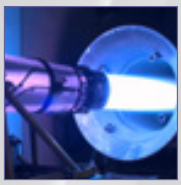
DYMAX®

SpeedMask® Masking Resins

PRODUCT SELECTOR GUIDE



aerospace

power generation

orthopaedic implants

metal finishing

surgical instruments

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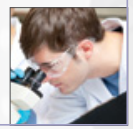
The Dymax **EDGE**

solutions

Products. Technology. Service. Dymax provides the innovative solutions you need to meet your application challenges.

expertise



At Dymax, we're committed to providing our customers with the solutions they need for their specific application challenges. Inherent in the Dymax Edge approach is the commitment to view a customer's challenge differently by listening, focusing, and using an entire toolbox of resources and expertise to deliver the most efficient solution. This expertise isn't limited to the formulation of chemistry or the calibration of a machine. Rather, it's defined by a depth and breadth of knowledge that allows us to devise innovative solutions based on an optimal balance of material, chemistry, and equipment. The Dymax Edge is more than the combined resources of product, technology, and service. It's the fundamental belief that you best serve a customer when you look at the need from their perspective, not yours.

DYMAX EDGE®
LISTEN. ENVISION. DELIVER.

About **DYMAX**

Dymax Corporation is an ISO 9001 registered leading manufacturer of light-curable adhesives, coatings, oligomers, light-curing equipment, and fluid dispense systems that work together to optimize assembly processes. Dymax products provide design, research, and manufacturing engineers value-added tools to dramatically improve manufacturing efficiency and lower costs.

The company's first products, a patented line of structural adhesives that combined high bond strength with fast fixture speed, offered significant productivity improvement to manufacturers of electric motors and were widely used in OEM and manufacturing environments.

Dymax continued to create formulations that offered faster processing speeds for a large segment of the industrial market. This eventually led to the development of light-cure adhesive technology and the compatible fluid dispensing and light-curing systems needed to dispense and cure the products.

Today, Dymax light-curable materials cure in seconds upon exposure to UV/Visible light, form high-strength, environmentally resistant bonds to glass, metal, and plastic substrates, and are ideal for bonding dissimilar materials. Dymax also manufactures light-curable form-in-place gaskets, SpeedMask® removable masking resins, and coatings. Formulations with activators and secondary heat or moisture cure are also available. Dymax supplies these products to the automotive, aerospace, appliance, alternative energy, electronic, industrial, medical device, and optical industries worldwide.

Since pioneering light-cure technology over 30 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.

The company's headquarters are located in Torrington, CT USA, with additional facilities in the USA, Germany, China, Hong Kong, Korea, and Singapore.

technology

technical consulting

SpeedMask® Process & Product **SELECTOR GUIDE**

Click on the product numbers for more information.

									Chemical Processes				Coatings			Media Finishing			Manufacturing Aids				Parts Handling
Product Name	Chemistry	Characteristics	Viscosity, cP (20 rpm) Nominal	Uncured Appearance	Durometer Hardness	Elongation @ Break, %	Modulus of Elasticity, MPa [psi]	Cure Time* (Seconds)	Anodizing	Plating	Acid Stripping	Chemical Milling/ Etching	Air Plasma Spray	HVOF	Painting & Powder Coatings	Grit Blasting	Shot Peening	Vibratory Finishing	Machining	Buffing/ Polishing	Airflow Testing	Laser Drilling	General Masking
Burn-Off																							
706	UV	High adhesion; excellent surface and cavity protection; hard/durable; chemical resistance	43,000	Colorless Gel	D75	6.2	830 [120,000]	20			X		X						X				
706-H	UV	Excellent surface and internal cavity protection; secondary heat cure; high adhesion; resists acids; hard/durable	30,000	Colorless Gel	D75	3.8	900 [130,000]	20			X		X						X				
707	UV	Prevents beam impingement; secondary heat cure for shadowed areas; reduces spatter; hard/durable	500	Colorless	D70	71	270 [39,000]	1														X	
718	UV/Visible	High adhesion; resists flame spray processes; excellent surface and cavity protection during APS and HVOF	50,000	White Paste	D80	3.4	1,056 [153,278]	20					X	X (limited)									
729	UV/Visible	High adhesion to nickel super alloys; resists acids and alkalis; hard and durable; spray or dip	20,000	Colorless Gel	D70	30	240 [35,000]	30		X	X												
735	UV	Internal cavity protection; high adhesion; secondary heat cure; excellent surface protection; resists acids; hard/durable	190	Clear Pale Yellow	D75	66	370 [53,000]	3		X	X		X						X				
738	UV/Visible	Resists flame-spray processes; high adhesion; hard/durable; excellent surface and cavity protection	55,000	White Paste	D80	4	900 [130,000]	1					X	X (limited)									
Peelable																							
708-SR	UV	Good surface protection; fast curing; sprayable	30,000	Red Gel	A65	180	69 [10,000]	15							X	X	X						X
724	UV/Visible	Good surface protection; fast curing; easy peel off	70,000	Colorless Gel	D40	200	2.7 [390]	15							X	X	X			X	X		X
725	UV/Visible	Excellent surface protection and chemical resistance; moderate adhesion; sprayable	13,000	Translucent Gel	A75	220	7.41 [1,075]	40	X	X		X				X	X						
726-SC	UV/Visible	See-Cure technology transitions resin from blue to pink upon sufficient exposure to light energy; excellent surface protection; easy peel off after heat exposure; spray or dip	45,000	Blue Gel	D40	160	3.9 [560]	8	X	X		X (decorative etching)	X		X	X	X						X
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	X	X	X					X	X	X	X				
730-BT	UV/Visible	Excellent surface and chemical resistance; moderate adhesion; spray or dip; trimmable after cure	20,000	Blue Gel	D35	275	3.4 [500]	4	X	X	X	X				X	X	X	X	X			
731	UV/Visible	Excellent surface protection; sprayable; easy peel after hot-water soak; high adhesion	18,000	Bright Yellow Gel	D50	500	86 [12,600]	15	X	X						X	X						
733-G	UV/Visible	Excellent surface protection; sprayable; fast curing; easy peel off	25,000	Green Gel	D50	220	46 [6,800]	1	X	X	X		X			X	X	X	X	X			
734-BT	UV/Visible	Excellent surface protection and chemical resistance; moderate adhesion; spray or dip; trimmable after cure	24,000	Blue Gel	D25	220	5.5 [800]	5	X	X	X	X	X			X	X	X	X	X			
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					X	X		X							
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					X	X		X							

*Cure time based upon Dymax 5000-EC Light-Curing Flood Lamp (250 mW/cm²)

SpeedMask®

PROCESS GUIDE

SpeedMask® light-curable temporary masking resins provide reliable protection of component surfaces and cavities during surface finishing and preparation operations for metal, glass, and some plastics. They cure in seconds upon exposure to UV/Visible light and replace traditional masking materials, such as tapes, lacquers, waxes, boots, and caps.

Light-curable masking resins are used successfully in many industries, including aerospace, power generation, metal finishing, and the manufacturing of orthopaedic implants and medical devices. SpeedMask resins are easily applied by syringe or through dipping, spraying, or screen-printing, and are available in peelable, water-soluble, or burn-off grades that leave component surfaces residue-free.

SpeedMask® Masking Resins offer the following advantages over traditional masking methods:

- Apply and cure in seconds
- Residue-free surfaces after proper curing
- Reliable protection for complex and intricate configurations
- No additional investment for design changes or new components
- Superior protection with a single coat
- Masked components are immediately ready for production

Anodizing

Anodizing masks feature chemical resistance for better surface protection of components from the strong acids used in the anodizing process. Cured SpeedMask resins protect the substrate surface while the oxide layer of coating (which changes the microscopic texture of the component surface) is applied. These materials can tolerate most Type I (Chromic Acid), Type II (Sulfuric Acid), or Type III (Hard coat) anodizing processes.

Plating

Plating masks feature chemical and heat resistance and provide superior surface protection of components during plating processes where particles are deposited onto conductive surfaces. SpeedMask resins are able to withstand the most common plating processes such as Electroless Nickel (Ni), Platinum (Pt), Chrome (Cr), Gold (Au), Silver (Ag), and Copper (Cu). Plating masks are available in low, moderate, and high levels of adhesion to accommodate the various operating temperatures of plating baths.

Acid Stripping

Acid stripping masks withstand soaking in hot acid without permeation or seepage under the mask. When cured, SpeedMask resins provide superior surface protection from chemical processing of nickel super alloys, steel, and titanium. They hold up to the surface preparation of grit blasting, which may be required prior to, or in combination with, the hot-acid soak. These masking resins can tolerate most acid soaks such as Hydrochloric (HCl), Nitric (HNO3), Acetic (CH3COOH), Phosphoric (H3PO4), Hydrofluoric (HF), or various combinations of the acids.

Chemical Milling/Etching

Chemical milling masks have enhanced chemical resistance and superior surface protection from the strong acids and alkalis used in dissolving metal substrates during the chemical milling process. Cured SpeedMask resins can be trimmed to provide defined edge boundaries and accommodate the most complex and intricate components, while still providing excellent protection with no leakage. These resins withstand the typical 200°F+ Nitric Acid (HNO3) and Hydrofluoric Acid (HF) solutions used for the chemical milling of titanium components and typical Sodium Hydroxide (NaOH) and Potassium Hydroxide (KOH) solutions used for the chemical milling of aluminum components.

Air Plasma Spray and HVOF

Air plasma spray masks provide superior surface protection during thermal barrier coating processes. SpeedMask masking resins 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 are deposited onto the substrate, the cured masking resin protects the surface underneath the protected area.

Painting, e-Coating, and Powder Coatings

SpeedMask masking resins offer superior surface protection of components during painting, e-coating, and powder coating, and are resistant to the heat and chemical exposure during these processes.

Grit Blasting

Grit-blasting masks are resilient to both smooth and sharp particles and the pressure used during grit-blasting surface treatment. Cured SpeedMask resins 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 resins 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.

Vibratory Finishing

SpeedMask resins 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.

Machining

Machining, buffing/polishing, and laser drilling masks provide excellent protection during the milling, grinding, drilling, polishing, and turning of turbine and metal components, orthopaedic implants, surgical instruments, medical devices, as well as glass and plastic substrates. The durability of the cured SpeedMask resins allow the maskants to be machined through, without any lifting of the remaining masks, while continuing to provide reliable protection of the masked surfaces. These resins can withstand various water-soluble and oil-based coolants used in machining, as well as absorbing the energy from laser drilling during the installation of cooling holes.

Airflow Testing

When cured, SpeedMask airflow-testing masks allow for complete sealing of cooling holes and core cavities of turbines and other components, for either row-by-row or mass airflow testing. They also provide complete sealing, preventing air leaks during pressurized flow, leak, and duration testing.

General Masking

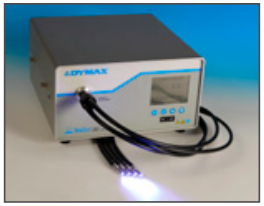
SpeedMask masking resins feature superior surface protection of turbine and metal components, orthopaedic implants, surgical instruments, and other medical devices from FOD (foreign object damage) during the manufacturing process, handling, and transportation.

Dispensing
& Curing

EQUIPMENT

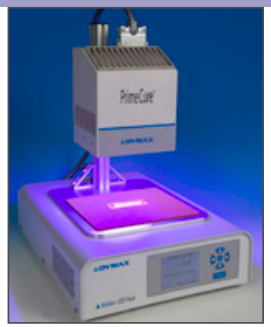
Dymax designs, manufactures, and sells a range of light-curing spot lamps, flood lamps, conveyor systems, and dispensing equipment, as well as radiometers and other equipment accessories. These systems work with Dymax light-curable adhesives to gain process efficiencies by targeting rapid surface curing, depth of cure, and speed of cure, all while delivering light in a quick and economical way. Dymax equipment is ideal for industrial bonding, coating, encapsulating, potting, and sealing applications. Manufacturers can easily integrate these curing systems into existing assembly lines or use them as stand-alone, bench-top curing systems. CE marked equipment is available.

CURING



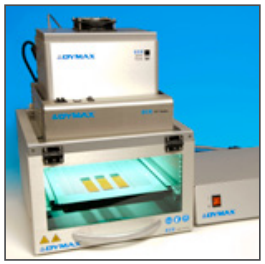
UV-Curing Spot Lamps

Spot-curing systems emit very high-intensity UV/Visible light and are ideal for quickly curing small areas (5 mm diameter) – typically within a 0.5-5 second cure time. They use high-pressure mercury vapor bulbs that produce light energy in the 300 to 450 nm range and can be equipped with single- or multi-pole lightguides or rod lenses for a variety of curing options.



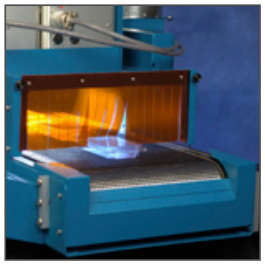
Light-Emitting Diode (LED) Curing Equipment – Spot and Flood Lamps

LED spot and flood lamps generate UV and visible curing light using an array of surface-mounted LEDs instead of traditional metal halide or mercury bulbs. These lamps emit over 15,000 mW/cm² of UV light (centered at 385 nm) and offer cooler cures compared to traditional bulb-style lamp systems. They emit light over a narrow spectrum at a discreet wavelength and extend maintenance intervals due to the longevity of the LED array. There are no bulbs to change and no warm-up; just cool cures and constant intensity for thousands of hours.



UV-Curing Flood Lamps

UV light-curing flood-lamp systems are ideal for area curing of large parts or simultaneously curing many small parts. They use moderate- to high-intensity multi-spectrum UV/Visible light for curing areas larger than 12.7 mm in diameter. With intensities ranging from 75-225 mW/cm², Dymax flood lamps are capable of curing most UV light-curable adhesives, sealants, and coatings, tack free in 30 seconds or less.



UV-Curing Conveyors

Light-curing conveyor systems consist of a moving belt that passes through a curing tunnel with multi-spectrum flood or focused-beam curing lamps mounted from above or on each side. Dymax conveyor systems, ideal for curing large parts, offer consistent line speed (1-27.5 fpm), adjustable lamp height and belt width, and high intensity for fast, safe curing of adhesives, coatings, potting materials, and gaskets. They can be outfitted with standard metal halide (longwave UV), mercury (short-wave UV), or visible bulbs. Conveyor systems are also available with 365, 385, or 405 nm LED flood arrays.

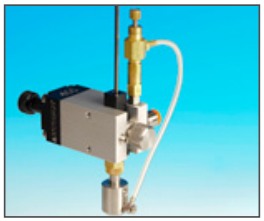
Radiometers

A radiometer is a device that measures the intensity and/or dose associated with light of specified wavelengths. UV light is, by definition, not visible and so a radiometer is required to determine UV intensity. Dymax radiometers measure intensity and dose of UV spot lamps, flood lamps, and conveyors in the UVA (320-395 nm) range. Measuring light intensity and/or dose is useful for maintaining a controlled, “worker friendly” light-curing process and measuring the transmission of light through the substrate.

Accessories

A variety of accessories is available for use with Dymax light-curing equipment including single- and multi-pole light-guides for spot-curing lamps, as well as shields, stands, and shutters for mounting or modifying flood-curing lamps.

DISPENSING

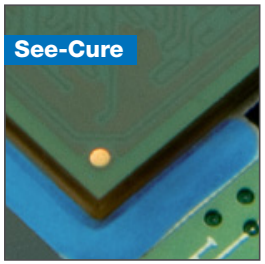


Dispensing Systems

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, 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 to facilitate clean, crisp shutoff and dispensing valves that offer contaminate-free dispensing are available. Dymax partners with some of the world’s leading dispensing manufacturers to provide solutions for applications that require high-speed automated dispensing equipment.

SPOT LAMPS | FLOOD LAMPS | CONVEYOR SYSTEMS | DISPENSERS

Innovative TECHNOLOGIES



Patented See-Cure Technology

Dymax adhesives formulated with patented See-Cure technology answer the two most asked questions in an adhesive bonding application: Have I dispensed a sufficient amount of adhesive onto my substrate? Has the adhesive cured completely? Uncured See-Cure adhesives are bright blue in color. This makes them easy to see after dispensing onto the substrate. During the light-curing process, the blue color transitions to colorless, indicating that sufficient energy was received by the adhesive to complete the curing process. This visual cure indicator may initially be used to qualify a process and then to ensure that the process remains within the qualified parameters.

Ultra-Red™ Fluorescing Technology

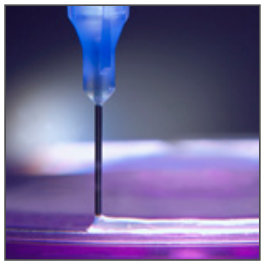
Patented Ultra-Red™ fluorescing technology enhances adhesive bond-line inspection processes and product authentication. Adhesives formulated with Ultra-Red technology remain clear until exposed to low-intensity UV light, at which point they fluoresce bright red. This feature is particularly helpful when bonding plastics that naturally fluoresce blue, such as PVC and PET. Ultra-Red technology also produces a unique spectral output that manufacturers can use for product authentication.

LED Light-Curing Technology

Dymax manufactures a variety of LED light-curable adhesives and compatible LED UV and visible curing lamps. LED-curable adhesives range from fast to ultra-fast cure speeds to accommodate specific industrial, medical device, and electronic assembly needs. Dymax BlueWave® LED curing systems offer significant advantages over conventional lamp-curing systems including cooler curing temperatures, lower intensity degradation over time, more consistent cure results, lower energy consumption, and reduced costs.

BONDING | COATING | ENCAPSULATING | POTTING | SEALING

Types of APPLICATIONS



Dymax is a leading major manufacturer of both light-curable materials (LCMs) and light-curing equipment.

This focus on light-curing technology, coupled with the synergy produced by designing both the materials and equipment, uniquely positions Dymax as the technical leader in light-curing technology. Dymax provides solutions across a range of markets.

ADHESIVES

Application Use	Bonding glass, plastic, metal, and ceramic
Industries	Appliance, aerospace, automotive, alternative energy, medical
Chemistries	Light-curable adhesives, Multi-Cure® adhesives, activator-cured acrylics, 2-part epoxies

COATINGS

Application Use	Protective conformal coatings for electronics, decorative coatings, optically clear hard coatings
Industries	Automotive, appliance, electronics
Chemistries	Light-curable adhesives, Multi-Cure® adhesives

POTTING COMPOUNDS

Application Use	Component protection
Industries	Appliance, aerospace, automotive, alternative energy, electronic devices
Chemistries	Light-curable adhesives, Multi-Cure® adhesives, moisture-cure adhesives, 2-part epoxies

MASKING MATERIALS

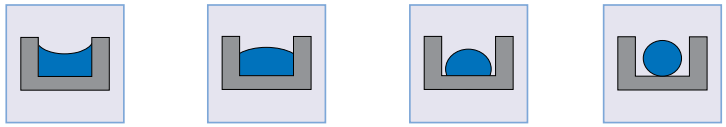
Application Use	Protection during surface treatment and manufacturing processes
Industries	Aerospace, automotive, orthopaedic implants, electronic devices
Chemistries	Light-curable resins, Multi-Cure® resins

GASKETS

Application Use	Moisture barrier, vibration resistance, noise reduction
Industries	Appliance, automotive, aerospace, fuel cell, alternative energy, electronic devices
Chemistries	Light-curable resins

REFERENCE Tables

The following tables provide additional information about the Dymax adhesives in this guide.



LV Low Viscosity
Newtonian

T Viscosity
Slightly Thixotropic

VT Viscosity
Thixotropic

GEL Viscosity
Highly Thixotropic

VISCOSITY

When choosing a viscosity, consideration should be given to how the adhesive must flow (or not flow) on the part after the adhesive is applied. Part geometry, process design, and assembly speed and method should all be considered when selecting viscosity. Viscosity is a material's resistance to flow. Low-viscosity adhesives flow more readily than high-viscosity adhesives. Thixotropic gels flow very slowly and are recommended when adhesive flow on a part after dispensing must be minimal.

Dymax adhesives are available in a variety of viscosities. The identifiers appear as suffixes on product names as follows:

VLV = Very Low Viscosity
LV = Low Viscosity
T = Thick
VT = Very Thick
GEL = Gel

Standard viscosity products do not have a suffix.

Typical Centipoise (cP/mPas)	Typical Reference Liquids at 20°C
1	Water
10	Kerosene
110	SAE 10 Oil
200	Maple Syrup
440	SAE 30 Oil
1,100	Castor Oil
3,000	Honey
10,000	Molasses
18,000	Chocolate Syrup
65,000	Vaseline
100,000	Sour Cream
200,000	Peanut Butter
1,500,000	Shortening

PRODUCTION THROUGHPUT PLANNER

1 Piece Every…	Minute	Hour	*Day (8 hours)	*Week (40 hours)	*Month (21 days)	*Year (50 weeks)
0.5 second	120	7,200	57,600	288,000	1,209,600	14,400,000
1 second	60	3,600	28,800	144,000	604,800	7,200,000
5 seconds	12	720	5,760	28,800	120,960	1,440,000
10 seconds	6	360	2,880	14,400	60,480	720,000
30 seconds	2	120	960	4,800	20,160	240,000
1 minute	1	60	480	2,400	10,080	120,000
5 minutes	-	12	96	480	2,016	24,000
10 minutes	-	6	48	240	1,008	12,000
30 minutes	-	2	16	80	336	4,000
1 hour	-	1	8	40	168	2,000

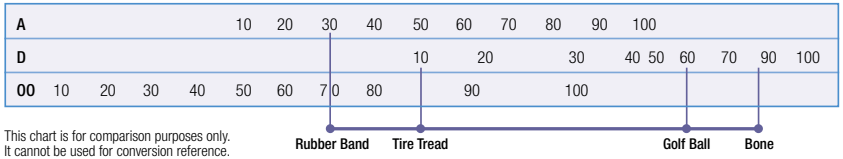
*Based on one 8-hour shift.

ESTIMATING USAGE

Bond-Line Gap or Coating Thickness	Theoretical Area Covered by 1 Liter of Adhesive or Coating
0.002" (51 µm)	30,500 in^2 (212 ft^2) (19.7 m^2)
0.005" (127 µm)	12,200 in^2 (84.7 ft^2) (7.88 m^2)
0.010" (254 µm)	6,100 in^2 (42.4 ft^2) (3.94 m^2)
0.015" (381 µm)	4,070 in^2 (28.3 ft^2) (2.63 m^2)

Bead Size	Theoretical Usage (Length per Liter)
1/32" (.79 mm)	66,300 in (1,684 m)
1/16" (1.6 mm)	16,600 in (422 m)
3/32" (2.4 mm)	7,400 in (188 m)
1/8" (3.2 mm)	4,100 in (104 m)
3/16" (4.8 mm)	1,900 in (48 m)
1/4" (6.4 mm)	1,000 in (25.4 m)

HARDNESS



This chart is for comparison purposes only.
It cannot be used for conversion reference.

Frequently Asked

QUESTIONS

Dispensing

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

A: The best choice is to flush a jetting valve with IPA. 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 pails. The ram pump will prevent cavitation.

Curing

Q: Are SpeedMask® resins LED compatible?

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

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 fluoresces yellow.

Removal

Q: Are there any ways to ease the removal of a cured 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.

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.

DYMAX EDGE®

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