

Advanced Materials

Resin XD 4447 / Hardener XD 4448

Structural Adhesives

Resin XD 4447 / Hardener XD 4448

Two component epoxy adhesive

Key properties

- Good impregnating properties
- Good resistance to temperatures up to 110oC
- Resin / hardener mix storable for 4-6 weeks
- Cures at 120 - 200oC
- Solvent containing

Description

Resin XD 4447 is an epoxy resin solution of medium viscosity. It is used with hardener XD 4448, a solution of low viscosity to provide a hot-curing adhesive for bonding metals, ceramics, glass, PTFE and other heat resistant materials.

The resin-hardener mixture is applied either direct to the surfaces to be bonded or to paper or glass cloth carriers. Use of carriers (pre-impregnated with mixture, dried and tailored to joint dimensions) ensures close control over bond-line thickness and eliminates time otherwise needed for solvent evaporation from joint surfaces.

Special uses in the electrical industry include the bonding of sheet steel laminations, wound cores and the binding of iron dust cores.

The adhesive, when cured, gives bonds of high mechanical strength, which are resistant to heat and chemical attack and offer excellent electrical insulation.

Typical product data

	XD 4447	XD 4448	Mixed adhesive
Colour (visual)	Pale yellow	Clear	Pale yellow
Specific gravity	1.00-1.10	0.95	1.03-1.06
Viscosity (Pas)	1.2 - 3.0	ca 0.02	0.3 - 0.6
Useable life at 18-25°C	-	-	4 weeks
Solids content at 150°C (%)	58-63	21 - 23	ca 50
Flash point (°C)	36	23	-

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 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
Resin XD 4447	100	100
Hardener XD 4448	33	35

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

Application of adhesive

The resin/hardener mix is applied to both bond surfaces with a brush or roller or by spraying or dip coating.

Small bond surfaces are best coated with a brush to avoid the wastage of adhesive which spraying would entail.

Dip coating is recommended when the entire surface of a part has to be covered with adhesive.

A water free solvent may be added if the resin/hardener mix is too viscous to allow application by any of the methods suggested. Acetone has been found to give satisfactory results.

Pre-drying

To ensure expulsion of all solvent residues the adhesive must be pre-dried at not less than 100°C.

The pre drying times shown below for temperatures above 100°C must not be exceeded, otherwise pre-curing will result and impair flow.

Parts coated with pre-dried adhesive may be joined immediately. Alternatively, they may be stored for long periods at room temperature in a dust free facility without impairing the bonding strength of the adhesive.

Pre-drying temperature °C	Pre-drying time
5 - 10 (cold weather)	12 hours or more
20 - 25 (normal room temperature)	5 hours or more
50 (hot air blast)	1 - 3 hours
100 (oven drying)	10 - 30 minutes
150 (tunnel oven, etc)	2 - 10 minutes

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 adhesives is a difficult and time-consuming operation.

If solvents such as acetone are used for cleaning, operatives should take the proper precautions and in addition avoid skin and eye contact.

Curing

The figures for cure time given in the following table do not include the time taken to heat up the bond surfaces to cure temperature.

Temperatures below 120oC will not give adequate cure even when time is prolonged.

Temperature	°C	120	140	160	180	200
Cure time	h	24	5	2	1	-
	min	-	-	-	-	30
Lap shear strength at 23°C	N/mm ²	15 - 27	17 - 19	17 - 19	15 - 17	14 - 16

Typical cured properties

Standard test pieces

Unless otherwise indicated, the figures given below were determined on standard test pieces made by bonding 170 x 25 x 1.5mm strips of aluminium (BS L165) to form a 12.5mm lap joint.

These 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.

Lap shear strength versus temperature

(average values)

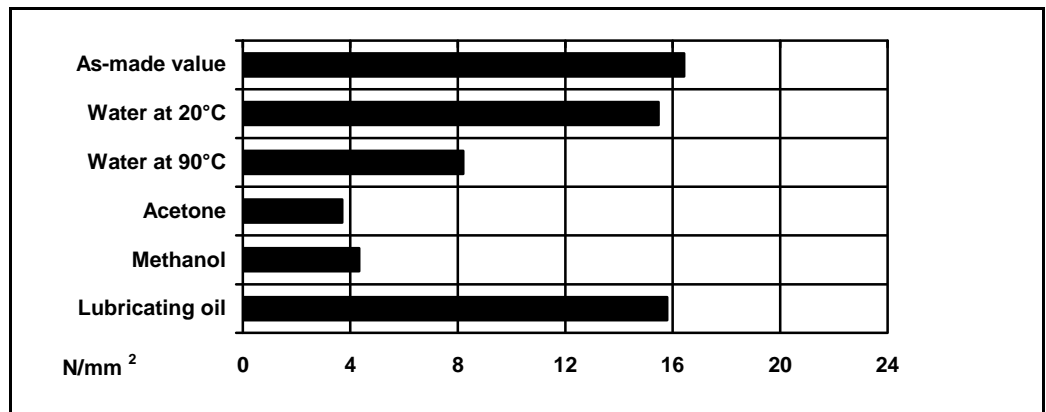
Cure: 2h/180oC

Temperature	°C	-40	-20	+23	60	100	120	140
Lap shear strength Aluminium BS L165	N/mm ²	17	17	17	14	10	6	3

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

Pre-drying: 30 min/100oC Cure: 2h/180oC

Lap shear strength determined at 23oC after 90 days immersion in medium.



Storage

XD 4447 and XD 4448 may be stored for up to 18 months and 12 months 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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