



Advanced Materials

HUNTSMAN

Enriching lives through innovation

Technical Datasheet

ARALDITE® 2051 A/B Structural Adhesive

Product Description

ARALDITE® 2051 A/B adhesive is a two component, toughened methacrylate general purpose adhesive for rapid assembly operations on a wide range of substrates. This adhesive provides excellent strength even when used at very low temperature and in moist conditions. It is the perfect choice for repair jobs in very difficult conditions.

Features

- Fast curing from 0°C to 40°C (32°F to 104°F)
- Application and curing under water and humid areas
- Excellent bond to a wide range of plastics, composites and metals
- Minimum substrate pretreatment needed
- Suitable for service at temperatures up to 250°F (120°C)
- Excellent ageing and weathering resistance

Typical Properties*

Property	ARALDITE® 2051 A	ARALDITE® 2051 B	Mixed System
Appearance	Off white	Greenish Yellow	Pale Yellow
Density, g/cm ³	1.0	1.0	1.0
Viscosity at 25°C (77°F), cP (Brookfield, spindle # 7 and at 10 rpm)	35,000-60,000	15,000-30,000	non-sag
Pot Life at 25°C (77°F), 100 g, minutes	--	--	4-6
Time to peak exotherm, 20g, min	--	--	8-14

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

Processing

Mix Ratio

Product	Parts by weight	Parts by volume
ARALDITE® 2051 A	100	100
ARALDITE® 2051 B	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® 2051 A/B 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

This system 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. 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 0.25 mm thick will normally impart the greatest lap shear strength to the joint. 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 cartridge dispensing system, visit www.ARALDITEadhesives.com.

Temperature of application: the recommended temperature application range is 0°C to 40°C (32 to 104°F). If the adhesive is used at a temperature above 40°C, because of the fact reaction, the viscosity will increase so rapidly that a good wetting of the substrate will be difficult to achieve. Therefore above 40°C (104°F), the performance of the bond may be limited. For temperature below 0°C (32°F), the ARALDITE® 2050 may be preferred.

WARNING! *The cure reaction can generate a high amount of heat, it is not recommended to mix large amounts of material at room temperature*

Cure times to reach minimum shear strength (sandblasted aluminum)

Temperature	0°C (32°F)	10°C (50°F)	23°C (73°F)	30°C (86°F)	40°C (104°F)
>1MPa (145 psi)	90 min	30 min	15 min	10 min	6 min
>10MPa (1,450 psi)	2 h	50 min	25 min	15 min	10 min

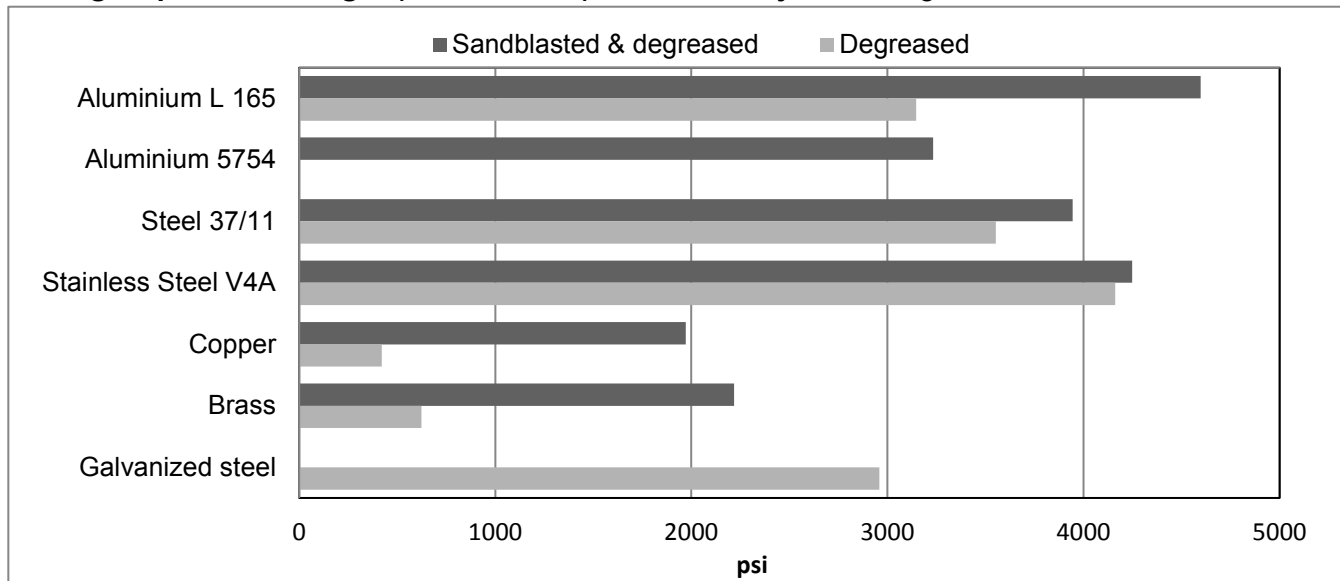
Equipment Maintenance

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.

Typical Physical Properties

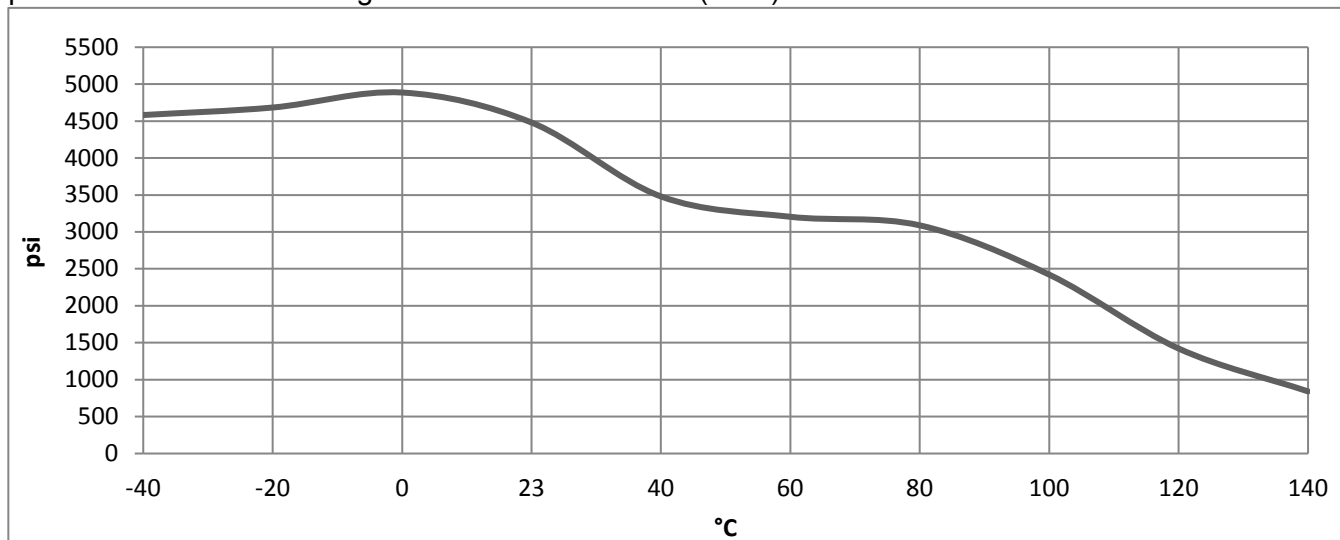
Unless otherwise stated, the data were determined with typical production batches using standard test methods. They are typical values only, and do not constitute a product specification. Unless a different specification is given, the figures below were all determined by testing standard specimens made by lap-jointing 4.5 x 1 x 0.063 in (114 x 25 x 1.6 mm) strips. The joint area was 0.5 x 1 in (12.5 x 25 mm) in each case.

Average lap shear strength (ASTM D1002), metal-metal joints. Degreased with IPA.

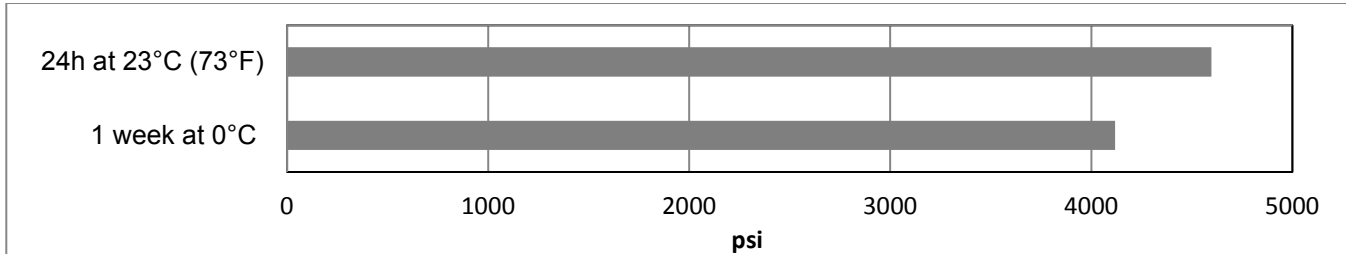


Notes: ARALDITE® 2051 is not suitable to bond copper or brass without surface preparation. Steels should not be abraded or sandblasted, better results are obtained with only degreasing.

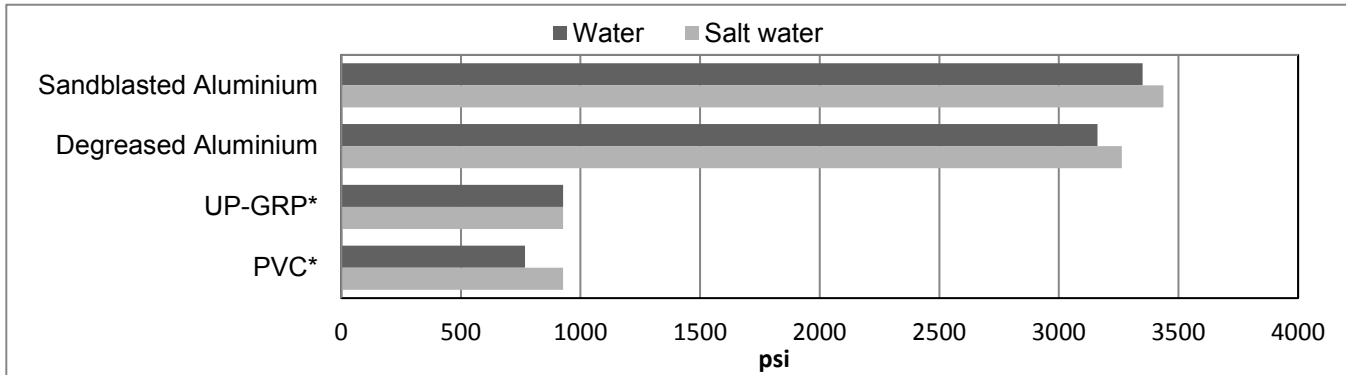
Lap shear strength (ASTM D1002) versus temperature (typical average values). On aluminum, pre-treatment: sand blasting. Cure: 24 hours at 23°C (73°F).



Average lap shear strengths (ASTM D1002) on aluminum after bonding and cure at low temperature (typical average values). Bonded and cured at the temperatures indicated below. Test on aluminium sandblasted and degreased. Tested at 23°C just after release of the specimens from the climatic chamber.

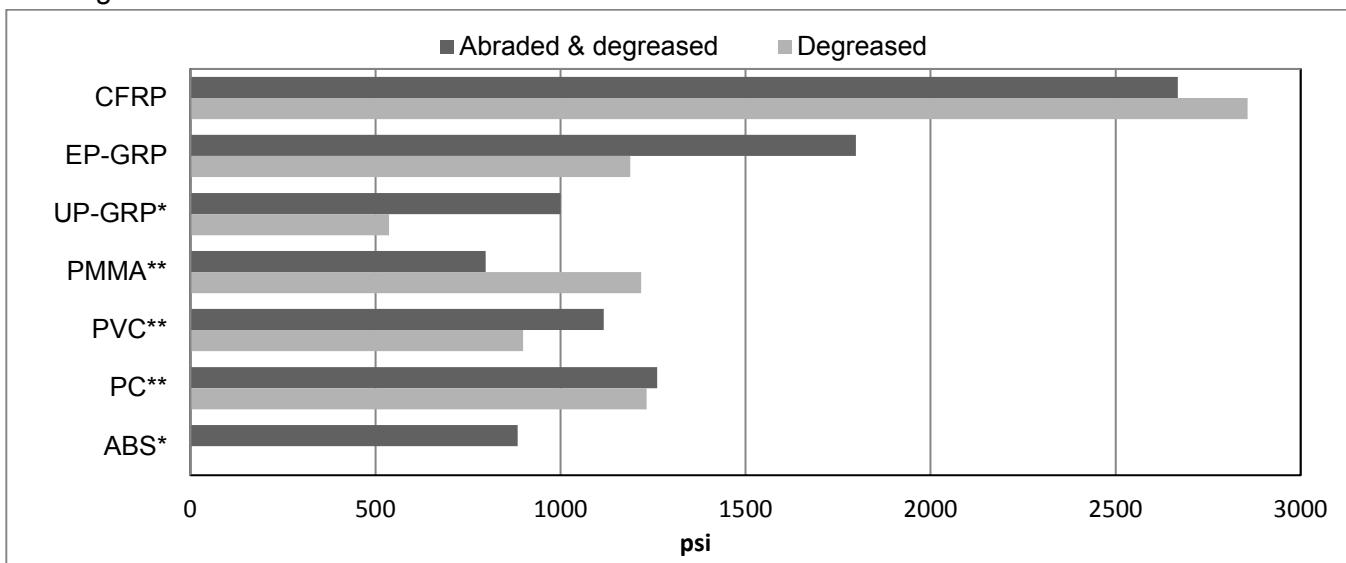


Average lap shear strengths (ASTM D1002) after application, bonding and curing under water (typical average values). Cure 24 hours under water at 23°C (73°F).



(*): UP-GRP, PVC, substrate failures observed.

Average lap shear strength (ASTM D3163), plastic-plastic joints. Substrates were lightly abraded and degreased with IPA.

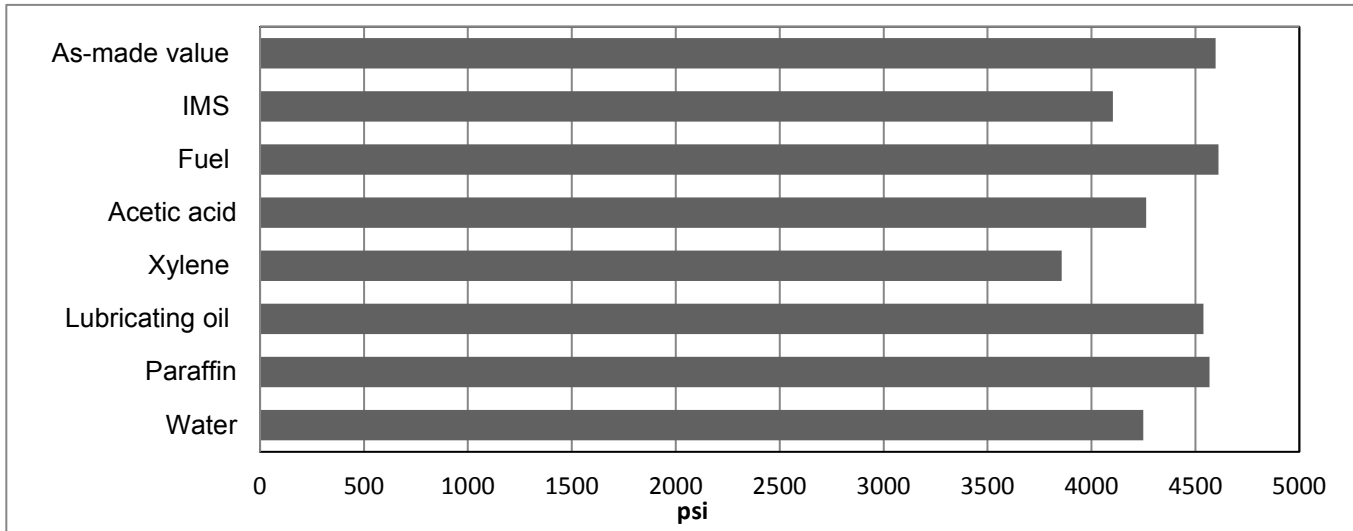


(*): UP-GRP, ABS, substrate failure observed when abraded and degreased.

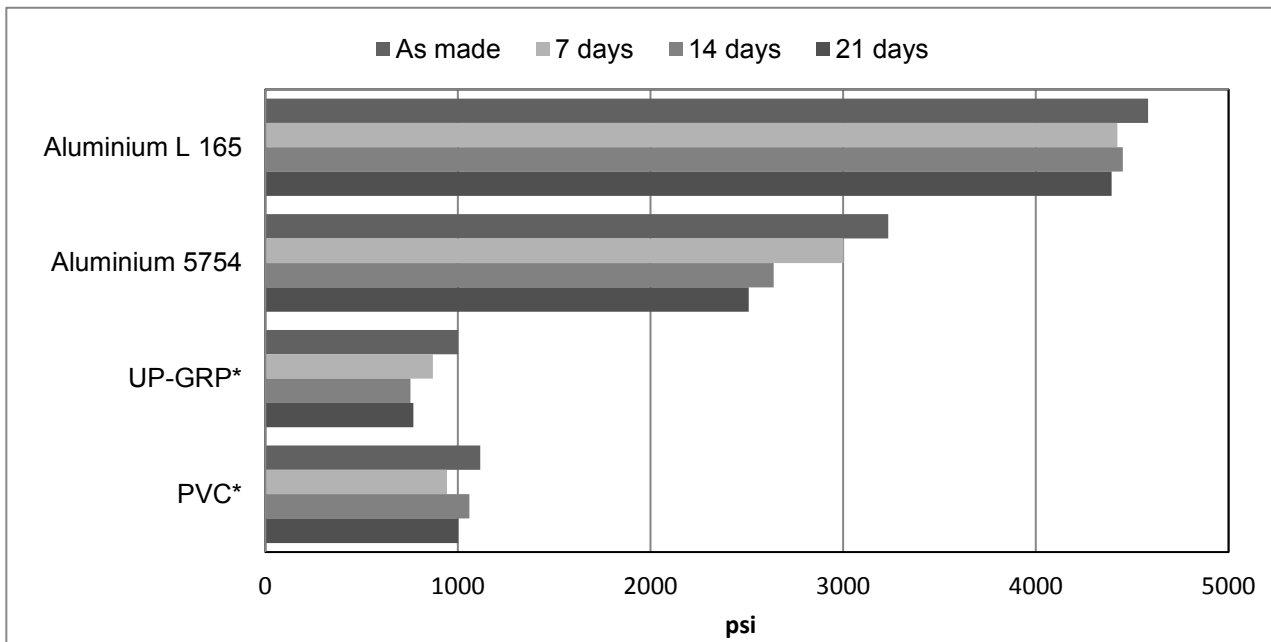
(**): PMMA, PVC, PC, substrate failure observed in all conditions.

Lap shear strength (ASTM D1002) versus immersion in various media (typical average values)

On aluminum, pretreatment: sand blasting. Cured 24 hours at 23°C (73°F). Tested at 23°C (73°F) after immersion for 30 days at 23°C (73°F).

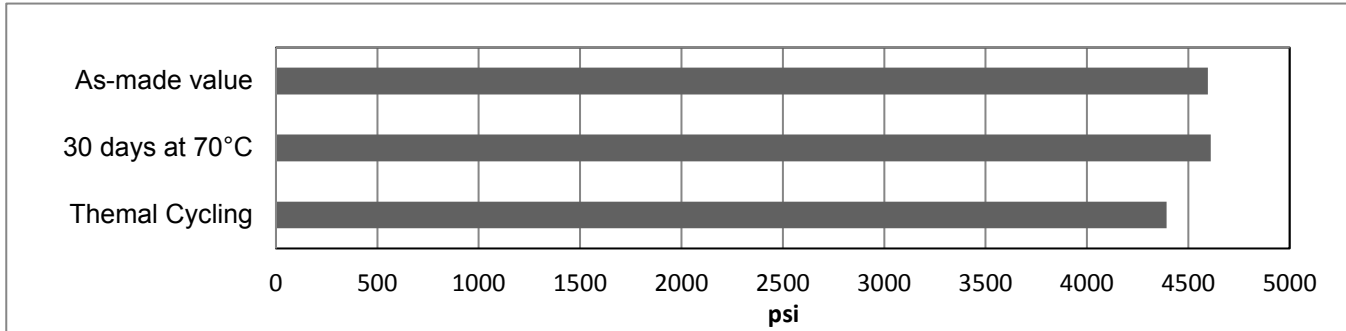


Lap shear strength versus Cataplasma ageing (typical average values). Cure 24 hours at 23°C (73°F). – Cataplasma according to ISO 9142/E2 - Tested at 23°C (73°F). Metals sandblasted and degreased / plastics abraded and degreased.



(*): UP-GRP, PVC, substrate failure

Lap shear strength versus heat ageing and thermal cycling (typical average values). Cure: 24 hours at RT. Tested at 23°C (73°F). Thermal cycling: 100 cycles (2h at 30°C (-22°F) → 1 h ramp up to 70°C (158°F) → 2h at 70°C (158°F) → 1h ramp down to -30°C (-22°F))



Additional properties

Property		Value	Test Method
Tg by DMA	Onset Storage Modulus	98°C	ASTM E1640
	Midpoint Storage Modulus	127°C	
Tensile Properties	Strength, psi	5,800	ASTM D638
	Modulus, psi	246,000	
	Elongation, %	~10%	

Storage

ARALDITE® 2051 A/B Adhesive should be stored in a dry place, in the original sealed containers, at temperatures between 2°C to 8°C (36°F to 46°F). Under these storage conditions, the product has a shelf life of **24 months** from date of manufacture. The expiry date is indicated on the package. The product should not be exposed to direct sunlight. The product may be placed at room temperature before use, the total time at room temperature should not exceed 6 months. Long term exposure above 25°C (77°F) will reduce the shelf life of the product. The product should be never frozen.

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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