A1853-TX
Dual cure epoxy adhesive: UV-Heat cure adhesive

PRODUCT DESCRIPTION:
• Base chemistry: epoxy only, cationic polymerization
• One component adhesive ready for use, solvent-free, UV and/or heat curing, thixotropic, translucent blue green color

PRODUCT USE:
• Active alignment of components for optoelectronics and semiconductor packaging
• Module bonding with active alignment: example: bond image sensor to board or bonding VCM to lens barrel.
• Bonding of opaque substrates

FEATURES:
• Epoxy only, low thermal cure temperature with short cure time, UV-curable with LED-365nm, high adhesion, high Tg, long working life, excellent reliability performances, robust for solder reflow process

INSTRUCTIONS FOR USE:
1) Clean the substrates to remove contamination, dust, moisture, salt and/or oil
2) Dispense adhesive on substrates
3) Bond substrates (with active alignment – optional)
4) UV cure to fix alignment or to bond
5) Thermal cure: to cure adhesive in shadow area and to improve adhesion of bonded parts

CURING CONDITIONS: 3 curing ways: UV + heat or heat or UV
1) **UV + Heat curing:** both UV and heat are used in the curing process
   - **First step:** UV cure
     * Metal halide/Mercury UV: UV-A (320-400 nm), intensity: 100-1,000 mW/cm²
     * or LED-365 nm, UV light intensity: 200 to 1,000 mW/cm²
   - **Second step:** heat cure: the adhesive is exposed to UV light first, then heat cure 80 to 85 °C for 45 to 60 minutes

2) **Heat curing:** heat is the only source for curing, the adhesive sees no UV light
   - 80°C for 90-120 minutes
   - or 85°C for 60-90 minutes
   - The adhesive is expected to be cured in the absence of air or sandwiched between two substrates If the adhesive surface is exposed to ai during cure, surface stickiness might result.
   - The actual heat cure time is dependent on the heating time of the bonded components. The time to heat up the components must be added to the total cure time of the adhesive for the process

3) **UV Curing:** UV is the only source of curing
   - 1000 mW/cm² x 10 to 15 sec metal halide/mercury light source with UV-A (320-400 nm) or with LED-365 nm
   - The recommended UV cure dose is at the adhesive; if the substrate absorbs curing light, then the actual cure time needs to be increased.
   - The effect of humidity is greater for very thin film, if the adhesive layer is <25 µm, then longer cure time might be needed
   - To ensure good curing speed, the humidity should be <60% RH
   - Epoxy adhesives have post cure properties. Adhesion strength should be conducted at least 24 hrs after part assembly.

The maximum adhesion strength is achieved by HEAT cure. For best adhesion, UV fix cure should be kept at a minimum and the majority of the bonded components should be cured by HEAT

TYPICAL PROPERTIES

**Liquid**
- Viscosity at 25 °C, mPa.s or cps (shear rate: 10/s) 65,000 to 70,000
- Thixotropic index (shear rate: 1/s over 10/s) 7
- Density (g/mL) 1.1
- Shelf life (-40 to -20°C): 6 months
- Pot life or working life (20 - 25°C): 48 hours

**Cured film**
- Appearance of cured adhesive light yellow to tan
- Outgas, weight % (per Telcordia GR-1221) 0.01
- Outgas, weight % (per MIL-STD 883/5011) 0.01

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Bond strength study:

PC/PC bonded strips, 25 µm adhesive thickness,
UV dose 1.5 J/cm² + 80°C 1 hr

UV-Vis and NIR Spectra:

Cured film properties (continued)

- Water permeability (g/m² 24 hrs, 50 °C/95% RH, 75 µm film) 2.2 x 10⁻⁴
- Shrinkage (volume, %) 1
- Hardness, shore D 75-80
- Glass transition temperature (DMA, °C) 165
- Coefficient of thermal expansion (DMA)
  - below Tg (x10⁻⁶), °C⁻¹ 35
  - above Tg (x10⁻⁶), °C⁻¹ 100
- Physical properties tested at 25°C, 50% RH (ASTM D638)
  - Tensile strength, MPa 150
  - Elongation (%) 5
  - Young’s Modulus, MPa 2,000
- Operating temperature, °C -40 to 150

GENERAL USAGE INFORMATION:

Shipment: adhesive is shipped in cold pack

Storage: After receipt, cold storage at -20 °C or -40 °C in the original container is required

Before use: The cold adhesive needs to reach RT (20-25°C) before use. The container needs to sit at RT, adding heat is not allowed. Room temperature equilibration time is dependent on container size, but a 10-30 gram syringe equilibration time is approximately 30-60 minutes. Condensed water on the container must be removed prior to use

SAFETY AND HANDLING

The uncured adhesive can be cleaned from apparatus with isopropyl alcohol (IPA), methyl ethyl ketone (MEK), acetone or commercial alcohol based cleaning solution. Avoid direct skin and eye contact. Use only in well ventilated areas. Use protective clothing, gloves and safety goggles. Read Safety Data Sheet before handling.