

Multi-Cure® 707 Laser Drilling Mask

APPLICATIONS

- Laser Drilling
- Sealing Internal Cavities/ Passages

FEATURES

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

RECOMMENDED SURFACES

- Nickel Alloys
- High Temperature Steel

SPEEDMASK® 707 is a Multi-Cure® mask, specially formulated to cure with heat in applications where shadowed 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 the RoHS2 directives 2015/863/EU and 2011/65/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

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

CURED MECHANICAL PROPERTIES *

Property	Value	Test Method
Durometer Hardness	D70 [4,100]	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

* Not Specifications

N/A Not Applicable



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 sec
5000-EC (200 mW/cm ²) ^A	1 sec
BlueWave® 200 (10 W/cm ²) ^A	2 sec
Porta Ray 400 (400 mW/cm ²) ^A	1 sec
UVCS Conveyor with Fusion F300S (2.5 W/cm ²) ^B	7.6m/min [25ft/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™ 100 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

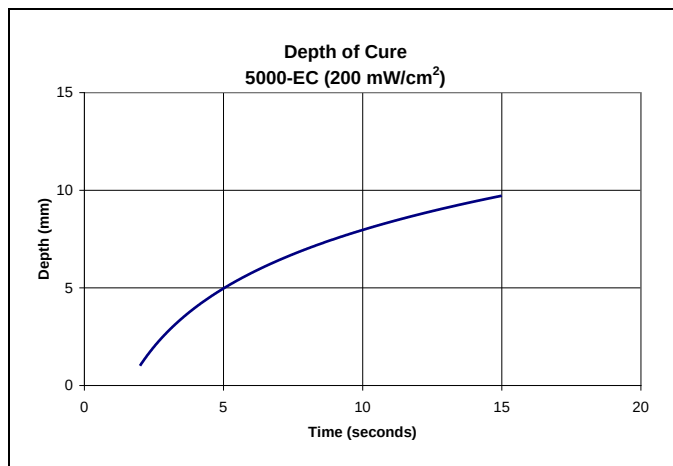
*Note: Actual heat cure time may vary due to part configuration, volume of mask applied, and oven efficiency.

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 masks.

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/cm²) 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 THE RESIN

This material may be dispensed with a variety of manual, semi-automated and fully automated fluid delivery systems. Dymax' SG family of Regular, High Flow and Super Flow Spray Guns can be utilized for spraying larger surface areas. The fluid delivery systems are supported with various size cartridge containers and ram pumps for larger volume applications. Small area applications including beads and small dots can be achieved using hand-held Dymax dispensing systems like our SD-100 syringe dispenser and our Model 400 needle valve systems. Dymax has several other dispensing systems that may be suitable for use with our masking materials. 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. This product may polymerize upon prolonged exposure to ambient and artificial light. Keep covered when not in use. This material has a 12-month shelf life 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 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.

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://www.dymax.com/index.php/en/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.

Except as otherwise noted, all trademarks used herein are trademarks of Dymax. The "®" symbol denotes a trademark that is registered in the U.S. Patent and Trademark Office.

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.