LINQBOND **UF-3802**

Reworkable BGA & CSP Epoxy Underfill

- High Degradation Temperature
- High Glass Transition Temperature
- Low Viscosity and Fast Curing

LINQBOND UF-3802 is a reworkable, one-component epoxy underfill specifically designed for electronic devices. It boasts a high glass transition temperature and degradation temperature, making it ideal for demanding applications. This underfill cures rapidly, enhancing production cycles, and forms tough, strong bonds with components, providing exceptional shear, peel, and impact strength. It effectively absorbs stresses caused by thermal expansion and contraction differences. **LINQBOND UF-3802** is tailored for CSP (Chip Scale Package) and BGA (Ball Grid Array) underfill applications. Additionally, it offers excellent manufacturability and versatility, suitable for various electronic components in casting, sealing, and encapsulation processes.

LINQBOND UF-3802 is solvent-free and does not release toxic materials. It is RoHS compliant and halogen free.

Cure Schedule

- 130°C for 10 min
- Alternative Cure schedule:
  - 150°C for 5 min to 8 min

Uncured Properties

Property	Value	Unit
Color	Black	–
Viscosity (*25°C, 20 rpm*)	290 ± 60	cPs
Pot life *@ 25°C*	72	hours
Shelf life *@ -5°C*	9	months

Instructions for Use:

1. Before use, thaw the product to reach room temperature for 1–2 hours. Syringe should be placed vertically while thawing. Keep container airtight until room temperature is reached.
2. Ensure the surface to be bonded is clean and free of contaminants like dirt, grease, or mold release agents. A simple solvent wipe is often sufficient.
3. Cure time may vary based on the actual part geometry, material volume, and equipment. It is recommended to test on actual parts and equipment.
4. For large-scale applications, consider a staged curing process: start with a lower temperature precure, followed by a full cure at a higher temperature to effectively manage heat release.
5. Cool down gradually after curing to minimize thermal stress.
6. The epoxy cannot be refrozen once exposed to room temperature.

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Cured Properties[1]

Property	Value	Unit
Glass Transition Temperature, Tg (TMA)	113	ºC
Coefficient of Thermal Expansion (CTE), α1	88	ppm/ ºC
Coefficient of Thermal Expansion (CTE), α2	252	ppm/ ºC
Water Absorption Ratio (*25 ºC /24 h*)	0.21	%
Water Absorption Ratio (*80 ºC /24 h*)	3.51	%
Durometer Hardness	85	Shore D
Dielectric Constant *@1KHz*	3.05	–
Dielectric Loss *@1GHz*	0.02	–
Degradation Temperature (TGA, 10 ºC /min)	340	ºC
Weight Loss Ratio *@300°C*	6.80	%
Specific Gravity	1.19	–
Temperature Range	-40 to 120	°C

[1] *Above values were measured with material cure condition 130 ºC for 10 min*

Rework Process:

1. **Component Removal**. Component solder joints must be heated above their reflow temperature (260°C to 280°C). At this temperature, the undefill will be soft and easy to remove. Component may then be pulled or removed by twisting or with a use of a vacuum pick-up nozzle.
2. **Site Preparation**. After component removal, cleaning of residues may be done by the following methods
   a. Scraping. Heat the site to 250°C to 300°C and scrape off the underfill carefully avoiding damage of pads on the substrate. Alternatively, heating can also be done from the bottom of the substrate.
   b. Rotating Brush. Apply sufficient amount of pressure onto the brush to clean the residues. Care should be taken to avoid damage to substrate.
3. **Component Replacement**. Isopropanol or a flux pen may be used to ensure no residue remain on the circuit board after cleaning. Brush solder paste or flux on the board and align the new component using vacuum and reflow using hot air. Underfill will likewise be applied followed by cure step.

Storage and Handling

Store and transport below -5°C temperature. Keep away from moisture and heat sources. It is strictly forbidden to store in outdoor environments.

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