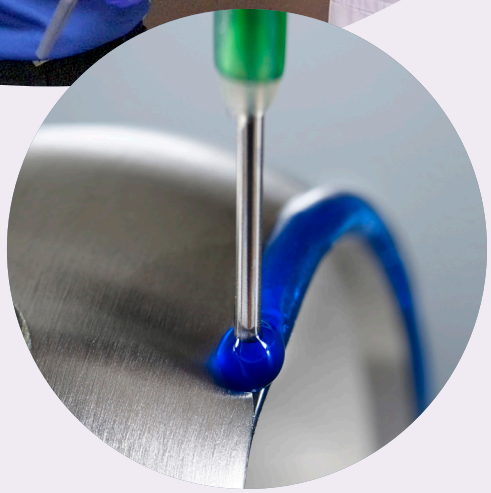
SPEEDMASK® MASKANTS FOR ORTHOPAEDICS

DYMAX®

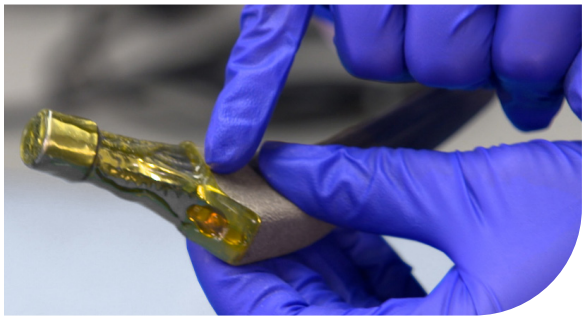


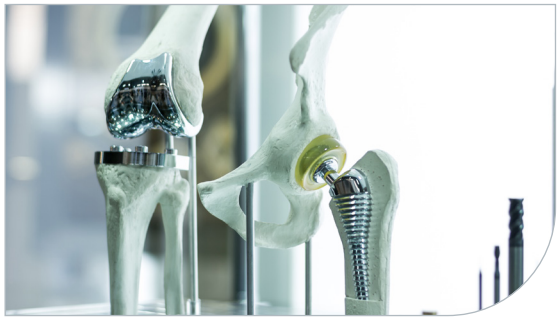
Only Dymax offers expert knowledge of light-cure technology, along with a full array of light-cure products. Dymax is committed to developing a true collaborative partnership — applying our extensive process knowledge to your specific application challenges.

We create custom solutions to ensure that chemistry and equipment work seamlessly together with maximum efficiency. Our application engineering team works side-by-side with our customers, providing assistance with formulation, testing, evaluation, and pre-production trials. We also offer an extensive inventory of curing equipment, manual and automated dispensing systems to help you achieve a more efficient, cost-effective manufacturing process.

About Dymax

Since pioneering light-cure technology over 40 years ago, Dymax has continued to develop innovative ways to co-optimize the assembly process with customer-centric solutions that meet today's application challenges. Dymax owns over 30 patents and has a worldwide network of technical experts who understand manufacturers' demands and assist them with adhesive selection, dispensing options, curing recommendations, component design, and process validation. The result of this collaboration is faster, more reliable processing, less energy consumption, and lower production costs.





SpeedMask® Maskants for Orthopaedics

SpeedMask® light-curable maskants provide superior surface protection of orthopaedic implants, surgical instruments, and medical devices during aggressive surface finishing processes. They cure in seconds upon exposure to UV light and replace traditional masking materials such as tapes, lacquers, waxes, boots, and caps. SpeedMask® maskants are easily applied by syringe or through dipping, spraying, or screen printing, and are available in peelable or burn-off grades that leave component surfaces residue free.

SpeedMask® maskants offer the following advantages over traditional masking methods:

- Apply and cure in seconds
- Residue-free surfaces after proper curing
- Reliable protection for complex andintricate configuration
- No additional investment for design changes or new components
- Superior protection with a single coat
- Masked components are immediately ready for production
- ISO 10993-5 Cytotoxicity compliant options

Our Commitment to Greener, Safer Manufacturing

Dymax is committed to green manufacturing that reduces environmental impact, conserves energy, and provides greater worker safety. Over the last 40 years, our light-curable materials and curing equipment have become the industry standard for fast, environmentally conscious assembly. Dymax products are readily replacing technologies that contain hazardous ingredients, produce waste, or require higher amounts of energy to process.

Eco-friendly, one-component materials

Materials with no added solvents improved worker and user safety

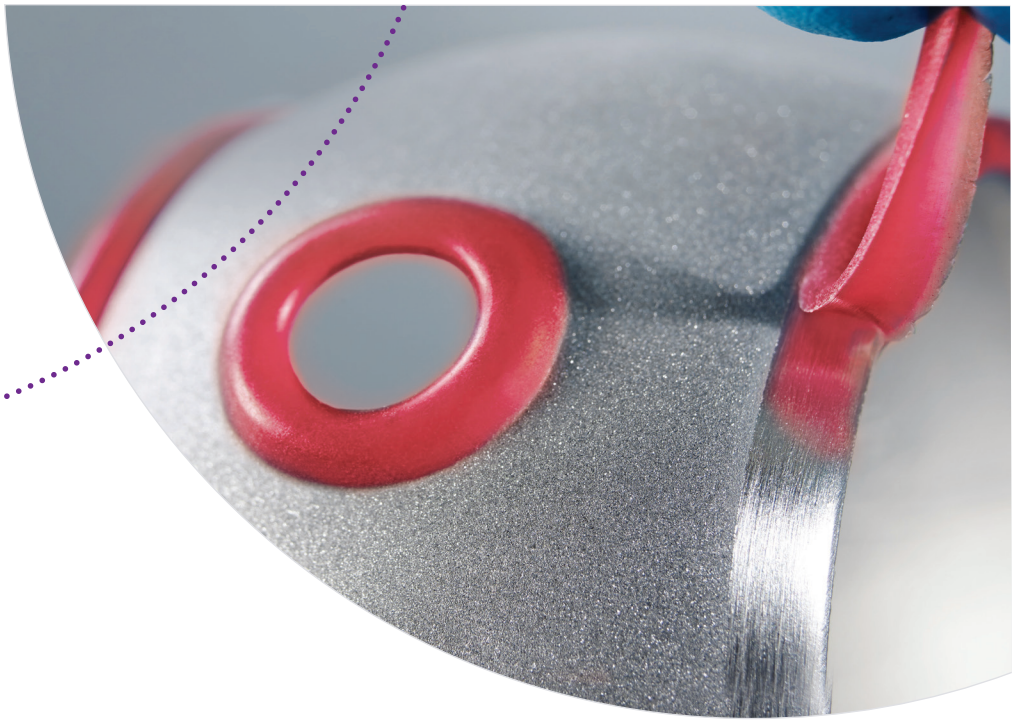
Fast curing products and equipment designed for less energy consumption

Dymax meets global statutory and regulatory requirements

SpeedMask® Products

Product	Chemistry	Characteristics	Viscosity, cP	Uncured Appearance	Durometer Hardness	Elongation at Break, %	Modulus of Elasticity, MPa [psi]	Cure Time, rSeconds*	LED Curable	ISO 10993 -5 Cytotoxicity Approved
Buffing, Polishing, and Finishing										
728-G	UV/Visible	High adhesion; excellent surface protection to aggressive chemical processes; easy removal after hot-water soak; sprayable	25,000	Green/Blue Gel	D55	230	83 [12,000]	10	-	Yes
731-REV-A	UV/Visible	Excellent surface protection; sprayable; easy peel after hot-water soak; high adhesion; fluoresces yellow	18,000	Bright Yellow Gel	D55	300	28 [4,200]	70	-	Yes
750	UV/Visible	High adhesion; cures tack free; hard and durable; resilient to blast media	30,000	Translucent Pink Gel	A50	140	2.5 [370]	45	Yes	Yes
7602	UV/Visible	Moderate adhesion; color change upon cure; resist to strong acid solutions and etchants; blue fluorescing	18,800	Translucent Pink Gel	A85	185	60.4 [8,757]	4	Yes	Yes
Surface Texturing (Grit Blast, Shot Peening, Sand Blasting)										
726-SC	UV/Visible	See-Cure technology; excellent surface protection; easy peel off after heat exposure; spray or dip	52,000	Blue Gel	D40	160	3.9 [560]	8	-	Yes
728-G	UV/Visible	High adhesion; excellent surface protection to aggressive chemical processes; easy removal after hot-water soak; sprayable	25,000	Green/Blue Gel	D55	230	83 [12,000]	10	-	Yes
7602	UV/Visible	Moderate adhesion; color change upon cure; resist to strong acid solutions and etchants; blue fluorescing	18,800	Translucent Pink Gel	A85	185	60.4 [8,757]	4	Yes	Yes
Thermal Spray Coatings (Plasma Spray (APS, VPS, HA) and HVOF)										
750-SC	UV/Visible	Turns purple to pink after sufficient exposure to UV/Visible light; sprayable; high adhesion	30,000	Translucent Purple Gel	A85	140	4.4 [640]	10	-	Yes
734-BT	UV/Visible	Excellent surface protection and chemical resistance; moderate adhesion; spray or dip; trimmable after cure	24,000	Blue Gel	D25	235	5.0 [731]	5	-	Yes
726-SC	UV/Visible	See-Cure technology; excellent surface protection; easy peel off after heat exposure; spray or dip	52,000	Blue Gel	D40	160	3.9 [560]	8	-	Yes
Low-Moderate Adhesion for General										
724	UV/Visible	Good surface protection; fast curing; easy peel off	70,000	Colorless Gel	D40	200	2.7 [390]	15	-	Yes
730-BT	UV/Visible	Excellent chemical resistance; spray or dip; trimmable after cure; easy peel off	22,000	Blue Gel	D35	300	3.4 [500]	4		Yes

*Cure time based upon Dymax 5000-EC light-curing flood lamp (200 mW/cm^2)



Process Guide

Buffing, Polishing, and Finishing

Buffing/Polishing

SpeedMask maskants are resilient to abrasive belts, pads, and brushes used during buffing and polishing operations. They are suitable for use in robotic processes as well as smaller manual operations. Maskants have excellent adhesion to the components and can be cleanly removed after processing.

Vibratory Finishing

SpeedMask maskants provide reliable surface protection of intricate and complex configurations during vibratory finishing operations such as slurry, tumbling, or deburring. These masks withstand the compound solution (soap, water, or alternative cleaning/polishing agents) and abrasion from ceramic, plastic, or steel media while vibrating during the finishing process.

Surface Texturing

Grit Blasting

Grit-blasting masks are resilient to both smooth and sharp particles and the pressure used during grit-blasting surface treatment. Cured SpeedMask maskants provide reliable protection from media such as aluminum oxide, garnet, plastics, and organic media. The cured resin absorbs the energy from the air stream blast, while the media bounces off the masked surface, protecting the area underneath.

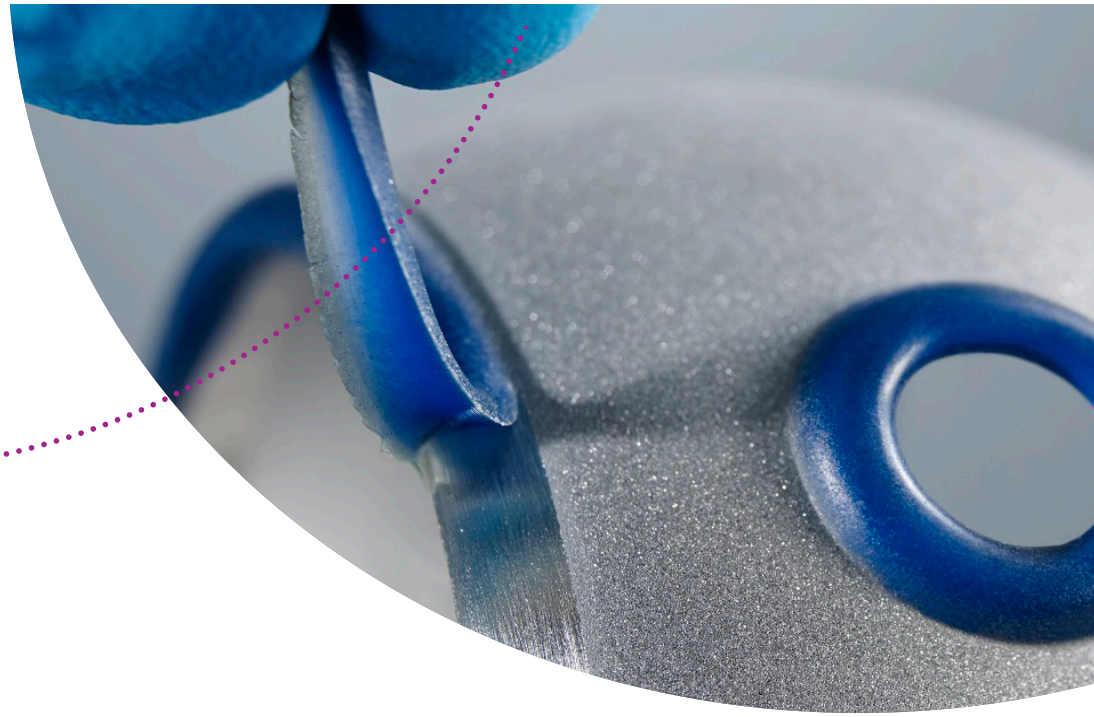
Shot Peening

Shot-peening masks have superior surface protection during the shot-peening, plastic-deformation surface-treatment process. Cured SpeedMask maskants are resistant to various peening media (such as cut wire, round metal, ceramic particles, and glass beads) and the pressures used in peening applications. The cured resin absorbs the energy from the ball-peen hammer effect of the media blast, while the media bounces off the masked surface, protecting the area underneath.

Thermal Spray Coatings

Plasma Spray (APS, VPS, HA) and HVOF

Air plasma spray masks provide superior surface protection during thermal barrier coating processes. SpeedMask maskants are resistant to the aggressive force and heat of flame-spray processes. The cured masks absorb the energy from the force of plasma spray materials, such as zirconium, Molybdenum (used for thermal protection), Tungsten Carbide, or ceramics used for wear-resistant coatings. As the melted particles from the flame spray ae deposited onto the substrate, the cured masking resin protects the surface underneath the protected area.



Mask Removal

After processing is finished, maskants can be removed leaving a residue-free surface. When deciding on the best removal process for an application, many variables should be taken into consideration, including product, substrate and surface finish, maskant thickness, geometry of parts, and ability to expose to heat, cold, chemical, or water.

Manual Removal

Hand/Tool Manual Peel

Plastic razors, plastic dental picks, and metal picks are effective tools for manual removal/scraping of the mask.

Tab Removal Method

A tab is created out of maskant or another flexible plastic and used to to peel the maskant.

Embrittlement with Cold

Some maskants (specifically ones that are harder and rigid) can be made brittle with exposure to cold temperatures. This may be achieved by dipping the part in liquid nitrogen, wrapping it in dry ice, or bringing its temperature below -60°C (-76°F) in a deep freezer.

Heat Aided Removal

Maskants can be heated to a temperature above the glass transition temperature (T_g) or to about ~150°C (300°F) to soften. Mechanical removal such as peeling can then be performed while the part is still hot. A heat gun ican be used for a more localized approach compared to heating the entire part in an oven or on hot plate.

Semi-Automatic Removal

Chemical Removal

Exposure to aggressive solvents/chemicals will help weaken the bond strength of SpeedMask maskants. Since most Dymax maskants are formulated to have chemical resistance, chemical soaking will typically not dissolve the maskant 100% and some mechanical removal, scraping, or a post-soak wash may still be required. Duration of exposure is maskant/thickness dependent and should be tested individually. Adding bath agitation or elevated temperature during chemical soaking may help decrease exposure time. Typical solvents used to aid in removal include 99% isopropyl alcohol (IPA), acetone, and methyl ethyl ketone (MEK). Chemical cleaners/strippers such as Dynaloy Dynasolve (185, 711, 750) and Savogran Strypeeze® Paint & Varnish Removers are also effective.

UltraSonic Removal

Ultrasonic cleaning is a process that uses ultrasound to agitate a fluid. This is sometimes done with just water, but often a solvent or additive is added depending on the cleaning objective. If additives are used, a warm water rinse after removal is recommended.

Dry Ice Blasting

Dry ice is accelerated in a pressurized air stream and directed at the masked surface. This causes a thermal shock on the surface, causing shear stresses in micro-layers of the maskant.

Automatic Removal

Incineration/Furnace Burn Off

When incinerated at appropriate temperatures/cycle times, SpeedMask resins that are comprised of 100% organic maskant will combust and reduce to ash. A temperature of at least 650°C (1200°F) is recommended. Remaining ash can be blown off the surface with shop air.

Automated Grippers

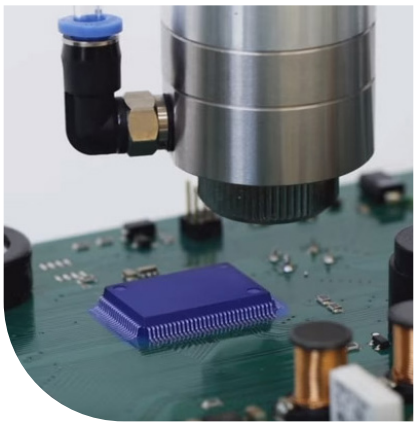
This method uses pneumatic clamps on an XYZ table to grab the masked area and pull in Z or X/Y direction to peel off.

Water Jet

Water jetting uses high-pressure water (usually >138,000 kPa, >20,000 psi) to remove the maskant. The water jet nozzle's diameter and shape (cone vs stream) can be changed, as well as the pressure, to better fit the application.

Dispensing Equipment

Dymax has developed high-quality, field-proven dispense systems to fit many types of adhesive and fluid dispensing applications. These systems include various automated and manual dispensing valves, spray valves and guns, controllers, material reservoirs, and related components for seamless integration into assembly processes. The systems provide accurate, consistent dispense for a range of low- to high-viscosity fluids. Dispensing systems with adjustable suck-back control and dispensing valves that offer contaminate-free dispensing are available.



SD-200 Digital Syringe Dispenser

This dispensing system is ideal for use as an operator work station and can also be integrated into an automated process if needed. It provides an accurate way to dispense low-to-high viscosity materials from a syringe. The system is easy to set up and operate.

eco-PEN450 Dosing System

The eco-PEN 450 is ideally suited for dispensing very precise volumes of low- to medium-viscosity materials. It offers maximum volumetric precision for both dot and bead applications, making it an excellent choice for masking components on PCB boards or other small-area applications.

eco-SPRAY Precision Micro-Spray System

This micro-spray system is excellent for a wide range of applications and for use with a variety of low- to high-viscosity spray media. Users can achieve a variety of spray volumes, from dot to endless spraying.

SG-200 Super-Flow Spray Gun System

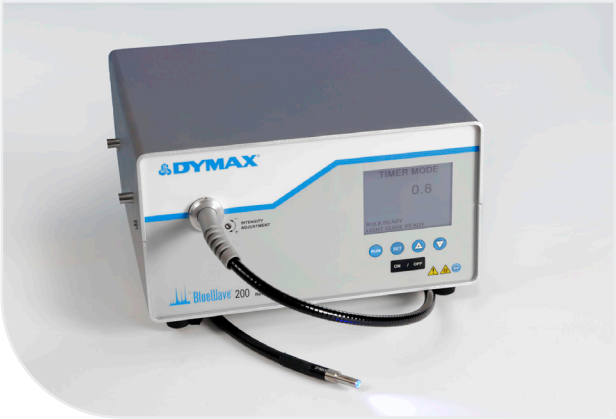
Dymax SG-200 super-flow spray gun systems are designed for masking and coating applications where a significantly higher flow rate is required. The systems are ideal for dispensing fluids with viscosities up to 80,000 cP. If you are manually masking a large area, this is a great option.

Model 400 Hand-Held Needle Valve System

The Model 400 needle valve is designed for dispensing very precise dots or fine beads of low- to medium-viscosity materials. The valve is hand-held but is compact and lightweight, making it easy and comfortable to handle.

Light-Cure Systems

Dymax designs and manufactures a wide range of curing equipment including spot lamps, flood lamps, and conveyor systems, as well as radiometers and other accessories. Dymax systems are optimized to work with light-curable adhesives to gain process efficiencies by targeting rapid surface curing, depth of cure, and speed of cure, all while delivering light in a rapid and economical way. CE marked equipment is available.



Spot Lamps

Spot lamps provide a variety of methods to deliver light to a very precise location. They can be used manually by an operator or incorporated into a high-speed automated assembly line. Dymax offers multi-spectrum light-emitting lamps which use high-pressure mercury vapor bulbs, as well as light-emitting diode spot lamps, which use an array of surface-mounted LEDs instead of traditional metal halide or mercury bulbs.

BlueWave® 200

- UV curing with adjustable intensity
- Ideal for fast processing of small curing areas
- Suited for manual or automated processes

BlueWave® MX-150

- Emitter design for set up flexibility and consistent intensity
- LED curing emitters in 365, 385, and 405 nm
- PLC interface

BlueWave® QX4

- One controller controls up to four LED heads
- LED heads available in 365, 385, and 405 nm
- PLC interface

Flood Lamps

Static flood-lamp systems are suited for area curing or for curing multiple assemblies. Dymax offers UV models which use moderate- to high-intensity, multi-spectrum UV/Visible light and LED models that use light-emitting diodes for fast curing. Dymax flood lamps can be easily integrated into existing manufacturing processes by mounting the lamps above high-speed assembly lines to achieve rapid cures. Shutter assemblies, mounting stands, and shields are available to create a custom curing system.

EC or ECE 5000 Flood Lamp Systems

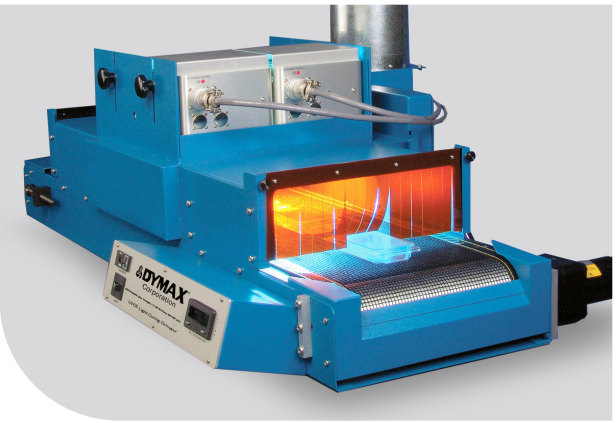
- Most popular and versatile
- Great for curing larger parts
- 5″ x 5″ curing area with 225 mW/cm^2 initial intensity

EC or ECE 2000 Flood Lamp Systems

- Flood lamp with the largest cure area (8″ x 8″)
- Ideal for LED and masking applications
- 105 mW/cm^2 initial intensity

BlueWave® AX-550 LED Flood Lamp Systems

- Compact, all-in-one design
- 5″ x 5″ curing area with up to 800 mW/cm^2 initial intensity
- Available in 365, 385, and 405 nm



Conveyor Systems

Conveyor systems consist of a moving belt that passes through a curing tunnel with multi-spectrum lamps mounted above or on each side for rapid curing of parts. These conveyor systems are designed to offer consistent, fast, and safe curing. They can be outfitted with standard metal halide (longwave UV), mercury (shortwave UV), visible bulbs, or LED flood arrays. Consistent line speed, lamp height, and intensity provide a consistent light-curing process for high throughput.

WIDECURE® Conveyor System

- 24″ curing width for processing larger parts
- Line speeds from 4-30 feet per minute, adjustable in 0.1 fpm increments

Edge-Carry Conveyor System

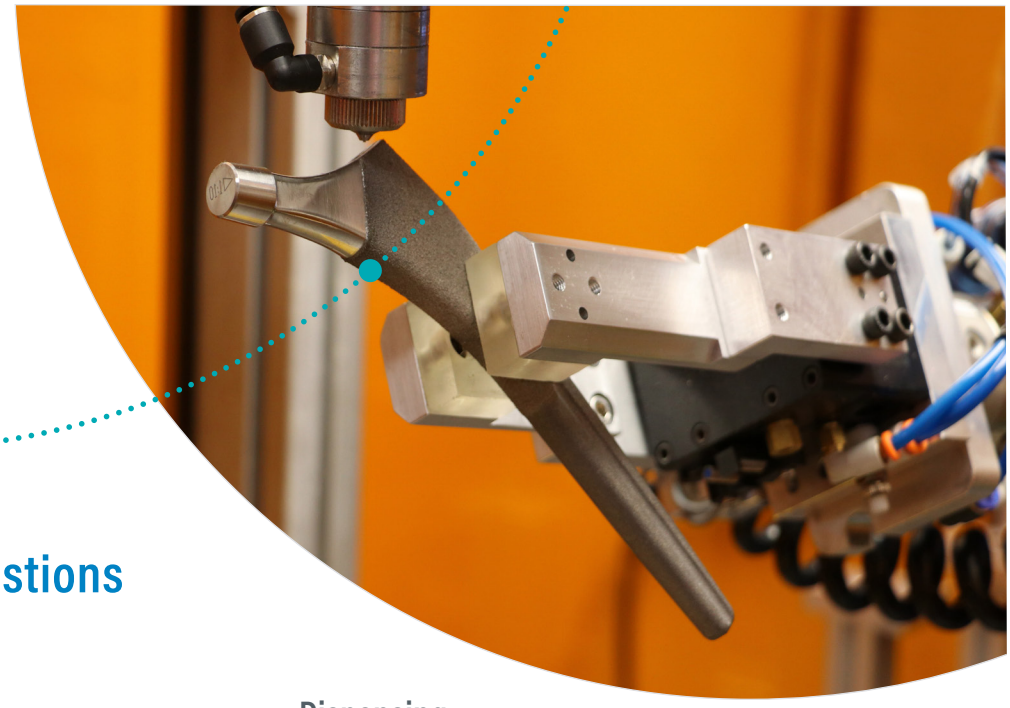
- Items move through the conveyor on a chain rail instead of a traditional mesh belt
- Ideal for curing low profile parts such as PCBs
- Chain rail is adjustable, accommodating part widths up to 12″

UVCS Conveyor Systems

- Left, right, and top curing capability with 6″- or 12″-width cure area
- Available in a wide range of configurations with UV broad-spectrum or LED flood lamps

Radiometers

Measurement of the lamp intensity and dosage is critical to the successful implementation of light-curing technology. Dymax radiometers allow operators to monitor and document a light-curing process.



Frequently Asked Questions

Application and Product Specific

Q: What thickness is recommended for a mask?

A: 0.015" (0.38 mm) is the recommended minimum thickness for a mask. We suggest that during the product evaluation a few thicknesses be tested to determine the appropriate thickness sufficient to hold up to each process.

Q: How do you dispose of cured maskant?

A: Cured maskant should always be treated in accordance with the local and state regulatory agencies. SpeedMask resins are 100% organic materials and considered to be an industrial plastic after curing. If the maskant has been exposed to plating baths or other chemicals, the user needs to consult their regulatory agency for guidance on disposal.

Q: Are there fluorescing versions of SpeedMask®?

A: Yes, SpeedMask® 731-REV-A fluoresces yellow. SpeedMask® 7601 and 7602 fluoresce blue.

Curing

Q: Are SpeedMask® resins LED compatible?

A: Yes. Some SpeedMask® resins such as 724, 726-SC, 728-G, 758-H, 7601, and 7602 are LED compatible. Please refer to the PDS for curing guidelines.

Dispensing

Q: Can I flush out a jetting valve with Acetone?

A: The best choice is to flush a jetting valve with Isopropyl Alcohol. Acetone may leave a residue.

Q: Would you recommend a ram pump or pressure pot to dispense masking resins?

A: We recommend a ram pump for dispensing maskant from 15-liter or 1-gallon pails. The ram pump will prevent cavitation when compared to a pressure pot.

Removal

Q: Are there any ways to ease the removal of a cure peelable mask?

A: The maskant can be exposed to warm air or ultrasonic bath at 150°F (66°C) for 3 to 5 minutes to ease the removal of the peelable maskant. Please consult *INF048 - SpeedMask Removal Infographic* for additional suggestions.

Q: Can a mask be incinerated in a vacuum furnace process?

A: SpeedMask resins can be incinerated in either an air or vacuum furnace.

Q: Can a water jet be used to remove cured maskants?

A: Yes, a water jet can remove some of the masking products. This removal process will need to be tested on a case-by-case basis.

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