

# ALPHA<sup>®</sup> 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
<p>1. Freeze at <math>\leq -20</math> °C to guarantee product stability.</p> <p>2. Upright Position, tip facing bottom</p> 	<ol style="list-style-type: none"> <li>1. Remove the syringe from the freezer.</li> <li>2. Set aside at room temperature for 2 hours.</li> <li>3. Do not open the cap before the product is sufficiently thawed.</li> <li>4. Product should not be refrozen after thawed.</li> <li>5. To prevent contamination of unused product, do not return any material to its original container.</li> </ol>	<p>ALPHA HiTech CU11-3127 can be effectively dispensed at room temperature condition.</p> <p>If dispensing at a higher temperature is required, the nozzle temperature must be maintained at <math>&lt; 40</math> °C for better pot life stability. A higher preheat temperature up to <math>\leq 80</math> °C may be applied to the substrate for faster underfill flow rate.</p>	<p>For full property development, cure at the following conditions in a convection oven.</p> <ul style="list-style-type: none"> <li>• 140 °C for <math>\geq 20</math> minutes</li> <li>• 150 °C for <math>\geq 15</math> minutes</li> <li>• 165 °C for <math>\geq 5</math> minutes</li> </ul>

**TECHNICAL DATA**

Category	Specification
<b>Typical Uncured Material Properties</b>	
Appearance	Black
Viscosity (RVT Brookfield Spindle #5, 20 rpm @ 25 °C, cP)	1,000 to 4,000
Filler Content (SiO <sub>2</sub> ), %	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
<b>Typical Cured Materials Properties</b>	
Glass Transition (T <sub>g</sub> ), °C via TMA	177 ± 5
CTE (α <sub>1</sub> ), <T <sub>g</sub> , ppm	29 ± 10
CTE (α <sub>2</sub> ), >T <sub>g</sub> , 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 <sup>-</sup> : 0.01
	Cl <sup>-</sup> : 0.98
	Total: 0.99
Extractable Ionic Content - Cation, ppm	Li <sup>+</sup> : 0.03
	Na <sup>+</sup> : 5.36
	Total: 5.39
Reworkable	No

Category	Specification
<b>Typical Cured Material Properties</b>	
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, $\Omega/\text{cm}^2$ (ASTM D257)	$4.6 \times 10^{16}$
Volume Resistivity, $\Omega.\text{cm}$ (ASTM D257)	$5.4 \times 10^{16}$
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](http://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](http://www.macdermidalpha.com)

<p><b>North America</b>          300 Atrium Drive          Somerset, NJ 08873, USA          1.800.367.5460</p>	<p><b>Europe</b>          Unit 2, Genesis Business Park          Albert Drive          Woking, Surrey, GU21 5RW, UK          44.01483.758400</p>	<p><b>Asia</b>          8/F., Paul Y. Centre          51 Hung To Road          Kwun Tong, Kowloon, Hong Kong          852.3190.3100</p>
--	--	---

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

DISCLAIMER: All statements, technical information and recommendations contained herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed. No statement or recommendation shall constitute a representation unless set forth in an agreement signed by officers of seller and manufacturer. NO WARRANTY OF MERCHANTABILITY, WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY IS MADE. The following warranty is made in lieu of such warranties and all other warranties, express, implied, or statutory. Products are warranted to be free from defects in material and workmanship at the time sold. The sole obligation of seller and manufacturer under this warranty shall be to replace any noncompliant product at the time sold. Under no circumstances shall manufacturer or seller be liable for any loss, damage or expense, direct, indirect, incidental or consequential, arising out of the inability to use the product. Notwithstanding the foregoing, if products are supplied in response to a customer request that specifies operating parameters beyond those stated above, or if products are used under conditions exceeding said parameters, the customer by acceptance or use thereof assumes all risk of product failure and of all direct, indirect, incidental and consequential damages that may result from use of the products under such conditions, and agrees to exonerate, indemnify, defend and hold harmless MacDermid, Incorporated and its affiliates therefrom. No suggestion for product use nor anything contained herein shall be construed as a recommendation to use any product in a manner that infringes any patent or other intellectual property rights, and seller and manufacturer assume no responsibility or liability for any such infringement.

© 2019 MacDermid, Inc. and its group of companies. All rights reserved. "(R)" and "TM" are registered trademarks or trademarks of MacDermid, Inc. and its group of companies in the United States and/or other countries.