Multi-Cure® 9-20351-UR
Flexible Coating/Encapsulant

APPLICATIONS	FEATURES	OTHER FEATURES
• Conformal Coating	• UV/Visible Light Cure • Secondary Heat-Cure Technology • Low VOC • Suitable for Spraying	• Ultra-Red® Fluorescing • Isocyanate Free • One Part, No Mixing Required • Optimized for Wetting High-Profile Leads

Multi-Cure® 9-20351-UR cures upon exposure to light and is designed for rapid conformal coatings of printed circuit boards and other electronics assemblies. This coatings has been engineered for application thicknesses between 50 mic [0.002 in] and 0.51 mm [0.020 in]. The low modulus of this product allows it to excel in thick coatings applications where thermal shock performance is critical. When exposed to black light, Ultra-Red® Fluorescing emits a bright red color, providing a vivid contrast on components and solder masks. 9-20351-UR 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 UL 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 Translucent Gel	N/A
Soluble in	Organic Solvents	N/A
Density, g/ml	1.05	ASTM D1875
Viscosity, cP	10,000 (nominal)	ASTM D2556
Shelf Life at Recommended Conditions from Date of Manufacture	6 months	N/A

CURED MECHANICAL PROPERTIES ¥

Property	Value	Test Method
Durometer Hardness	D60	ASTM D2240
Tensile at Break, MPa [psi]	13.8 [2,000]	ASTM D638
Elongation at Break, %	165	ASTM D638
Modulus of Elasticity, MPa [psi]	89.6 [13,000]	ASTM D638

ELECTRICAL PROPERTIES ¥

Property	Value	Test Method
Dielectric Constant (1 MHz)	4.90	ASTM D1304
Dissipation Factor (1 MHz)	0.04	ASTM D1304
Dielectric Strength, kV/mm [V/mil]	200 [500]	ASTM D1304
Volume Resistivity, ohm-cm	500x10E12	ASTM D1304
Surface Resistivity, ohm	6,000x10E12	ASTM D1304

OTHER CURED PROPERTIES ¥

Property	Value	Test Method
Refractive Index (20°C)	1.5	ASTM D542
Boiling Water Absorption, % (2 h)	2.4	ASTM D570
Water Absorption, % (25°C, 24 h)	0.8	ASTM D570
Linear Shrinkage, %	0.6	ASTM D2566
Glass Transition Tg, °C	41	ASTM D5418
$CTE\alpha_1$, µm/m/°C	65	ASTM E831
$CTE\alpha_2$, µm/m/°C	192	ASTM E831

ADHESION

Substrate	Recommendation
Ceramic	✔
PCB	✔
Flex	✔
Silicon	✔
Leadframe	✔

✔ Recommended   o Limited Applications

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

CURING GUIDELINES

Light-curing guidelines for Multi-Cure® 9-20351-UR at 0.003 in (0.075 mm). Fixture time is defined as the time to develop a shear strength of 0.1 N/mm^2 [10 psi] between glass slides. Actual cure time typically 3-to-5 times fixture time.

Dymax Curing System (Intensity)	Cure Time or Belt Speed
5000-EC (200 W/cm^2)^B	1s
BlueWave® 200 (10 W/cm^2)^B	4s

[A] Intensity was measured over the UVA range (350-450 nm) using a Dymax ACCU-CAL™ 50-LED Radiometer.
[B] Intensity was measured over the UVA range (320-395 nm) using a Dymax ACCU-CAL™ 160 Radiometer.

Full cure is best determined empirically by curing at different times and intensities, and measuring the corresponding change in cured properties such as tackiness, adhesion, hardness, etc. Full cure is defined as the point at which more light exposure no longer improves cured properties. Higher intensities or longer cures (up to 5x) generally will not degrade Dymx light-curable materials.

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 graph below shows the increase in depth of cure as a function of exposure time. 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.
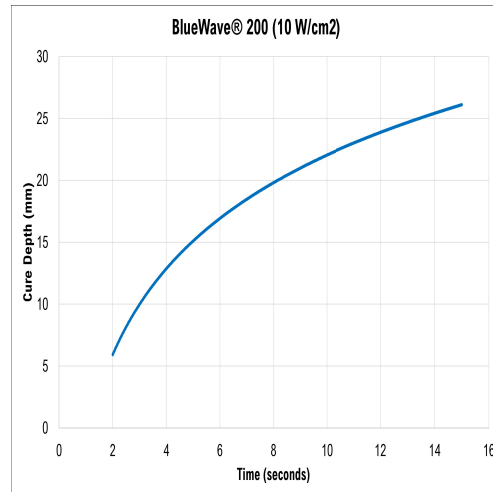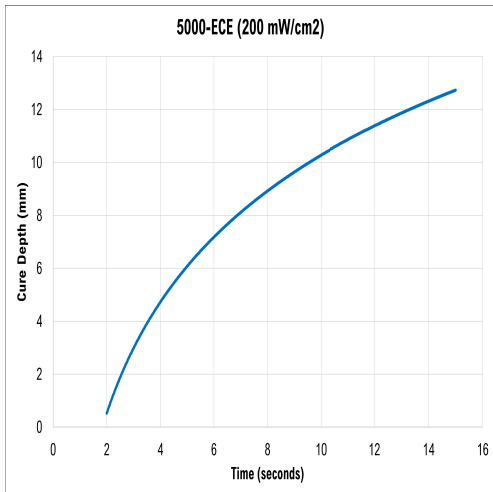
OPTIMIZING PERFORMANCE AND HANDLING

1. This product cures with exposure to UV and visible light as well as moisture. Exposure to ambient and artificial light and moisture 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 bond surfaces should be clean and free from grease, mold release, or other contaminants prior to dispensing the adhesive.
3. Cure speed is dependent upon many variables, including lamp intensity, distance from the light source, required depth of cure, bond gap, and percent light transmission of the substrate.
4. Oxygen in the atmosphere may inhibit surface cure. Surfaces exposed to air may require high-intensity UV light to produce a dry surface cure. Flooding the bond 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.
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 the gap between mating parts to reduce stress caused by an interference fit. The third option is to minimize the amount of time the liquid adhesive 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.
9. Resealing opened container under a dry, inert gas, such as nitrogen, can help to prolong the shelf life.
10. Light cure is recommended prior to moisture cure. Full cure develops after both light and moisture cure, not one or the other.

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 low humidity, cool, and dark place when not in use. This product may polymerize upon prolonged exposure to ambient and artificial light as well as moisture. This material shelf life noted on page 1 of this document, when stored between 10°C (50°F) and 25°C (77°F) in the original, unopened container.

Resealing large containers under dry inert gas, such as nitrogen, can help maintain the shelf life. Smaller syringes and cartridges should be kept in moisture barrier bags with desiccant when not in use.

CLEAN UP

Uncured Dymax dual-cure materials may be removed from dispensing components and parts with non-alcoholic solvents. Alcoholic solvents (such as IPA or ethanol) that contain moisture activate the curing process. Therefore, it is recommended that non-alcohols such as Butyl Acetate Acetone or MEK be used to cleanup uncured material and purge wetted dispensing lines.

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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