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DYMAX®

ELECTRONIC CIRCUIT BOARD MATERIALS

9309-SC Product Data Sheet

See-Cure 9309-SC
Light-Cure BGA, CSP Reinforcement Adhesive

APPLICATIONS

- Reinforcement of Fine-Pitch or Leadless Components on Printed Circuit Boards
- Shock Absorption
- Underfill Alternative

FEATURES

- Blue to Clear Upon Exposure to UV/Visible Light
- UV/Visible Light Cure

OTHER FEATURES

- High Viscosity
- Highly Thixotropic
- Adhesion to Various PCB Substrates
- Reduces Stress on Components

Dymax See-Cure 9309-SC cures upon exposure to light and is designed for rapid ruggedization of circuit board components. The blue color of Dymax See-Cure products disappears when they are fully cured. Dymax See-Cure materials contain no nonreactive solvents and cure upon exposure to light. Their ability to cure in seconds enables faster processing, greater output, and lower processing costs. When cured with Dymax light-curing spot lamps, focused-beam lamps, or flood lamps, they deliver optimum speed and performance. Dymax lamps offer the ideal balance of UV and visible light for the fastest, deepest cures. This product is in full compliance with the RoHS Directives 2002/95/EC and 2003/11/EC.

UNCURED PROPERTIES *

Property	Value	Test Method
Solvent Content	No Nonreactive Solvents	N/A
Chemical Class	Acrylated Urethane	N/A
Appearance	Blue Transparent Gel	N/A
Soluble in	Organic Solvents	N/A
Density, g/ml	1.05	ASTM D1875
Viscosity, cP (20 rpm)	45,000 (nominal)	DSTM 502‡

CURED MECHANICAL PROPERTIES *

Property	Value	Test Method
Durometer Hardness	D57	ASTM D2240
Tensile at Break, MPa [psi]	22 [3,200]	ASTM D638
Elongation at Break, %	140	ASTM D638
Modulus of Elasticity, MPa [psi]	163 [23,800]	ASTM D638
Glass Transition Temperature (T_g), ˚C	65	DSTM 256‡
CTEα_1, µm/m/˚C	162	ASTM E831
CTEα_2, µm/m/˚C	204	ASTM E831

OTHER CURED PROPERTIES *

Property	Value	Test Method
Appearance	Colorless	N/A
Refractive Index (20˚C)	1.50	ASTM D542
Boiling Water Absorption, % (2 h)	5.1	ASTM D570
Water Absorption, % (25˚C, 24 h)	3.0	ASTM D570
Linear Shrinkage, %	1.2	ASTM D2566

* Not Specifications

N/A Not Applicable

‡ DSTM Refers to Dymax Standard Test Method

ELECTRICAL PROPERTIES *

Property	Value	Test Method
Dielectric Constant (1 MHz)	5.85	ASTM D150
Dissipation Factor (1 MHz)	0.07	ASTM D150
Dielectric Breakdown Voltage, kV/mm [V/mil]	24 [610]	ASTM D149
Volume Resistivity, ohm-cm	1.42 x 10^{14}	ASTM D257
Surface Resistivity, ohm	4.63 x 10^{14}	ASTM D257

ADHESION

Substrate	Recommendation
Leadframe	✓
Ceramic	✓
PCB	✓
Silicon	✓

✓ Recommended o Limited Applications

st Requires Surface Treatment (e.g. plasma, corona treatment, etc.)

RoHS Compliant

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Technical Data Collection Prior to 2012

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9309-SC Product Data Sheet

CURING GUIDELINES

The blue color of Dymax See-Cure products disappears when they are fully cured. Full cure is achieved when additional light exposure does not improve cured properties. The charts below provide information on how long it takes to complete the transition from blue to clear using different light sources and adhesive thicknesses.

Dymax Curing System (Intensity)	5000-EC (200 mW/cm²) [A]
Adhesive Thickness, mm [mil]	**Time to complete transition, s [B]**
0.10 [4.0]	10 s
0.41 [16]	15 s
1.6 [64]	18 s
6.5 [260]	32 s

Dymax Curing System (Intensity)	BlueWave® 200 (10.0 W/cm²) [A, C]
Adhesive Thickness, mm [mil]	**Time to complete transition, s [B]**
0.10 [4.0]	3 s
0.41 [16]	4 s
1.6 [64]	5 s
6.5 [260]	10 s

Dymax Curing System (Intensity)	UVCS Conveyor with Fusion F300 (2.5 W/cm²) [D]
Adhesive Thickness, mm [mil]	**Belt speed to complete transition, m/min [ft/min] [B]**
0.10 [4.0]	7.5 [24.6]
0.41 [16]	6 [19.7]
1.6 [64]	5 [16.4]
6.5 [260]	2 [6.6]

A *Intensity was measured over the UVA range (320-395 nm) using a Dymax ACCU-CAL™ 50 Radiometer.*

B *Curing through light-blocking substrates may limit the ability of See-Cure adhesives to transition from blue to clear and may require longer light exposure at critical wavelengths (320-400 nm for UV light curing; 320-450 nm for UV/Visible light curing). These times/speeds are typical for curing through 100% light-transmitting substrates.*

C *Due to the distance between the end of the lightguide and adhesive, intensity at the curing area was measured as 4.0 W/cm².*

D *At 53 mm [2.1 in] focal distance. Maximum speed of conveyor is 8.2 m/min [27 ft/min]. Intensity was measured over the UVA range (320-395 nm) using the Dymax ACCU-CAL™ 150 Radiometer.*

Higher intensities or longer cures (up to 5x) generally will not degrade Dymax light-curable materials.

Although Dymax Application Engineering can provide technical support and assist with process development, each customer ultimately must determine and qualify the appropriate curing parameters required for their unique application.

OPTIMIZING PERFORMANCE AND HANDLING

1. This product cures with exposure to UV and visible light. Exposure to ambient and artificial light should be kept to a minimum before curing. Dispensing components including needles and fluid lines should be 100% light blocking, not just UV blocking.
2. All surfaces in contact with the material should be clean and free from flux residue, grease, mold release, or other contaminants prior to dispensing the material.
3. Cure speed is dependent upon many variables, including lamp intensity, distance from the light source, required depth of cure, thickness, and percent light transmission of components between the material and light source.
4. Oxygen in the atmosphere may inhibit surface cure. Surfaces exposed to air may require high-intensity (>100 mW/cm²) UV light to produce a dry surface cure. Flooding the curing area with an inert gas, such as nitrogen, can also reduce the effects of oxygen inhibition.
5. Parts should be allowed to cool after cure before testing and subjecting to any loads or electrical testing.
6. In rare cases, stress cracking may occur in assembled parts. Three options may be explored to eliminate this problem. One option is to heat anneal the parts to remove molded-in stresses. A second option is to open any gap between mating parts to reduce stress caused by an interference fit. The third option is to minimize the amount of time the liquid material remains in contact with the substrate(s) prior to curing.
7. Light curing generally produces some heat. If necessary, cooling fans can be placed in the curing area to reduce the heating effect on components.
8. At the point of curing, an air exhaust system is recommended to dissipate any heat and vapors formed during the curing process.

DISPENSING THE MATERIAL

This material may be dispensed with a variety of manual, semi-automated and fully automated fluid delivery systems. Small area applications including beads and small dots can be achieved using hand-held Dymax dispensing systems like our SD-100 syringe dispenser and our Model 400 needle valve systems. The valve system can be used in a manual, semi-automated or fully automated application. Dymax has several other dispensing systems that may be suitable for use with our masking materials. Questions relating to and defining the best fluid delivery system and curing equipment for specific applications should be discussed with the Dymax Application Engineering Team.

CLEAN UP

Uncured material may be removed from dispensing components and parts with organic solvents. Cured material will be impervious to many solvents and difficult to remove. Clean up of cured material may require mechanical methods of removal.

STORAGE AND SHELF LIFE

Store the material in a cool, dark place when not in use. Do not expose to light. This product may polymerize upon prolonged exposure to ambient and artificial light. Keep covered when not in use. This material has a 7-month shelf life from date of manufacture for all packages except 550CRT, when stored between 10°C (50°F) and 35°C (90°F) in the original, unopened container. This material packaged in 550CRT has a 13-month shelf life from date of manufacture, when stored between 10°C (50°F) and 35°C (90°F) in the original, unopened container.

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9309-SC Product Data Sheet

GENERAL INFORMATION

This product is intended for industrial use only. Keep out of the reach of children. Avoid breathing vapors. Avoid contact with skin, eyes, and clothing. Wear impervious gloves. Repeated or continuous skin contact with uncured material may cause irritation. Remove material from skin with soap and water. Never use organic solvents to remove material from skin and eyes. For more information on the safe handling of this material, please refer to the Safety Data Sheet before use.

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