

Adhesives and Tooling

Structural Adhesives

Araldite AV 4600

One component impact resistant epoxy adhesive

Key properties

- Cures at 150-200°C
- Heat resistant to 120°C
- Very good peel strength
- Good chemical resistance
- Thixotropic - no flow during cure
- Gap filling to 3mm
- Exceptionally good impact strength at temperatures down to -40°C

Description

Araldite AV 4600 is a multipurpose, one component heat curing thixotropic paste adhesive of high impact strength and toughness, even at subzero temperatures. It is suitable for bonding a wide variety of metals and many other materials.

Typical product data

Properties	Araldite AV 4600
Colour (visual)	orange
Specific gravity	ca. 1.2
Viscosity (Pas)	thixotropic paste

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, trichloroethylene or proprietary degreasing agent in order to remove all traces of oil, grease and dirt. 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

Application of adhesive

The resin/hardener mix is applied with a spatula to the pretreated and dry joint surfaces. A layer of adhesive 0.05 to 0.10 mm thick will normally impart the greatest lap shear strength to the joint. The joint components should be assembled and clamped as soon as the adhesive has been applied. An even contact pressure throughout the joint area will ensure optimum cure.

Mechanical processing

Specialist firms have developed metering, mixing and spreading equipment that enables the bulk processing of adhesive.

Vantico will be pleased to advise customers on the choice of equipment for their particular needs.

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.

Curing times

Temperature	°C	160	180	200
Cure time	minutes	40	30	20
Lap shear strength at 23°C	N/mm ²	42-44	42-44	40-42

Note: Temperatures below 150°C will not give adequate cure even when cure time is prolonged.

The adhesive may exotherm in thick bondlines. Bondline thickness should not exceed 2 mm.

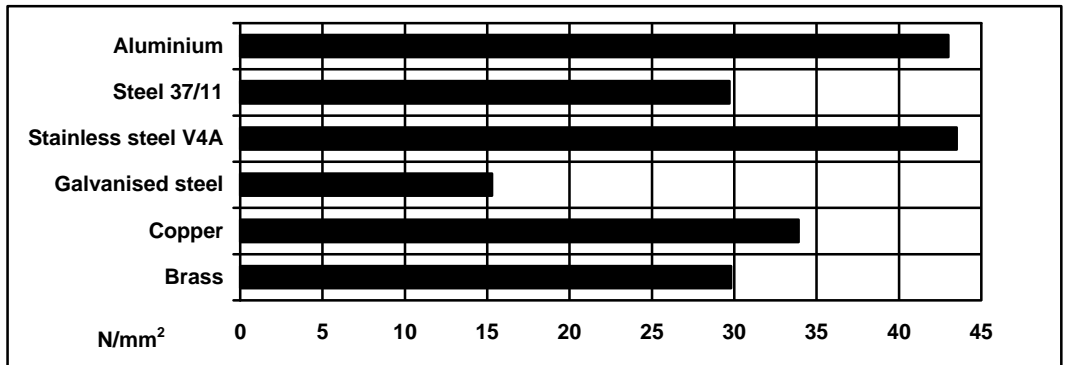
Typical cured properties

Unless otherwise stated, the figures given below were all determined by testing standard specimens made by lap-jointing 115 x 25 x 1.5 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)

Cured for 30 mins at 180°C and tested at 23°C

Pretreatment - Sand blasting



Tensile strength

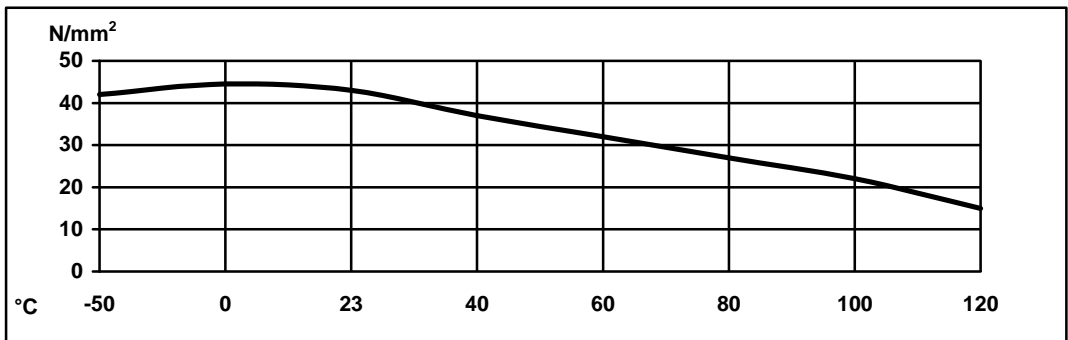
(cured 30 minutes at 180°C) 60 MPa

Elongation at break ca. 5%

E - modulus 3-5 Gpa

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

Cure: 30 mins at 180°C



Roller peel test (ISO 4578)

Cured 30 mins at 180°C

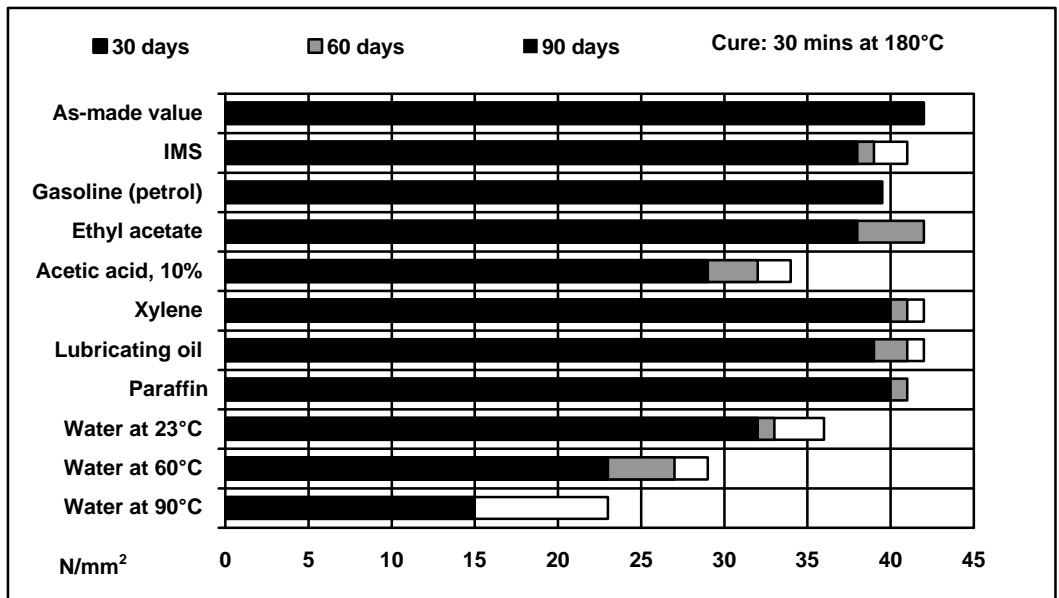
9-10 N/mm

Glass transition temperature (TMA)

Cured at 30 mins at 180°C

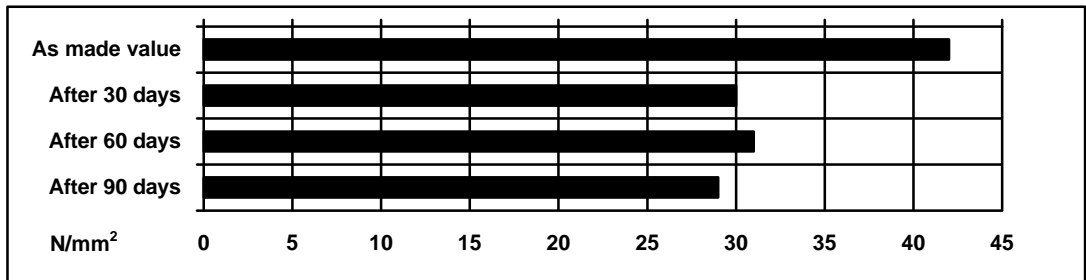
ca. 110°C

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



Lap shear strength versus tropical weathering (40/92, DIN 50015; typical average values)

Cure: 30 mins at 180°C



Shear modulus (measured by Rheometrics)

Cure:30min/180°C

25°C	-	3.5 GPa
100°C	-	3.5 GPa
125°C	-	3.2 GPa

Resistance to Thermal cycling (100 cycles +70°C to -30°C) - residual strength 40.2 N/mm²

Impact peel strength (chromated aluminium)

Cured 30 mins at 180°C

Mean of 3 values tested at 40°C	-	18 - 20 N/mm
		23°C - 16 - 19 N/mm
		- 20°C - 13 - 16 N/mm
		- 40°C - 10 - 12 N/mm

Storage

Araldite AV 4600 may be stored for up to 2 years at 2 - 8°C. At 15-25°C the life of the product is 6 months after removal from storage at 2 - 8°C. The expiry date is indicated on the label.

Handling precautions

Caution

Vantico 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 Vantico publication No. 24264/3/e Hygienic precautions for handling plastics products of Vantico and in the Vantico Material Safety Data sheets for the individual products. These publications are available on request and should be referred to for fuller information.

Vantico
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