



KM1912HK

HIGH THERMAL CONDUCTIVITY
SILVER EPOXY ADHESIVE

1 DESCRIPTION

KM1912HK is the next generation in silver epoxy adhesives. Although similar to the KM1901HK product family, KM1912HK uses a unique silver filler technology (patent pending) yielding thermal conductivities upwards of 60W/m²K. It is designed specifically for very small die and applications, such as LED attachment and very high-power applications. KM1912HK has been specially formulated to have an exceptional resistance to drying out, allowing for longer open times and ease of processing. Unlike typical epoxy systems, the KM1912HK product can also be shipped and stored at room temperature.

2 APPLICATIONS

- HB-LEDs
- Power semiconductors
- Laser diodes
- RF power devices
- GaAs devices
- MMICs
- Power hybrids
- Solder replacement

3 KEY FEATURES

- **Unmatched** thermal conductivity - 60
- **W/m²K** Very long **open time**
- **Electrical resistivity as low as 4 μ -cm**
- **Replaces solder – eliminates Pb metal and plating requirements**
- **Excellent rheology for dispensing and screen printing**
- Superior bond-line control
- Room temperature shipping & storage in jars – **no dry ice necessary**

4 TYPICAL PROPERTIES

Parameter	Unit	Note / Condition
PASTE PROPERTIES (before curing)		
Viscosity	35,000 cP	25 °C, 10 rpm, Brookfield RVT viscometer, TC spindle
Thixotropic index	2.2 --	25 °C, 10 rpm / 50 rpm
Shelf life	12 month	Syringes, – 40 °C
	8 month	Jars, -15 °C
Density	5.7 g/cc	Calculated
CURED PROPERTIES (after 10 °C/minute ramp and 200 °C, 30 minute cure)		
Bulk thermal conductivity	60 W/m ² K	Laser Flash, ASTM E1461-07
Volume electrical resistivity	4 μ -cm	
Rth	0.042 Kcm ² /W	300 -mil Si to 400- mil Si (Laser Flash, ASTM E1461-07)
Shear adhesion	2,700 psi	250-mil Si die to Al ₂ O ₃
	16 MPa	6.35-mm Si die to Al ₂ O ₃
Coefficient of Thermal Expansion (CTE)	26 ppm/°C	DMA
Flexural modulus	5800 psi	ASTM D790
	4,135 MPa	
Glass Transition Temperature (Tg)	92 °C	DMA
Ionic impurities	<12 ppm	Total of Cl-, F-, K+, and Na+
Silver content	97 %	By weight
Density	8.0 g/cc	By weight
SYRINGE PROPERTIES		
Syringe potlife	24 hours	
Syringe thaw time	30-60 minutes	

5 STORAGE AND HANDLING

KM1912HK is available packaged in frozen syringes and shipped at -40°C or below. For more information please refer to the document *SYRINGE-PACKAGED ADHESIVE PASTES*.

KM1912HK is also available packaged in jars without dry ice. Storing jars on a jar roller, such as Diemat's model 8010, at

1 to 5 rpm is recommended. Failure to roll the jars adequately could result in non-homogeneity and inconsistent dispensing. If not jar-rolled, gentle stirring is recommended before use. If the paste is homogeneous (no solvent on top or thick solid felt in bottom of the jar), it can be poured into a syringe and used immediately.

Curing Profile

For smaller die (<0.250 inches), no prebake is necessary. Larger die require this predrying step before the cure cycle. Simply place attached materials into a ventilated, forced-air convection oven at room temperature, and set for your desired peak temperature. If using a belt furnace or other type of oven, ramp rates should be controlled for optimal results. The following options for ramp rate, time and temperature guidelines are recommended for components smaller than 0.400 in. (10 mm) square attach area. Recommended profiles are die size related and are shown on the following figures and tables:

Figure 1:

Curing Profile for die size up to 250 mils per side

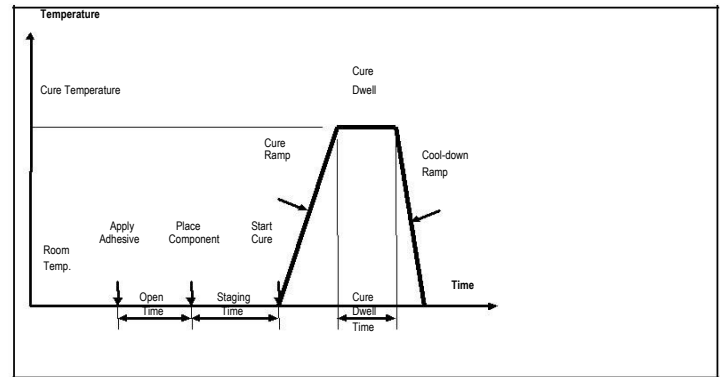


Table 1:

Curing Parameters for die size up to 250 mils per side

Ramp Rate	Cure Temp.	Dwell
5-10 °C / minute	225 °C	15 minutes
	200 °C	30 minutes
	175 °C	45 minutes
Note: Use only one cure temperature/time combination		

Figure 2:

Curing Profile with pre-bake for die size from 250 to 400 mils per side

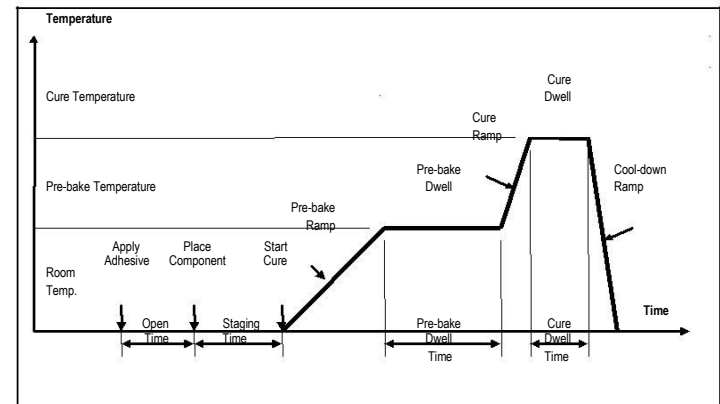


Table 2:

Curing Parameters with pre-bake for die size from 250 to 400 mils per side

Ramp Rate	Temp.	Dwell	Ramp Rate	Temp.	Dwell
5-10 °C / minute	125 °C	30 min.	5-10 °C / minute	225 °C	15 min.
	110 °C	60 min.		200 °C	30 min.
	100 °C	75 min.		175 °C	45 min.
Note: Use only one cure temperature/time combination					

Application

The KM1912HK rheology has been designed for use in automated high-speed dispensing equipment without tailing or dripping.

KM1912HK should be uniform and essentially free of air bubbles prior to use. A 22 gage needle (16 mil or 0.41 mm ID) is recommended to dispense KM1912HK. Needles smaller than 25 gage (10 mil or 0.25 mm ID) may not produce uniform dispense weights. The material should be dispensed in an "X" pattern with sufficient quantity to produce fillets halfway up the side of the attached component. Deposition weights will vary according to component size. Typical dispense

quantities are 75 µL per square inch of die area (12 µL per square cm of die area). Components should be pressed all the way into the KM1912HK material wet deposit such that a **3.2 – 4.7 mil wet bondline** exists with fillet formation around the perimeter. Final cured bondline thickness should be approximately **2.0 to 3.0 mil**.

7 ORDERING INFORMATION

Ordering Number

KM1912HK

Key Product Characteristics

Very high thermal conductivity; Slow Drying; Low resistivity

- Specify container type and size when ordering. Available in syringes and jars.
- Standard syringe sizes are 3, 5, and 10 cc, and may hold volumes in increments of 0.5 cc from 0.5 cc to 100% full.
- Standard jar sizes are 50, 100, and 200 grams.