ALPHA® HiTech CU11-3127

High Tg, Low CTE Underfill

DESCRIPTION

ALPHA HiTech CU11-3127 is a one-component, capillary underfill designed for the protection of assembled chip packages onto printed circuit boards. It protects solder joints from mechanical stresses such as drop shock and impact bending.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES AND BENEFITS

The balanced set of features and benefits:

- Releases stress over a large area, primary stress is CTE mismatch between component and board
- High Glass Transition Temperature (Tg)
- Low Coefficient of Thermal Expansion (CTE)
- Halogen-Free
- Complies with RoHS Directive 2015/863/EU

APPLICATION GUIDELINES

Storage	Thawing	Application	Curing
1. Freeze at ≤ -20 °C to guarantee product stability. 2. Upright Position, tip facing bottom 	1. Remove the syringe from the freezer. 2. Set aside at room temperature for 2 hours. 3. Do not open the cap before the product is sufficiently thawed. 4. Product should not be refrozen after thawed. 5. To prevent contamination of unused product, do not return any material to its original container.	ALPHA HiTech CU11-3127 can be effectively dispensed at room temperature condition. If dispensing at a higher temperature is required, the nozzle temperature must be maintained at < 40 °C for better pot life stability. A higher preheat temperature up to ≤ 80 °C may be applied to the substrate for faster underfill flow rate.	For full property development, cure at the following conditions in a convection oven. • 140 °C for ≥ 20 minutes • 150 °C for ≥ 15 minutes • 165 °C for ≥ 5 minutes

TECHNICAL DATA

Category	Specification
Typical Uncured Material Properties	
Appearance	Black
Viscosity (RVT Brookfield Spindle #5, 20 rpm @ 25 °C, cP)	1,000 to 4,000
Filler Content (SiO2), %	56
Average Filler Size, µm	0.7
Maximum Filler Size, µm	10
Specific Gravity	1.55 to 1.65
Pot Life @ 25 °C, day	1
Shelf Life @ ≤ -20 °C, month	6
Available Packaging	30 cc, 55 cc syringes
Typical Cured Materials Properties	
Glass Transition (Tg), °C via TMA	177 ± 5
CTE (α_1), <Tg, ppm	29 ± 10
CTE (α_2), >Tg, ppm	107 ± 15
Hardness (Shore D)	85 to 95
Modulus, Mpa (via DMA)	9120
Linear Shrinkage, %	0.8
Volume Shrinkage, %	1.4
Coefficient of Thermal Conductivity, W/mK	0.857
Halogens, ppm (per 3rd Party Lab testing)	Cl: 84
Extractable Ionic Content - Anion, ppm	F^-: 0.01
	Cl^-: 0.98
	Total: 0.99
Extractable Ionic Content - Cation, ppm	Li^+: 0.03
	Na^+: 5.36
	Total: 5.39
Reworkable	No

Category	Specification
Typical Cured Material Properties	
Water Absorption, %	25 °C for 24 hrs: 0.17
	100 °C for 2 hrs: 0.29
DSC Compatibility Test with Flux Residue	ALPHA CVP-390: Pass
	ALPHA OM-353: Pass
	ALPHA OM-358: Pass
SIR per IPC J-STD-0004B IPC-TM-650 Method 2.6.3.7 (40 °C, 90 %RH, 12 V bias)	ALPHA HiTech CU11-3127: Pass
	ALPHA HiTech CU11-3127 + ALPHA CVP-390: Pass
	ALPHA HiTech CU11-3127 + ALPHA OM-353: Pass
	ALPHA HiTech CU11-3127 + ALPHA OM-358: Pass
Thermal Shock (Air to Air) @ -40 to 125 °C / Dwell 30 min / cycle (Alloy: SAC305)	Pass up to 2,000 Cycles
Surface Resistivity, Ω/cm2 (ASTM D257)	4.6×10^{16}
Volume Resistivity, Ω.cm (ASTM D257)	5.4×10^{16}
Dielectric Breakdown Voltage, kV (ASTM D149)	62
Dielectric Breakdown Strength, kV/mm (ASTM D149)	24
Dielectric Constant (Low Frequency – 1 KHz & 1 MHz: ASTM D150; High Frequency – 1 GHz & 2 GHz: IPC-TM-650 2.5.5.9)	1 KHz: 3.94
	1 MHz: 3.69
	1 GHz: 3.03
	2 GHz: 2.99
Dissipation Constant (Low Frequency – 1 KHz & 1 MHz: ASTM D150; High Frequency – 1 GHz & 2 GHz: IPC-TM-650 2.5.5.9)	1 KHz: 0.0006
	1 MHz: 0.0041
	1 GHz: 0.0070
	2 GHz: 0.0098

SAFETY & WARNING

It is recommended that the company/operator read and review the Safety Data Sheets for the appropriate health and safety warnings before use. **Safety Data Sheets are available at MacdermidAlpha.com/assembly-solutions/knowledge-base.**

CONTACT INFORMATION

To confirm this document is the most recent version, please contact Assembly@MacDermidAlpha.com

www.macdermidalpha.com

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Also read carefully warning and safety information on the Safety Data Sheet. This data sheet contains technical information required for safe and economical operation of this product. READ IT THOROUGHLY PRIOR TO PRODUCT USE . Emergency safety directory assistance: US 1 202 464 2554, Europe + 44 1235 239 670, Asia + 65 3158 1074, Brazil 0800 707 7022 and 0800 172 020, Mexico 01800 002 1400 and (55) 5559 1588