Multi-Cure® 9-20557
Conformal Coating/Encapsulant Adhesive

APPLICATIONS

- Conformal Coating

FEATURES

- UV/Visible Light Cure
- Secondary Heat Cure
- Low VOCs
- Medium Viscosity, Designed to Enhance Wetting of Leads
- Suitable for Most Types of Spray Equipment

OTHER FEATURES

- MIL-I-46058C Listed
- IPC-CC-830-B Approved
- UL Flammability Recognized
- UL 746 Recognized
- Blue Fluorescing
- Isocyanate Free
- One Part, No Mixing Required

Dymax Multi-Cure® 9-20557 cures upon exposure to light and is designed for rapid conformal coating of printed circuit boards and other electronic assemblies. This coating has been optimized for coating thicknesses between 51 mic [0.002 in] and 510 mic [0.020 in]. The low modulus of 9-20557 allows it to excel in coating applications where thermal shock performance is critical. Dymax 9-20557 is a Multi-Cure® material specially formulated to cure with heat in applications where shadow areas exist. Dymax Multi-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 for conformal coating. Dymax lamps offer the ideal balance of UV and visible light for the fastest, deepest cures. This product is in full compliance with RoHS directives 2015/863/EU.

UNCURED PROPERTIES *

Property	Value	Test Method
Solvent Content	No Nonreactive Solvents	N/A
Chemical Class	Acrylated Urethane	N/A
Appearance	Colorless Transparent Liquid	N/A
Soluble in	Organic Solvents	N/A
Density, g/ml	1.05	ASTM D1875
Viscosity, cP (20 rpm)	2,300	ASTM D1084
Shelf Life at Recommended Conditions from Date of Manufacture	18 months	N/A

CURED MECHANICAL PROPERTIES *

Property	Value	Test Method
Durometer Hardness	D60	ASTM D2240
Tensile at Break, MPa [psi]	15.8 [2,300]	ASTM D638
Elongation at Break, %	150	ASTM D638
Modulus of Elasticity, MPa [psi]	37.9 [5,500]	ASTM D638
Glass Transition Tg, °C	52	ASTM D5418
CTEα_1, µm/m/°C	109	ASTM E831
CTEα_2, µm/m/°C	222	ASTM E831

ELECTRICAL PROPERTIES *

Property	Value	Test Method
Dielectric Constant (1 MHz)	4.49	ASTM D150
Dissipation Factor (1 MHz)	0.03	ASTM D150
Dielectric Withstand Voltage, V	>1,500	MIL-I-46058C
Volume Resistivity, ohm-cm	1.48×10^{15}	ASTM D257
Surface Resistivity, ohms	8.29×10^{14}	ASTM D257

ADHESION

Substrate	Recommendation
Lead Frame	✓
Ceramic	✓
PCB	✓
Flex	✓
Silicon	✓

✓ Recommended o Limited Applications
st Requires Surface Treatment (e.g. plasma, corona treatment, etc.)

* Not Specifications
N/A Not Applicable

Technical Data Collected 2016 Rev.02/10/2023

OTHER CURED PROPERTIES *		
Property	**Value**	**Test Method**
Refractive Index (20°C)	1.49	ASTM D542
Boiling Water Absorption, % (2 hr)	3.0	ASTM D570
Water Absorption, % (25°C, 24 hr)	1.0	ASTM D570
Linear Shrinkage, %	1.1	ASTM D2566
Thermal Shock, -65°C to 125°C	50 cycles	MIL-I-46058C
Flammability	V1	UL 94
Moisture Resistance	Passes	MIL-I-46058C
Fungus Resistance (ASTM G21-13)	Passes	MIL-I-46058C

CURING GUIDELINES

UV-curing guidelines for 9-20557 at 0.003 in (0.076 mm):

Dymax Curing System (Intensity)	Fixture Time or Belt Speed [A]
5000-EC (225 mW/cm^2)[A]	20 s
BlueWave® 200 (10 W/cm^2)[A]	15 s
UVCS Conveyor with Fusion D lamp (2.5 W/cm2)[B]	3.0 m/min [10 ft/min]
UVCS Conveyor with one 5000-EC (250 mW/cm2)[B]	1.0 m/min [3 ft/min]

A Intensity was measured over the UVA range (320-395 nm) using a Dymax ACCU-CAL™ 50 Radiometer.
B Intensity was measured over the UVA range (320-395 nm) using a Dymax ACCU-CAL™ 160 Radiometer.

SECONDARY HEAT CURE

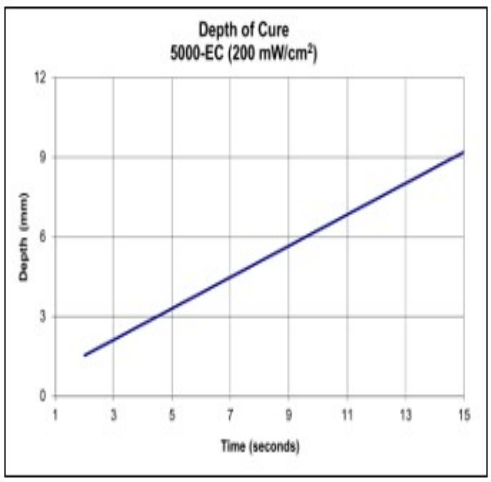
Heat can be used as a secondary cure mechanism where the adhesive cannot be cured with light. Light curing must be done prior to heat cure. The following heat cure schedule may be used:

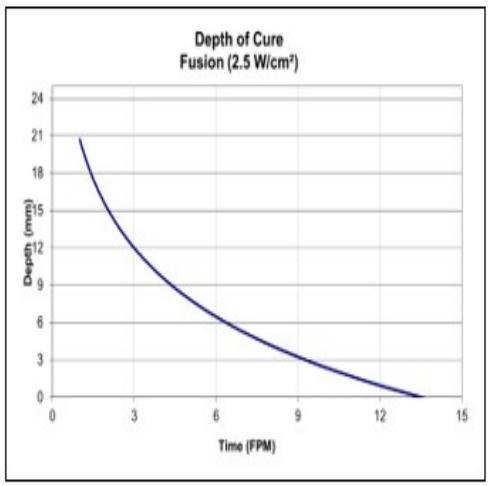
Temperature	Time*
110°C [230°F]	60 minutes
120°C [250°F]	30 minutes
150°C [300°F]	15 minutes

*Note: Actual heat cure time may vary due to part configuration, volume of adhesive applied, and oven efficiency.

DEPTH OF CURE

The graphs below show the increase in depth of cure as a function of exposure time with two different lamps at different intensities. A 9.5 mm [0.37 in] diameter specimen was cured in a polypropylene mold and cooled to room temperature. It was then released from the mold and the cure depth was measured.





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 SUPPORT

The Dymax Application Engineering team is ready to discuss your application requirements to provide the most appropriate dispensing and/or spraying solution. Visit our current dispensing equipment portfolio here or consult our global contact phone numbers and online chat feature (available in North America only) during normal business hours for instant support.

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 shelf life noted on page 1 of this document, when stored between 10°C (50°F) and 32°C (90°F) in the original, unopened container.

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. Cleanup of cured material may require mechanical methods such as ultrasonic bath, water jet, vacuum tweezers, air knife and/ or warming to aid in the removal.

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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