

Structural Adhesives

Aerospace Adhesives Araldite® 501 A/B Composite repair adhesive

Key properties

- Low viscosity
- Good mechanical strength
- High temperature resistance up to 120°C
- Ambient or elevated temperature curing

Description

Araldite 501 A/B is a two part, ambient or warm curing, epoxy composite repair adhesive. It was developed for the repair of composite components of aircraft.

Typical product data

Property	Araldite 501 A	Araldite 501 B	Mixed adhesive
Colour (visual)	colourless	blue	blue
Specific gravity	1.15 - 1.25	0.8 - 0.85	1.1 - 1.2
Viscosity at 25°C (Pas)	ca. 80	ca. 0.02	3 - 4
Gel time (100 gm at 25°C) mins	-	-	90

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.

All machining and preparation of the repair surfaces should be completed before Araldite 501 A/B is prepared for use. All surfaces must be clean, dry and free from grease or loose deposits, and should have a uniform, finely roughened (matt) finish. This enables the resin to wet the surface properly, thus creating a high strength bond.

Mix ratio	Parts by weight	Parts by volume
Araldite 501 A	100	100
Araldite 501 B	15	22

The resin and hardener should be blended until they form a homogeneous mix.

Application of adhesive

Impregnate the dry, repair fabric with Araldite 501 A/B using a brush or spreader bar on a release-covered surface. Cut layers of the wet fabric to shape and position on the prepared damaged area. After consolidating with a roller, cover the assembly with a vacuum bag lay-up and apply vacuum throughout the cure cycle. A heater mat placed between the release film and breather layer will reduce cure time.

If the honeycomb is exposed in the damaged area, it should first be filled with one of Huntsman Advanced Materials' extensive range of syntactic filler pastes, and cured before application of Araldite 501 A/B and fabric.

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.

Typical cure schedules

At 25°C, Araldite 501 A/B achieves 50% of its full strength approximately 2 days after mixing, 80 - 90% after 7 days and full strength after 7 weeks.

Where circumstances permit, curing time can be reduced by warming the repair assembly:

At 45°C, Araldite 501 A/B will fully cure in 16 hours.

At 70°C, Araldite 501 A/B will fully cure in 2 hours.

Typical cured properties

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.

The following tests were conducted using 8 harness satin glass cloth, No. 181, with P 703 finish, and were carried out on specimens cut from laminates cured for 3 hours at 66°C.

Test	Units	Results			Test method
		Dry at 23°C	Wet at 23°C	Dry at 70 °C	
Flexural strength	MPa	530	300	400	ASTM-D-790
Flexural modulus	GPa	22	17	18	ASTM-D-790
Tensile strength	MPa	320	200	280	ASTM-D-638*
Tensile modulus	GPa	20	20	19	ASTM-D-638*
Flexural modulus on unreinforced material	GPa	3.5	-	-	ASTM-D-790
Tensile strength on unreinforced material	MPa	80	-	-	ASTM-D-638*

* Using ISO R527 type 1 specimens.

Typical Tg values of Araldite 501 determined by DMTA.

Cure	Tg
3 days at 25°C	119°C
7 days at 25°C	123°C
2 hours at 70°C	121°C

Storage

Araldite 501 A/B may be stored for up to 3 years at 2 - 40°C, provided 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.

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