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Advanced Materials

Arathane® 4497 PO / Arathane® 3304 IS

RAPID CURING TWO COMPONENT POLYURETHANE PASTE ADHESIVE

KEY PROPERTIES:

- Thixotropic, non slumping paste
- Gap filling for bonding or repair
- Rapid curing
- Good curing
- Good water and chemical resistance

DESCRIPTION:

Arathane® 4497 PO with Arathane® 3304 IS is a two component rapid curing, thixotropic paste adhesive of high strength and toughness, with good environmental and chemical resistance. Used for bonding of metals, bonding and finishing of GRP structures and general industrial assembly.

TYPICAL PRODUCT DATA:

Property	Arathane® 4497 PO	Arathane® 3304 IS	Mixed Adhesive
Colour (visual)	Beige	Brown	Beige
Specific gravity	Ca 1.4	Ca 1.2	Ca 1.4
Viscosity (Pas)	30 – 55	Ca 0.2	Thixotropic
Pot Life (100gm at 25°C)	-	-	9 minutes
Flash point (°C)	194	226	-

PROCESSING:

Pretreatment

The strenght and durability of a bond joint are dependent 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.

Mix ratio	Parts by weight	Parts by volume
Arathane® 4497 PO	100	100
Arathane® 3304 IS	40	45

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

Application of adhesive

The resin/hardener mix is applied with a spatula or by automated equipment, to the pretreated and dry joint surfaces.

When bonding reinforced polyester or epoxy laminates the adhesive thickness depends on the evenness of the substrates. Bondlines of 0.5 – 5mm are normal. Optimum results are obtained with low thickness of adhesive.

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.

Mechanical processing

Specialist firms have developed metering, mixing and spreading equipment that enables the bulk processing of adhesive. Huntsman advance Materials 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 adhesive 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	**°C**	**10**	**15**	**23**	**40**	**60**	**100**
Cure time to reach	Hours	2 ¼	1 ¾	-	-	-	-
RC > 1N/mm^2	Minutes	-	-	80	22	10	3 ½
Cure time to reach	Hours	7 ¼	5 ½	2 ¼	-	-	-
RC > 10N/mm^2	Minutes	-	-	-	45	25	7

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 1.5mm strips of aluminium alloy. The joint area was 12.5 x 25mm in each case.

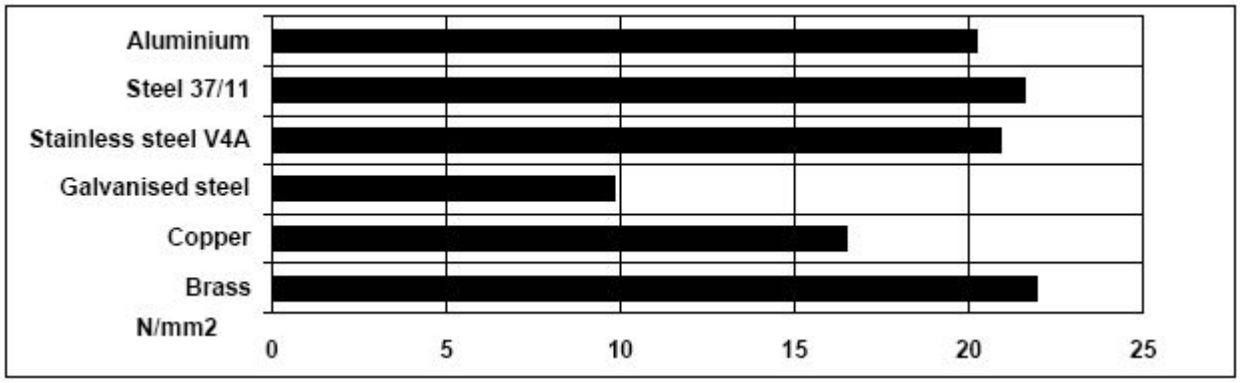
The figures were determined with typical production batches using standard testing methods. They are provided solely as technical information and do not constitute a product specification.

*In addition to the brand name product denomination may show different appendices, which allows us to differenciate between our production sites: e.g., BD=Germany, US=United States, IN= India, CI=China, etc… These appendices are in use on packaging, transport and invoicing documents. Generally the same specifications apply for all versions. Please address any additional need for clarification to the appropriate Huntsman contact.

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

Cured for 16 hours at 40°C and tested at 23°C.

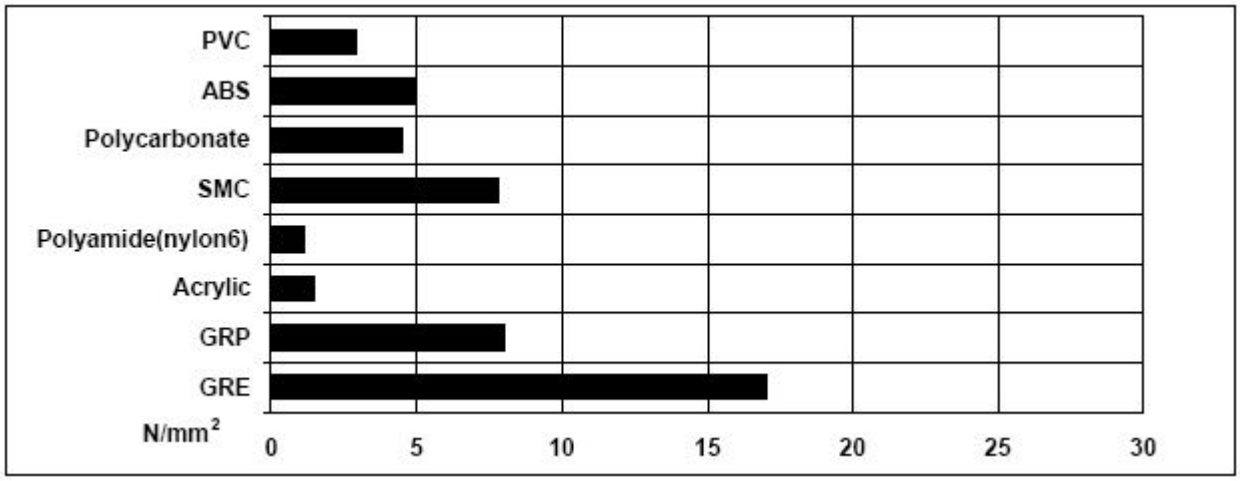
Pretreatment – sand blasting



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

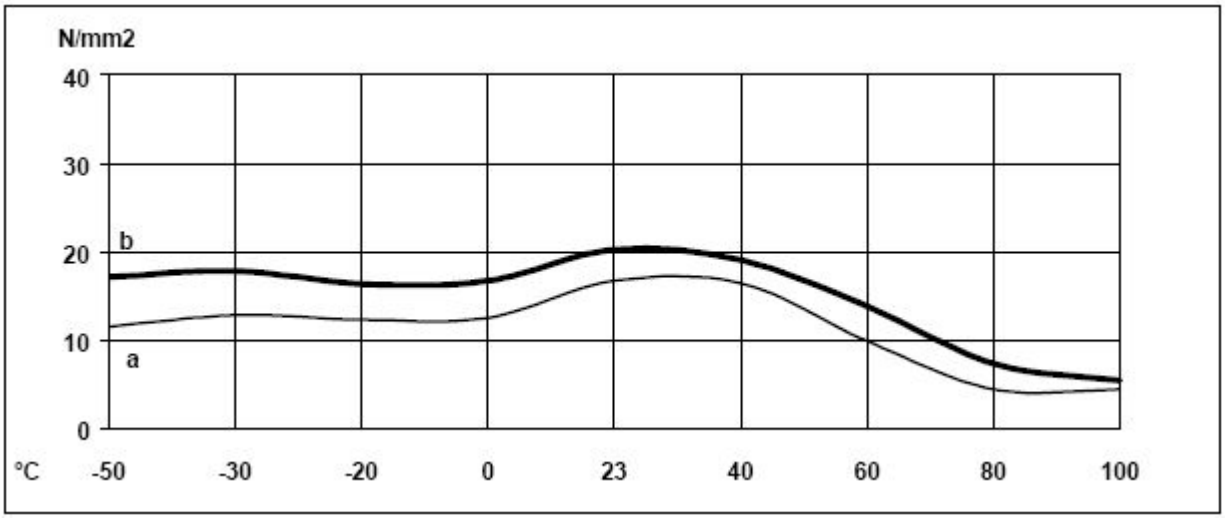
Cured for 16 hours at 40°C and tested at 23°C.

Pretreatment – Lightly abrade and alcohol degrease.



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)

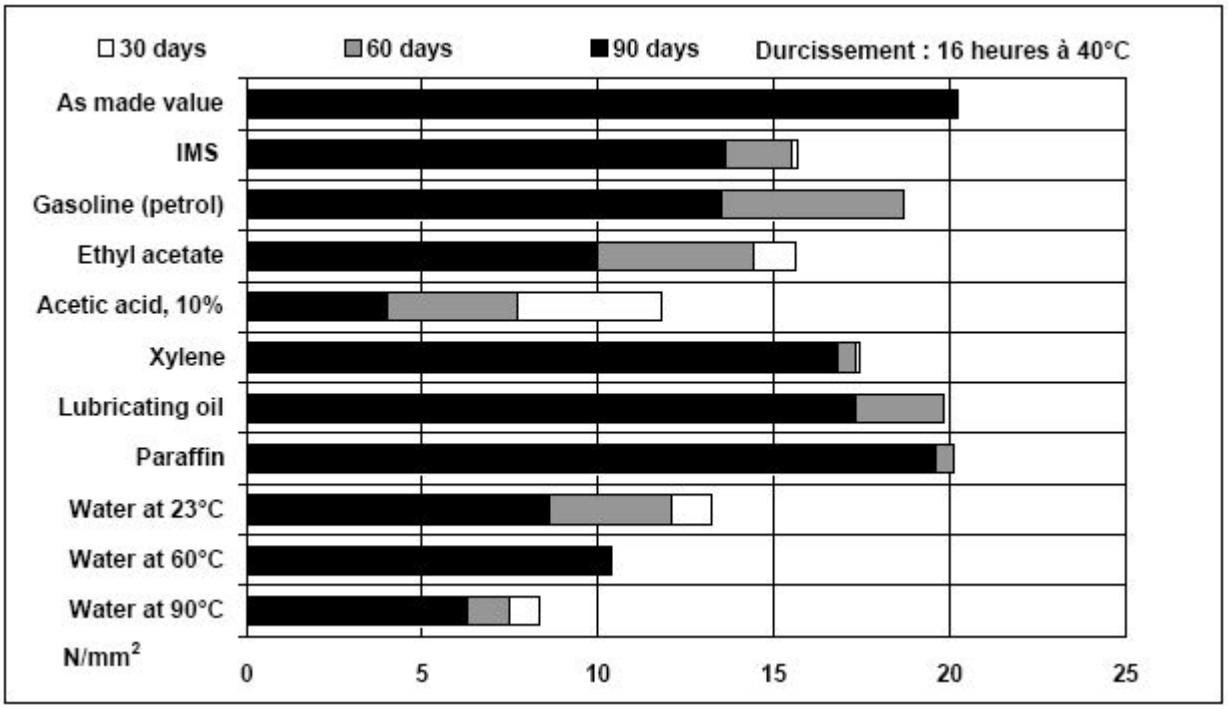
Cured 16 hours at 40°C	3.5 N/mm

Temperature de transition vitreuse (DSC)

Cured 16 hours at 40°C	Ca 50°C
E modulus (ISO R527) at 23°C	Ca 2.5 Gpa
Tensile strength (ISO R527) at 23°C	Ca 28 Mpa (ca. 1% elongation at break)

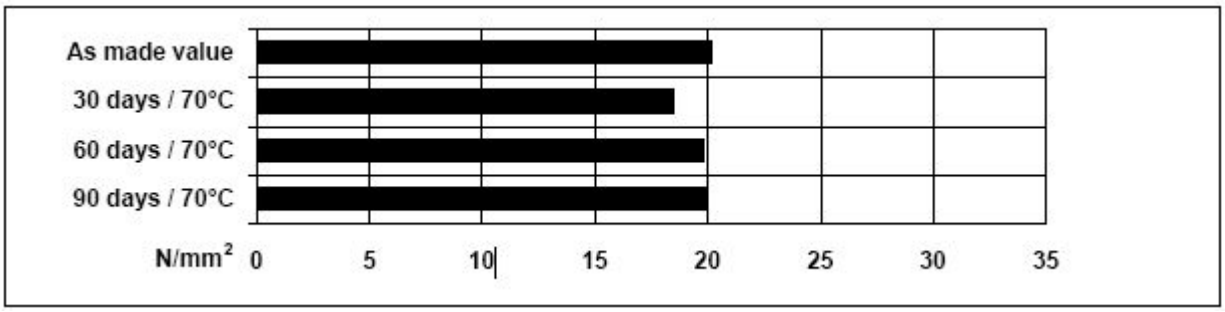
Lap shear strength versus immersion in various media (typical average values)

Unless otherwise stated, LSS was determined after immersion for 90 days at 23°C



Lap shear strength versus heat ageing

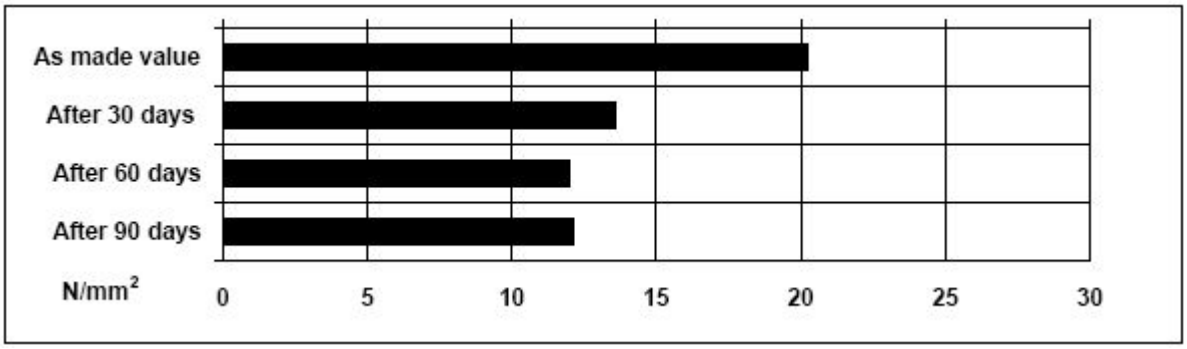
Cure: 16 hours at 40°C



Lap shear strength versus tropical weathering

(40/92, DIN 50015; typical average values)

Cured: 16 hours at 40°C Test: at 23°C



STORAGE:

Arathane® 4497 PO and Arathane® 3304 IS may be stored for up to 2 years and 1 ½ years respectively at 2-40°C provided the components are stored in sealed containers. The expiry date is indicated on the label.

HANDLING PRECAUTIONS:

Caution
Huntsman Advanced Material's products are generally quite harmless to handle provided that certain precautions normally taken when handling chemical are observed. The uncured materials must not, for instance, be allowed to come into contact with foodstuffs or food ustensils, 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 Huntsman Advanced Materials Publication No. 24264/3/e, Hygienic precautions for handling plastics products of Huntsman Advanced Materials and in Huntsman Advanced Materials Safety Data Sheets fo the individual products. These publications are available on request and should be refered to for further information.

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