HUNTSMAN

Enriching lives through innovation

Advanced Materials

Araldite® 2053-05

Structural Adhesives

TECHNICAL DATASHEET

Araldite® 2053-05
Two-component toughened methacrylate adhesive system

Key properties

- **Tough, high-elongation adhesive**
- **Excellent ageing and weathering resistance**
- **5-minute working time with fast cure**
- **Resistant to e-coat cycles up to 200°C**
- **Minimum surface treatment required**

Description

Araldite® 2053-05 is a two-part toughened methacrylate adhesive designed for structural bonding. This adhesive has an open time of 5 minutes and combines high elongation at break with an excellent resistance to ageing and weathering, and is suitable for bonding metals, composites and plastics.

Product data

Properties	Araldite® 2053-05 A	Hardener 2053 B	Mixed adhesive
Colour	Off-white	Black	Dark grey
Specific gravity	1.04	1.2	ca. 1.1
Viscosity at 25°C (Pa.s)	ca. 100	ca. 100	non-sagging
Pot life (20 gr. at 25°C)	-	-	6 - 10 minutes
Open time	-	-	5 minutes
*Lap shear strength at 25°C (A501)**	-	-	*> 15 MPa*
*Time to peak exotherm (20gr) (A159)**	-	-	*5 – 18 minutes*

** Specified data are on a regular basis analysed. Data which is described in this document as 'typical' is not analysed on a regular basis and is given for information purposes only. Data values are not guaranteed or warranted unless if specifically mentioned.*

Processing

Pretreatment

The strength and durability of a bonded joint are dependent on proper pretreatment of the surfaces to be bonded. 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® 2053-05 A	100	100
Hardener 2053 B	13	10

Application of adhesive

The resin/hardener mix may be applied manually or using automated application to pretreated surfaces ready for bonding. Huntsman's technical support group can advise further on surface pre-treatments as well as suitable application methods and dispensing equipment.
An adhesive bond thickness of 0.1 to 0.30 mm will typically impart the greatest lap shear strength to a joint. Proper adhesive joint design and surface preparation is critical to produce a durable bond. The bonded components should be assembled and clamped or held in a fixed position as soon as possible after applying the adhesive, at least until the handling strength is reached (handling strength considered as 1MPa lap shear strength – see table below).
For more information regarding surface preparation and pretreatment, adhesive joint design, dispensing systems and adhesive properties, please request the Technical Guide for ARALDITE® Adhesives.

Temperature of application: the recommended temperature range for application is 10°C to 40°C.

Cure exotherm: please note that the mixed adhesive can generate significant amounts of heat (exotherm) during cure if cured in large volumes. Care is therefore needed when mixing or curing large amounts of the product.

Equipment maintenance

Tools should be cleaned using a suitable solvent, such as methoxy propanol or acetone, before adhesive residues have had time to cure. Removal of cured residues with solvents is not possible, and mechanical abrasion must be used.
If solvents are used for cleaning, operatives should take the appropriate precautions and, in addition, avoid skin and eye contact.

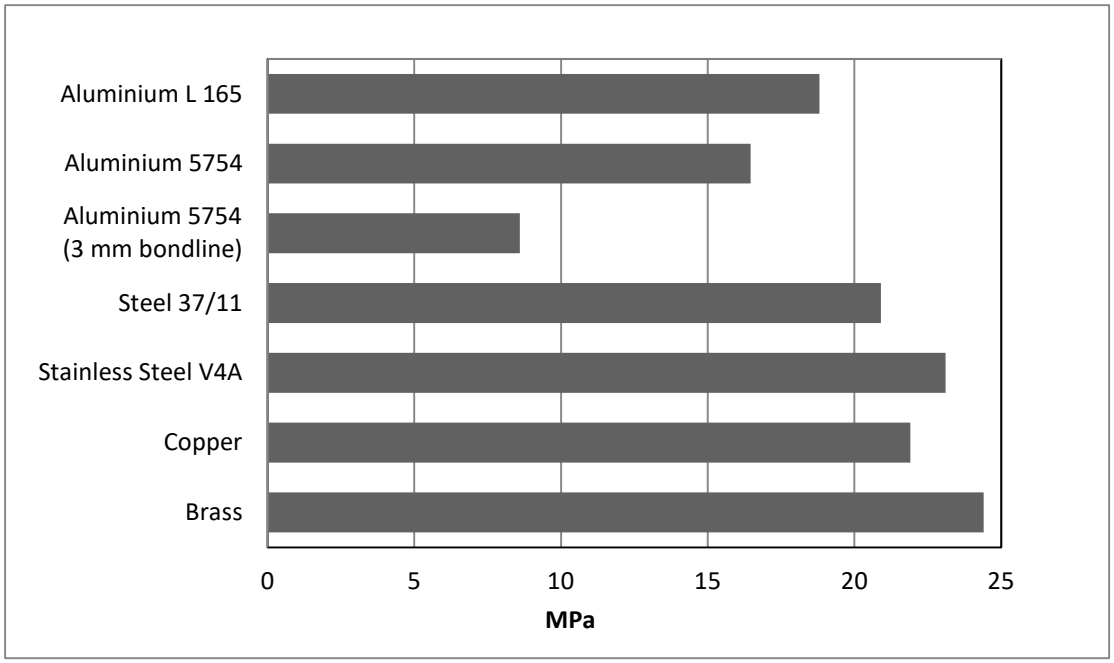
Temperature	°C	10°C	23°C	30°C	40°C
Cure time to reach	hours				
LSS > 1MPa	minutes	40	20	10	3
Cure time to reach	hours				
LSS > 10MPa	minutes	60	30	15	6

Typical cured properties

Unless otherwise stated, the figures given below were all determined by testing standard specimens made by lap-jointing 114 x 25 x 1.6 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) (typical average values)

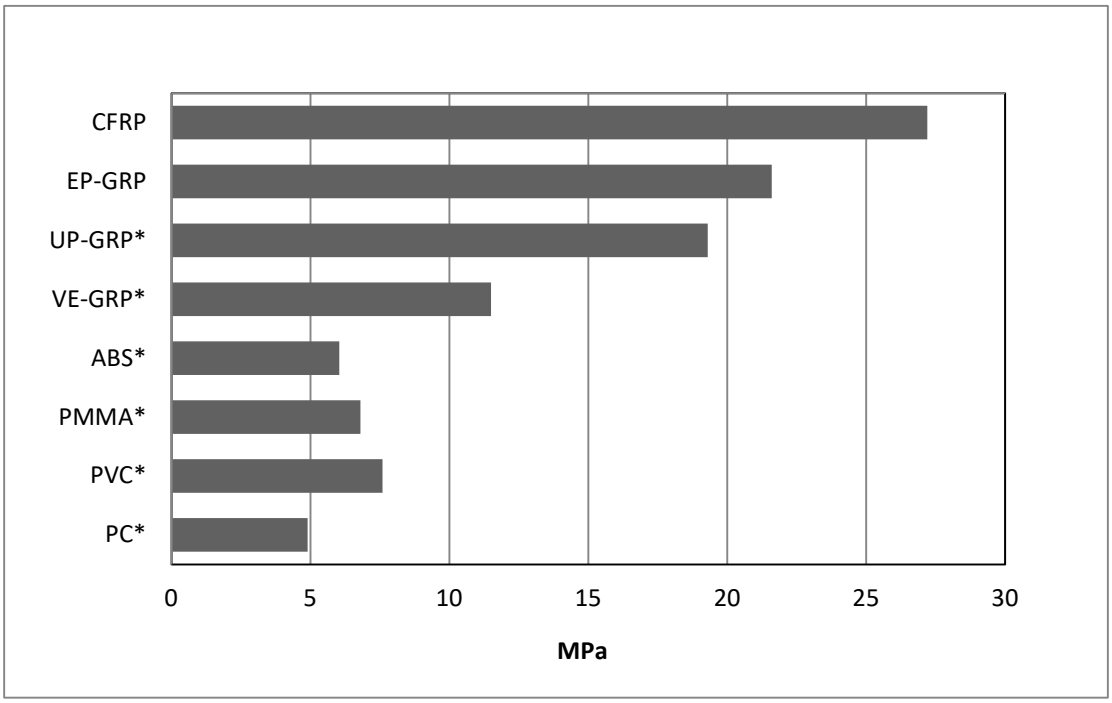
Cured for 7 days at RT and tested at 23°C. Substrates sandblasted and degreased with acetone.



Note: Araldite® 2053-05 is not recommended for bonding galvanized steel

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

Cured for 7 days at RT and tested at 23°C. Substrates abraded and degreased with isopropanol.



(*): UP-GRP, VE-GRP, ABS, PMMA, PVC, PC, substrate failure or substrate delamination observed

Tensile Properties (ISO 527) (Typical average values) Cure 7 days at RT and test at 23°C

Tensile Strength	20 MPa
Tensile Modulus	1000 MPa
Elongation at break	ca. 50%

Glass Transition Temperature (DMA) (Typical average values) Cure 7 days at RT

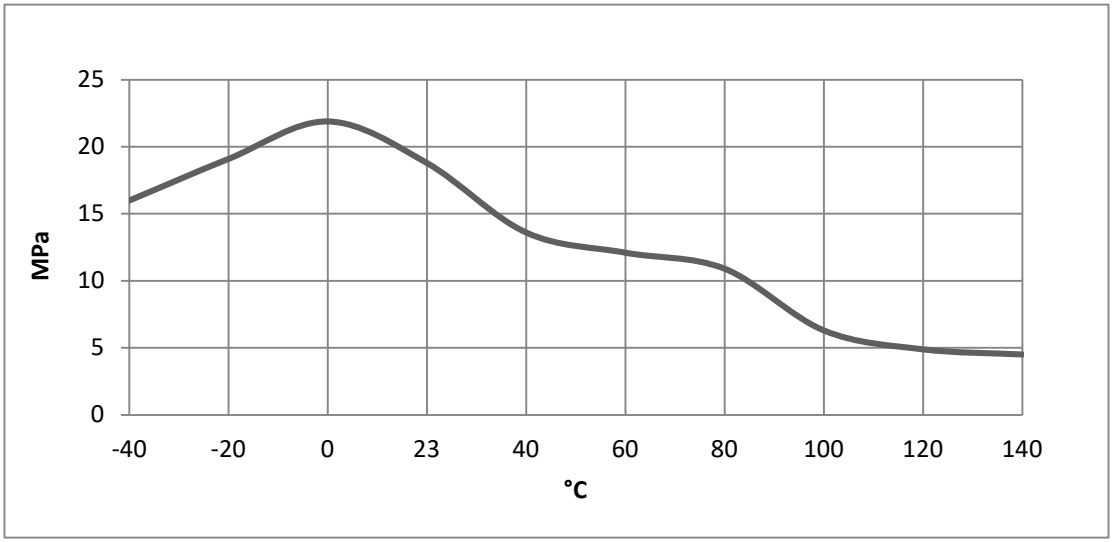
Midpoint	115°C

Roller Peel Strength (Typical average values) Cure 7 days at RT

Sandblasted Aluminium L165	8.5 N/mm

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

Substrates sandblasted and degreased with acetone. Cure: 7 days at RT.

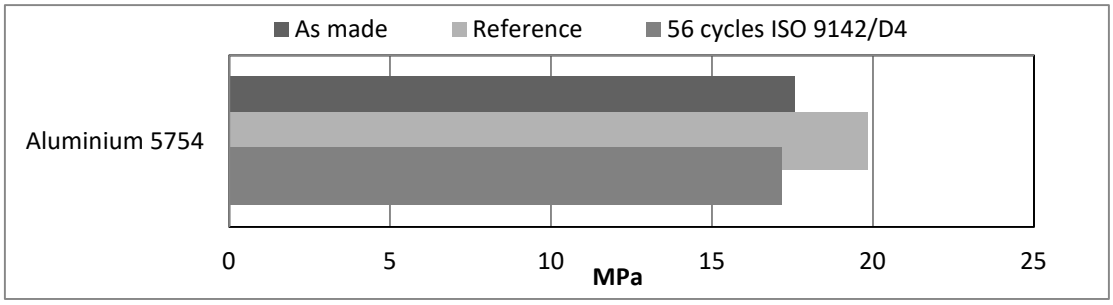


Lap shear after cycling ageing (typical average values)

Cure: 7 days at RT. Test at 23°C. Substrates sandblasted and degreased with acetone.

Reference sample: 28 days at 23°C / 50% relative humidity.

Humid-heat and cold cycle (-40°C / 70°C 90% RH) 56 cycles (28 days) according to ISO 9142/D4

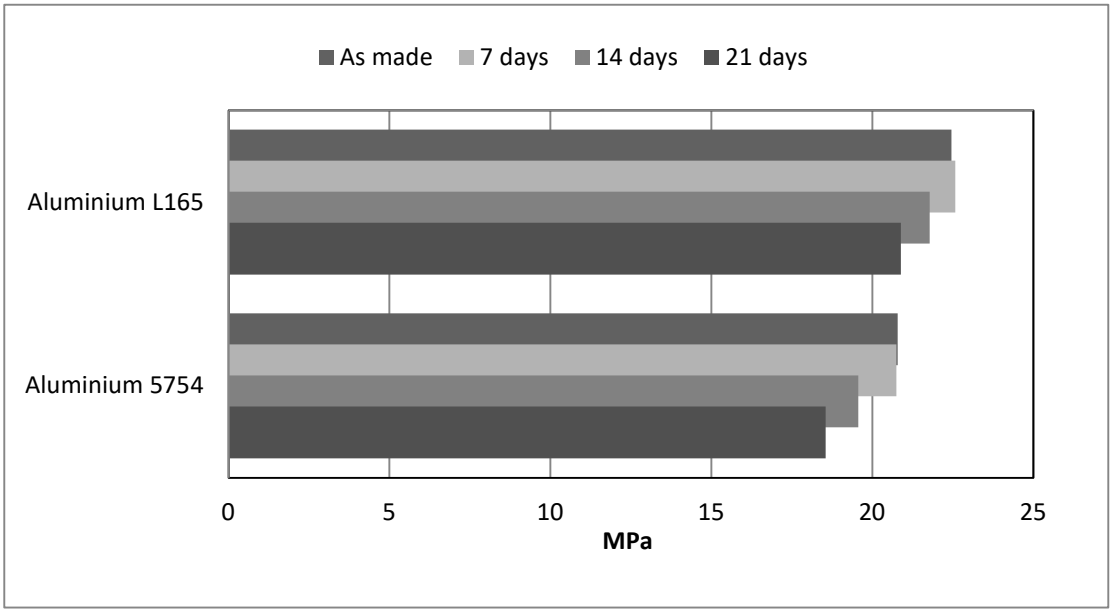


Lap shear strength versus cataplasma ageing (typical average values)

Cure: 7 days at RT. Test at 23°C. Substrates sandblasted and degreased with acetone.

Cataplasma ageing according to ISO 9142/E2 (x days 70°C in soaked cotton / 15 hours -20°C / 24 hours recovery).

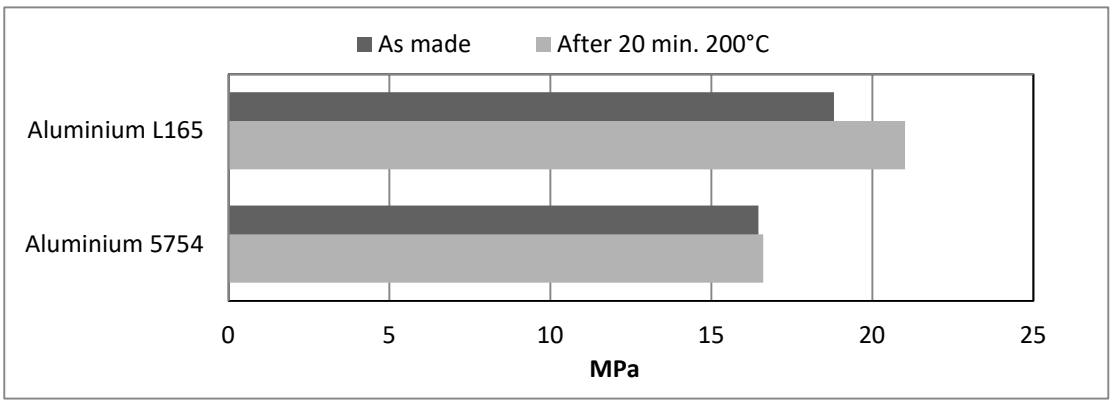
Test: at 23°C.



Lap shear strength after coating post-cure cycle at 200°C (typical average values)

Cure: 7 days at RT. Test at 23°C. Substrates sandblasted and degreased with acetone.

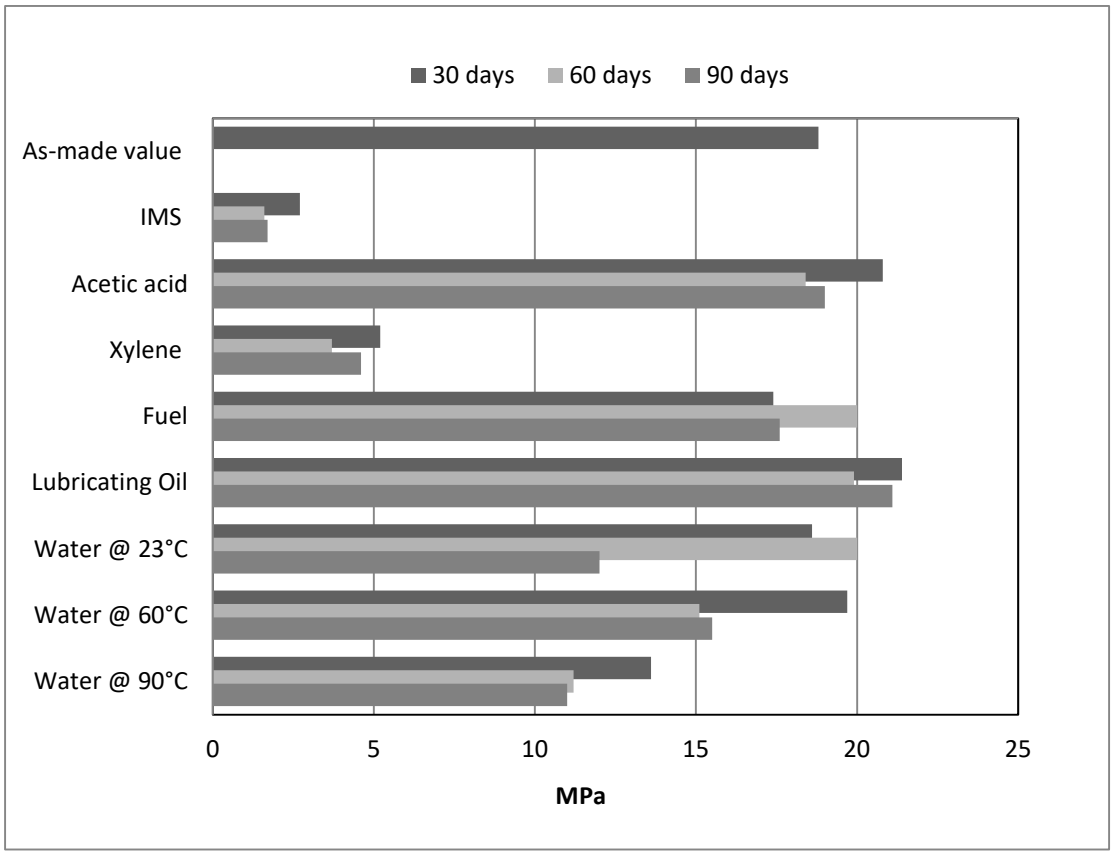
Ageing with a simulated coating post-cure cycle of 20 minutes at 200°C in a oven. Test performed at 23°C



Lap shear strength versus immersion in various media (ISO4587) (typical average values)

On aluminium L165, pretreatment: sandblasting. Cure: 7 days at RT. Tested at 23°C.

LSS was determined after immersion for 30 days at 23°C.



Storage

Araldite® 2053-05 may be stored for up to 24 months at 2 – 8°C provided the components are stored in the original sealed containers. The expiry date is indicated on the packaging.

The product should be allowed to reach room temperature before use. The total time at room temperature should not exceed 9 months. Long term exposure above 25°C will reduce the shelf life of the product.

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.

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