Advanced Materials

Araldite® AW 139-1 / Hardener HW 5323-1

Structural Adhesives

TECHNICAL DATA SHEET

Araldite® AW 139-1 / Hardener HW 5323-1
Two component epoxy paste adhesive

Key properties

- **Grey paste**
- **High temperature resistance**
- **Very resistant to water and to a wide variety of chemicals**
- **Gap filling, non sagging up to 5mm thickness**

Description

Araldite® AW 139-1 / HW 5323-1 is a two component, room temperature curing, thixotropic paste adhesive of high strength with good environmental and excellent chemical resistance. Used for bonding of metals, electronic components, GRP structures and many other items where a higher than normal temperature or more aggressive environment is to be encountered in service.

Product data

Property	AW 139-1	HW 5323-1	Mixed adhesive
*Colour (visual) (A112)**	*beige paste*	*grey paste*	grey paste
Specific gravity	ca. 1.6	ca. 1.5	ca. 1.6
Viscosity at 25°C (Pa.s)	50 - 80	thixotropic	thixotropic
Pot Life (100 g at 25°C)	-	-	110 minutes
*Lap shear strength at 25°C (A501)**			*> 14 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 dependant 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, alcohol 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® AW 139-1	100	100
Hardener HW 5323-1	50	50

This adhesive is also available in cartridges (Araldite® 2014-2) 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	13	10	5	-	-	-
LSS > 1MPa	minutes	-	-	-	90	20	5
Cure time to reach	hours	25	15	8	2	-	-
LSS > 10MPa	minutes	-	-	-	-	30	6

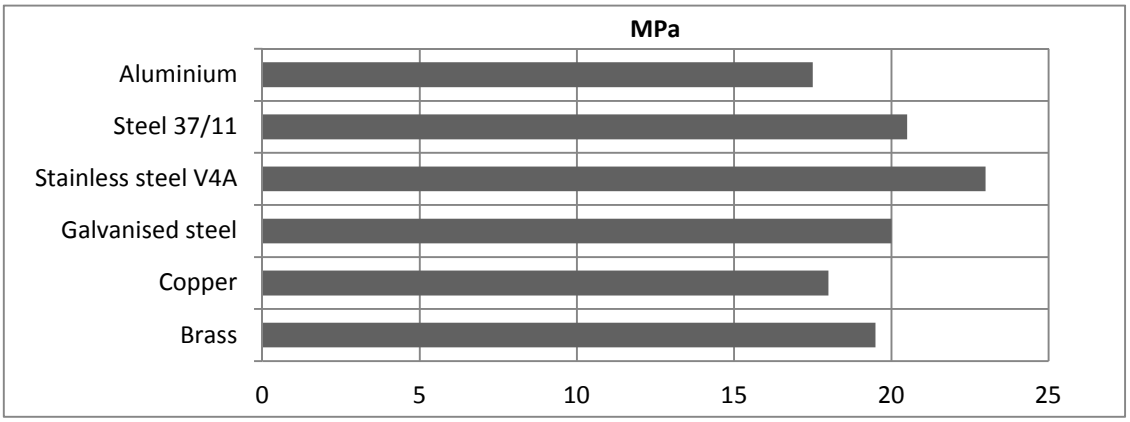
LSS = Lap shear strength.

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.

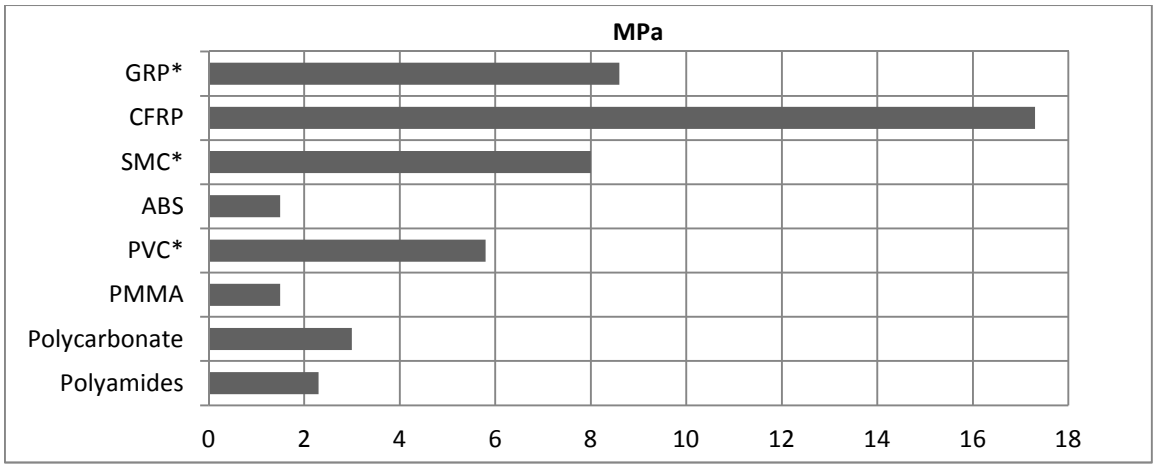
Average lap shear strengths of typical metal-to-metal joints (ISO 4587) (typical average values)

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



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

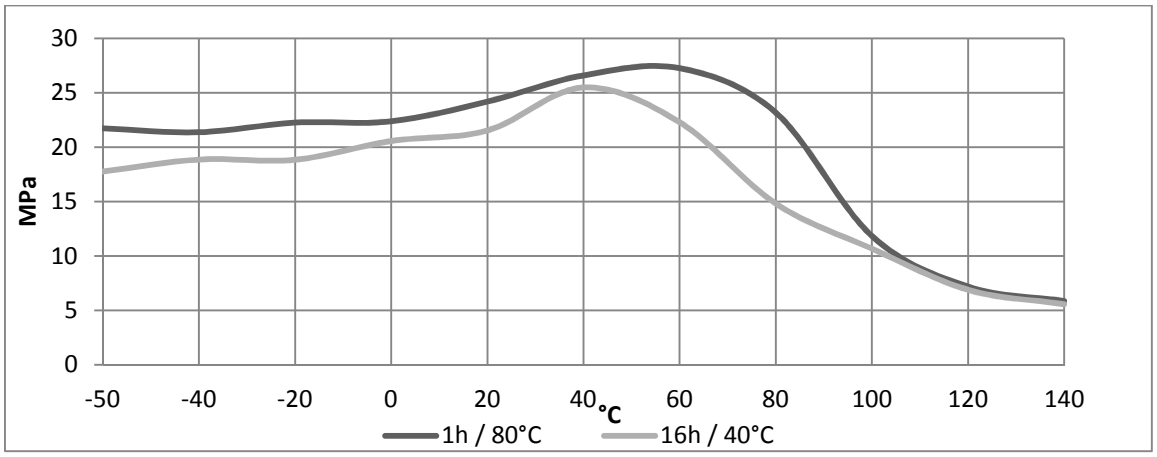
Cured for 16 hours at 40°C and tested at 23°C. Pretreatment - Lightly abrade and alcohol degrease.



**** : substrate failure***

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

On aluminium. Pretreatment: sandblasting. Cure: 16 hours at 40°C or 1 hour at 80°C



Glass transition temperature (typical average values)

Cure: 16 hours at 40°C (DMA)	ca. 69°C
Cure: 24 hours at 23°C + 1 hour at 80°C (DSC)	ca. 85°C

DMA (ISO 6721) (typical average values)

Cure: 16 hours / 40°C

Temperature	G'
50°C	1.2 GPa
75°C	32 MPa
100°C	25 MPa
125°C	22 MPa

Flexural Properties (ISO 178) (typical average values)

Cure: 16 hours / 40ºC and test at 23 ºC

Flexural Strength	60 MPa
Flexural Modulus	3500 MPa

Tensile Properties (ISO 527) (typical average values)

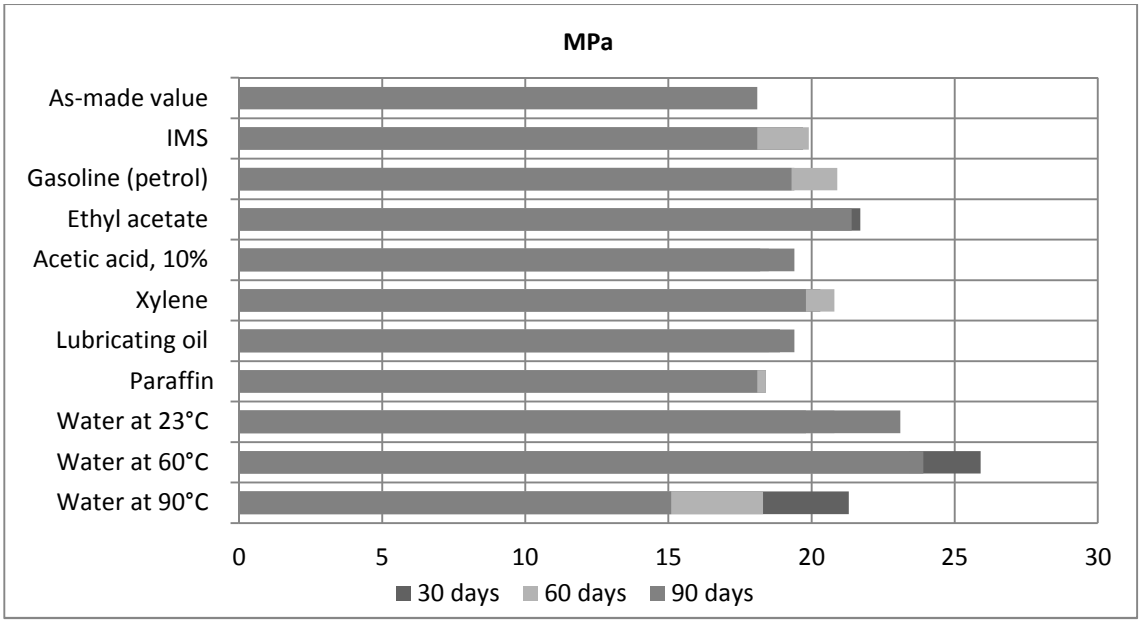
Cure: 16 hours / 40ºC and test at 23 ºC

Tensile Strength	30 MPa
Tensile Modulus	3100 MPa
Elongation at break	0,9 %

Additional electrical properties (typical average values)	Test values	Test methods
Dielectric strength (kV/mm)	25	ASTM D-149
Surface resistivity (Ohm)	4.6 E+16	IEC 60093
Volume resistivity (Ohm.cm)	2.7 E+15	IEC 60093
Dielectric constant at 60Hz	4.0	IEC 60250
Loss tangent, % at 60Hz	1.3	IEC 60250

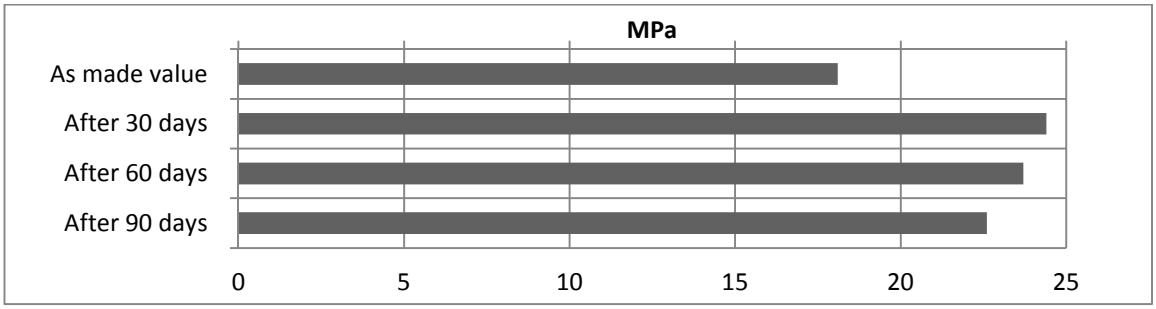
Lap shear strength versus immersion in various media (typical average values)

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



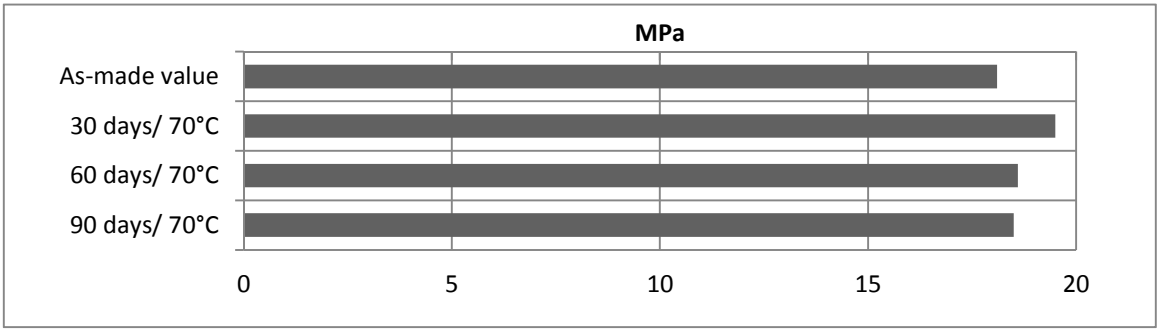
Lap shear strength versus tropical weathering (typical average values)

(40℃ / 92% Relative Humidity) On aluminium. Cured for 16 hours at 40°C and tested at 23°C. Pretreatment - Sand blasting



Lap shear strength versus heat ageing (typical average values)

On aluminium. Cured for 16 hours at 40°C and tested at 23°C. Pretreatment - Sand blasting



Storage

Araldite® AW 139-1 and Hardener HW 5323-1 must be stored at room temperature 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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