# vantico

Adhesives and Tooling

Structural Adhesives

### Araldite<sup>®</sup> AT 1-1 One component heat curing powdered epoxy adhesive

Key properties	<ul> <li>Cures at 120 - 200°C</li> <li>Long term heat resistance up to 110°C</li> </ul>						
	<ul><li>Good resistance to weathering and chemicals</li><li>High resistance to static and dynamic stress</li></ul>						
Description	Araldite AT 1-1 is a one component, heat curable, epoxy adhesive in powder form for use in general industrial applications such as the bonding of abrasive and magnetic powders.						
Typical product data							
	Property	Araldite AT1-1					
	Colour (visual) Specific gravity Viscosity (Pas) Flash point (°C)	white to yellowish free flowing powder 1.2 - 1.3 solid material softening point ca 55°C >250					
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						
	<ul> <li>Application of adhesive</li> <li>Araldite AT 1-1 is solid at room temperature, highly viscous at 70 - 90°C, and a low viscosity liquid at 130 - 140°C. It is cured by prolonged heating at temperatures above 120°C.</li> <li>The powdered adhesive can be sprinkled onto the cold joint surfaces, which are then heated briefly to melt the powder and ensure a thorough wetting of the surfaces.</li> <li>No matter how it has been applied, the layer of adhesive will solidify when it cools. The parts to be bonded can be assembled and the adhesive cured either immediately after application, or after several weeks.</li> <li>The recommended bondline thickness is 0.1mm. This is achieved by applying about 140 - 160g adhesive per square metre.</li> </ul>						

**Cure requirements** 

Temperature	°C	120	130	140	150	160	170	180	200
Cure time	h	24	10	5	3	2	-	-	-
	min	-	_	_	_	_	80	55	30
Lap shear strength									
at 23°C	N/mm <sup>2</sup>	32	32	33	33	33	33	33	33

The cure temperatures normally used lie between 130 and 200°C. At 130 - 180°C there is no risk of breaking down the adhesive by exceeding the recommended cure times.

The figures shown in the table are minimum cure times and do not take into account the time needed to heat the material being bonded to the selected cure temperature.

Shock curing temperatures of 200°C and above are feasible, but the correct times must be determined by preliminary tests since they will depend on the thermal conductivity of the materials to be bonded.

## Typical cured properties

Unless otherwise stated, the figures given below were all determined by testing standard specimens made by lap-jointing 170 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 3 hours at 160°C and tested at 23°C Pretreatment - Sand blasting



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

Cure: 3 hours at 160°C



Drum peel test (ISO 4578)

Cure: 3 hours at 160°C 4 - 6 N/mm

#### Coefficient of linear thermal expansion (VSM 77110)

Cure: 3 hours at 160°C

At 22 to 72°C : 64 x  $10^{-6}$  mm/mm°C

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

Cure : 3 hours at 160°C ;Lap shear strength was determined after immersion at 23°C in media shown



Lap shear strength versus tropical weathering

(40/92, DIN 50015; typical average values)

Cure: 3 hours at 160°C ; tested at 23°C



#### Lap shear strength versus heat ageing



Cure:3 hours at 160°C ; tested at: 23°C at 50% rh

#### Fatigue test on simple lap joints (DIN 53285)

Cure: 3 hours 160°C. Test carried out using a load cycle frequency of 95Hz Mean static lap shear strength: 30 N/mm<sup>2</sup>

Fluctuating load as % of static shear strength	No of load cycles to joint failure
40	10 <sup>4</sup>
30	10 <sup>5</sup>
25	10 <sup>5</sup> - 10 <sup>6</sup>
20	10 <sup>6</sup> - 10 <sup>7</sup>
15	>10 <sup>7</sup>

#### Storage

Araldite AT 1-1 may be stored for up to 3 years at less than 18°C. The expiry date is indicated on the label. Storage at higher temperatures may cause sintering. Boxes should not be stacked more than 2 layers high.

## 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 Adhesives and Tooling All recommendations for the use of our products, whether given by us in writing, verbally, or to be implied from the results of tests carried out by us, are based on the current state of our knowledge. Notwithstanding any such recommendations the Buyer shall remain responsible for satisfying himself that the products as supplied by us are suitable for his intended process or purpose. Since we cannot control the application, use or processing of the products, we cannot accept responsibility therefor. The Buyer shall ensure that the intended use of the products will not infringe any third party's intellectual property rights. We warrant that our products are free from defects in accordance with and subject to our general conditions of supply.

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