AC A535-AT

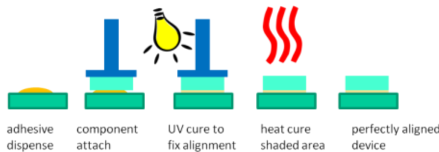
Dual cure epoxy adhesive: UV-Heat cure adhesive

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^2

*LED-365 nm, UV light intensity: 100 to 1,000 mW/ cm^2

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)
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

* 140 to 150 °C for 2 to 3 hrs

2) **Heat curing**: heat is the only source for curing, the adhesive see no UV light
140°C for 4-6 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^2 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	1,200 to 1,500
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^{-4}
Shrinkage (linear, %)	< 0.5
Hardness – Shore D	90
Glass transition temperature (DMA, °C)	160
Coefficient of thermal expansion (DMA)	
below Tg (x10^{-6}), °C^{-1}	42
above Tg (x10^{-6}), °C^{-1}	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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