Dual-Cure 3401
Light/Moisture-Cure PC and ABS Plastic Bonder

APPLICATIONS

- Plastic Assembly
- Appliance Assembly
- Bonding, Sealing or Encapsulating PC and ABS Components

FEATURES

- UV/Visible Light Cure
- Secondary Moisture Cure
- Blue Fluorescing for Easy In-line Inspection
- Shadow Area Performance
- Moisture and Thermal Resistance

RECOMMENDED SUBSTRATES

- ABS
- PC
- PCTG
- PVC

Dymax dual-cure 3401 is designed for rapid bonding of a wide variety of plastic and metal substrates. The product is formulated with a UV/Visible light and secondary ambient moisture-cure system for curing in shadow areas and fluoresces blue for in-line inspection under low-intensity “black light” (365 nm). Dymax dual-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, supplemented by secondary moisture cure, they deliver optimum speed and performance for plastic bonding, sealing, and 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	Transparent Liquid	N/A
Soluble in	Organic Solvents	N/A
Density, g/ml	1.07	ASTM D1875
Viscosity, cP	150 (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	D55-D75	ASTM D2240
Tensile at Break, MPa [psi]	30 [4,400]	ASTM D638
Elongation at Break, %	13	ASTM D638
Modulus of Elasticity, MPa [psi]	506 [73,400]	ASTM D638

OTHER CURED PROPERTIES *

Property	Value	Test Method
Refractive Index (20°C)	1.48	ASTM D542
Boiling Water Absorption, % (2 h)	2.6	ASTM D570
Water Absorption, % (25°C, 24 h)	0.7	ASTM D570
Linear Shrinkage, %	0.2	ASTM D2566
Glass Transition Tg, °C	68	ASTM D5418

TYPICAL PERFORMANCE OF CURED MATERIAL *

Property	Value	Test Method
PC to PC Lap Shear, lbf	400	DSTM 255‡
PC to SS Lap Shear, lbf	216	DSTM 251‡

ADHESION

Substrate	Recommendation
ABS acrylonitrile-butadiene-styrene	✓
PC polycarbonate	✓
PCTG poly(cyclohexylene dimethylene terephthalate)glycol	✓
PEI polyetherimide	✓
PETG poly(ethylene terephthalate)glycol	✓
PI polyimide	✓
Brass	✓
Glass	✓
PSU polysulfone	✓
PVC poly(vinyl chloride)	✓

✓ Recommended o Limited Applications

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

* Not Specifications

N/A Not Applicable

‡ DSTM Refers to Dymax Standard Test Method

Technical Data Collected Prior to 2018 Rev.02/10/2023

CURING GUIDELINES

Fixture time is defined as the time to develop a shear strength of 0.1 N/mm2 [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]
2000-EC (50 mW/cm^2)[B]	<1 s
5000-EC (200 mW/cm^2)[B]	<1 s
BlueWave® MX-150 PrimeCure® 385 nm (15 W/cm^2)[C]	0.2 s
BlueWave® 200 (10 W/cm^2)[B]	0.2 s
UVCS Conveyor with one 5000-EC (200 mW/cm^2)[D]	8.2 m/min [27 ft/min]
UVCS Conveyor with Fusion F300S (2.5 W/cm^2)[D]	8.2 m/min [27 ft/min]

A Fixture times/belt speeds are typical for curing thin films through 100% light-transmitting substrates. Light-obstructing substrates 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.

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.

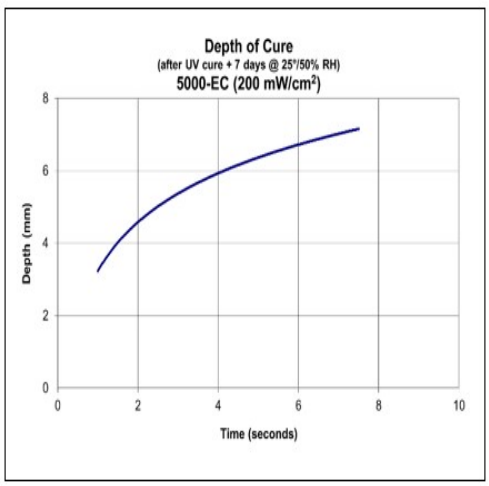
Dymax recommends that customers employ a safety factor by curing longer and/or at higher intensities than required for full cure. Although Dymax Applications Engineering can provide technical support and assist with process development, each customer ultimately must determine and qualify the appropriate curing parameters required for their unique application.

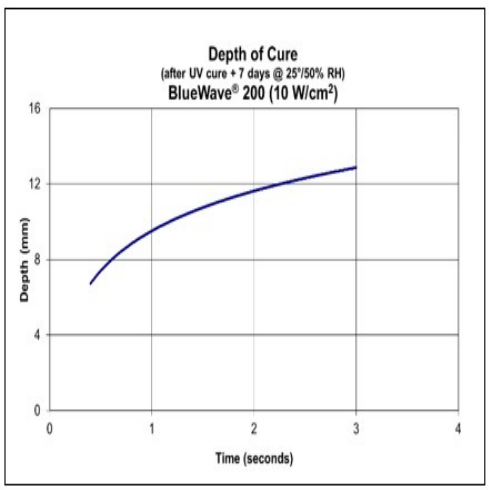
Moisture Cure

Moisture is used as a secondary cure mechanism for shadowed areas that cannot be cured with light. While moisture cure time is typically 3-5 days at 25°C [77°F], 50% RH, actual moisture cure time is application specific and may vary. Cure time depends on humidity level, amount of material in shadowed areas, and proximity of shadowed material to humidity. Substrates which block moisture transmission may have a prolonged cure time.

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 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 (>100 mW/cm^2) 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.

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. If the product is exposed to colder temperatures, allow it to equilibrate at room temperature for 24 hours prior to 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 clean up 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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