

## Adhesives and Tooling

### Structural Adhesives

## XD 4495/XB 5304

### Two component polyurethane adhesive

#### Key properties

- **Medium curing speed / working life**
- **Good environmental and chemical resistance**
- **High peel strength**
- **Excellent resistance to thermal cycling**
- **Suitable for bonding panel laminates**
- **Bonds a wide range of metals, composites and plastics**

#### Description

XD 4495/XB 5304 is a two component room temperature curing liquid polyurethane adhesive, particularly suitable as a laminating adhesive for bonding GRP, wood, aluminium and foam sandwich constructions, for vehicle construction and LNG tanks.

#### Typical product data

	<b>XD 4495</b>	<b>XB 5304</b>	<b>Mixed Adhesive</b>
Colour (visual)	White/beige paste	Brown liquid	Beige liquid
Specific gravity	ca. 1.4	ca. 1.2	ca. 1.4
Viscosity (Pas)	7 - 16	ca. 0.2	ca. 10
Pot Life (100 gm at 25°C)	-	-	ca. 90 mins

#### 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, trichloroethylene or proprietary degreasing agent 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

<b>Mix ratio</b>	<b>Parts by weight</b>	<b>Parts by volume</b>
XD 4495	100	100
XB 5304	25	30

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. Vantico 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.

**Times to minimum shear strength**

Temperature	10	15	20	30	40	60	100
Cure time to reach LSS > 1N/mm <sup>2</sup>	24h	16h	4½h	3h	1½h	30 min	12 min
Cure time to reach LSS > 10N/mm <sup>2</sup>	48h	24h	16h	10h	5h	40 min	25 min

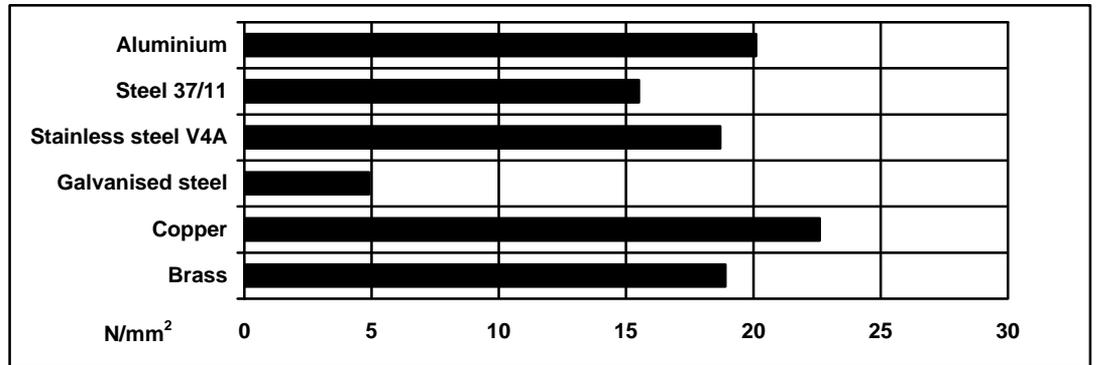
LSS = Lap shear strength.

**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.

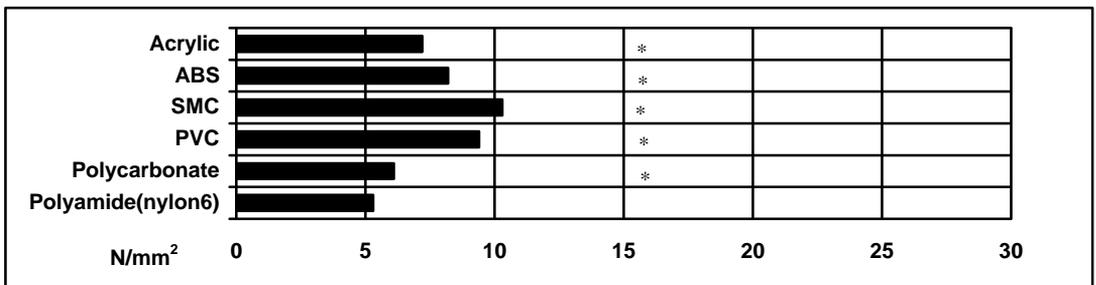
**Average lap shear strengths of typical metal-to-metal joints (ISO 4587)**

Cure: 16 hours at 40°C and tested at 23°C.  
Pretreatment - Sand blasting



**Average lap shear strengths of typical plastic-to-plastic joints**

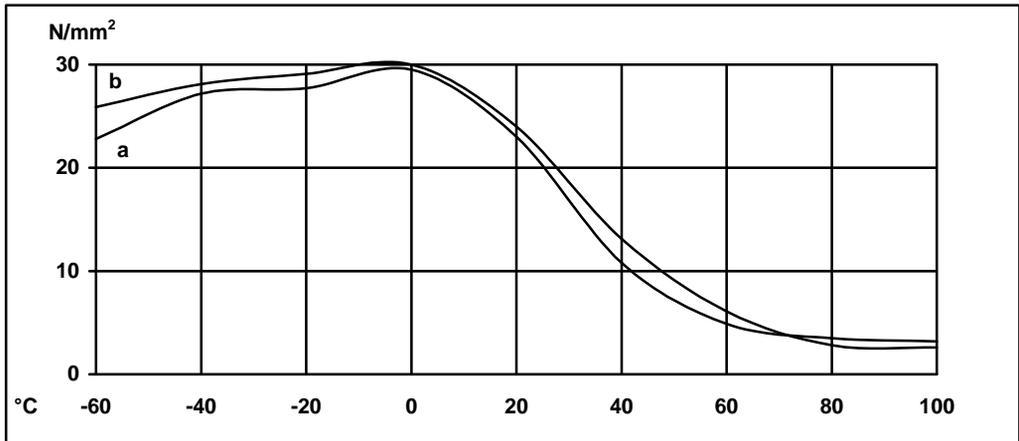
Cure: 16 hours at 40°C and tested at 23°C. Pretreatment - degreased and abraded



\* denotes substrate failure

**Lap shear strength versus temperature (ISO 4587) (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)**

ca. 6.1 N/mm

Cure: 16 hours at 40°C

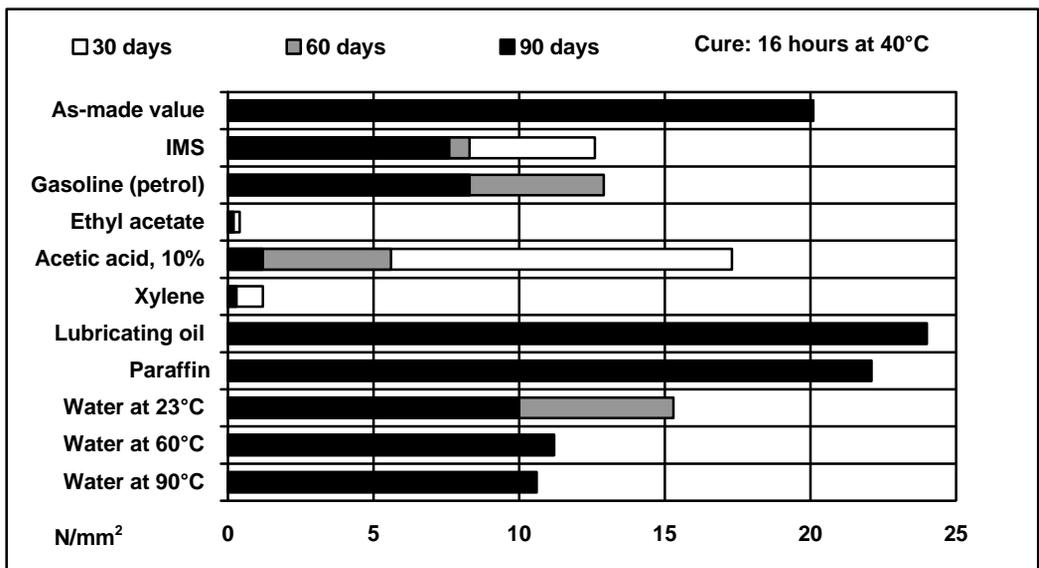
**Glass transition temperature (Tg)**

Cure: 16 hours at 40°C

ca. 39°C

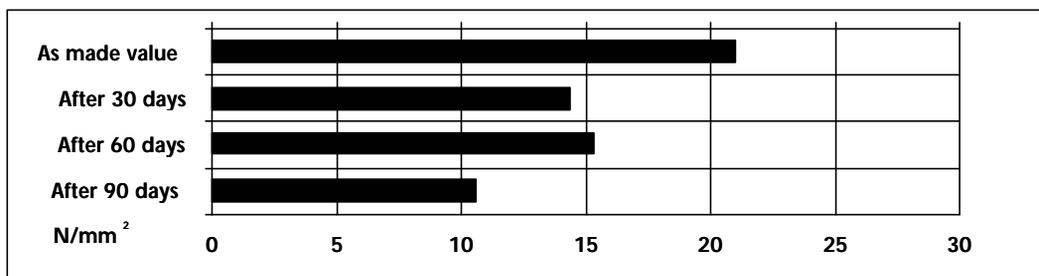
**Lap shear strength at 23°C after immersion in various media (typical average values)**

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



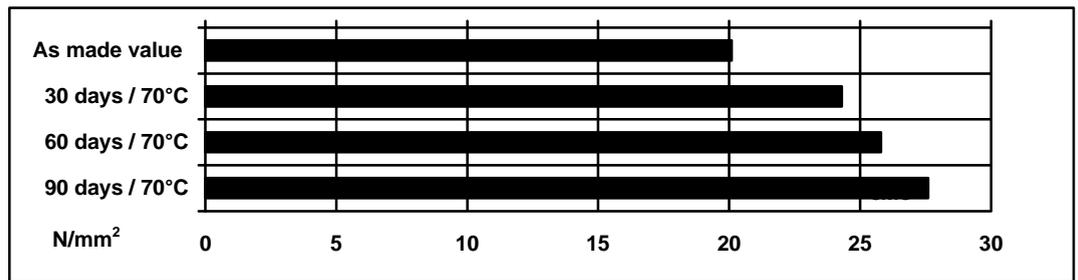
**Lap shear strength versus tropical weathering (40/92, DIN 50015; typical average values)**

Cure: 16 hours at 40°C; test at 23°C.



### Lap shear strength versus heat ageing

Cure: 16 hours at 40°C



### Thermal cycling

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

Resultant lap shear strength tested at 23°C = 22.3 N/mm<sup>2</sup>

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### Storage

XD 4495 and XB 5304 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.

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### Handling precautions

#### Caution

Vantico 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 Vantico publication No. 24264/3/e Hygienic precautions for handling plastics products of Vantico and in the Vantico Material Safety Data sheets for the individual products. These publications are available on request and should be referred to for fuller information.

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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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