

Advanced Materials

ARALDITE® 2020-1 (XW 396-1 Resin / XW 397-1 Hardener)

Structural Adhesives

PROVISIONAL TECHNICAL DATA SHEET

Two-component transparent epoxy adhesive

Key properties

- Low viscosity, colourless transparent adhesive
- Especially suitable for glass and ceramic bonding
- Suitable for clear castings and laminates
- Refractive index similar to glass

Description

ARALDITE® 2020-1 (XW 396-1 Resin / XW 397-1 Hardener) is a two-component, room-temperature curing, low-viscosity adhesive designed for glass bonding and applications requiring a transparent adhesive.

It is also suitable for bonding a wide variety of metals, ceramics, rubbers, rigid plastics and many other materials in common use, and may be used for small castings and component potting.

Product data

	XW 396-1 RESIN	XW 397-1 HARDENER	MIXED ADHESIVE
Appearance, visual	Transparent, colourless	Transparent, colourless	Transparent, colourless
Specific gravity	ca. 1.12	ca. 0.95	ca. 1.1
Viscosity at 25°C (mPas)	120 - 220	150 - 250	ca. 300
Pot life (100g at 23°C)	-	-	ca. 160 minutes
Refractive index	-	-	ca. 1.50

Data in this document shows 'typical' values and is given for information purposes only. Data values are not guaranteed or warranted unless specifically mentioned.

Processing

Pretreatment

The strength and durability of a bonded joint are dependent on proper pretreatment of the surfaces to be bonded. At the very least, joint surfaces should be cleaned with a good degreasing agent such as methoxy propanol, acetone or other proprietary degreasing agents 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. Abrading should be followed by a second degreasing treatment.

Mix ratio	Parts by weight	Parts by volume
XW 396-1 Resin	100	100
XW 397-1 Hardener	28	33

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

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 held in a fixed position as soon as the adhesive has been applied, 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, visit www.aralditeadhesives.com and download the Technical Guide for ARALDITE® Adhesives.

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.

Typical times to minimum shear strength

Temperature	°C	10	15	23	40	60	100
Cure time to reach	hours	28	25	16	4	-	-
LSS > 1N/mm ²	minutes	-	-	-	-	70	8
Cure time to reach	hours	68	42	25	9	2	-
LSS > 10N/mm ²	minutes	-	-	-	-	-	15

LSS = Lap shear strength.

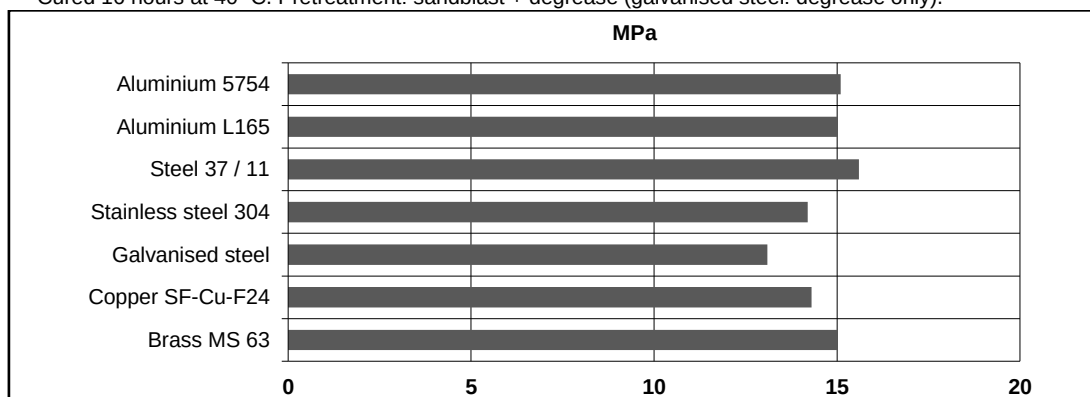
Note – There is a risk of exotherm when casting the product in bulk or in thick sections (>1cm). This should be assessed before proceeding.

Typical cured properties

The data shown below is provided solely as technical information and do not constitute a product specification. Unless otherwise stated, the figures given below were determined by testing standard specimens made by lap-jointing 100 x 25 x 1.6 mm strips of sandblasted aluminium alloy. The bond area was 12.5 x 25 mm, with bonded specimens cured under light clamping pressure. Lap shear testing was carried out at 23°C at 10mm/min unless indicated otherwise.

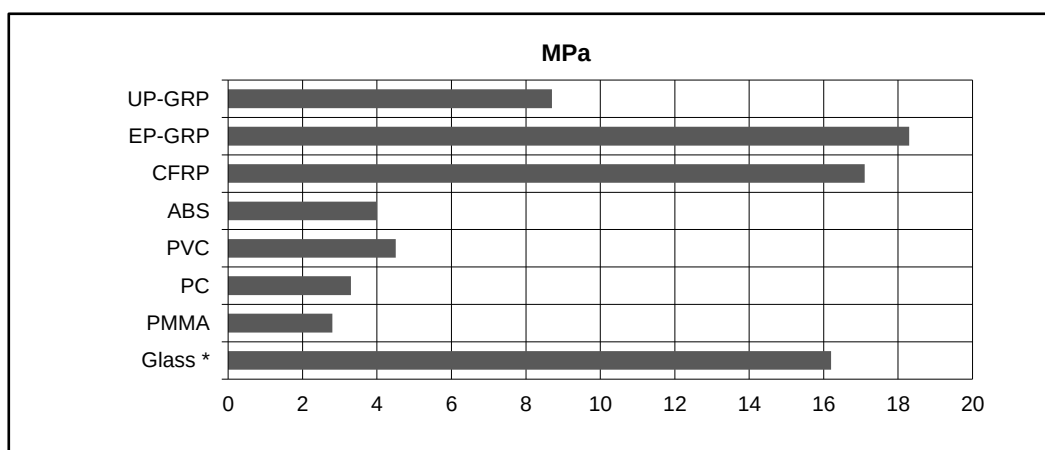
Average lap shear strengths of typical metal-to-metal joints (ISO 4587; typical average values)

Cured 16 hours at 40°C. Pretreatment: sandblast + degrease (galvanised steel: degrease only).



Average lap shear strengths of typical joints – other materials (ISO 4587; typical average values)

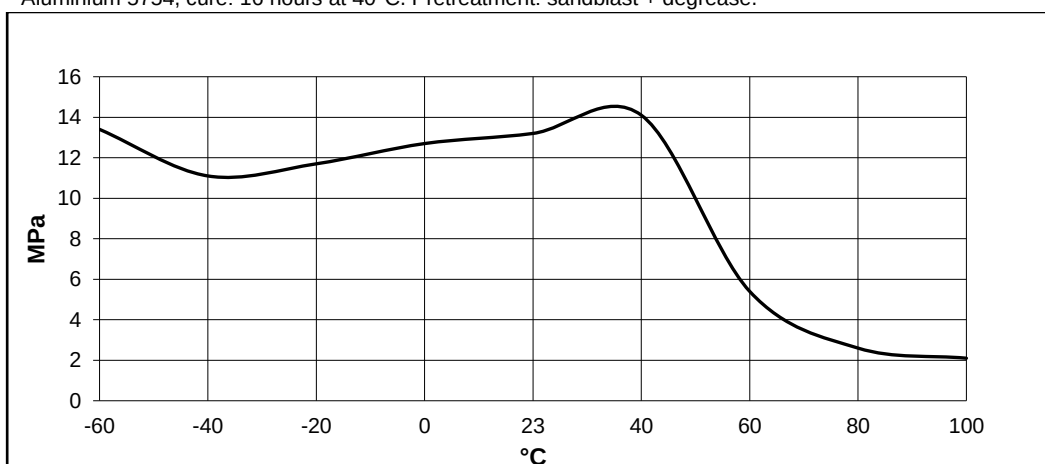
Cured 16 hours at 40°C. Pretreatment: light abrasion + degrease.



* Lap-bonded glass specimens tested in compression mode

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

Aluminium 5754, cure: 16 hours at 40°C. Pretreatment: sandblast + degrease.



Tensile Properties (ISO 527) Cure 16 hours at 40°C, tested at 23°C (typical average values)

Tensile strength	55 MPa
Tensile modulus	2170 MPa
Elongation at break	11.9 %

Flexural Properties (ISO 178) Cure 16 hours at 40°C, tested at 23°C (typical average values)

Flexural strength	70 MPa
Flexural modulus	2320 MPa

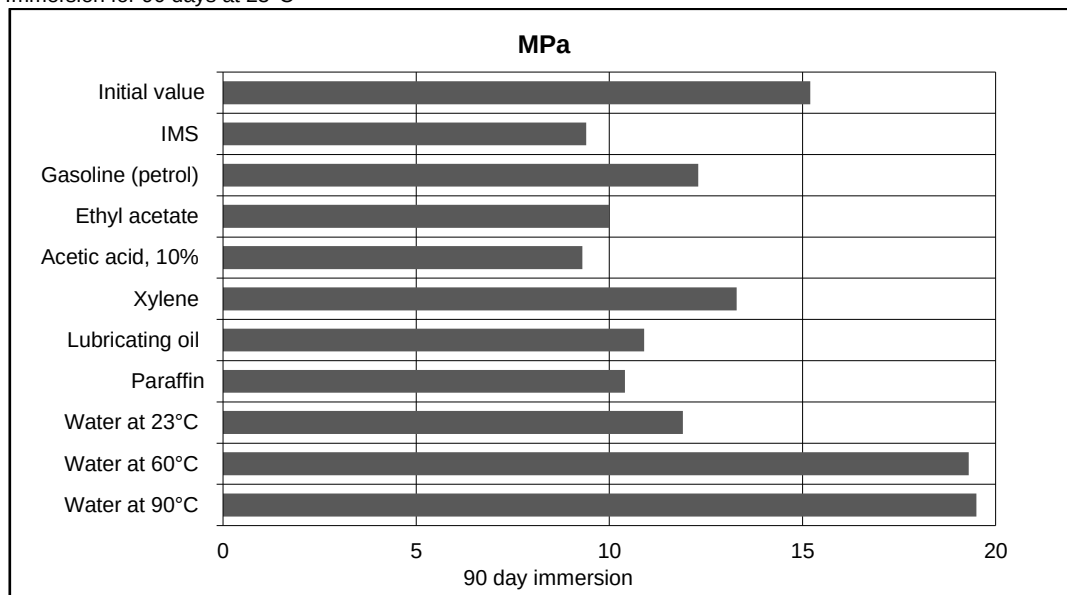
DMA (Dynamic Mechanical Analysis ISO 6721) Cure 16 hours at 40°C (typical average values)

Tg midpoint	53°C
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Lap shear strength versus immersion in various media (ISO 4587; typical average values)

Aluminium 5754, cured 16 hours at 40°C and tested at 23°C. Pretreatment: sandblast + degrease

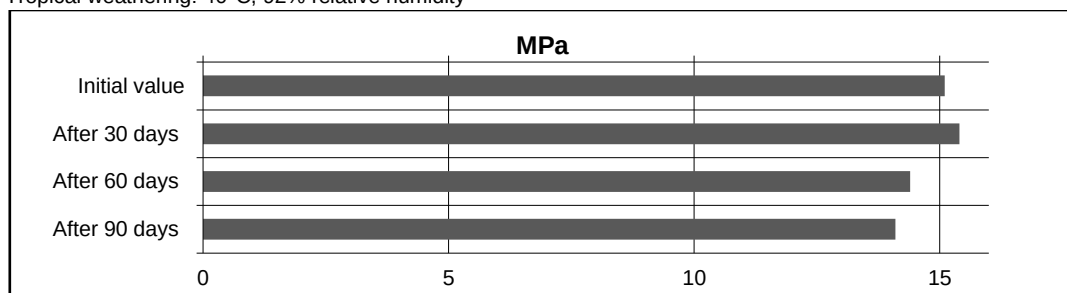
Immersion for 90 days at 23°C



Lap shear strength versus tropical weathering (DIN 50015; typical average values)

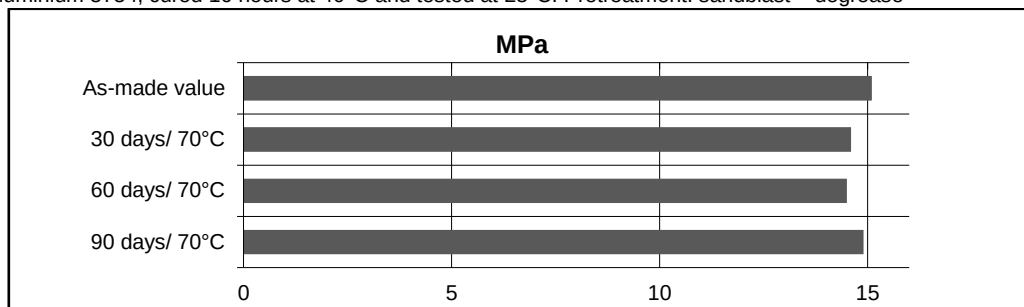
Aluminium 5754, cured 16 hours at 40°C and tested at 23°C. Pretreatment: sandblast + degrease

Tropical weathering: 40°C, 92% relative humidity



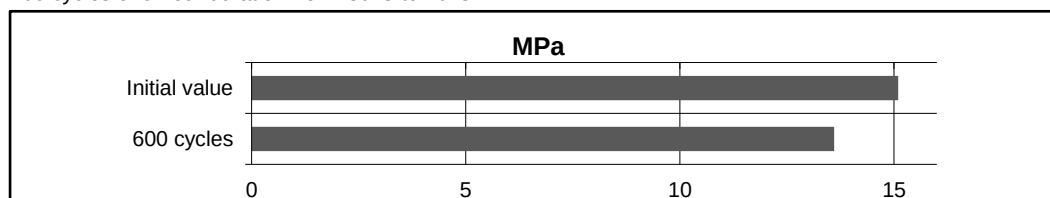
Lap shear strength versus heat ageing at 70°C (ISO 4587; typical average values)

Aluminium 5754, cured 16 hours at 40°C and tested at 23°C. Pretreatment: sandblast + degrease



Lap shear strength versus thermal cycling (ISO 4587; typical average values)

Aluminium 5754, cured 16 hours at 40°C and tested at 23°C. Pretreatment: sandblast + degrease
100 cycles of 6-hour duration from -30°C to 70°C



Storage

ARALDITE® 2020-1 (XW 396-1 Resin / XW 397-1 Hardener) should be stored at room temperature in the original sealed containers, kept in a dry place protected from extremes of temperature and strong sunlight. The expiry date is indicated on the labels.

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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Products may be toxic and require special precautions in handling. The user should obtain Safety Data Sheets from Huntsman Advanced Materials containing detailed information on toxicity, together with proper shipping, handling and storage procedures, and should comply with all applicable safety and environmental standards.

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