

# A1819

## 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-heat curing, thixotropic

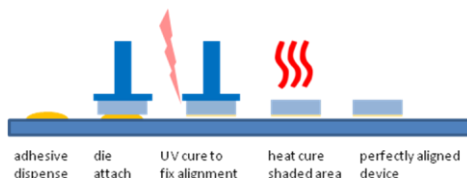
### PRODUCT USE:

- Active alignment bonding of components for optoelectronics and semiconductor packaging
- Camera module bonding with active alignment
- High precision bonding
- Bonding of opaque substrates

**FEATURES:** Epoxy only, Low thermal cure temperature with short cure time, High adhesion, High Tg, Long shelf and working life, No Oxygen Inhibition, Excellent reliability performances.

### PROCESS STEPS:

- 1) Prepare the substrates if necessary
- 2) Dispense adhesive on substrates
- 3) Join substrates (with active alignment –optional)
- 4) UV cure to fix alignment or to fix substrates with LED-365 nm or UV-A (315 to 400 nm) metal halide or mercury UV light
- 5) Thermal cure: a thermal cure at 70°C to 80°C for 60 to 120 minutes 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 will be used in the curing process

##### UV Curing

- UV Metal Halide or Mercury UV light source with UV-A (315-400 nm) with UV light intensity: 50 to 1,000 mW/cm<sup>2</sup>
- LED-365 nm with UV light intensity: 100 to 1,000 mW/cm<sup>2</sup>, intensity of 50 mW/cm<sup>2</sup> is possible if cure time is extended

<u>LED-365 nm</u>		<u>Metal Halide or Mercury UV (UV-A: 315-400 nm)</u>	
UV intensity(mW/cm <sup>2</sup> )	x time (sec)	UV intensity(mW/cm <sup>2</sup> )	x time (sec)
50	60 sec or more	50	30 sec or more
100	30 sec or more	100	20 sec or more
200	10 sec or more	200	10 sec or more
500	4 sec or more	500	4 sec or more
1,000	2 sec or more	1,000	2 sec or more

##### Heat Curing

70 °C 60 to 120 minutes  
80 °C 30 to 60 minutes  
85 °C 30 to 60 minutes

- The time between UV curing and heat curing should not be longer than 60 minutes at room temperature
- The actual heat cure time is dependent on the heating time of the bonded components. The heat cure time of the components must be added to the total cure time of the adhesive for the process

#### 2) Heat curing: Heat is the only source for curing

80 °C 60 to 90 minutes

- The actual heat cure time is dependent on the heating time of the bonded components. The heat cure 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 for curing

UV intensity (1000 mW/cm<sup>2</sup>) x 2 to 5 sec

- The recommended UV cure dose is at the adhesive. If the substrates absorb some curing light, then the actual cure dose needs to be increased.

\*\*The effect of humidity is greater for very thin film, if the adhesive layer is very thin (<25 μm), then longer cure time might be needed.

\*\*To ensure good curing speed, the humidity is recommended to be < 60% RH

\*\*Dual cure epoxy adhesives have post cure properties. Adhesion testing should be conducted at least 24 hrs after part assembly.

**TYPICAL PROPERTIES:**

<u>Liquid:</u>		<u>Cured Adhesive (continue)</u>	
Viscosity at 25°C, mPa.s	2,300 – 2,700	Hardness – Shore D	85
Appearance of cured adhesive	light yellow to tan	Coefficient of thermal expansion (DMA), 75 μm	
Shelf life (-40 to -20 °C) / Shelf life (3 to 5 °C)	12 months/3 months	below Tg (x10 <sup>-6</sup> ), °C <sup>-1</sup>	40
Working life (Pot life) (20 – 25 °C)	3 days	above Tg (x10 <sup>-6</sup> ), °C <sup>-1</sup>	170
Density (g/mL)	1.1	Physical properties @ 25°C, 50% RH (ASTM D638)	
		Tensile, MPa	172
<u>Cured Adhesive</u>		Elongation (%)	5
Shrinkage (volume, %)	1	Modulus, MPa	2,300
Water permeability (g/m 24 hrs, 50 °C/95% RH, 75 μm film)	2.2 x 10 <sup>-4</sup>	Operating temperature (°C)	-40 to 150
Glass transition temperature (°C, DMA)	155		

**GENERAL USAGE INFORMATION:**

**Shipment:** cold pack shipment

**Storage:** After the adhesive is received in black syringes or amber HDPE bottles, cold storage at 3 to 5 °C, or -20 °C or -40 °C in the original container is required

**Before use:** The cold syringe or bottle container needs to reach room temperature (23-25°C) before use. The container needs to sit at room temperature, adding heat is not allowed. Room temperature equilibration time is dependent on container size, but a 10-30 gram syringe equilibration time is approximate 30-60 minutes. Condensed water on the container must be removed prior to use

**SAFETY AND HANDLING**

The un-cured adhesive can be cleaned from apparatus with isopropyl alcohol (IPA), methyl ethyl ketone (MEK), or commercial alcohol based cleaning solution. Use caution in handling this material. Avoid direct skin and eye contact. Use only in well ventilated areas. Use protective clothing, **gloves and safety goggles**. Read [Material Safety Data Sheet](#) before handling. The information presented here represents our best available information and is believed to be reliable, but it and does not constitute any guarantee or warranty. Inasmuch as Addison Clear Wave has no control over the exact manner in which others may use this information, it does not guarantee the results to be obtained. Nor does the company make any expressed or implied warranty of merchantability, or fitness for a particular purpose concerning the effects or results of such use. Purchasers are further responsible for determining the suitability of the product for its intended use and the appropriate manner of utilizing the production processes and applications so as to ensure safety, quality and effectiveness. Addison Clear Wave makes no warranties and assumes no liability in connection with the use or inability to use this product.