



A1853

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, blue green color

PRODUCT USE:

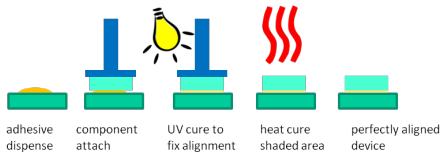
- Active alignment of components for optoelectronics and semiconductor packaging
- Bonding of opaque substrates

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



GENERAL USAGE INFORMATION:

Shipment: adhesive is shipped in cold pack

Storage: at -40 °C or -20 °C in the original container is required

Before use: The cold adhesive needs to reach RT (23-25°C) before use. The container needs to sit at RT, adding heat is not allowed. RT 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.

CURING CONDITIONS: 2 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: 200-1,000 mW/cm²

*or LED-365 nm, UV light intensity: 200 to 1,000 mW/ cm²

| LED-365 nm | | Metal Halide/Mercury (UV-A: 320-400 nm) | |
|------------------------------------|--------------|--|--------------|
| UV intensity (mW/cm ²) | x time (sec) | UV intensity (mW/cm ²) | x time (sec) |
| 200 | 10 to 30 sec | 200 | 10 to 30 sec |
| or 500 | 4 to 10 sec | or 500 | 4 to 10 sec |
| or 1,000 | 2 to 6 sec | or 1,000 | 2 to 6 sec |

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 85°C for 60-120 minutes or 90°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 air 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. 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 | 4,000 to 4,600 |
| 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 | transparent |
| Outgas, weight % (per Telcordia GR-1221) | 0.02 (specification: <0.1%) |
| Outgas, weight % (per MIL-STD 883/5011) | 0.22 (specification: <1%) |

Cured film properties (continued)

| | |
|---|------------------------|
| Water permeability (g/m 24 hrs, 50 °C/95% RH, 75 µm film) | 2.2 x 10 ⁻⁴ |
| Shrinkage (linear, %) | < 0.3 |
| Hardness, shore D | 75-80 |
| Glass transition temperature (DMA, °C) | 160 |
| Refractive index of cured film (25°C) | |
| @ 589 nm | 1.578 |
| @ 1310 nm | 1.562 |
| @ 1550 nm | 1.558 |
| Coefficient of thermal expansion (DMA) | |
| below Tg (x10 ⁻⁶), °C ⁻¹ | 35 |
| above Tg (x10 ⁻⁶), °C ⁻¹ | 140 |
| 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 |

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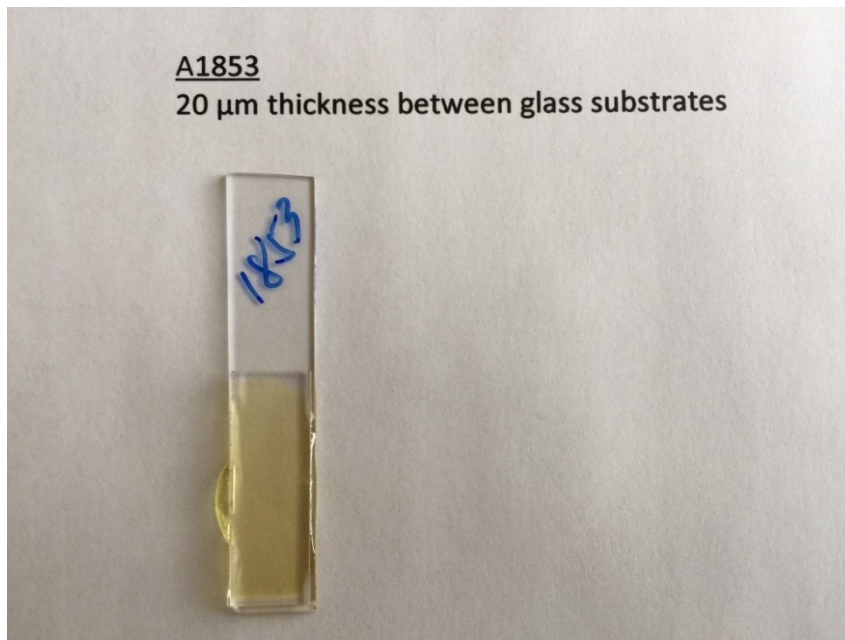
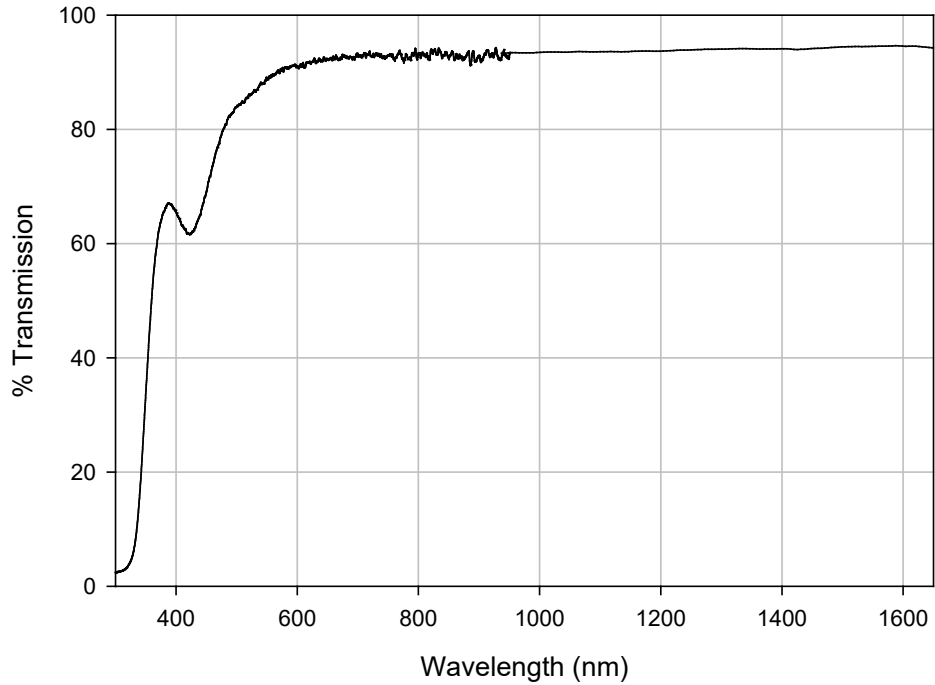
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A1853 20 micron film between glass slides



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