

## Structural Adhesives

### Aerospace Adhesives

#### Araldite<sup>®</sup> 420 A/B

#### Two component epoxy adhesive

##### Key properties

- Very high shear and peel strength
- Extremely tough and resilient
- Good moisture resistance
- Bonds a wide variety of materials including metal, wood, rubber, glass fibre reinforced composites and many plastics

##### Description

Araldite 420 A/B is a two-component, room temperature curing paste adhesive of high strength and toughness.

It is suitable for a wide variety of metal, honeycomb and fibre reinforced composite bonding applications. It has very high shear strength even at temperatures up to 70°C and good peel strength.

Typical uses include:

- Bonding inserts, ferrules, aluminium and composite edge members, joining strips, etc, in both metallic and non-metallic honeycomb sandwich structures.
- Fabrication of composite components using the cut and fold technique.

##### Typical product data

Property	Araldite 420 A	Araldite 420 B	Mixed adhesive	Test Method
Colour (visual)	yellow	blue	dark green	visual
Specific gravity	ca.1.2	ca.1.0	1.1 - 1.2	ASTM-D-792
Viscosity at 25°C (Pas)	100 - 300	0.6 - 1.4	35 - 45	ASTM-D-2196
Gel time (100 gm at 25°C) mins	-	-	60	ASTM-D-2471

##### 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 or other proprietary degreasing agents 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.

Mix ratio	Parts by weight	Parts by volume
Araldite 420 A	100	100
Araldite 420 B	40	50

Stir the two components thoroughly together until the two colours are completely blended, without any visible streaks. Automatic mixing / dispensing may be used.

Araldite 420 A/B is also supplied in cartridges incorporating mixers and can be applied as ready to use adhesive with the aid of the tool recommended by Huntsman Advanced Materials.

#### Usable life

Due to exothermic reaction between the two components the usable life depends to some extent on the quantity mixed and the shape of the container. Use of a shallow container will extend the usable life and as a rough guide:

For a 50gm mix, usable life at 25°C is 2 hours

For a 100gm mix, usable life at 25°C is 1 hour

#### Application of adhesive

The resin/hardener mix is applied directly or 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.

#### Curing

Once applied, Araldite 420 A/B will gel in 3 - 4 hours at 25°C and will be sufficiently cured after 5 hours to allow the bonded component to be handled. After 4 - 5 days the adhesive will obtain 90% of its full strength and achieve full strength after 1 to 2 weeks at room temperature.

Cure can be accelerated by heating. 4 hours at 50°C or 1 hour at 120°C will be sufficient to achieve full strength.

Shear properties can be improved, particularly at elevated temperatures, by post-curing for up to 24 hours at 70°C.

#### Lap shear strength after various cure times at 23°C

5 hours: 1 N/mm<sup>2</sup>

6 hours: 8 N/mm<sup>2</sup>

7 hours: 9 N/mm<sup>2</sup>

---

#### Typical cured properties

These figures are for guidance and do not constitute a specification.

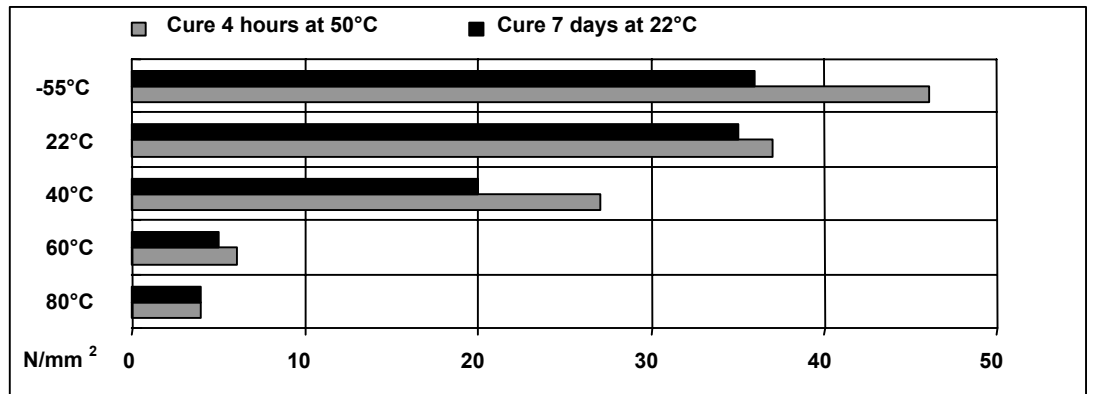
**Bell peel** 150 N/25mm (60°C peel using 2024-T3 clad aluminium adherents at 25°C).

#### Honeycomb bonding results (in accordance with MIL-A-25463)

Beam shear at 22°C: 12kN (core failure); Flatwise tensile at 22°C: 8.5 N/mm<sup>2</sup>

Metal: 2024 - T3; Core: 7.9 - ¼ - 40 5052

**Variation of lap shear strength as a function of temperature**



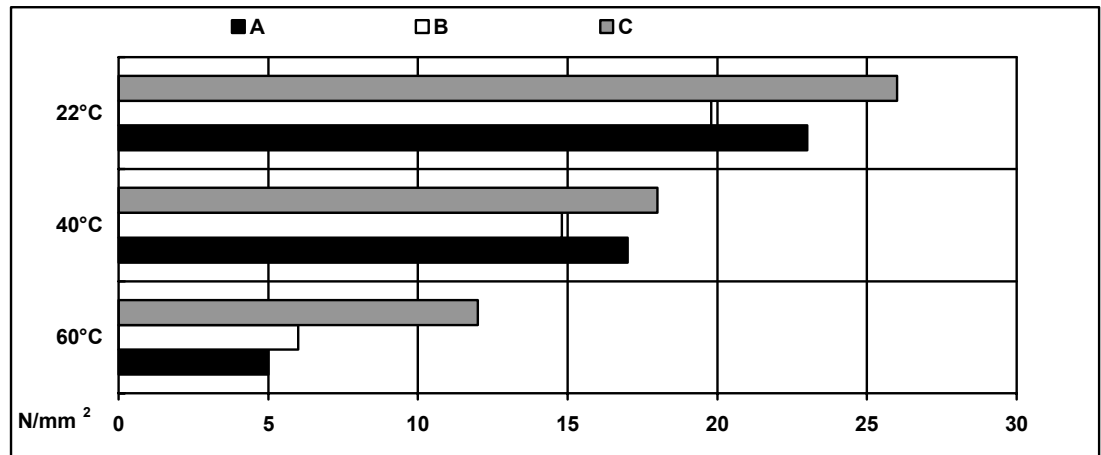
**Lap shear strength: variation after exposure to 95% RH at 60°C**

(cured 7 days at 23°C)

C = 30 days exposure

A = 90 days + drying for 16 hours at 60°

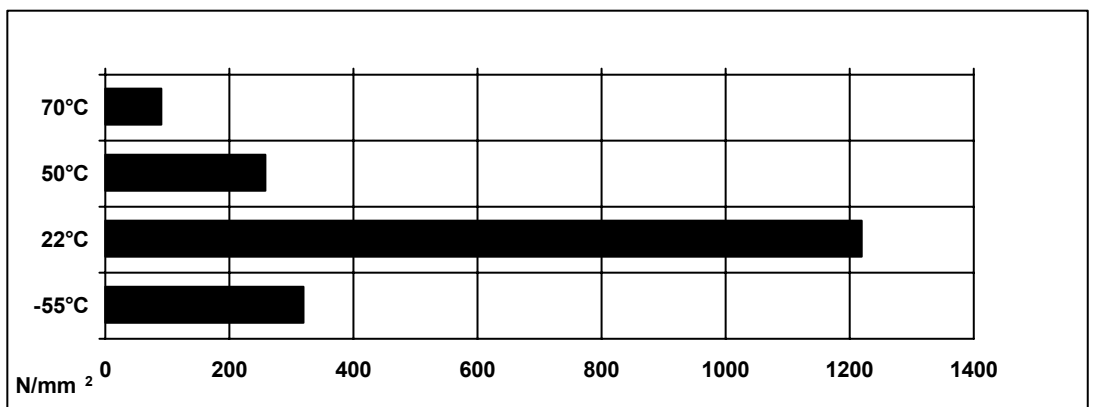
B = 90 days exposure



**Honeycomb peel performance**

(Cured 7 days at 23°C)

Tested in accordance with MIL-A-25463 using approx. 300g/m² of Araldite 420 per skin.



### Effects of alternative cure schedules on lap shear strength performance (LSS)

Test	Results		Test methods	
	Cure cycle	Test temp (°C)		LSS (MPa)
70°C for	1 hour	22	37	A.E.C.M.A. EN2243-1
	2 hours	70	4	
	6 hours	70	6	
	16 hours	70	11	
	24 hours	70	10	
120°C for 1 hour		22	43	A.E.C.M.A. EN2243-1
		50	29	
		70	10	

#### Storage

Araldite 420 A/B may be stored for up to 36 months at 2-40°C, provided that the components are stored in their original sealed containers. The expiry date is indicated on the label.

#### 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.

Duxford, Cambridge  
England CB2 4QA

© Huntsman Advanced Materials (Switzerland) GmbH all rights reserved  
® Araldite is a registered trademark of Huntsman LLC or an affiliate thereof in one or more, but not all, countries.

Tel: +44 (0) 1223 832121  
Fax: +44 (0) 1223 493322  
www.araldite.com