SpeedMask® 707
Laser Drilling Mask

APPLICATIONS

- Laser Drilling
- Sealing Internal Cavities/Passages

FEATURES

- UV Light Cure
- Secondary Heat Cure
- Prevents Beam Impingement
- Reduces Spatter
- Hard/Durable
- Low Viscosity

RECOMMENDED SURFACES

- Nickel Alloys
- High-Temperature Steel

SpeedMask® 707 is a protective mask, specially formulated to cure with UV light followed by secondary heat cure for applications where shadow areas exist. This low viscosity UV light-curable masking resin is formulated to provide excellent internal cavity protection of turbine components during laser drilling operations. It flows easily into cavities and achieves full depth of cure by using heat. This 100% organic resin cures quickly with proper UV energy exposure and is easily removed by incineration at minimum of 650°C [1200°F] leaving a residue-free surface with minimal ash from combustion of the maskant. SpeedMask resins 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 many masking applications. 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	Colorless Transparent Liquid	N/A
Soluble in	Organic Solvents	N/A
Density, g/ml	1.1	ASTM D1875
Viscosity, cP (20 rpm)	500 (nominal)	ASTM 1084
Shelf Life at Recommended Conditions from Date of Manufacture	18 months	N/A

CURED MECHANICAL PROPERTIES *

Property	Value	Test Method
Durometer Hardness	D70	ASTM D2240
Tensile at Break, MPa [psi]	28 [4,100]	ASTM D638
Elongation at Break, %	71	ASTM D638
Modulus of Elasticity, MPa [psi]	270 [39,000]	ASTM D638

OTHER CURED PROPERTIES *

Property	Value	Test Method
Boiling Water Absorption, % (2 hr)	7.6	ASTM D570
Water Absorption, % (25°C, 24 hr)	3.9	ASTM D570
Linear Shrinkage, %	0.8	ASTM D2566

DISPENSE EQUIPMENT RECOMMENDATIONS *

Application	Manual	Semi-Automated	Fully Automated
Dots	SD-100	Model 400 Needle Valve	eco-PEN
Beads	SD-100	Model 400 Needle Valve	eco-PEN
Large Area	SG-150-RH	SG-150-RH	eco-SPRAY

CURING EQUIPMENT RECOMMENDATIONS *

Process Method	Spot Lamp	Flood Lamp	Conveyor
Broad Spectrum	BlueWave® 200	5000-ECE or PortaRay 400	UVCS Conveyor with Fusion F300S

* Not Specifications

N/A Not Applicable

Technical Data Collected PRIOR TO 2008 Rev.02/10/2023

CURING GUIDELINES

Cure rate is dependent upon many variables, including lamp intensity, distance from the light source, and required depth of cure. The cure times below are based on lab results and are intended for reference only. Testing was performed using a 0.38 mm [0.015 in] coating thickness. Time/belt speed was determined by a complete, tack-free cure.

Dymax Curing System (Intensity)	Cure Time or Belt Speed
2000-EC (50 mW/cm^2)[A]	3 s
5000-EC (200 mW/cm^2)[A]	1 s
BlueWave® 200 (10 W/cm^2)[A]	2 s
PortaRay 400 (400 mW/cm^2)[A]	1 s
UVCS Conveyor with Fusion F300S (2.5 W/cm^2)[B]	7.6m/min [25 ft/min]

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

SECONDARY HEAT CURE

Heat can be used as a secondary cure mechanism where the resin cannot be cured with light. 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

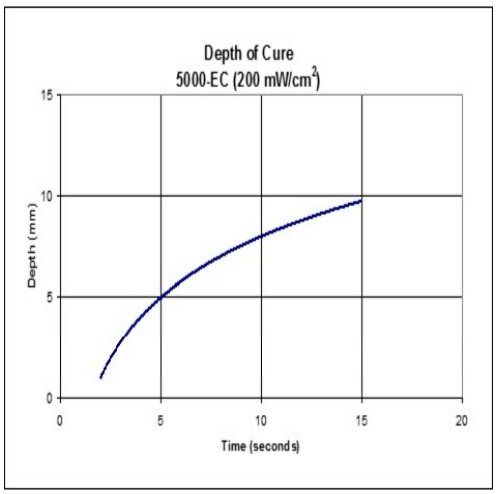
*Note: Actual heat cure time may vary due to part configuration, volume of mask applied, and oven efficiency.

Full cure is best determined empirically by curing at different times, intensities, and temperatures, 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 or heat exposure no longer improves cured properties. Higher intensities or longer cure times may degrade Dymax light curing maskants.

Dymax recommends that customers employ a safety factor by curing longer, at higher intensities, and/or at higher temperatures 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. These depths are only due to light cure.



OPTIMIZING PERFORMANCE AND HANDLING

1. This product cures with exposure to UV light, visible light, and heat. 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 to be masked should be clean and free from grease, mold release, or other contaminants prior to dispensing the resin.
3. Oxygen in the atmosphere may inhibit surface cure. Surfaces exposed to air may require higher intensity UV (> 100 mW/cm^2) to produce a tack-free cure. Flooding the bond area with an inert gas, such as nitrogen, can also reduce the effects of oxygen inhibition.
4. Part should be allowed to cool after cure before testing.
5. Light curing generally produces some heat. If necessary, cooling fans can be placed in the curing area to reduce the heating effect on components.
6. At the point of curing, an air exhaust system is recommended to dissipate any heat and vapors formed during the curing process.
7. 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

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 is noted on page 1 of this document, when stored between 10°C (50°F) and 32°C (90°F) in the original container.

CLEAN UP

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 of 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.

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