

Advanced Materials**Araldite® 2047-1****Structural Adhesives****TECHNICAL DATA SHEET****Araldite® 2047-1****Methacrylate adhesive requiring minimal surface pretreatment****Key properties**

- Gap filling
- Good properties on otherwise difficult to bond substrates
- High impact resistance over a wide temperature range
- Good performance particularly at low temperatures

Description

Araldite® 2047-1 is a cold curing two-part methacrylate adhesive for metal and plastic bonding. Depending on the method of processing, Araldite® 2047-1 fills joints up to a gap width of approximately 5mm. With many bonds, an expensive pretreatment of the parts to be joined is not necessary, or can be reduced to a minimum. The adhesive can be processed at temperatures up to 40 °C. Higher temperatures shorten the setting time.

Product data

Property	Component A (resin)	Component B (hardener)	Mixed Adhesive
Colour (visual) (A112)*	beige	red	brownish
Specific gravity	1.3	1.15	1.3
Viscosity at 25°C (Pas)	50 - 80	20 - 60	thixotropic
Gel time (100 gm at 25°C)	-	-	9 -11 minutes
Time to peak exotherm (22 gr) (A179)*			10- 25 minutes

* Specified data are on a regular basis analysed. Data which is described in this document as 'typical' is not analysed on a regular basis and is given for information purposes only. Data values are not guaranteed or warranted unless if specifically mentioned.

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 (petrol) 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
Component A (resin)	100	100
Component B (hardener)	8.8	10

Araldite® 2047-1 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 0.05 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.

Typical times to minimum shear strength

Temperature	°C	10	15	23	40
Cure time to reach	Hours	-	-	-	-
LSS > 1MPa	Minutes	25	20	15	5
Cure time to reach	Hours	2	-	-	-
LSS > 10MPa	Minutes	-	45	25	15

LSS = Lap shear strength.

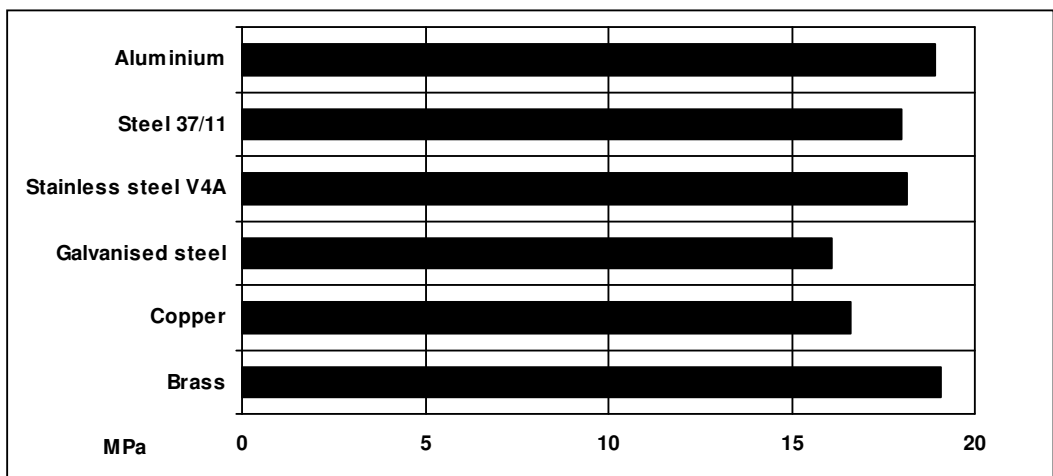
Typical cured properties

Unless otherwise stated, the figures given below were all determined by testing standard specimens made by lap-jointing 114 x 25 x 1.6 mm strips of aluminium alloy. The joint area was 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.

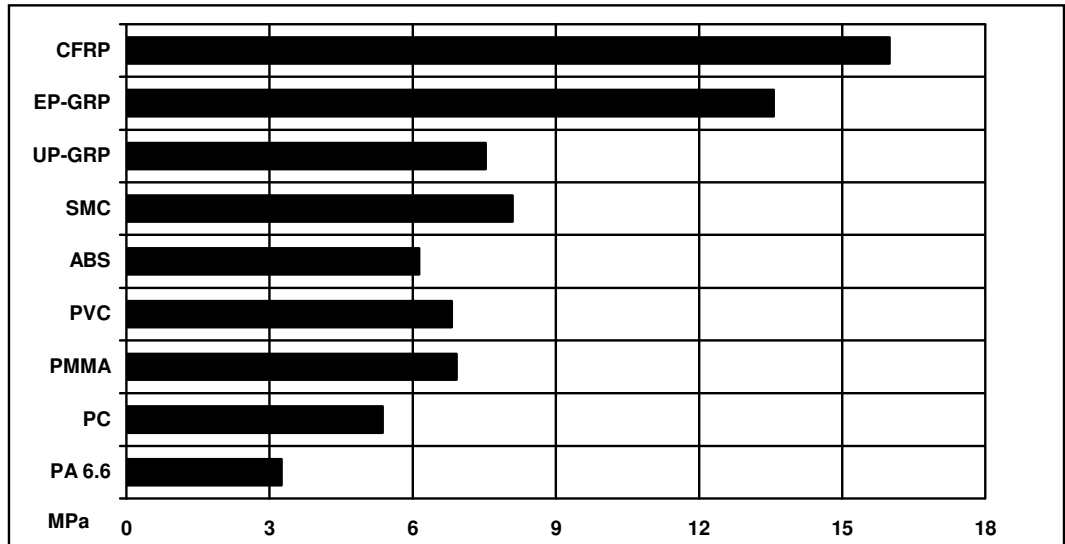
Average lap shear strengths of typical metal-to-metal joints (ISO 4587) (typical average values)

Cured for 16 hours at 40°C and tested at 23°C. Pretreatment - Sand blasting, isopropanol degreasing



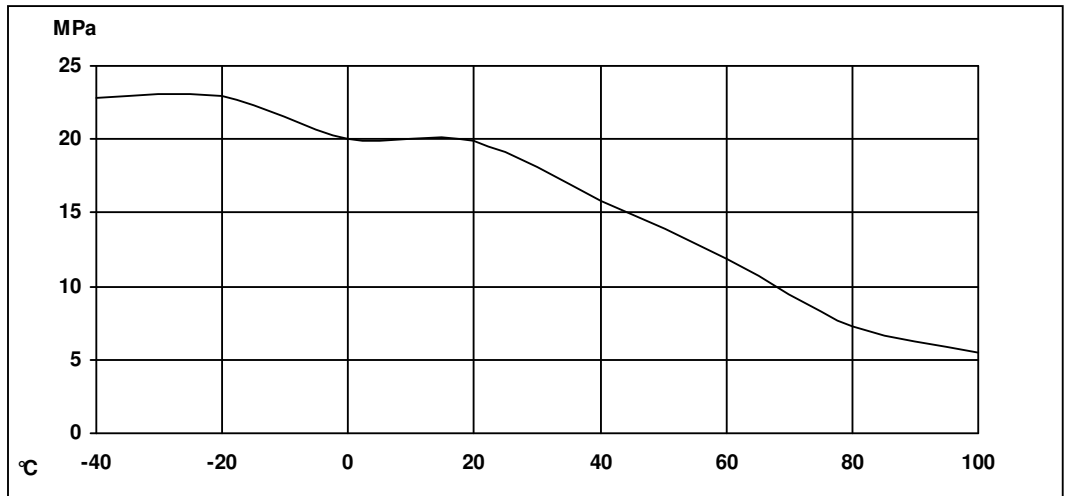
Average lap shear strengths of typical plastic-to-plastic joints (ISO 4587) (typical average values)

Cured for 16 hours at 40°C and tested at 23°C. Pretreatment - Lightly abrade and isopropanol degrease.



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

On aluminium, cure: 16 hours at 40°C, Pretreatment - Sand blasting, isopropanol degreasing



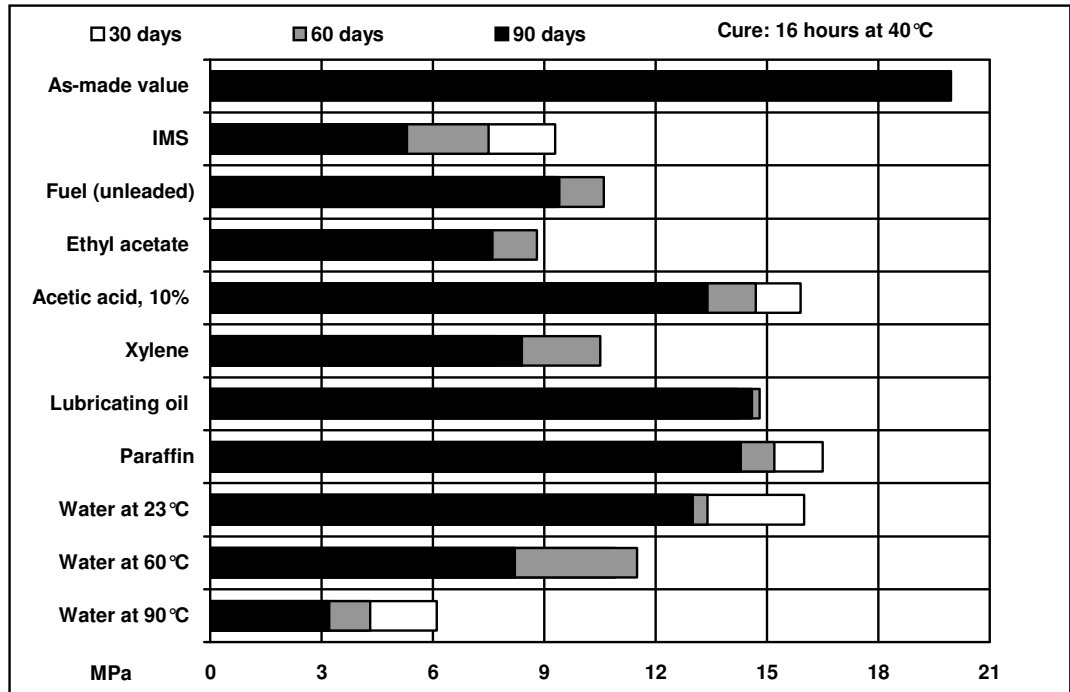
Glass transition temperature (typical average values) (ISO 6721)

Cure: 16 hours at 40°C

80°C by DMA

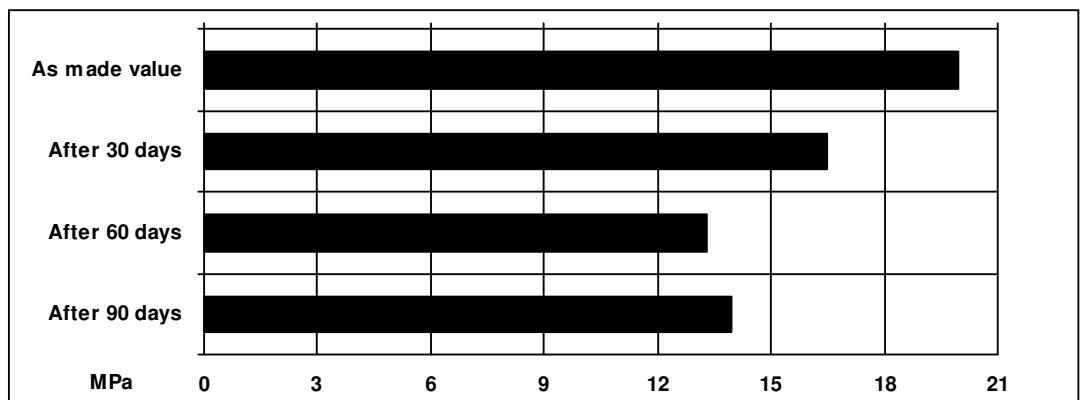
Lap shear strength versus immersion in various media (ISO 4587) (typical average values)

On aluminium, cured for 16 hours at 40°C and tested at 23°C. Pretreatment - Sand blasting, isopropanol degreasing. Unless otherwise stated, L.S.S. was determined after immersion for 30, 60 and 90 days at 23°C



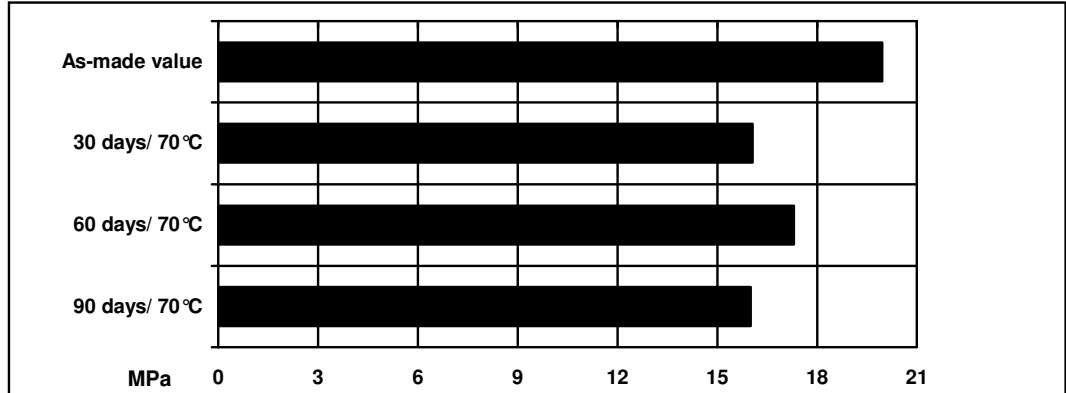
Lap shear strength versus tropical weathering (ISO 4587) (typical average values)

(40°C/ 92% RH), on aluminium, cured for 16 hours at 40°C and tested at 23°C. Pretreatment - Sand blasting, isopropanol degreasing



Lap shear strength versus heat ageing (ISO 4587) (typical average values)

On aluminium, cured for 16 hours at 40°C and tested at 23°C. Pretreatment - Sand blasting, isopropanol degreasing



Lap shear strength versus thermal cycling (ISO 4587) (typical average values)

On aluminium, cured for 16 hours at 40°C and tested at 23°C. Pretreatment - Sand blasting, isopropanol degreasing
100 cycles of 6 hours duration from -30°C to 70°C: 17.75 MPa

Tensile properties (ISO 527). Cure 16hrs at 40°C (typical average values)- tested at 23°C

Tensile strength	13 - 15 MPa
Tensile modulus	750 - 900 MPa
Elongation at break	13 - 15 %

Shear properties (ISO 6721). Cure 16hrs at 40°C (typical average values)

Shear Modulus		
	at 23°C	500 - 600 MPa
	at 50°C	200 - 300 MPa
	at 75°C	40 - 50 MPa

Storage

Araldite® 2047-1 must be stored at 2 – 8 °C , provided the components are stored in sealed containers. The expiry date is indicated on the label.

Handling precautions**Caution**

Our products are generally quite harmless to handle provided that certain precautions normally taken when handling chemicals are observed. The uncured materials must not, for instance, be allowed to come into contact with foodstuffs or food utensils, and measures should be taken to prevent the uncured materials from coming in contact with the skin, since people with particularly sensitive skin may be affected. The wearing of impervious rubber or plastic gloves will normally be necessary; likewise the use of eye protection. The skin should be thoroughly cleansed at the end of each working period by washing with soap and warm water. The use of solvents is to be avoided. Disposable paper - not cloth towels - should be used to dry the skin. Adequate ventilation of the working area is recommended. These precautions are described in greater detail in the Material Safety Data sheets for the individual products and should be referred to for fuller information.



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