Dual-Cure 9014
Blue Fluorescing Encapsulant/Wire Bond Adhesive with Secondary Moisture Cure

APPLICATIONS

- **Chip on Board**
- **Chip on Flex**
- **Chip on Glass**
- **Wire Bonding**

FEATURES

- **UV Light Cure**
- **Secondary Moisture-Cure Capability**
- **Flexible Encapsulant**
- **Shadow Area Performance**
- **Blue Fluorescing**

RECOMMENDED SURFACES

- **FR4**
- **Kapton**
- **GL**

Dual-cure 9014 encapsulant is formulated to cure primarily with UV light and includes a secondary moisture-cure function for applications where shadow areas exist. Dymax dual-cure 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 encapsulation. 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	Light Yellow Translucent Gel	N/A
Soluble in	Organic Solvents	N/A
Density, g/ml	1.02	ASTM D1875
Viscosity, cP (20 rpm)	12,500 (nominal)	DSTM 502

CURED MECHANICAL PROPERTIES *

Property	Value	Test Method
Durometer Hardness Ω	A70	ASTM D2240
Durometer Hardness ¥	D51	ASTM D2240
Tensile at Break, MPa [psi] ¥	8.2 [1,200]	ASTM D638
Elongation at Break, % ¥	63	ASTM D638
Modulus of Elasticity, MPa [psi] ¥	119 [17,300]	ASTM D638

OTHER CURED PROPERTIES * ¥

Property	Value	Test Method
Refractive Index (20˚C)	1.50	ASTM D542
Boiling Water Absorption, % (2 h)	1.8	ASTM D570
Water Absorption, % (25˚C, 24 h)	0.6	ASTM D570
Linear Shrinkage, %	1.8	DSTM 614‡
Glass Transition T_g, ˚C	51	DSTM 256‡
CTEα_1, µm/m/˚C	107	DSTM 610‡
CTEα_2, µm/m/˚C	192	DSTM 610‡

* Not Specifications
¥ Measured after UV cure followed by 14 days at 25°C / 50% RH
Ω Measured after UV cure only
N/A Not Applicable
‡ DSTM Refers to Dymax Standard Test Method

ELECTRICAL PROPERTIES * ¥

Property	Value	Test Method
Dielectric Constant (1 MHz)	4.92	ASTM D150
Dissipation Factor (1 MHz)	0.023	ASTM D150
Dielectric Breakdown Voltage, kV/mm [V/mil]	40 [1020]	ASTM D149
Volume Resistivity, ohm-cm	9.70E+13	ASTM D257
Surface Resistivity, ohm	3.50E+13	ASTM D257

ADHESION Ω

Substrate	Recommendation
FR4	✓
Kapton	✓
GL glass	✓

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

RoHS Compliant

Technical Data collected: 12/2018
Rev. 11/22/2019

Dymax Corporation
+1.860.482.1010 | info@dymax.com | www.dymax.com

Dymax Oligomers & Coatings
+1.860.626.7006 | info_oc@dymax.com | www.dymax-oc.com

Dymax Asia (H.K.) Limited
+852.2460.7038 | dymaxasia@dymax.com | www.dymax.com.cn

Dymax Europe GmbH
+49 611.962.7900 | info_de@dymax.com | www.dymax.de

Dymax UV Adhesives & Equipment (Shanghai) Co. Ltd.
+86.21.37285759 | dymaxasia@dymax.com | www.dymax.com.cn

Dymax Asia Pacific Pte. Ltd.
+65.6752.2887 | info_ap@dymax.com | www.dymax-ap.com

Dymax Engineering Adhesives Ireland Ltd.
+353 21.237.3016 | info_ie@dymax.com | www.dymax.ie

Dymax UV Adhesives & Equipment (Shenzhen) Co. Ltd.
+86.755.83485759 | dymaxasia@dymax.com | www.dymax.com.cn

Dymax Korea LLC
+82.2.784.3434 | info_kr@dymax.com | www.dymax.com/kr

CURING GUIDELINES

Recommended Application Thickness	Recommended Light Curing	Recommended Moisture Curing (after light curing)
Up to 2.5 mm	UVCS Conveyor with Fusion F300S 2.5 W/cm^2 intensity* 5 fpm (1.5 m/min)	7 days at 25˚C, 50% RH or 2 days at 40˚C, 50% RH

** At 2.1" focal distance. Intensity was measured over the UVA range (320-395 nm) using a Dymax ACCU-CAL 150™ Radiometer.*

SECONDARY MOISTURE CURE

A combination of light and moisture cure is required to achieve full cured mechanical properties. Moisture is also used as a secondary cure mechanism for shadowed areas that cannot be cured with light. While moisture cure time in shadowed areas is typically 2-3 days at 25˚C [77˚F], 50% RH, actual moisture cure time is application specific and may vary. For material that has been light cured, typical full property development is after 7 days at 25°C [77°F], 50% RH.

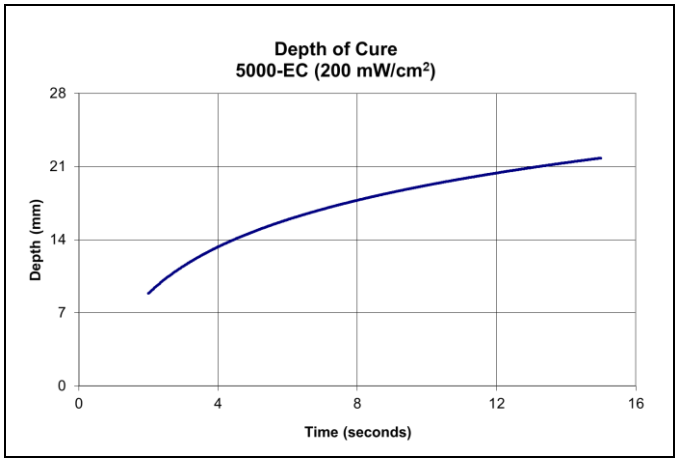
Cure time for both light cured and shadow areas depends on humidity level, amount of material in shadowed areas, and its proximity to humidity. Material entrapped under large components may have a prolonged cure time. Exposure to heat (typically 40˚C-60˚C) and higher relative humidity will accelerate cure.

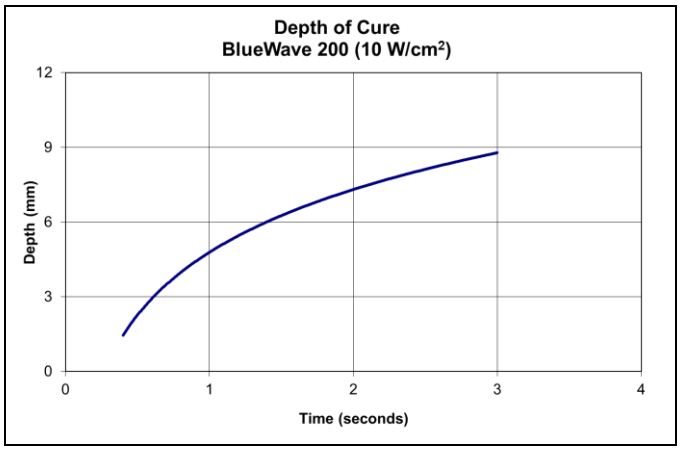
Full cure is best determined empirically by curing at different times and intensities, and measuring the corresponding change in cured properties such as tackiness, adhesion, hardness, etc. Full cure is defined as the point at which more light and/or ambient exposure no longer improves cured properties.

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 must ultimately 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 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 THE RESIN

This material may be dispensed with a variety of manual, semi-automated and fully automated fluid delivery systems. Dymax has several dispensing systems that may be suitable for use with this material such as our Model 110 mountable atomizing needle valve or SG-100-RS handheld spray gun. Small area applications including beads and small dots can be achieved using hand-held dispensers such as our SD-100 syringe dispenser and our Model 400 needle valve systems. These valve systems can be used in a manual, semi-automated or fully automated application. Actual dispensing options vary by material properties. 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.

STORAGE AND SHELF LIFE

Store the material in a cool, dark place when not in use. Do not expose to light or moisture. This product may polymerize upon prolonged exposure to ambient and artificial light as well as moisture. Keep covered when not in use. This material has a 6-month shelf life from date of manufacture, unless otherwise specified, when stored between 10°C (50°F) and 32°C (90°F) in the original, unopened container.

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.

The data provided in this document are based on historical testing that Dymax performed under laboratory conditions as they existed at that time, and are for informational purposes only. The data are neither specifications nor guarantees of future performance in a particular application. Dymax does not guarantee that this product's properties are suitable for the user's intended purpose.

Numerous factors—including, without limitation, transport, storage, processing, the material with which the product is used, and the ultimate function or purpose for which the product was obtained—may affect the product's performance and/or may cause the product's actual behavior to deviate from its behavior in the laboratory. None of these factors are within Dymax's control. Conclusions about the behavior of the product under the user's particular conditions, and the product's suitability for a specific purpose, cannot be drawn from the information contained in this document.

It is the user's responsibility to determine (i) whether a product is suitable for the user's particular purpose or application and (ii) whether it is compatible with the user's intended manufacturing process, equipment, and methods. Under no circumstances will Dymax be liable for determining such suitability or compatibility. Before the user sells any item that incorporates Dymax's product, the user shall adequately and repetitively test the item in accordance with the user's procedures and protocols. Unless specifically agreed to in writing, Dymax will have no involvement in, and shall under no circumstances be liable for, such testing.

Dymax makes no warranties, whether express or implied, concerning the merchantability of this product or its fitness for a particular purpose. Nothing in this document should be interpreted as a warranty of any kind. Under no circumstances will Dymax be liable for any injury, loss, expense or incidental or consequential damage of any kind allegedly arising in connection with the user's handling, processing, or use of the product. It is the user's responsibility to adopt appropriate precautions and safeguards to protect persons and property from any risk arising from such handling, processing, or use.

The specific conditions of sale for this product are set forth in Dymax's Conditions of Sale which are available at https://dymax.com/resources/sales-terms-conditions. Nothing contained herein shall act as a representation that the product use or application is free from patents owned by Dymax or any others. Nothing contained herein shall act as a grant of license under any Dymax Corporation Patent.

The contents of this document are subject to change. Unless specifically agreed to in writing, Dymax shall have no obligation to notify the user about any change to its content.