

## Structural Adhesives

### Araldite® 2024 (XD 4666 A/B)

#### Two component toughened methacrylate adhesive system

##### Key properties

- Tough flexible bonds for use in dynamic environments
- Tolerant to paint baking temperatures after curing
- High impact resistance and peel strength
- Fast build up of strength combined with good working time
- Bonds well to a wide range of metals and plastic materials
- Gap filling to 8mm

##### Description

Araldite 2024 is a two component, room temperature curing, flexible, methacrylate adhesive suitable for rapid bonding and repair on metals, composites and thermoplastics such as ABS, PVC and acrylics.

##### Product data

Properties	2024/A	2024/B	2024 (mixed)
Colour (visual)	Off-white	Blue	Pale blue/green
Specific gravity	ca. 0.96	ca. 1.07	ca. 1.0
Viscosity (Pas)	ca. 120	ca. 60	ca. 180
Pot Life (10 gm at 25°C)	-	-	4 - 5 minutes
Flash point (°C)	9	9	-

##### Processing

###### Pretreatment

The strength and durability of a bonded joint are dependant on proper pretreatment of the surfaces to be bonded, however the methacrylate adhesives can be used effectively with little surface preparation. Ideally 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.

Mix ratio	Parts by weight	Parts by volume
Araldite 2024/A	100	100
Araldite 2024/B	11	10

Resin and hardener are 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 is applied directly to the prepared and dry joint surfaces.

A layer of adhesive 0.10 to 0.20 mm thick will normally impart the greatest lap shear strength to a joint, although joints of up to 4mm gap can be assembled.

Note that layers of adhesive thicker than 8mm will react very vigorously during cure generating large amounts of heat.

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.

We 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.

**Times to minimum shear strength**

Temperature	°C	10	15	23	40
Cure time to reach	hours	-	-	-	-
LSS > 1N/mm <sup>2</sup>	minutes	20	15	10	6
Cure time to reach	hours	-	-	-	-
LSS > 10N/mm <sup>2</sup>	minutes	45	30	15	10

LSS = Lap shear strength.

Note that the adhesive will reduce in volume by ca 7% during cure.

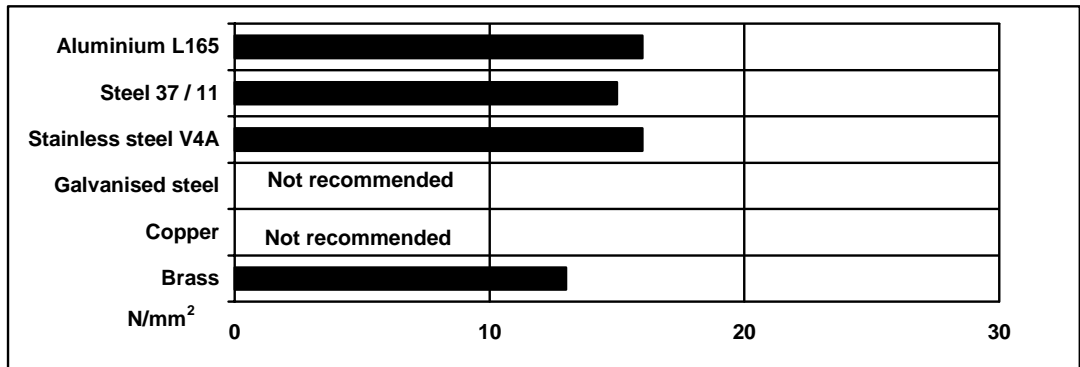
**Typical cured properties**

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 2 days at 23°C and tested at 23°C

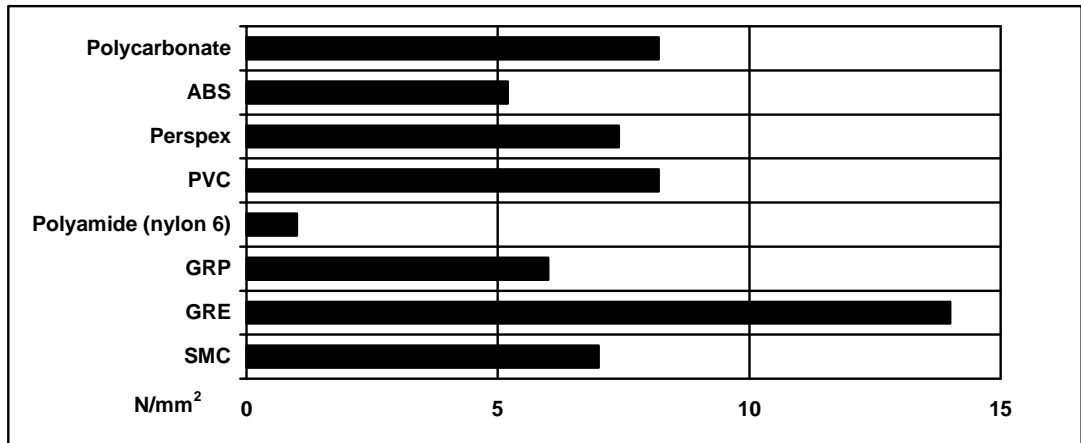
Pretreatment - Sand blasting



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

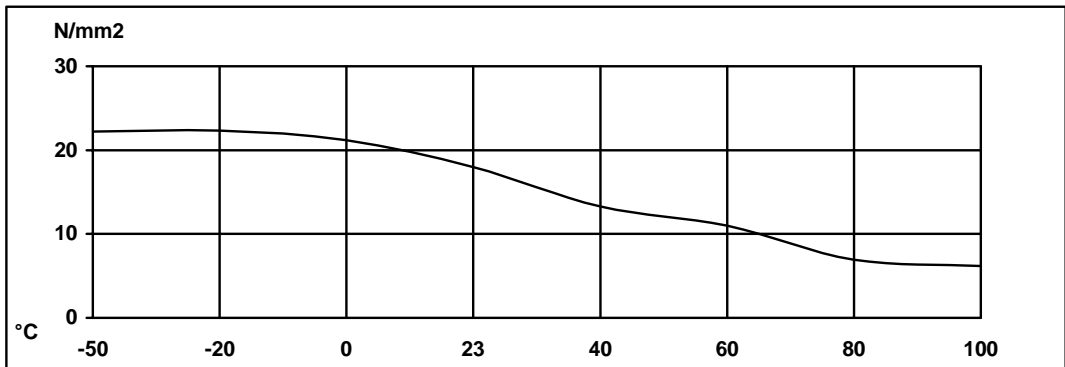
Cured for 2 days at 23°C and tested at 23°C

Pretreatment - Lightly abrade and alcohol degrease.



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

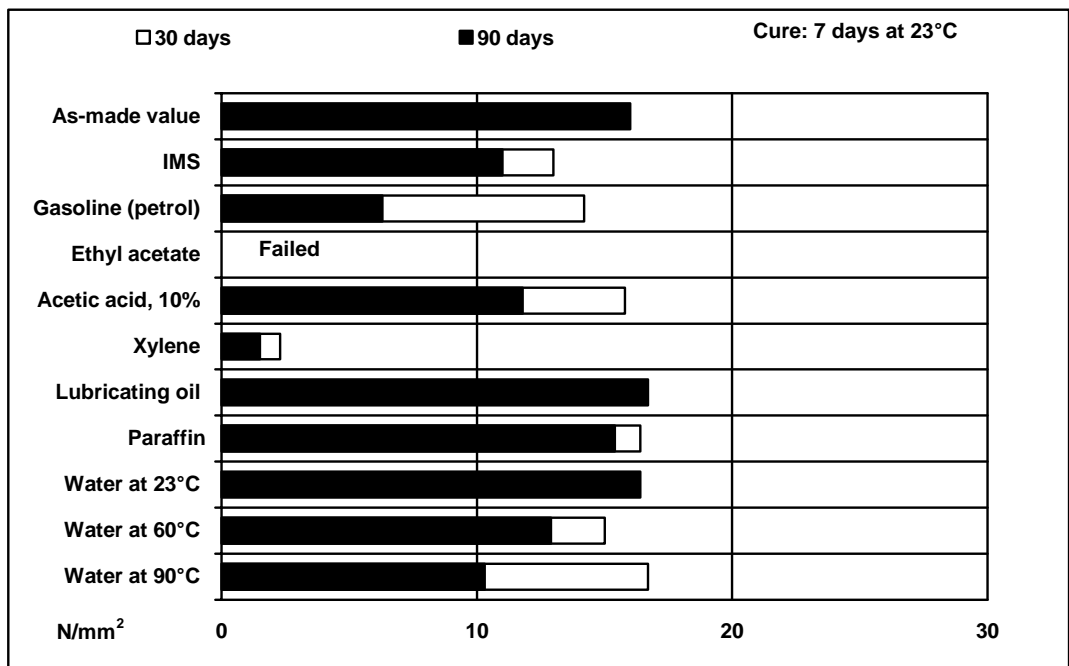
Cure: = 2 days at 23°C



<b>Roller peel test (ISO 4578) at 23°C</b>	6 N/mm
<b>at 80°C</b>	9 N/mm
<b>Impact peel strength at -40°C</b>	5 N/mm
<b>Tensile strength ISO R527 type 1</b>	20 MPa
<b>Elongation at break:</b>	35 - 50%
<b>Coefficient of thermal expansion (-30°C/+30°C)</b>	122 x 10 <sup>-6</sup> /°K

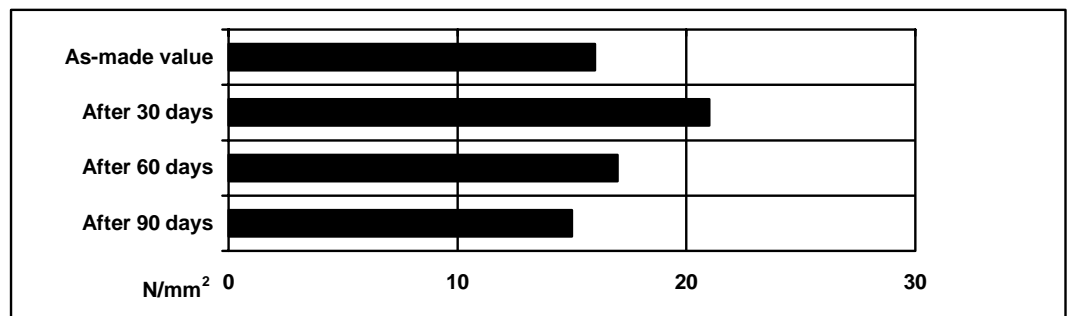
**Lap shear strength versus immersion in various media at 23°C (typical average values)**

Substrate - aluminium



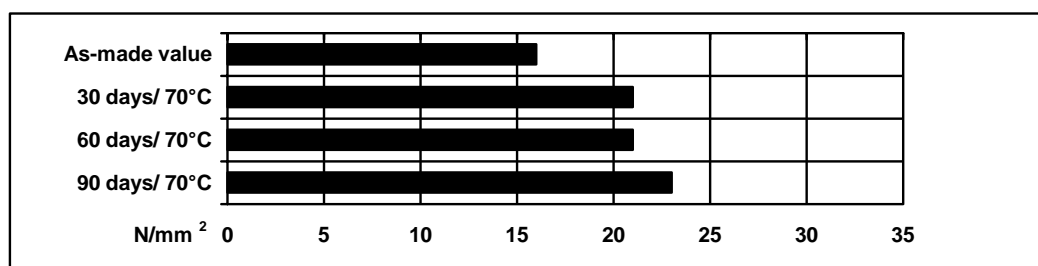
**Lap shear strength versus tropical weathering (40/92, DIN 50015; typical average values)**

Cure: 7 days at 23°C



### Lap strength versus heat ageing

Cure: 7 days at 23°C



Thermal cycling

100 cycles of 6 hour duration from -30°C to 70°C: 20 N/mm

### Shear modulus (DIN 53345)

cured 7 days at 23°C

Temperature	G' modulus	^ (Tan delta)
0°C	700 MPa	0.072
20°C	600 MPa	0.084
40°C	500 MPa	0.094
60°C	300 MPa	0.13
80°C	100 MPa	0.29
100°C	60 MPa	0.60
120°C	10 MPa	0.80
140°C	2 MPa	0.50

### Flexural Properties (ISO 178) Cure 1 day/ 23°C tested at 23°C

Flexural Strength 23.0 MPa

Flexural Modulus 758.3 MPa

## Storage

Araldite 2024/A and Araldite 2024/B may be stored for up to 12 months at 6-18°C provided the components are stored in sealed containers. When stored at 18 - 25°C the life is a maximum of 6 months. The combined expiry life when cold stored and then stored at 15-25°C should not exceed 12 months total. The expiry date, assuming 6-18°C storage is indicated on the packaging. If product is stored cold for significant periods the A component may thicken, and mixing problems can result. This can be reversed by raising the product to room temperature for 3-5 days before use.

## 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.

### Huntsman Advanced Materials

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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