

LINQBOND UF-3550R

Reworkable BGA Epoxy Underfill



- Low stress, high fatigue and crack resistance
- Fast curing at high temperatures for enhanced efficiency
- RoHS, UL 94 V0 compliant, and halogen-free

LINQBOND UF-3550R is a reworkable, and solvent-free, one-component epoxy underfill designed for electronic devices. It cures rapidly at elevated temperatures, increasing production cycles. It develops tough and strong bonds to components providing outstanding shear, peel and impact strength. **LINQBOND UF-3550R** provides low stress with high fatigue and crack resistance with its low modulus property and soft characteristic. It can effectively buffer the stresses caused by thermal expansion and contraction, as well as the mechanical stresses during drop tests. This improves the overall reliability and longevity of the electronic components.

LINQBOND UF-3550R is designed for CSP and BGA underfill. It also exhibits excellent manufacturability and can be applied on various electronic components as casting and sealing.

Cure Schedule

- 80°C for 30 min
- Alternative Cure schedules:
 - 100°C for 15 min
 - 150°C for 3 min

Uncured Properties

Property	Value	Unit
Color	Black	–
Viscosity (25 °C, 20 rpm)	700 ± 150	cps
Pot life @ 25°C	7	days
Shelf life @ -40°C to -5°C	240	days

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 Properties¹

Property	Value	Unit
Glass Transition Temperature, T _g (TMA)	35	°C
Coefficient of Thermal Expansion (CTE), α ₁	60	ppm/ °C
Coefficient of Thermal Expansion (CTE), α ₂	215	ppm/ °C
Young's Modulus	2.00	MPa
Water Absorption Ratio (25 °C /24 h)	1.22	%
Water Absorption Ratio (80 °C /24 h)	3.99	%
Durometer Hardness	88	Shore A
Surface Resistivity	4.5 × 10 ¹⁴	Ω
Volume Resistivity	4.5 × 10 ¹⁵	Ω · cm
Dielectric Strength	19	KV/mm
Dielectric Constant @ 1GHz	3.4	–
Degradation Temperature (TGA, 10 °C /min)	315	°C
Weight Loss Ratio @300°C	3.12	%
Specific Gravity	1.22	–
Temperature Range	-40 to 120	°C

¹ Above values were measured with material cure condition 80 °C for 30 min

Rework Process:

- Component Removal.** Component solder joints must be heated above their reflow temperature (260°C to 280°C). At this temperature, the underfill 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.
- Site Preparation.** After component removal, cleaning of residues may be done by the following methods
 - 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.
 - Rotating Brush. Apply sufficient amount of pressure onto the brush to clean the residues. Care should be taken to avoid damage to substrate.
- 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 in a -40°C to -5°C Temperature. Keep away from moisture and heat sources. It is strictly forbidden to store in outdoor environments.

- Shelf life at -40 °C to -5°C is 240 days.

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