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Advanced Materials

Araldite® 2033

Structural Adhesives

Technical Data

Araldite® 2033
Two-component gap filling epoxy adhesive with flame retardant properties

Key properties

- **Self-extinguishing**
- **Meets the fire resistance requirement UL 94 / V-0**
- **High strength**
- **Medium open time**
- **Gap filling**

Description

Araldite® 2033 is a room temperature curing self extinguishing epoxy adhesive, it was tested against stringent norms used for electronics and for railway applications. This adhesive has well balanced tensile properties: a medium modulus and a high elongation at break. It is suitable for structural applications requiring high strength.

Product data

Property	Component A (resin)	Component B (hardener)	Mixed Adhesive
*Colour (visual) (A112)**	*Black*	*White*	*Black*
Specific gravity	1.4	1.2	1.3
Viscosity at 25°C (Pas)	Thixotropic paste	Thixotropic paste	Thixotropic paste
Pot Life (100 gm at 25°C)	-	-	120 - 140 minutes
*Lap shear strength at 23°C (A501)**	-	-	*> 12 MPa*
Work time in static mixer	-	-	ca. 120 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)	88	100

Araldite® 2033 is available in cartridges incorporating mixers and can be applied as ready to use adhesive. Due to its high

viscosity, Araldite® 2033 is not free flowing. Therefore, only guns recommended by Huntsman Advanced Materials should be used to dispense the product from the cartridges.

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 (laboratory conditions: 40-60% RH)

Temperature	°C	10	15	23	40	60	100
Cure time to reach	hours	14	8	4			
LSS > 1MPa	minutes				85	15	< 5
Cure time to reach	hours	46	26	10	2.5		
LSS > 10MPa	minutes					40	8

LSS = Lap shear strength.

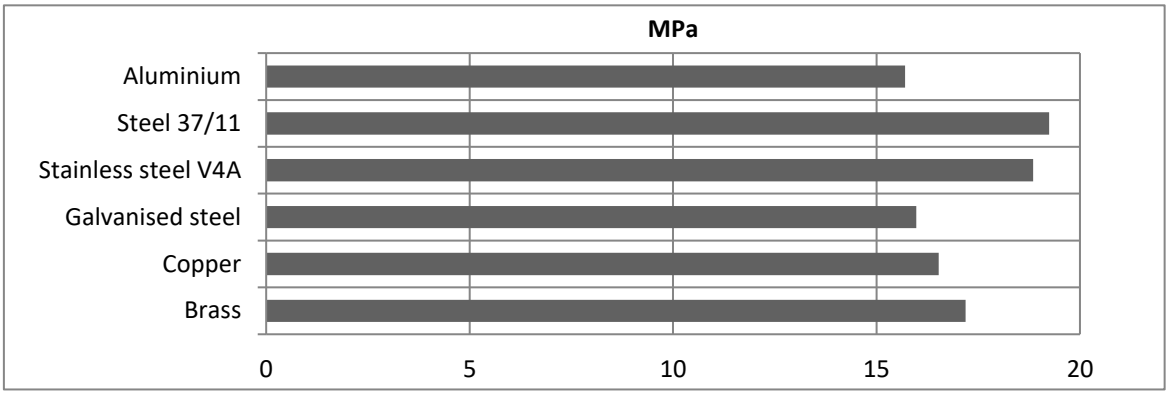
Typical cured properties

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)

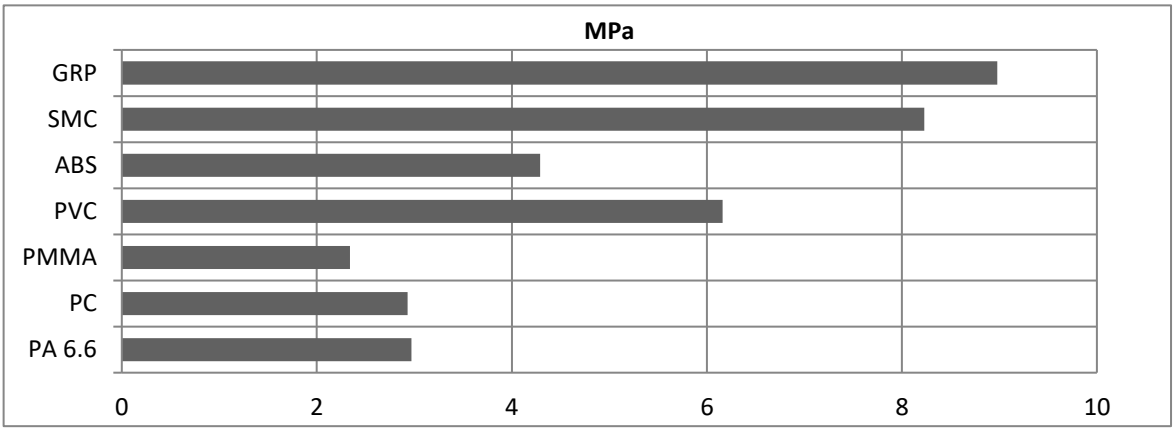
Cured for 16 hours at 40 °C and tested at 23°C

Pretreatment - Sand blasting



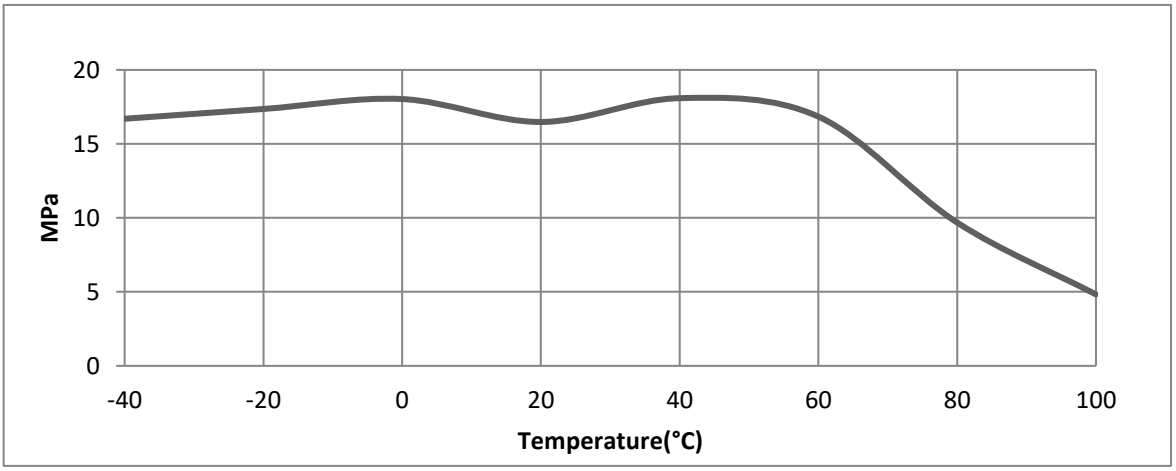
Average lap shear strengths of typical plastic-to-plastic joints (ISO 4587) (typical average values)

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



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

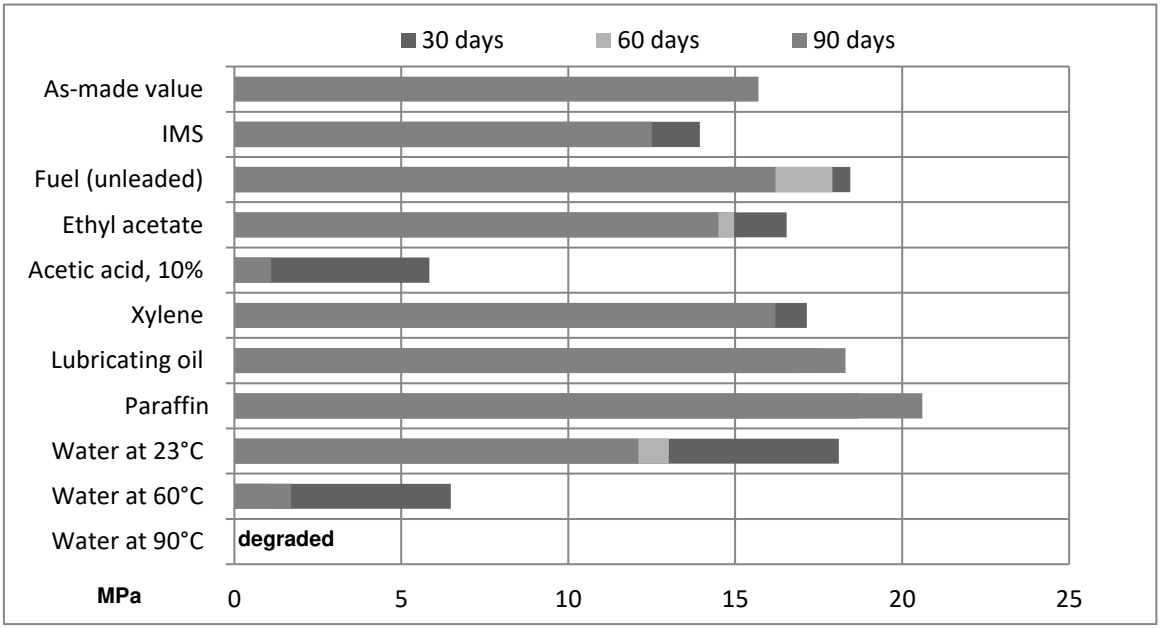
Cure: 16 hours at 40°C



Glass transition temperature (typical average value)	
Cure: 16 hours at 40°C	69°C by DMA
Tensile strength at 23°C (ISO 527) (typical average values)	22 MPa
E- Modulus	2500 MPa
Elongation at break	1.4 %
Shear modulus (ISO 6721) (typical average values)	
-40°C	2.52 GPa
0°C	2.05 Gpa
60°C	205 MPa
100°C	36 MPa
Thermal cycling (typical average values)	
Lap shear strength after 100 cycles of 6 hours duration from -30°C to 70°C	18.8 MPa

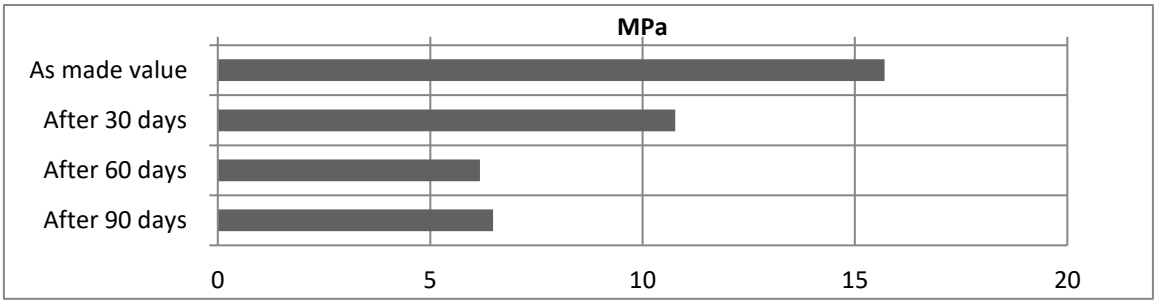
Lap shear strength versus immersion in various media at 23°C (typical average values)

Cure 16 hours at 40°C



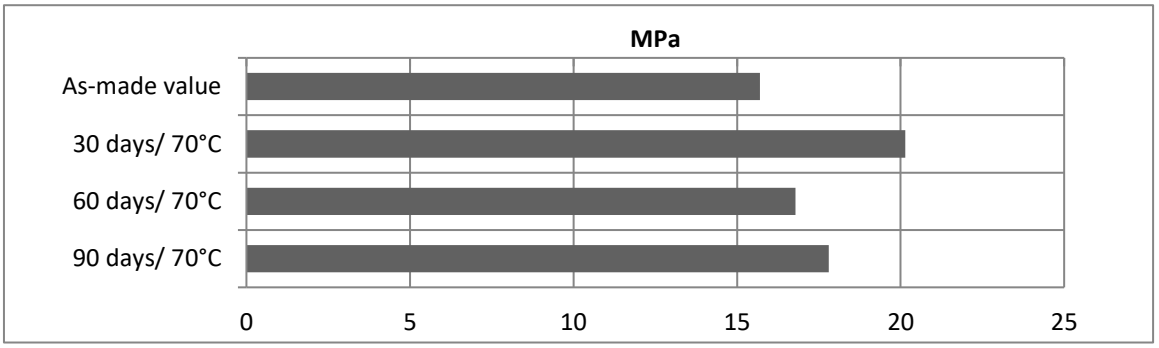
Lap shear strength versus tropical weathering (typical average values)

(40°C/92% HR, DIN 50017) - Cure: 16 hours at 40°C - Test: at 23°C



Lap shear strength versus heat ageing (typical average values)

Cure: 16 hours at 40°C



Fire Behavior

Classification V-0 according to UL94

Test Method	Thickness	Result
IEC 60695-11-10	4.5 mm	V-0

Electrical properties

Tracking resistance (typical average values)

Test Method	Conditions	Result
IEC 60112-10/03	23°C	> 600V

Dielectric loss factor / dielectric constant (typical average values)

Test Method	Conditions	Result
IEC 60250	50Hz / 23°C	tan d = 10.2% / e_r = 7.5

Dielectric strength (typical average values)

Test Method	Conditions	Result
IEC 60243-1	23°C / 2.99mm	8.4 kV/mm

Storage

Araldite® 2033 may be stored for up to 12 months at 2 to 8°C, provided the components are stored in sealed containers. The expiry date is indicated on the label. Remove cartridges from cold storage the day before use, to allow the product to come back to room temperature prior to its application.

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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https://www.huntsman.com/products/araldite2000

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