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Advanced Materials

Araldite® XD 4827 / XD 4828

Structural Adhesives

TECHNICAL DATASHEET

Araldite® XD4827 / XD4828

Two component epoxy adhesive designed for silicon wafer slicing.

Key properties

- **Suited for manual and automated bonding processes**
- **Fast curing**
- **Debonding in weak acid or in hot water**
- **suitable for reduction of wafer thickness**

Description

Araldite XD4827 / XD4828 is a two component, fast curing adhesive of high strength and toughness. It was especialy developed for silicon wafer slicing, its low viscosity and fast curing make it especially suitable for automated bonding processes and reduction of wafer thickness. Debonding can be done in weak acetic or lactic acid or in hot water.

Product data

Property	XD4827	XD4828	XD4827 / XD4828 (mixed)
Colour (visual)	beige	green	beige
Specific gravity (g/cm^3)	ca. 1.20	ca. 1.15	ca. 1.20
Viscosity at 25°C (Pa.s)	5 - 15	3 - 6	4 - 10
Pot Life (on 20 gm at 25°C)	-	-	6.5 minutes
Work time in static mixer	-	-	6 minutes
Shelf life (2-40°C)	3 years	3 years	-

Processing

Pretreatment : silicon ingot and glass beam

- For the **glass beam**, it is recommended to bond on a sandblasted or mechanicaly abraded surface.
- Both **silicon ingot and glass beam surfaces** should be cleaned with a good degreasing agent such as acetone, iso-propanol 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.

Mix ratio

Resin / Hardener	Parts by weight	Parts by volume
Araldite XD4827	100	100
Araldite XD4828	100	100

Application of adhesive

- The resin and the hardener may be mixed by hand or with a static mixer.
- The mix ratio should be as accurate as possible within the tolerance of +/- 5%. The mix ratio should be checked regularly.
- The resin/hardener mix may be applied manually or robotically to the pretreated and dry glass and silicon joint surfaces. Huntsman's technical support group can assist the user in the selection of an suitable application method as well as suggest a variety of reputable companies that manufacture and service adhesive dispensing equipment.
- A layer of adhesive 0.1 to 0.25 mm thick will normally be best for silicon slicing.
- The components should be assembled and secured in a fixed position as soon as the adhesive has been applied. No additional pressure is necessary, the weight of the silicon ingot is sufficient.
- The excess of adhesive which may overflow on the edges of the assembly should be limited either by wiping the excess off if the operation is carried out manually or by controlling the amount of adhesive if an automatic bonding unit is used.

Times to minimum shear strength

Determined by testing standard specimens made by lap-jointing 114 x 25 x 1.6 mm strips of aluminium alloy. The joint area was 12.5 x 25 mm in each case.

Lap shear strength according to ISO 4587

Temperature	15°C	10°C	23°C	40°C	60°C	100°C
Cure time to reach LSS > 1 MPa	80 minutes	60 minutes	45 minutes	15 minutes	6 minutes	2 minutes
Cure time to reach LSS > 10 MPa	8 hours	5.5 hours	3 hours	50 minutes	20 minutes	3 minutes

LSS = Lap shear strength.

Process times for silicon slicing (operation at 25°C)

Time before closing assembly	Maximum 5 minutes
Time before transfer of the assembly	Minimum 45 minutes
Time before start of the sawing process	Minimum 5 hours

Bonding 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.

Storage in PEG (Polyethyleneglycol)

After sawing, it is possible to place the ingot in PEG for storage. The storage in PEG should only be done if absolutly necessary because it may affect the properties of the adhesive. This operation should be done at room temperature (25°C +/- 5°C) and the time of immersion should not exceed 2 hours. The thinner the wafers will be, the more critical the storage in PEG may be.

Precleaning process

The precleaning operation should be carried out preferably with water with a temperature of maximum 35°C. The streaming of the precleaning fuild should not be too strong in order not to create peel forces in the adhesive joint. The thinner the wafers will be, the more critical the precleaning process may be.

Minimum debonding conditions

Debonding Media	Minimun concentration	Minimum Temperature	Minimum duration
Lactic acid 20%	5%	40°C	10 minutes
Acetic acid 20%	5%	40°C	10 minutes
Water	-	80°C	10 minutes

Note : debonding conditions may vary depending on the thickness of the wafers being produced. For thinner wafers the debonding will be achieved with less severe conditions

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Storage

Araldite XD4827 / XD4828 may be stored for up to 3 years 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 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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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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