9906-AA

Low-Shrinkage Camera Module Epoxy with LED and Heat-Cure Capability

APPLICATIONS

- Active Alignment
- Optical Assembly
- Camera Module/LiDAR Bonding

FEATURES

- Very Fast UV/Visible Light Cure
- Low-Temperature (80-85°C) Heat-Cure Capability
- One Component, No Mixing Required
- Cold Ship/Cold Storage at 1-5°C
- Excellent Depth of Cure
- Moisture and Thermal Cycle Resistant

RECOMMENDED SUBSTRATES

- LCP
- PCB
- PPS
- FPC
- Metallic Surfaces

Dymax 9906-AA is a very low shrinkage, fast curing UV/Visible light-curable epoxy with superior adhesion for camera modules. 9906-AA is especially formulated to cure primarily with UV light and includes a low-temperature heat-curing function in applications where shadow areas exist or where heat only curing is preferred. Dymax materials contain no nonreactive solvents. 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 camera module assembly. Dymax lamps offer the ideal balance of UV and visible light for the fastest, deepest cures. This product requires cold store and cold shipping and should be kept between 1°C [34°F] and 5°C [41°F] in the original, unopened container. 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	Epoxy	N/A
Appearance	Off White to Light Gray Opaque Gel	N/A
Soluble in	Organic Solvents	N/A
Density, g/ml	1.6	ASTM D1875
Viscosity, cP	86,000 (nominal)	DSTM 502‡
Shelf Life at Recommended Conditions from Date of Manufacture	7 months	N/A

CURED MECHANICAL PROPERTIES

Property	Value	Test Method
Durometer Hardness	D94	ASTM D2240
Tensile at Break, MPa [psi]	37.7 [5,469]	ASTM D638
Elongation at Break, %	1.5	ASTM D638
Modulus of Elasticity, MPa [psi]	2,980 [432,229]	ASTM D638

OTHER CURED PROPERTIES

Property	Value	Test Method
Boiling Water Absorption, % (2 h)	0.49	ASTM D570
Water Absorption, % (25°C, 24 h)	0.22	ASTM D570
Volumetric Shrinkage, %	1.4	DSTM 6114‡
Glass Transition Tg, °C	177	ASTM D5418
CTEα1, µm/m/°C	24	ASTM E831
CTEα2, µm/m/°C	66	ASTM E831

* Not Specifications

N/A Not Applicable

‡ DSTM Refers to Dymax Standard Test Method

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Technical Data Collected 11/2022 Rev.03/09/2026

ADHESION	
Substrate	**Recommendation**
ABS (acrylonitrile-butadiene-styrene)	✔
Aluminum	✔
CAP (cellulose acetate propionate)	✔
FR-4 Board	✔
Glass	✔
LCP (liquid-crystal polymer)	✔
Magnesium	✔
PC (polycarbonate)	✔
PET (poly(ethylene terephthalate))	✔
PPS (polyphenylene sulfide)	✔
PS (polystyrene)	✔
Stainless Steel	✔

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

CURING GUIDELINES

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 is 3-to-5 times fixture time.

Dymax Curing System (Intensity)	Fixture Time or Belt Speed A
5000-EC (200 mW/cm2)B	1 s
BlueWave® 200 (10 W/cm2)B	0.2 s
BlueWave® LED Flood RediCure® 365 nm (450 mW/cm2)C	0.2 s
BlueWave® LED Flood PrimeCure® 385 nm (850 mW/cm2)C	0.2 s
BlueWave® LED Flood VisiCure® 405 nm (950 mW/cm2)C	0.2 s
UVCS Conveyor with 5000-EC (200 mW/cm2)D	7 m/min [25 ft/min]
UVCS Conveyor with Fusion F300S (2.5 W/cm2)D	8 m/min [27 ft/min]

A Fixture times/belt speeds are typical for curing thin films through 100% UV and light-transmitting substrates. Light-obstructing substrates may require longer cure times.

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

C Intensity was measured over the UVA/Visible range (350-450 nm) using a Dymax ACCU-CAL™ 50-LED Radiometer.

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™ 160 Radiometer.

Higher intensity for shorter time is preferred for curing this product (500-1000 mW/cm^2 is recommended).

SECONDARY HEAT CURE

Heat can be used as the sole cure mechanism **or** in conjunction with light curing. The following heat-cure schedule may be used*

80°C [176°F] 30-35 minutes
85°C [185°F] 20-25 minutes

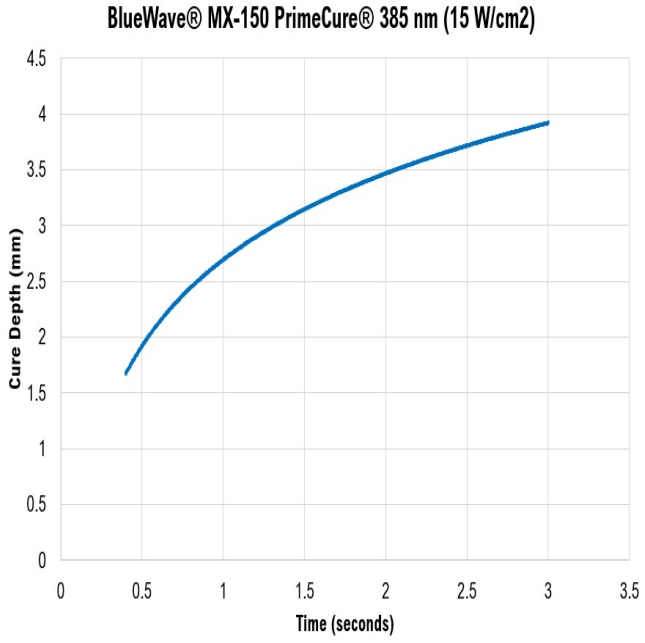
*Note: Actual heat-cure time may vary due to part configuration, volume of adhesive applied, and oven efficiency.

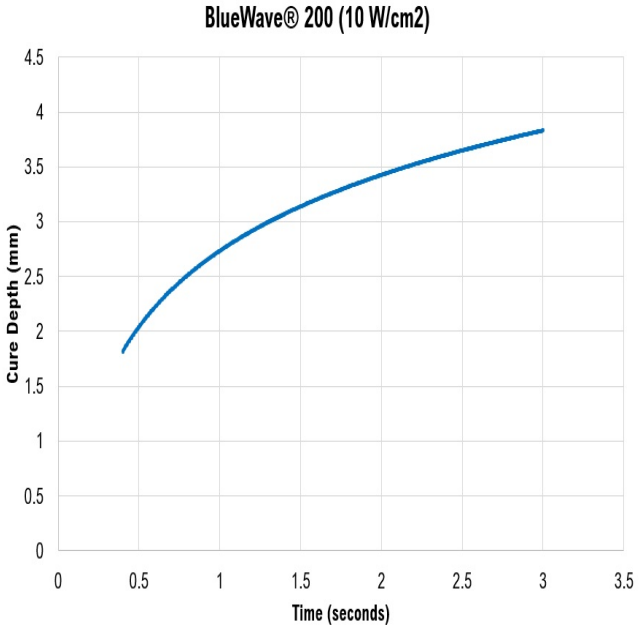
Full cure is best determined empirically by curing at different times and intensities, and measuring the corresponding change in cured properties such as tackiness, adhesion, hardness, etc. Full cure is defined as the point at which more light exposure or heat no longer improves cured properties. Higher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

Dymax recommends that customers employ a safety factor by curing longer and/or at higher intensities than required for full cure. 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.

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. 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 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. High humidity environments or basic materials may inhibit cure.
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.

DISPENSING THE MATERIAL

Material should be allowed to reach room temperature prior to use. This may take 20-60 minutes depending on the package size being used. Due to the filler in this material, 25-gauge (ID 0.25mm or 0.010") is the smallest recommended tip size in order to eliminate potential clogging issues.

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 covered material in a cool, dark place when not in use. This product may polymerize upon prolonged exposure to ambient and artificial light as well as ambient temperatures. This material shelf life noted on page 1 of this document, when stored between 1°C (34°F) and 5°C (41°F) in the original, unopened container.

The pot life is 5 days at 25°C. In a production setting, once material is removed from 1-5°C storage, it should be used in its entirety or be disposed of within 5 days.

CLEANUP

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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