9702

Optical Display Adhesive

APPLICATIONS

- Optical Display Lamination
- Touch Screens

FEATURES

- UV/Visible Light Cure
- Excellent Re-Workability
- Non-Yellowing
- Low Shrinkage
- Good Thermal Shock Resistance

RECOMMENDED SUBSTRATES

- PMMA
- PC
- PET
- Glass

Dymax 9702 optical display adhesive is designed for use in flat panel displays where re-workability and non-yellowing characteristics are important. materials cure upon exposure to light and contain no nonreactive solvents. Their ability to cure in seconds enables faster processing, greater output, and lower processing costs. When cured with Dymax focused-beam lamps, flood lamps, or spot lamps, they deliver optimum speed and performance for optical display lamination. 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 Liquid	N/A
Soluble in	Organic Solvents	N/A
Density, g/ml	0.93	ASTM D1875
Viscosity, cP	950 (nominal)	ASTM D1084
Shelf Life at Recommended Conditions from Date of Manufacture	12 months	N/A

CURED MECHANICAL PROPERTIES *

Property	Value	Test Method
Durometer Hardness	00-70	ASTM D2240
Tensile at Break, MPa [psi]	0.89 [129]	ASTM D638
Elongation at Break, %	137	ASTM D638
Modulus of Elasticity, MPa [psi]	0.36 [52]	ASTM D638
Glass Transition Tg, °C	1	ASTM D5418
CTEa1, mm/m/°C	105	ASTM E831
CTEa2, mm/m/°C	355	ASTM E831

OTHER CURED PROPERTIES *

Property	Value	Test Method
Refractive Index (20°C)	1.49	ASTM D542
Boiling Water Absorption, % (2 h)	0.35	ASTM D570
Water Absorption, % (25°C, 24 h)	0.42	ASTM D570
Volumetric Shrinkage, %	4.2	DSTM 611‡

ELECTRICAL PROPERTIES *

Property	Value	Test Method
Dielectric Constant (1 MHz)	3.44	ASTM D150
Dielectric Constant (1 kHz)	5.00	ASTM D150
Dissipation Factor (1 MHz)	0.04	ASTM D150
Dissipation Factor (1 kHz)	0.04	ASTM D150
kV/mm [V/mil]	20.86 [529.48]	ASTM D149
Volume Resistivity, ohm-cm	9.53×10^{14}	ASTM D257
Surface Resistivity, ohm	2.24×10^{14}	ASTM D257

* Not Specifications

N/A Not Applicable

‡ DSTM Refers to Dymax Standard Test Method

Technical Data Collected PRIOR TO 2012 Rev.07/08/2025

ADHESION	
Substrate	**Recommendation**
PMMA	✓
PC	✓
PET	✓
Glass	✓

✔ Recommended o Limited Applications

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

OPTICAL PROPERTIES *		
Property	**Value**	**Test Method**
% Transmittance at 570 nm	100	DSTM 501‡
Yellowness (b*) initial (5 mil thick)	0.12	DSTM 612‡
Yellowness (b*) after 85°C/85% RH, 500 h (5 mil thick)	0.10	DSTM 612‡
Yellowness (b*) after 5 min exposure to 60 mW/cm2 UV (5 mil thick)	0.17	DSTM 612‡
% Haze	0.58	ASTM D1003

TYPICAL PERFORMANCE OF CURED MATERIAL *		
Property	**Value**	**Test Method**
Glass to Glass Compression	MPa [psi]	DSTM D250‡
5000-EC (200mW/cm²)	2 [323]	DSTM D250‡
FX-1250 RediCure 365nm (1.5W/cm²)	5 [790]	DSTM D250‡
FX-1250 PrimeCure 385nm (1.5W/cm²)	3.5 [505]	DSTM D250‡
FX-1250 VisiCure 405nm (1.5W/cm²)	1.9 [280]	DSTM D250‡

CURING GUIDELINES

Cure times based on 0.005" (127 um) thickness

Dymax Curing System (Intensity)	Fixture Time or Belt Speed [A]
5000-EC (60 mW/cm²)	25 s
5000-EC (150 mW/cm²)	15 s
5000-EC (230 mW/cm²)	15 s
UVCS Conveyor with Fusion F300S (2,500 mW/cm^2)[D]	5 ft/min

A For applications requiring higher thicknesses, please contact Dymax Application Engineering.

B Curing through light-blocking substrates may require longer cure times if they obstruct wavelengths used for light curing (320-400 nm for UV light curing, 320-450 nm for UV/visible light curing). These curing times/belt speeds are typical for curing thin films through 100% light-transmitting substrates.

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

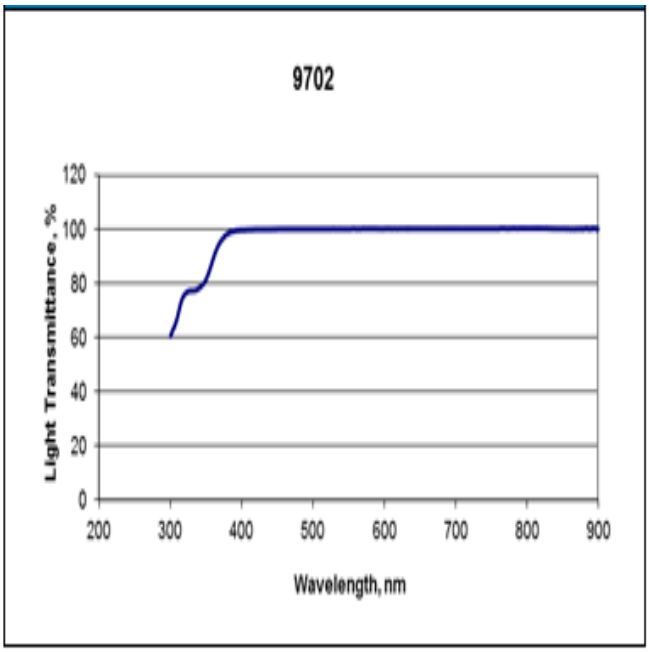
Full cure is best determined empirically by curing at different times and intensities, and measuring the corresponding change in cured properties such as tackiness, adhesion, hardness, etc. Full cure is defined as the point at which more light exposure no longer improves cured properties. Higher intensities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

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.

LIGHT TRANSMITTANCE

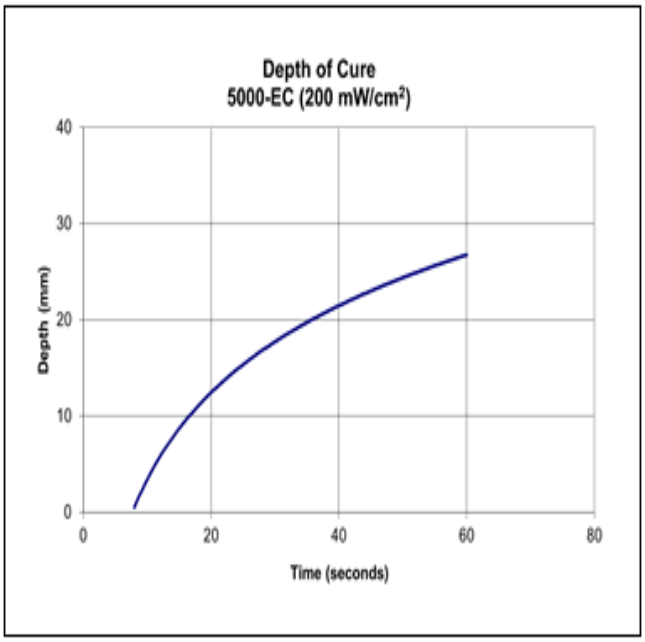
Measured at 0.03 mm [0.001in] per DSTM-501‡

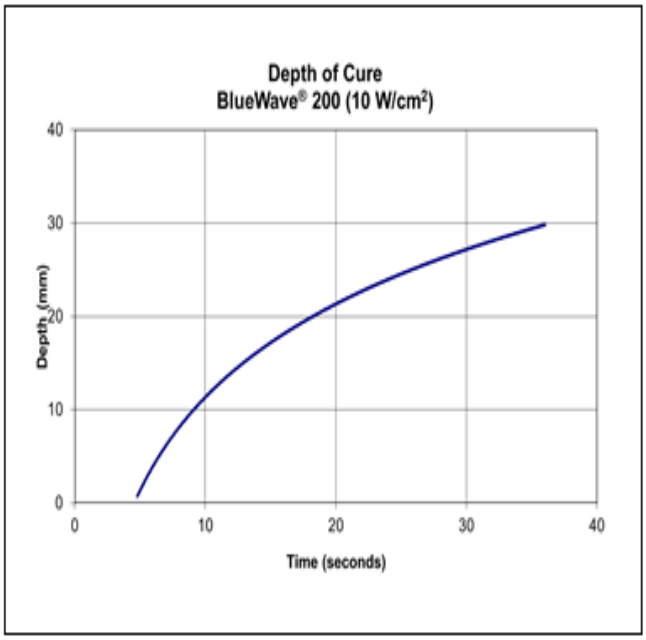
DSTM Refers to Dymax Standard Test Method

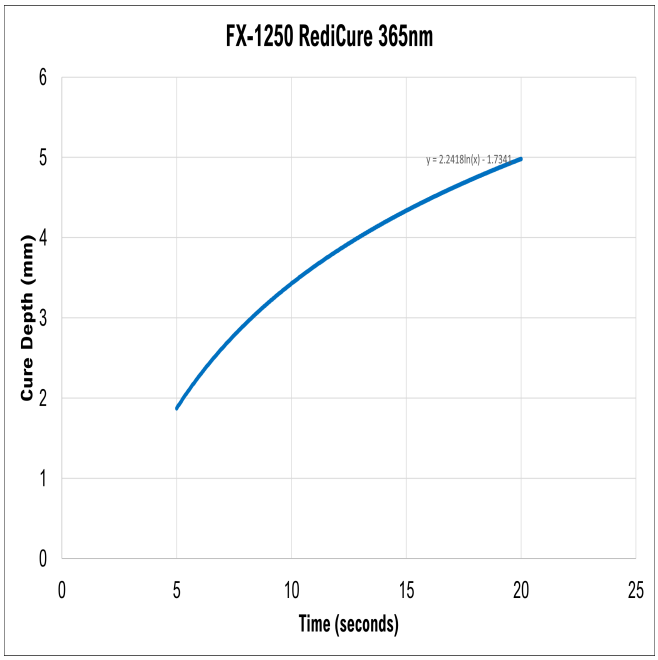


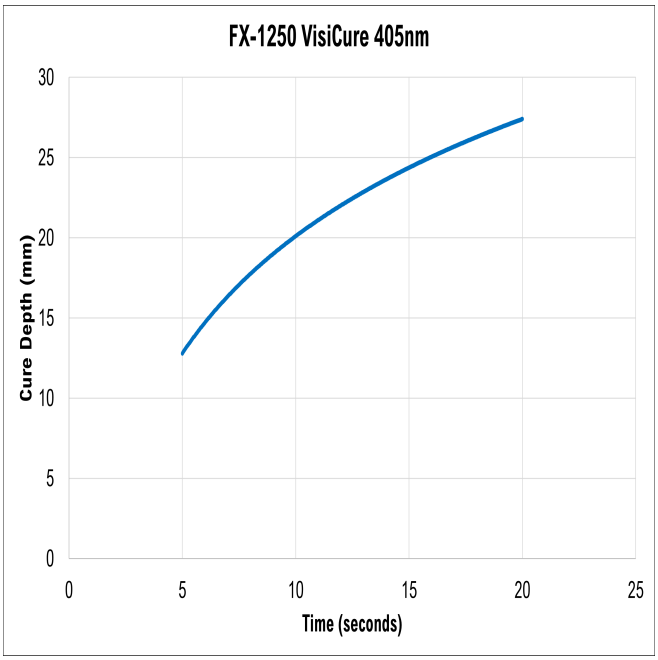
DEPTH OF CURE

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.

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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