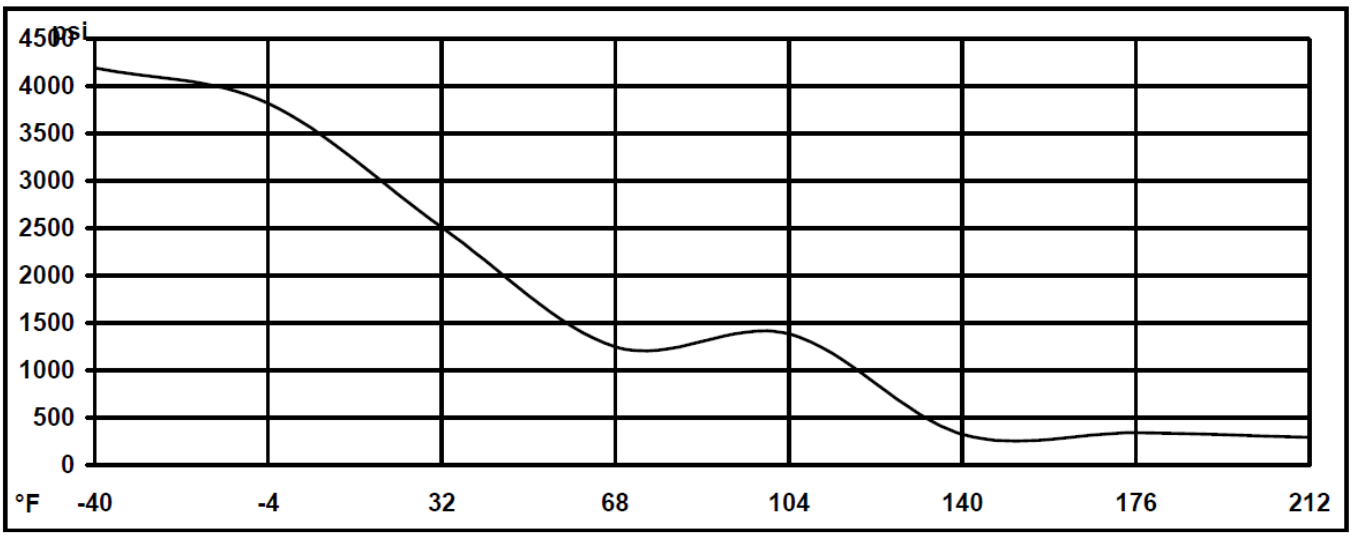
Samples were cured at 104°F (40°C) for 16 hours and tested at 23°C, unless noted otherwise.

Property	Value			Test Method
Average lap shear strength, metal-metal joints, sand blasting pre-treatment, psi				ISO 4587
Aluminum	1,247			
Steel 37/11	1,059			
Stainless steel V4A	1,204			
Galvanized steel	1,001			
Copper	1,494			
Brass	1,030			
Average lap shear strength, plastic-plastic joints, lightly abrade and alcohol degrease pre-treatment, psi				ISO 4587
GRP	1,088			
CFRP	1,218			
SMC	769			
ABS	609			
PVC	551			
PMMA	624			
Polycarbonate	740			
Polyamides	334			
Lap shear strength, after immersion in 23°C media, psi	30 days	60 days	90 days	ISO 4587
As-made value	--	--	1,247	
IMS	160	145	81	
Gasoline	261	232	252	
Ethyl acetate	58	73	70	
Acetic acid, 10%	29	0	0	
Xylene	116	160	103	
Lubricating oil	1,378	812	1,056	
Paraffin	1,465	1,711	1,178	
Water at 73°F	1,276	1,233	489	
Water at 140°F	1,128	702	--	
Water at 194°F	degraded	degraded	degraded	

Lap shear strength, exposure to tropical weather,* psi As-made value 30 days 60 days 90 days	 1,247 470 756 Degraded	DIN 50015
Lap shear strength, 158°F heat aging, psi As-made value 30 days 60 days 90 days	 1,247 2,089 2,184 1,781	--
Roller peel test, pli (N/mm)	23 (4)	ISO 4578
Glass transition temperature, Tg, °F (°C)	86 (30)	DMA
Elongation at break, %	165	ISO 527
Tensile strength, psi (MPa)	1,305 (9)	ISO 527
Tensile modulus, psi (MPa)	6,237 (43)	ISO 527
Thermal cycling,‡ psi (MPa)	1,146 (7.9)	--

*40/92, DIN 50015; typical average values; test at 23°C. Cured 16 hours at 104°F (40°C).
‡100 cycles of 6 hour duration from -22°F to 158°F; Test carried out using a load cycle frequency of 90 Hz.

Figure 1. Lap shear strength versus temperature (ISO 4587) (typical average values)
Cure: 16 hours at 104°F (40°C)



Storage

Araldite® 2040 Adhesive should be stored in a dry place, in the original sealed containers, at temperatures between 2°C and 40°C (36°F and 104°F). Under these storage conditions, the product has a shelf life of **1 year** (from date of manufacture). The product should not be exposed to direct sunlight.

Precautionary Statement

Huntsman Advanced Materials Americas LLC maintains up-to-date Safety Data Sheets (SDS) 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 SDS as mentioned above.

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