

Advanced Materials**XB 5090-1 / Arathane[®] HY 5611-1****Structural Adhesives****XB 5090-1 / Arathane[®] HY 5611-1
Two component polyurethane adhesive****Key properties**

- Standard curing speed
- Good environmental and chemical resistance
- Suitable for bonding panel laminates

Description

XB 5090-1/Arathane[®] HY 5611-1 is a standard two component room temperature curing liquid polyurethane adhesive, particularly suitable as a laminating adhesive for bonding GRP, wood, aluminium and foam sandwich constructions.

Typical product data

	XB 5090-1	Arathane[®] HY 5611-1	Mixed Adhesive
<i>Colour (visual) (A112)*</i>	<i>White/beige paste</i>	Brown liquid	Beige liquid
Specific gravity	1.6	1.2	1.4
<i>Viscosity (Pas) (A81)*</i>	<i>7.5 - 12.0</i>	<i>0.18 – 0.24</i>	ca. 3-5
Pot Life (100 gm at 25°C)	-	-	90-100 min
<i>Lap shear strength at 23°C (A501)*</i>	-	-	> 14 MPa

* 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 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, 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. Abrading should be followed by a second degreasing treatment

Mix ratio	Parts by weight	Parts by volume
XB 5090-1	100	100
Arathane [®] HY 5611-1	20	25

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

Application of adhesive

The resin/hardener mix is applied with a spreader or roller to the pretreated and dry joint surfaces.

A layer of adhesive 0.05 to 0.10 mm 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.

Exposure to moisture

Polyurethanes can absorb and react with moisture causing gelation, skinning or foaming.

For best results minimise atmospheric exposure of both unmixed and mixed product. Joints should be closed as soon as possible after adhesive application.

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 times to minimum shear strength

Temperature	15	23	40	60	80	100
Cure time to reach LSS > 1N/mm ²	8-16h	6h 20	2h 5	45 min	12 min	6 min
Cure time to reach LSS > 10N/mm ²		18h 30	6h 20	2h 15	25 min	16 min

LSS = Lap shear strength.

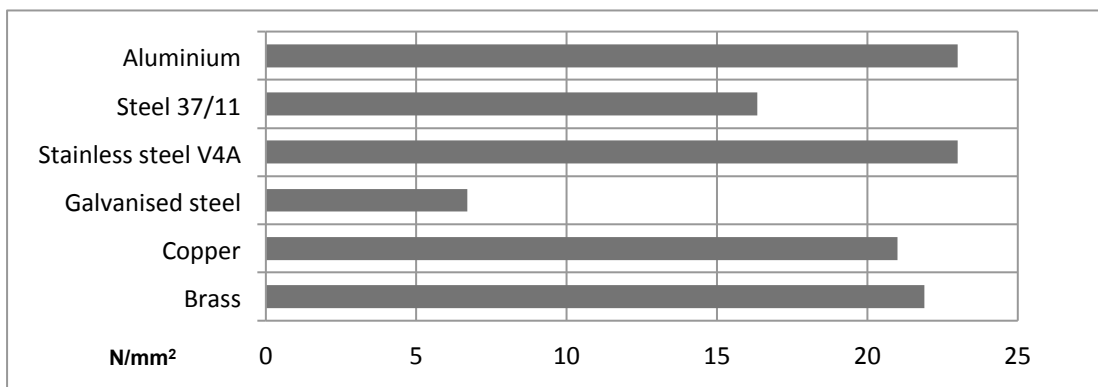
Typical cured properties

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.

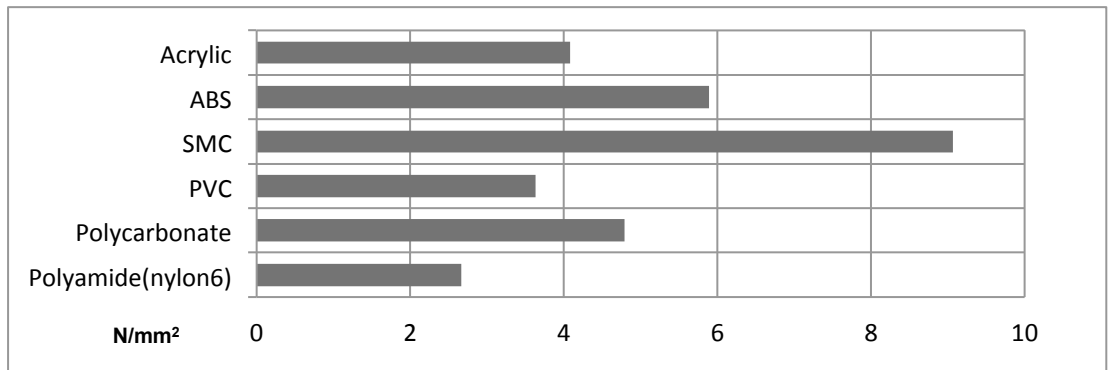
Average lap shear strengths of typical metal-to-metal joints (ISO 4587) (typical average values)

Cured for 16 hours at 40°C and tested at 23°C. Pretreatment - Sand blasting



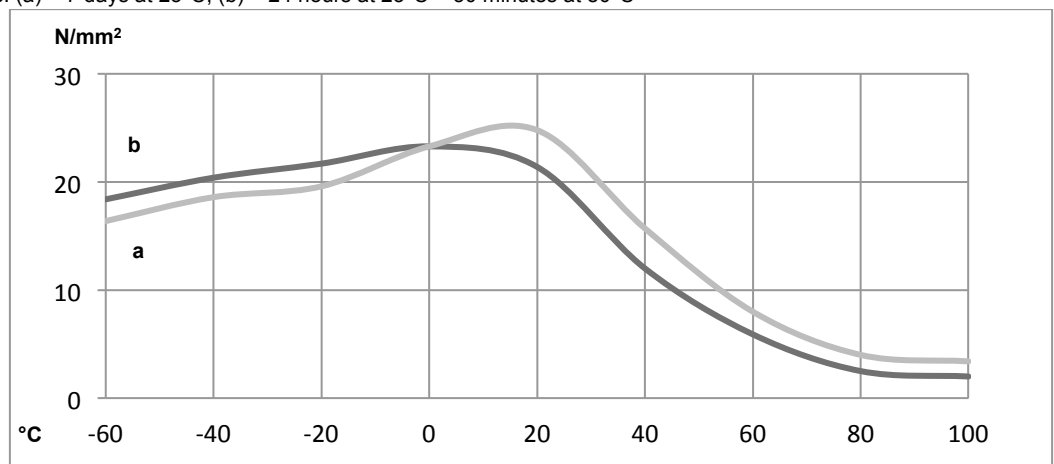
Average lap shear strengths of typical plastic-to-plastic joints (typical average values)

Cured for 16 hours at 40°C and tested at 23°C. Pretreatment - degreased and abraded



Lap shear strength versus temperature (DIN 53283) (typical average values)

Cure: (a) = 7 days at 23°C; (b) = 24 hours at 23°C + 30 minutes at 80°C



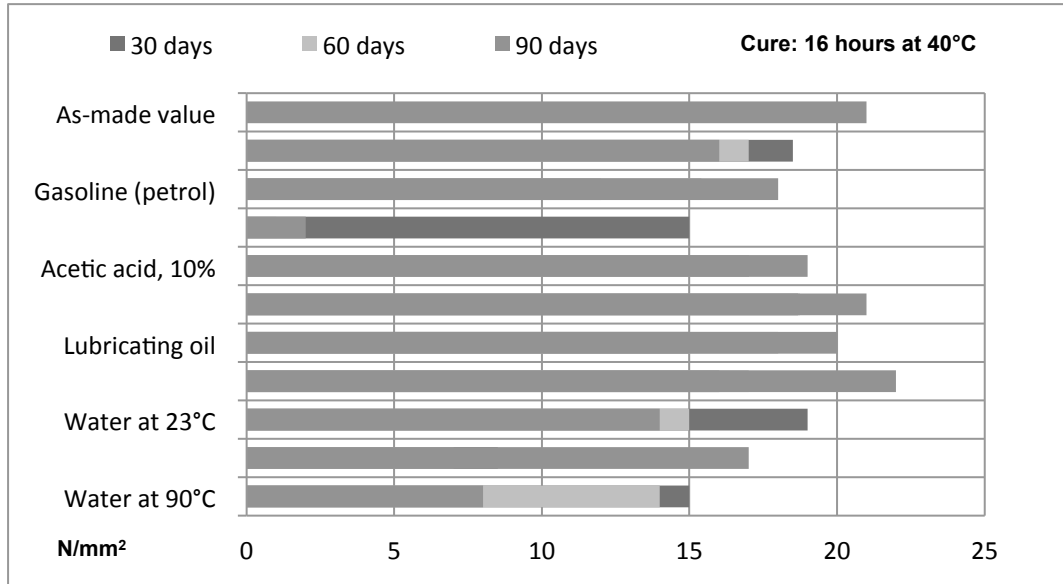
Roller peel test (ISO 4578) (typical average value)

3.4 N/mm

Cured 16 hours at 40°C

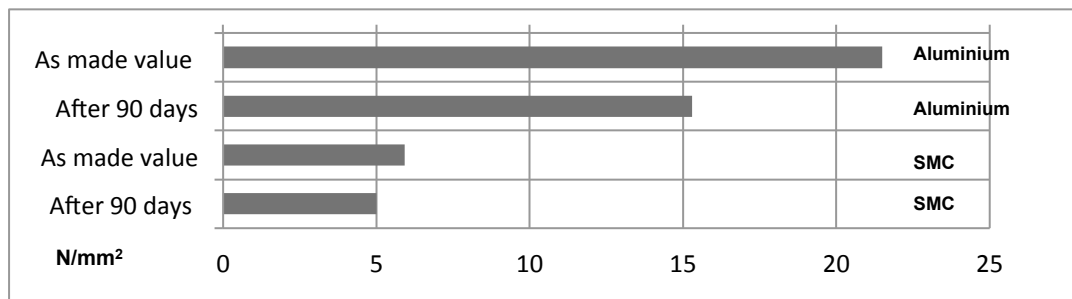
Lap shear strength at 23°C after immersion in various media (typical average values)

Unless otherwise stated, L.S.S. was determined after immersion for 90 days at 23°C



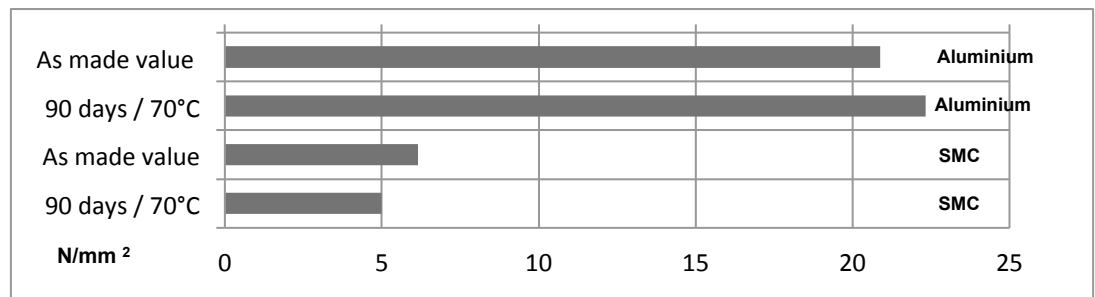
Lap shear strength versus tropical weathering (40/92, DIN 50015; typical average values)

Cure: 16 hours at 40°C; Test: at 23°C.



Lap shear strength versus heat ageing (typical average values)

Cure: 16 hours at 40°C



Thermal cycling (typical average values)

100 cycles of 6 hours duration from -30°C to +70°C:

Resultant lap shear strength tested at 23°C = 20.6 N/mm² on aluminium

6.8 N/mm² on SMC

Tg by DSC (ISO 11357-2)

28°C

Storage

XB 5090-1 and Arathane[®] HY 5611-1 may be stored for up to 1 year and 1½ years respectively at room temperature provided the components are stored in 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 food-stuffs 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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Huntsman Advanced Materials
(Switzerland) GmbH
Klybeckstrasse 200
4057 Basel
Switzerland

Tel: +41 (0)61 299 11 11
Fax: +41 (0)61 299 11 12

www.huntsman.com/advanced_materials
Email: advanced_materials@huntsman.com