

Structural Adhesives

Araldite® 2021 (XD 4661 A/B)

Two component toughened methacrylate adhesive system

Key properties

- Excellent bond to a wide range of plastics, composites and metals
- High shear and peel strengths
- Very good resistance to chemicals and water
- Very fast curing with good gap filling properties
- Suitable for service at temperatures up to 100°C

Description

Araldite 2021 is a two component, room temperature curing, methacrylate general purpose adhesive for rapid assembly operations on a wide range of substrates.

Product data

	2021/A	2021/B	2021 (mixed)
Colour (visual)	Off white	Beige / yellow	Pale yellow
Specific gravity	1.03	0.96	ca 1
Viscosity (Pas)	ca 45	ca 40	ca 45
Pot Life (100 gm at 25°C)	-	-	2-3 minutes
Flash point (°C)	10	10	-

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 2021/A	100	100
Araldite 2021/B	90	100

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 4mm 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 ²	minutes	20	12	8	2
Cure time to reach	hours	-	-	-	-
LSS > 10N/mm ²	minutes	30	25	18	5

LSS = Lap shear strength.

Note that the adhesive will reduce in volume by ca 13% during cure.

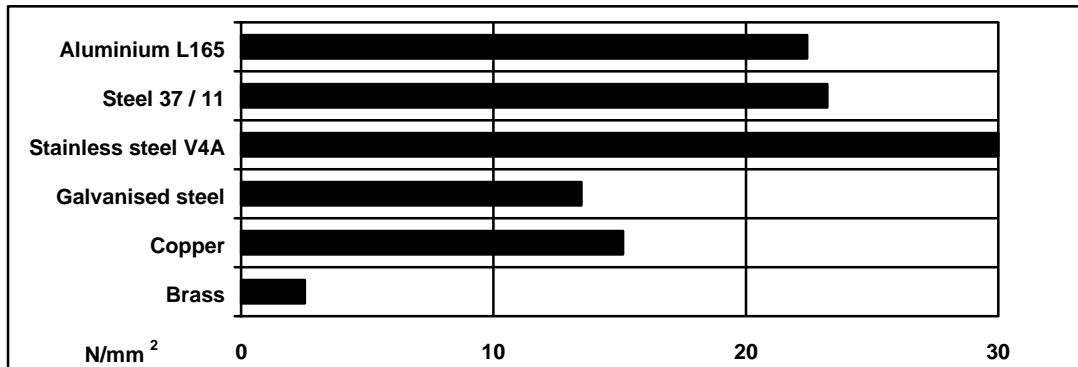
Typical cured properties

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 7 days at 23°C and tested at 23°C

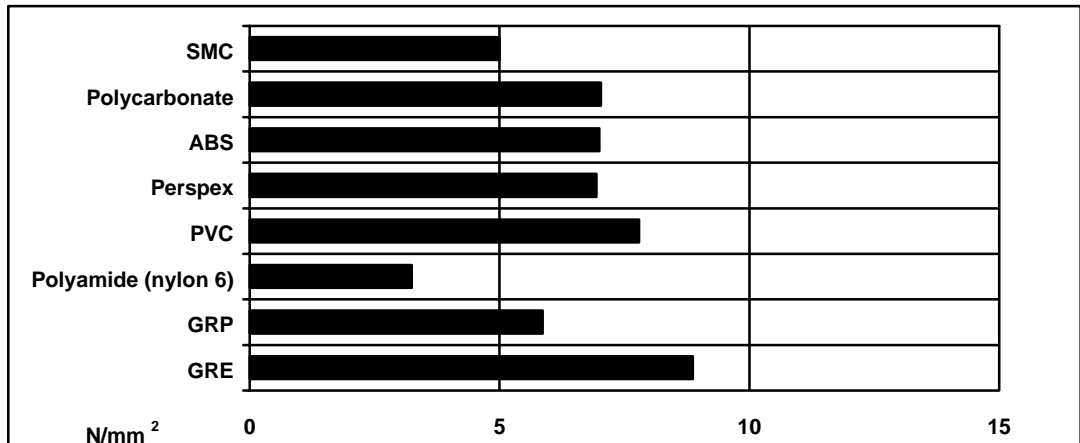
Pretreatment - Sand blasting



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

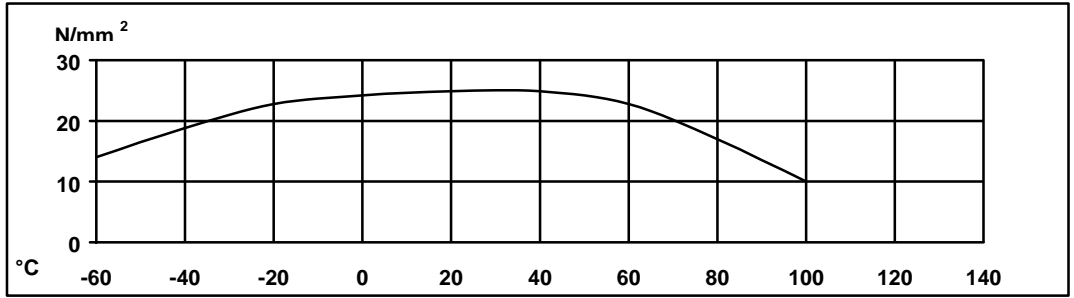
Cured for 7 days at 23°C and tested at 23°C

Pretreatment - Lightly abrade and alcohol degrease.



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

Cure: = 7 days at 23°C



Roller peel test (ISO 4578) 11N/mm

Shore hardness: D78

Elongation at break: 50 - 75%

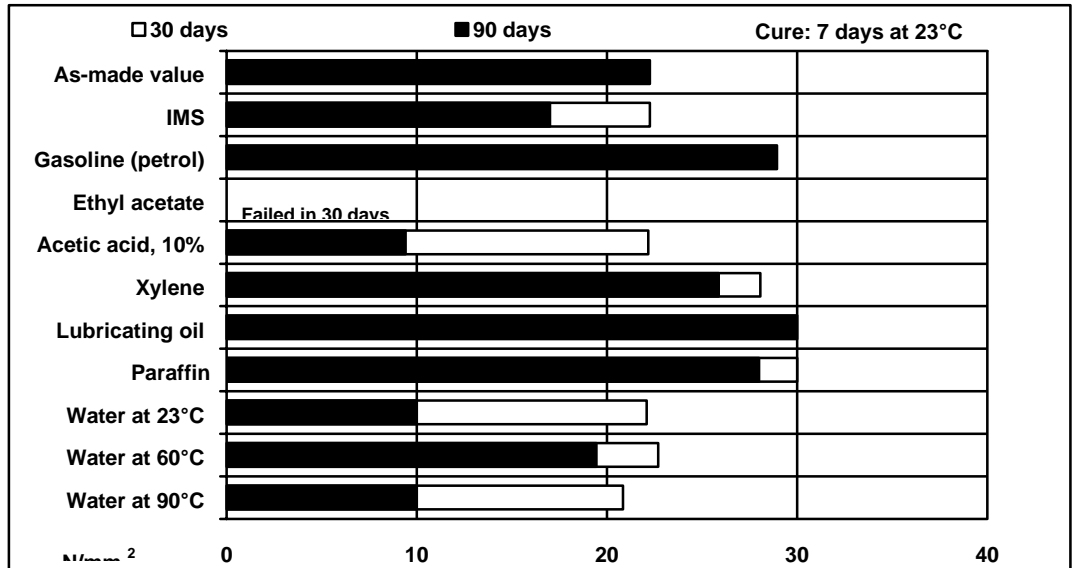
Flexural Properties (ISO 178) Cure 1 day/ 23°C tested at 23°C

Flexural Strength 36.0 MPa

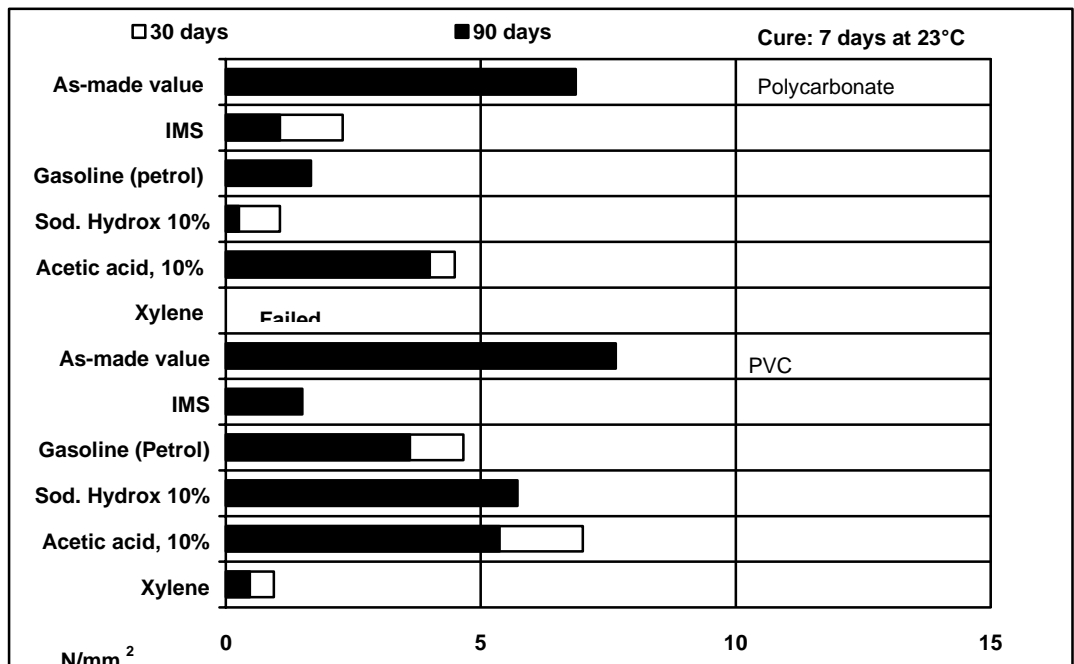
Flexural Modulus 1430.2 MPa

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

Substrate - aluminium

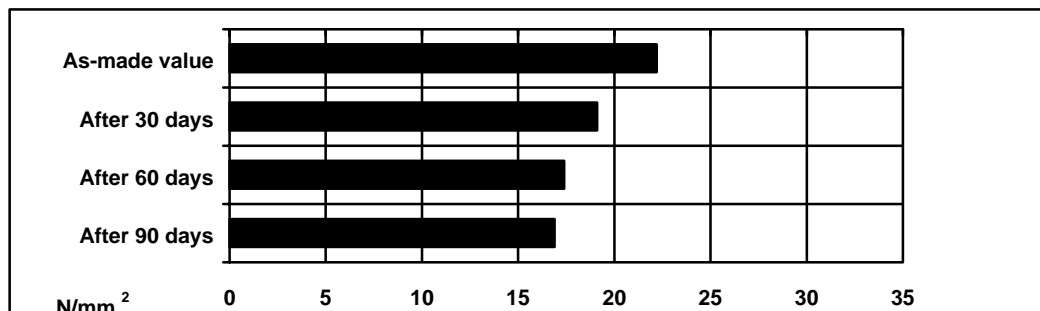


Plastic substrates - Polycarbonate and PVC



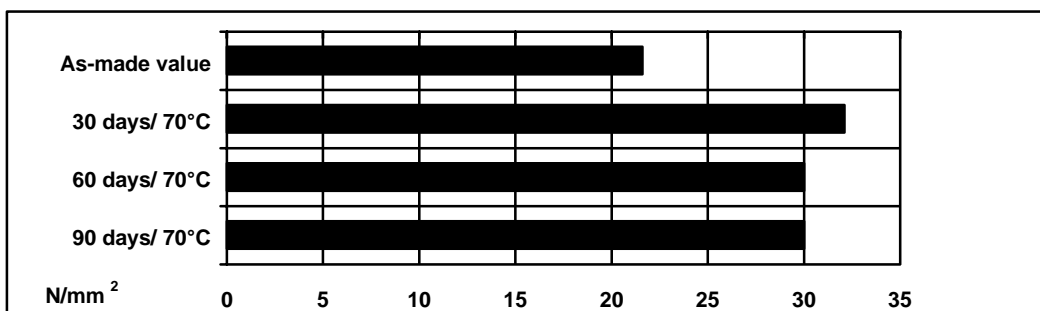
Lap shear strength versus tropical weathering (40/92, DIN 50015: typical average values)

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: 26.9 N/mm²

Storage

Araldite 2021/A and Araldite 2021/B may be stored for up to 18 months at 0-8°C provided the components are stored in sealed containers. When stored at 15 - 25°C the life is a maximum of 12 months. The combined expiry life when stored partially at 0-8°C and partially at 15-25°C should not exceed 18 months total. The expiry date, assuming storage at 0-8°C is indicated on the packaging.

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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