

ES3500

One component Epoxy for BGA, CSP Underfill

This product is a one component epoxy and can rework adhesive for electronic devices bonding. This product is easy to operate and suited for various applications of electronic components, such as potting, casting and sealing. This resin can be fast cured at high temperature, is able to reduce the working time and increase the efficiency at the same time. This product develops tough, strong, structural bonds which provide excellent shear, peel and impact strength. The durability of this resin is high levels, and this resin can pass many environmental test experiments. When underfilling CSP and BGA chips, it can buffer the expansion and contraction stress of the solder ball contacts and can buffer the shear force conducted by the reaction force during the drop test.

FEATURE

- Solvent-free, no volatile materials and will not release any toxic volatilizations
- Has low viscosity and excellent fluidity.
- The hardening surface will not exhibit a surface oiliness and poor gloss.
- The reactivity of this product is good at the temperature higher than 150°C.
- This resin excels where high rebound, fatigue and crack resistance is critical.
- Comply to the 2011/65/EU RoHS regulations
- Comply to Chlorine < 900ppm, Bromine < 900ppm, Chlorine + Bromine < 1500 ppm

And then put it at room temperature for an hour. Do not loosen container cover before temperature equilibration.

2. It should be applied to a clean surface which is free of dirt, grease or mold release. In many cases, a simple solvent wipe is sufficient.

3. After heat curing stage, cool down the part gradually can minimize the thermal stress.

4. Cure time on the really part will depend upon factors such as part geometry, materials to be bonded, bond-line thickness and efficiency of the oven. Cure schedule should be confirmed with actual production parts and equipment After heat curing stage, cool down the part gradually can minimize the thermal stress.

TYPICAL UNCURED PROPERTIES

Properties	ES3500
Appearance	Liquid
Color	Black
Viscosity *25°C, cps	2,500 ~ 4,000 S14, 100 rpm
Specific Gravity (20/20°C)	1.18

TYPICAL CURING PROPERTIES

Properties	ES3500
Pot Life, 25°C, days	2
Through Cured Time 80°C, min	30
Cured Time 100°C, min	15
Cured Time 120°C, min	10
Cured Time 150°C, min	5

DIRECTION OF USE

1. The package of this resin which is refrigerated in freezer or cold place. If this product takes out from freezer, it can be brought to ambient conditions by allowing to stand which is before using please take it out from refrigerator and put it at 2~10°C for an hour..

TYPICAL CURED PROPERTIES

Properties	ES3500
Glass Transition Temp., (TMA), °C	50
CTE (*6) (<Tg), µm/m/°C	30
CTE (*6) (>Tg), µm/m/°C	178
Specific Heat 0°C, J/g°C	1.01
Specific Heat 50°C, J/g°C	1.40
Specific Heat 100°C, J/g°C	1.62
Durometer Hardness, Shore D	76
Water Absorption Ratio (25°C/24hr), %	0.95
Water Absorption Ratio (80°C/24hr), %	2.40
Water Absorption Ratio (97°C/24hr), %	1.89
Flexural modulus, 25°C, GPa (DMA)	0.4
Flexural modulus, 50°C, GPa (DMA)	0.1
Flexural modulus, 100°C, GPa (DMA)	0.01
Young's Modulus, GPa	0.4
Elongation, %	20
Elongation breaking strength, Kg ^{*5}	231

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Properties	ES3500
Shear strength*1 Al vs Al, kgf/cm ²	173
Shear strength*2 Al vs Al, kgf/cm ²	133
Shear strength*3 Al vs Al, kgf/cm ²	168
Shear strength*4 Al vs Al, kgf/cm ²	160
Degradation Temp (TGA 10°C/min), °C	325
Weight Loss Ratio @100°C, %	0.1
Weight Loss Ratio @150°C, %	0.2
Weight Loss Ratio @200°C, %	0.4
Weight Loss Ratio @250°C, %	0.7
Weight Loss Ratio @300°C, %	1.8
Weight Loss Ratio @350°C, %	15.0
Volume Resistivity, ohm-cm	4.5*10 ¹⁵
Surface Resistivity, ohm	4.5*10 ¹⁴
Dielectric Constant, 1KHz	3.2
Dielectric Strength, kV/mm	18
Temperature Range, °C	-40 ~ 100

- (*1) Cure condition: 80°C / 30 min
- (*2) Cure condition: 100°C / 15 min
- (*3) Cure condition: 120°C / 10 min
- (*4) Cure condition: 150°C / 5 min
- (*5) Cure condition: 100°C / 30 min
- (*6) CTE: Coefficient of Thermal Expansion

STORAGE AND SHELF LIFE

This resin should be kept without any possibility of moisture and heat exposure. Shelf life of this product is one year at -25 ~ -15°C. Please put it at 2~10°C for an hour and then put at room temperature for an hour. Using up this product within 3 days. The properties will be changed when replace this product at room temperature.

REWORK PROCESS

1. Component Removal

Before component removal, component solder joints must be heated above their reflow temperature in order to reduce the damage to the circuit board. When the temperature of the circuit board is about 260~280°C, the underfill will be soft and easy to remove. It may pull out the pads if the circuit board is heated too slowly or to an excessive temperature. After heating the circuit board, the component can be easily removed by twisting or a vacuum pick-up nozzle.

2. Site preparation

After component removal, there are two methods to clean the residues.

(I) Scraping

Heat the soldering iron up to 250~300°C and scrape off the underfill without any damage of pads on the circuit board. Alternatively, heat the bottom of substrate and scrape off the underfill with a metal squeegee.

(II) Rotating Brush

Apply pressure onto the brush to clean the residues. Too large pressure may wear out the brush or increase the board damage. The types of the circuit board or the solder ball composition will influence the decision to apply solder paste or flux.

3. Component Replacement

The user can use isopropanol or a flux pen to make sure that no residues remain on the circuit board after cleaning. Brush the solder paste or flux on the board. After aligning the new package, it will be placed by vacuum, reflowed with hot air, and underfill, followed by the underfill cure step.

CAUTION

Some findings indicate a lack of potential for carcinogenicity with the compositions of this product by long term recurrent application to the skin. However, contact with skin is likely to produce mild transient reddening. It is important to remove adhesive from skin with soap and water thoroughly. DO NOT use solvents for cleaning hands. This resin is of moderate acute toxicity by swallowing. If swallowed, call a physician. Avoid contact with eyes. In case of contact, flush with water for at least 15 minutes and get medical attention immediately. For specific information on this product, consult the Material Safety Data Sheet.

The data contained in this bulletin is provided only as a guide for evaluation/consideration. These material characteristics are typical properties that are based on a limited number of samples tested in the laboratory. We cannot assume responsibility for results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any product or method. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide.