HUNTSMAN

Enriching lives through innovation

Advanced Materials

Araldite® 2013-1

Structural Adhesives

TECHNICAL DATA SHEET

Araldite® 2013-1
Two component epoxy paste adhesive

Key properties

- **Metal coloured paste**
- **Suitable for vertical applications**
- **Good environmental and chemical resistance**
- **Bonds a wide variety of materials**

Description

Araldite® 2013-1 is a two component, room temperature curing, paste adhesive of high strength and toughness. It is thixotropic with good environmental and chemical resistance.

Although it is designed as a metal bonding adhesive it is also suitable for bonding other materials such as, ceramics, glass, rubbers, rigid plastics and most other materials in common use.

Product data

Property	2013-1/A	2013-1/B	2013-1 (mixed)
*Colour - visual (A112)**	*grey paste*	*beige paste*	*grey paste*
Specific gravity	ca. 1.4	ca. 0.9	ca. 1.2
Viscosity at 25°C (Pa.s)	380 - 720	thixotropic	thixotropic
Pot Life (100 g at 25°C)	-	-	80 - 90 minutes
*Lap shear strength at 23°C (A501)**	-	-	*> 17 MPa*

** 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 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
Araldite® 2013-1/A	100	100
Araldite® 2013-1/B	60	100

Araldite® 2013-1 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 an 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.aralditeadhesives.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

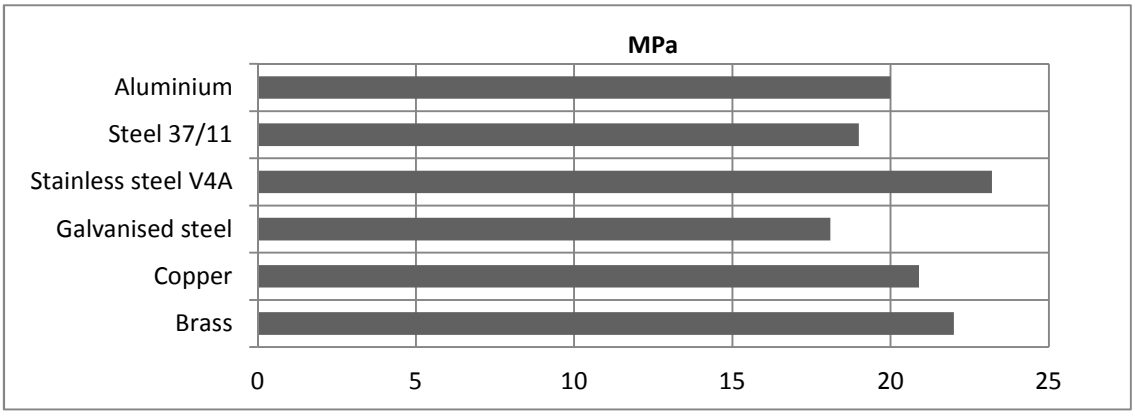
Temperature	°C	10	15	23	40	60	100
Cure time to reach	hours	15	12	5	-	-	-
LSS > 1MPa	minutes	-	-	-	80	25	5
Cure time to reach	hours	30	16	10	-	-	-
LSS > 10MPa	minutes	-	-	-	150	40	8

LSS = Lap shear strength.

Typical cured properties

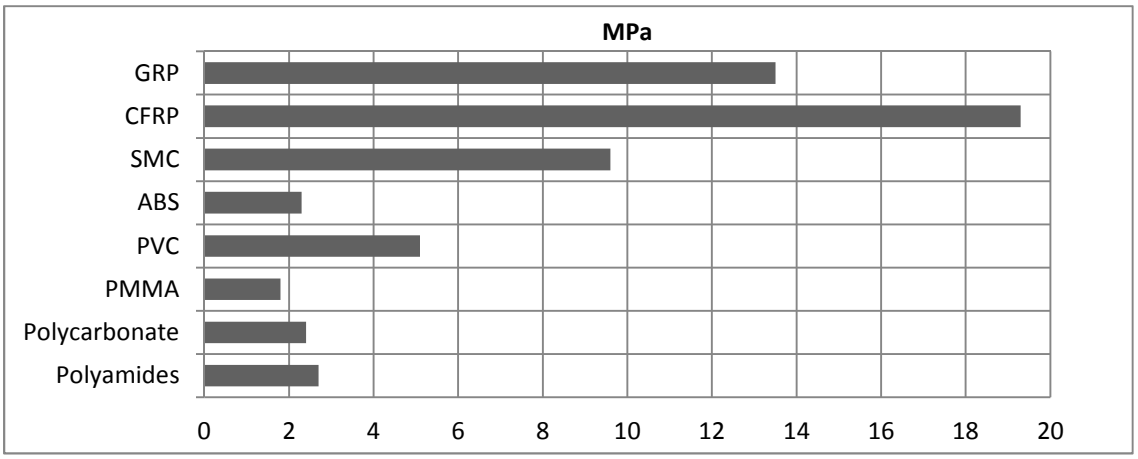
Unless otherwise stated, the figures given below were all determined by testing standard specimens made by lap-jointing 114 x 25 x 1.6 mm strips of aluminium alloy. The joint area was 12.5 x 25 mm in each case.
The figures were determined with typical production batches using standard testing methods. 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 and degreasing with acetone



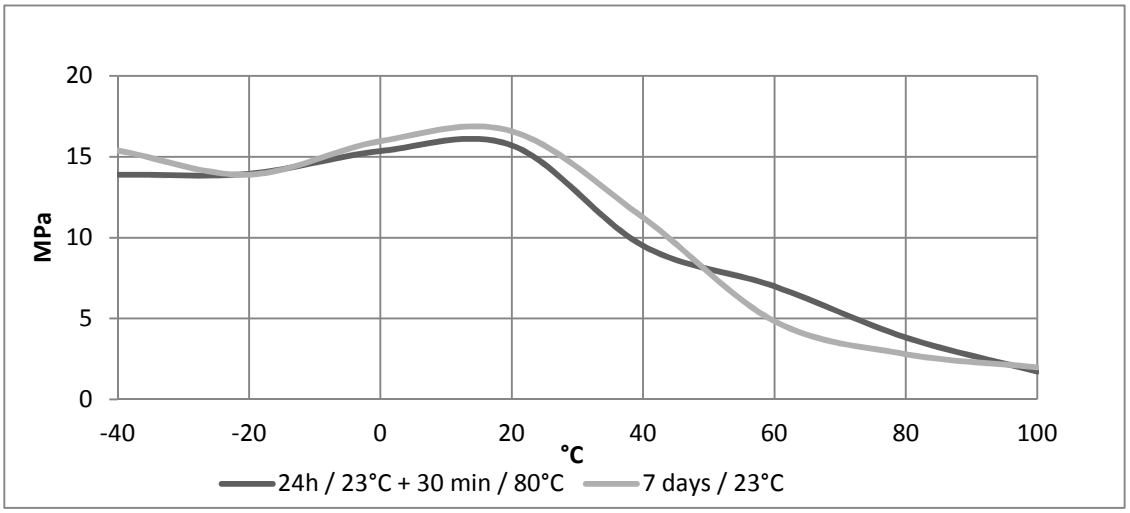
Average lap shear strengths of typical plastic-to-plastic joints (ISO 4587) (typical average values)

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



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

Cure: 7 days / 23°C or 24 hours / 23°C + 30 minutes / 80°C



DMA (ISO 6721) (typical average values)

Cure: 16 hours / 40°C

Temperature	G'
-50 °C	2700 MPa
23 °C	990 MPa
75 °C	18 MPa
150 °C	17 MPa

Glass transition temperature (typical average value)

Cure: 16 hours / 40°C — 63.3 °C by DMA

Tensile Properties (ISO 527) (typical average values)

Cure: 16 hours / 40ºC - tested at 23ºC

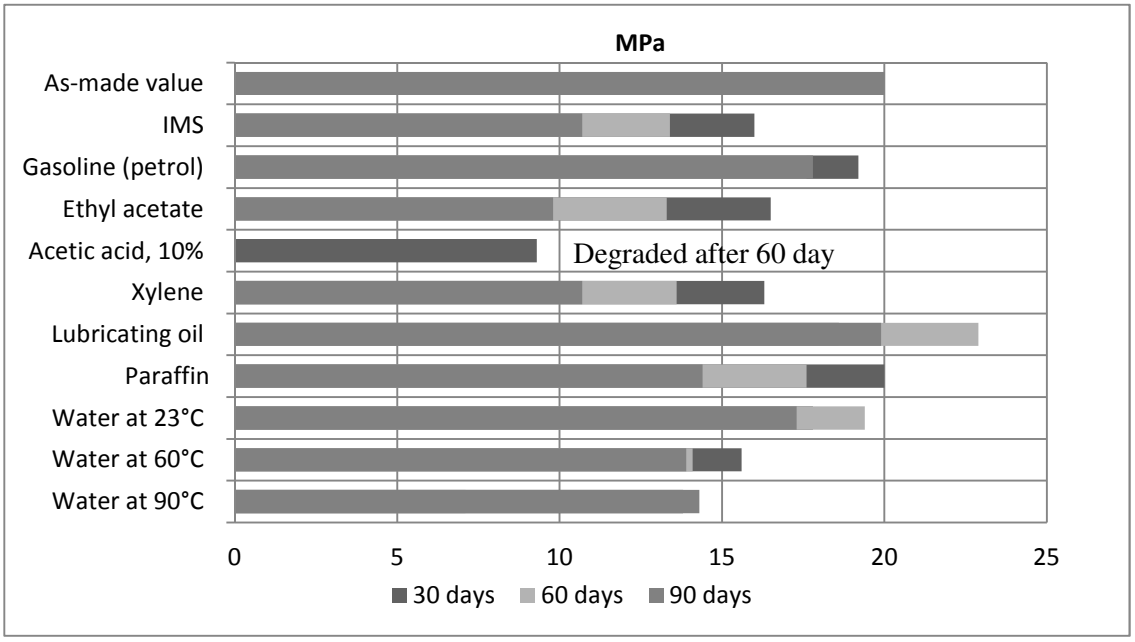
Tensile Strength — 22 MPa

Tensile Modulus	1370 MPa
Elongation at break	1.8%

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

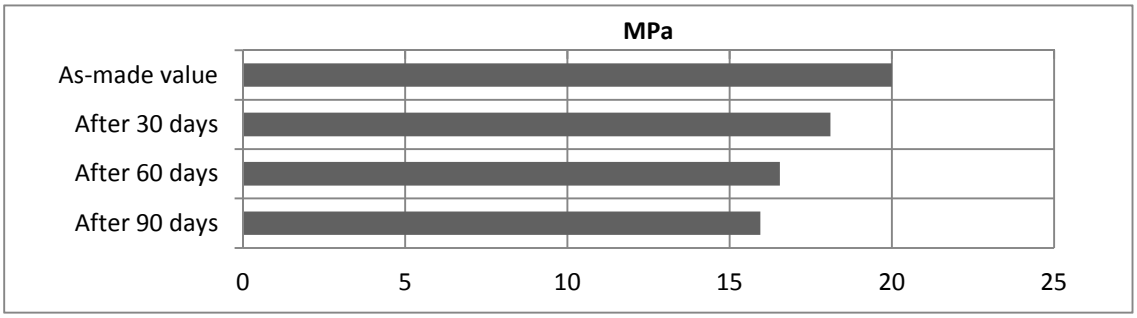
Cure: 16 hours / 40°C

Unless otherwise stated, L.S.S. was determined after immersion for 30, 60 and 90 days at 23°C



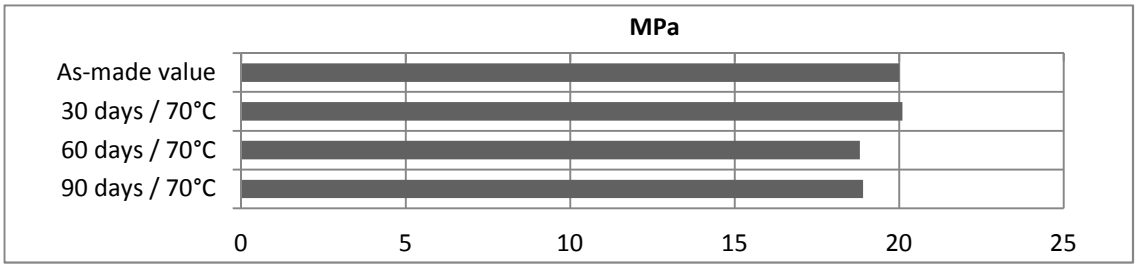
Lap shear strength versus tropical weathering (typical average values)

(40°C / 92% Relative Humidity) Cure: 16 hours / 40°C. Test at 23°C



Lap shear strength versus heat ageing (typical average values)

Cure: 16 hours / 40°C. Test at 23°C



Storage

Araldite® 2013-1/A and Araldite® 2013-1/B must be stored at room temperature and the components must be 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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