



# AC A535-AT

## 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

### PRODUCT USE:

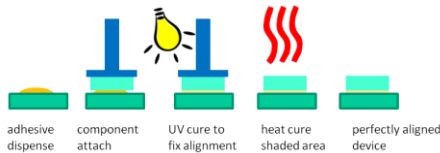
- Active alignment of components for optoelectronics and semiconductor packaging. Suitable for bonding many types of substrates
- High precision bonding
- Bonding of opaque substrates and optical parts. It is recommended to be used where instant UV fix, then thermal post cure of the fixed parts provides complete cure in areas where UV light cannot penetrate

### FEATURES:

- Epoxy only, high adhesion, high Tg, long shelf and working life, RT stable, not sensitive to oxygen in cure process, 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:** no restriction on shipment
- Storage:** After receipt in black syringes or amber HDPE bottles, room temperature storage (15-30°C) in the original container is required.
- Shelf life (20 - 25°C):** 6 months
- Pot life or working life (20 - 25°C):** 3 months

### SAFETY AND HANDLING

The uncured adhesive can be cleaned with isopropyl alcohol (IPA), methyl ethyl ketone (MEK), acetone, or xylene. 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: 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/cm<sup>2</sup>
- \*LED-365 nm, UV light intensity: 100 to 1,000 mW/cm<sup>2</sup>

| LED-365 nm                        |                 | Metal Halide/Mercury(UV-A: 320-400 nm) |                |
|-----------------------------------|-----------------|--|----------------|
| UV intensity(mW/cm <sup>2</sup> ) | x time (sec)    | UV intensity(mW/cm <sup>2</sup> )      | x time (sec)   |
| 100                               | 100 sec or more | 100                                    | 50 sec or more |
| or 200                            | 50 sec or more  | or 200                                 | 25 sec or more |
| or 300                            | 35 sec or more  | or 300                                 | 17 sec or more |
| or 400                            | 25 sec or more  | or 400                                 | 13 sec or more |
| or 500                            | 20 sec or more  | or 500                                 | 10 sec or more |
| or 1,000                          | 10 sec or more  | or 1,000                               | 5 sec or more  |

#### Second step: heat cure: the adhesive is exposed to UV light first, then heat cure

- \* 80 to 85 °C for 30 to 60 minutes

- 2) **Heat curing:** heat is the only source for curing, the adhesive see no UV light  
130°C for 4-5 hrs or 150°C for 2 to 3 hrs or 180°C for 1 hr
  - The actual heat cure time is dependent on the heating time of the bonded components. The heat time of 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/cm<sup>2</sup> x 5 to 10 sec metal halide/mercury light source with UV-A (320-400 nm) or with LED-365 nm
  - 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

#### Uncured resin

Viscosity at 25 °C, mPa.s or cps 1,000 to 1,300

Density (g/mL) 1.1

#### Cured film

Appearance of cured adhesive yellow to amber or tan

Outgas, weight % (per Telcordia GR-1221) 0.01

Outgas, weight % (per MIL-STD 883/5011) 0.05

Water permeability (g/m 24 hrs, 50 °C/95% RH, 75 µm film) 3 x 10<sup>-4</sup>

Shrinkage (linear, %) < 0.5

Hardness – Shore D 90

Glass transition temperature (DMA, °C) 160

Coefficient of thermal expansion (DMA)

below Tg (x10<sup>-6</sup>), °C<sup>-1</sup> 42

above Tg (x10<sup>-6</sup>), °C<sup>-1</sup> 86

Physical properties tested at 25°C, 50% RH (ASTM D638)

Tensile strength, MPa 540

Elongation (%) 4

Young's Modulus, MPa 1,700

Operating temperature, °C -60 to 200

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