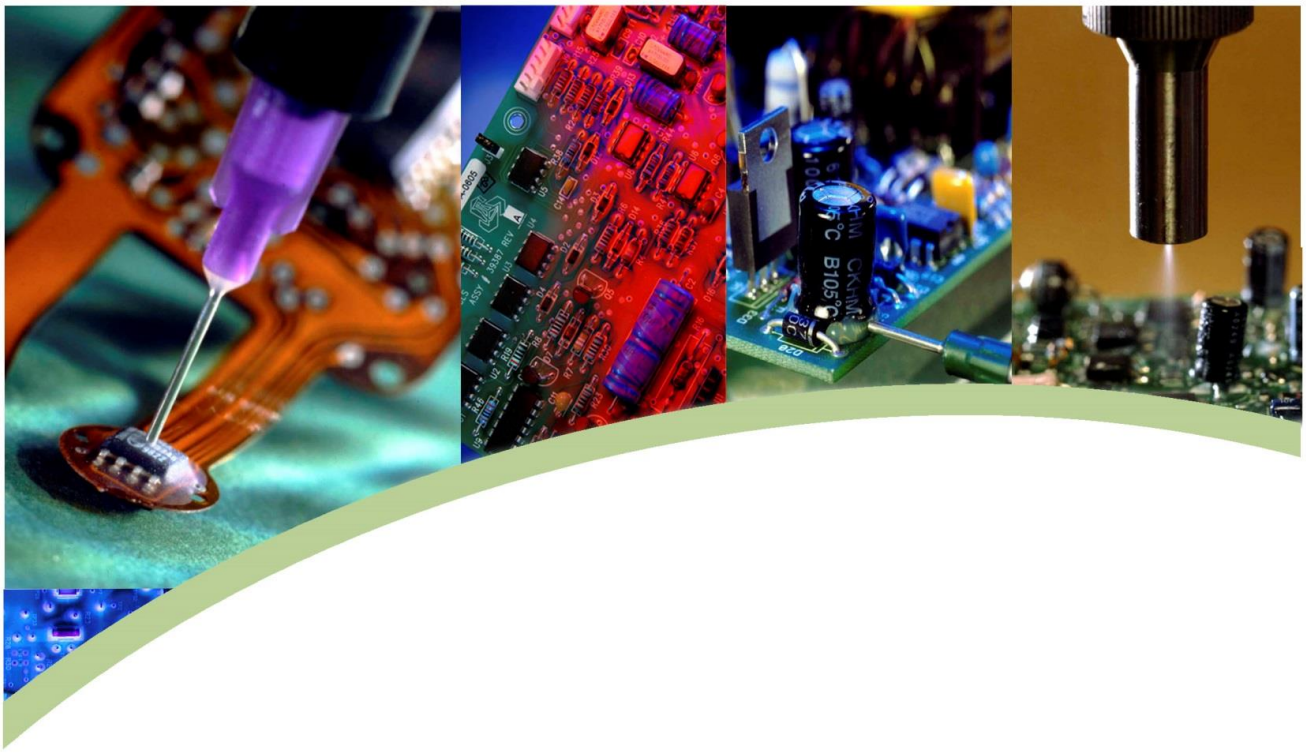


Electronics Assembly

UV Light-Curable Adhesives, Coatings, and Encapsulants for Electronic Assembly

DYMAX®

(ES) Equipements Scientifiques SA - Département Bio-Tests & Industries - 127 rue de Buzenval BP 26 - 92380 Garches
Tél. 01 47 95 99 90 - Fax. 01 47 01 16 22 - e-mail: bio@es-france.com - Site Web: www.es-france.com

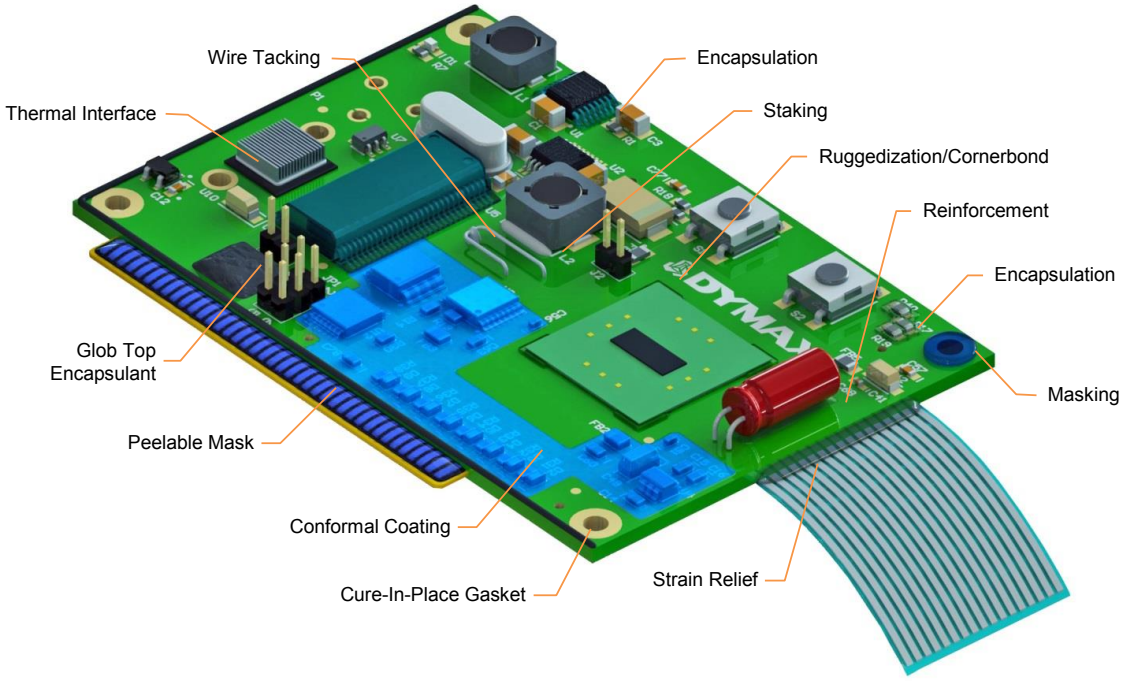
Our Technology. Your Advantage.™

At Dymax we combine our product offering with our expert knowledge of light-cure technology. Where others only supply products, we are committed to developing a true collaborative partnership, bringing our total process knowledge to our customer's specific application challenges.

Because we understand the process as a whole, and not just individual aspects of it, we can offer our customers a solution where chemistry and equipment work seamlessly together with maximum efficiency. Our application engineering team works side-by-side with our customers, providing assistance with testing, evaluation, and equipment selection if needed.

Dymax Materials for Electronics Assembly

Dymax one-part, solvent-free, UV light-curable electronic materials cure in seconds upon exposure to UV/Visible light and can be used in a wide variety of applications for circuit protection and electronic assembly. The products are electrically insulating and are designed for various operations including conformal coating, encapsulation, bonding, keypad coatings, thermal management, masking, and display bonding and lamination. Most products are available in multiple-viscosity grades, so the material flow may be tailored to the individual application. For shadowed areas, several cure options are available, including Dual-Cure light/moisture cure and Multi-Cure® light/heat cure technologies. IPC approved, MIL-I-46058C, and UL listed self-extinguishing grades are also available.



Environmental Benefits of Dymax Light-Curable Materials

Dymax understands that safe, ecologically friendly products benefit our customers, the environment, and us. We have created materials with attributes that lower product costs, life-cycle costs, and ecological impact. These attributes include:

- Solvent-free materials
- Halogen-free materials
- RoHS compliance
- REACH - no substance of very high concern (SVHC)
- Eco-friendly, one-component materials

Dymax Halogen-Free conformal coatings, encapsulants, and adhesives are documented by an independent laboratory to meet or exceed standards set forth in IEC 61249-2-21. This international directive defines halogen-free as <900 ppm for chlorine, <900 ppm for bromine and <1,500 ppm total level of both combined. The current test method used for certification is BS EN 14582:2007.

Conformal Coatings

Reliable Board Protection in Seconds

Product Number*	Description	Nominal Viscosity (cP)	Durometer Hardness	Modulus of Elasticity MPa [psi]	Dielectric Strength (Volts/mil)	Approvals	Halogen Free?
9-20351-UR	▪ Easy one-pass coverage of high-profile leads and tall components without seeping into shadowed areas ▪ Secondary heat cure for shadowed areas	13,500	D60	30.3 [4,400]	500	–	HF HALOGEN FREE
9-20557	▪ Medium viscosity for wetting components ▪ Low modulus for thermal cycling performance ▪ Secondary heat cure for shadowed areas	2,300	D60	37.9 [5,500]	>1,500	MIL-I-46058C listed IPC-CC-830 approved UL recognized	HF HALOGEN FREE
9-20557-LV	▪ Low viscosity for thin coatings ▪ Low modulus for enhanced thermal cycling performance ▪ Secondary heat cure for shadowed areas	850	D70	310 [45,000]	>1,500	MIL-I-46058C listed IPC-CC-830 approved	HF HALOGEN FREE
984-LVUF	▪ Rigid for high chemical and abrasion resistance ▪ Secondary heat cure for shadowed areas	160	D85	724 [1015,100]	1,800	MIL-I-46058 listed IPC-CC-830 approved UL recognized	HF HALOGEN FREE
987	▪ High chemical and abrasion resistance ▪ Secondary heat cure for shadowed areas	150	D85	900 [130,000]	>1,500	MIL-I-46058 listed IPC-CC-830 approved	HF HALOGEN FREE
9451	▪ True black coating ideal for covering sensitive information ▪ Secondary heat cure for shadowed areas ▪ Optimized for single pass coating	6,000	-	717 [104,000]	1,200	UL 94V-0	HF HALOGEN FREE
9452-FC	▪ Extremely low viscosity for film/flow coating applications ▪ Very good thermal shock resistance ▪ LED curable ▪ Secondary heat cure for shadowed areas ▪ Blue fluorescing	20	D60	1,137 [165,000]	1,000	UL 94V-0	HF HALOGEN FREE
9481-E	▪ Room-temperature secondary moisture cure for shadowed areas ▪ Highest chemical and abrasion resistance ▪ Low viscosity for thin coatings	125	D75	150 [21,800]	>1,500	MIL-I-46058 listed IPC-CC-830 approved UL 94V-0 UL 746E	HF HALOGEN FREE
9482	▪ Room-temperature secondary moisture cure for shadowed areas ▪ Superior re-workability ▪ Chemical and thermal shock resistance	1,100	D70	275 [40,000]	1,100	MIL-I-46058 listed IPC-CC-830 approved UL 94V-0 UL 746E	HF HALOGEN FREE

**Other grades are available for specific applications requiring physical properties different from standard products listed here.*
NOTE: Consult Dymax Conformal Coating Validation Report for more detailed information on conformal coatings.


Blue Fluorescing Coatings


Ultra-Red® Fluorescing Coatings


Coatings with Secondary Heat or Moisture Cure

- *Solvent free*
- *Tack-free UV cures in seconds*
- *Excellent environmental resistance*
- *Black grades available*
- *Adhesion to flex circuit substrates (FPC)*
- *Low stress under thermal cycling*
- *Rigid and flexible coatings available*
- *Variety of available viscosities*

Thermal Interface Adhesives

Efficient Thermal Transfer Between Heat Sinks and Electronics

Product Number	Description	Applications	Thermal Conductivity	Nominal Viscosity (cP)	Halogen Free?
9-20801	▪ Light cure in seconds ▪ Secondary activator or heat cure for shadowed areas* ▪ Highly thixotropic for optimal placement	▪ Mounting heat sinks on PCBs ▪ LED heat dissipation	0.9 W/m*K	110,000	HF HALOGEN FREE

**Dymax 501-E is the recommended activator for shadowed areas*

Bonding Heat Sinks

- *Sets in seconds with light exposure*
- *Cure shadow areas with activator or heat*
- *High-strength bonds*
- *Low stress for mismatched CTE's*
- *Room-temperature storage and cure*

Chip Encapsulants and Wire Bonders

For Superior Protection on Flexible and Rigid Platforms

Product Number	Description	Applications	Durometer Hardness	Nominal Viscosity (cP)	Elongation at Break (%)	Modulus of Elasticity MPa [psi]	Halogen Free?
9001-E-v3.1	▪ UV/Visible light cure for fastest processing ▪ Secondary heat cure for shadowed areas ▪ Multiple viscosities available for optimal flow and coverage ▪ Low modulus for wire bonding	▪ Chip-on-board ▪ Chip-on-flex ▪ Chip-on-glass ▪ Wire bonding ▪ Bare-die encapsulation	D45	4,500	150	17 [2,500]	HF HALOGEN FREE
9001-E-v3.5				17,000			
9001-E-v3.7				50,000			
9008	▪ Flexible ▪ Highly moisture-resistant bonds to diverse surfaces such as polyimide, DAP, glass, epoxy board, metal, PET ▪ High adhesion, even at -40°C	▪ Chip-on-flex encapsulation ▪ Flex circuit bonding and attachment to PCB and glass	A85	4,500	300	–	HF HALOGEN FREE
9101	▪ UV/Visible light cure with secondary moisture cure ▪ Flexible ▪ Moisture and thermal resistance	▪ Chip-on-board ▪ Chip-on-flex ▪ Chip-on-glass ▪ Wire bonding	D30-D50	7,000	38	17.5 [2,550]	HF HALOGEN FREE
9102				17,000	34	18.4 [2,670]	
9103				25,000	36	17.6 [2,560]	

Secondary Heat or Moisture Cure

Chip Encapsulants

Flex Circuit Encapsulants/ Wire Bonding

Black Encapsulants

- *100% solvent free*
- *Instant UV/Visible cures*
- *High ionic purity*
- *Tenacious adhesion to flex circuit substrates (polyimide and PET)*
- *Low stress under thermal cycling*
- *Electrically insulating*
- *Room-temperature storage*
- *Thermal shock and moisture resistance*

Ruggedization

Photocurable Technology Offers Lower Costs and Increased Productivity

Product Number	Description and Applications	Nominal Viscosity (cP)	Durometer Hardness	Tensile @ Break MPa [psi]	Cure Depth mm [in]	Halogen Free?
9309-SC	▪ Highly thixotropic ▪ Formulated with See-Cure technology for easy visual confirmation of full cure	45,000	D57	22 [3,000]	6.5 [0.26]	HF HALOGEN FREE
9422-SC	▪ Highly thixotropic for optimal placement and wetting of components ▪ Formulated with See-Cure technology for easy visual confirmation of full cure	38,000	D50	16 [2,300]	6.5 [0.26]	HF HALOGEN FREE

Ruggedizing

Leadless Component Edgebonding/ Cornerbonding

- *Fast dispense and cure*
- *Simple visual inspection (See-Cure blue-to-colorless change)*
- *Reduce stress on interconnects during push, pull, shock, drop, and vibration*
- *Easy rework*
- *Holds shape after dispense*
- *Improved bond strength for die and pry testing*
- *Engineered bead shape for wetting both board surface and component edge without seeping into shadowed area*
- *Jettable*

Peelable Masks

Product Number	Description and Applications	Cure Depth** (mm [in])	Durometer Hardness	Cure Speed* (sec)	Viscosity (cP)	Halogen Free?
9-20479-B-REV-A	▪ Wave-solder resistant ▪ Blue color for easy visual inspection ▪ Highly thixotropic for manual or automated dispensing	4.90 [0.19]	A70	1	150,000	HF HALOGEN FREE
9-318-F	▪ Wave-solder resistant ▪ Fluoresces blue for easy inspection ▪ Very fast curing	6.40 [0.25]	A55	<4	50,000	HF HALOGEN FREE
9-7001	▪ Wave-solder resistant ▪ Visible pink color in uncured state ▪ Lower shrinkage	8.36 [0.33]	A70	1	40,000	HF HALOGEN FREE

** Cure speed depends on the intensity and distance from the light source. Cure speed was measured at an intensity of 175 mW/cm².*
*** 5 second cure*

Fluorescing Mask

Removable Mask

Peelable Mask

- *100% solids*
- *UV/Visible cure in seconds*
- *No ionic contamination*
- *Fluorescing and colored grades*
- *One part – no mixing*

Acrylated Urethane Potting and Sealing

For Shallow Potting in 10-30 Seconds or Less – Highest Adhesion to Substrates

Product Number	Description and Applications	Recommended Substrates	UV Cure* Speed (sec)/ Depth (mm [in])	Durometer Hardness	Nominal Viscosity (cP)	Halogen Free?
921-T	▪ Connectors, thermal switches ▪ Tamperproofing ▪ Translucent bonds with high adhesion	ABS, filled nylon, metal, glass	30/6.4 [0.25]	D75	3,500	HF HALOGEN FREE
921-VT					11,000	
921-Gel					25,000	
9001-E V3.1	▪ Sensors ▪ Flexible ▪ Excellent adhesion to engineering plastics	ABS, PC, PVC, FR-4, metals	15/6.4 [0.25]	D45	4,500	HF HALOGEN FREE
9001-E V3.5					17,000	
9001-E V3.7					50,000	

**UV cure speed depends on the intensity reaching the surface of the resin. Cure speed was measured at an intensity of 175 mW/cm^2.*

Cable Potting

Deep Layer Potting

Chip Potting

- *Full UV/Visible cure in seconds*
- *Solvent free*
- *High adhesion to substrates*
- *Flexible and rigid products available*

LED Encapsulating

Bonding, Potting, and Sealing in Seconds

Product Number	Description	Applications	Linear Shrinkage (%)	Nominal Viscosity (cP)	Halogen Free?
LIGHT-CAP® 9622	▪ UV/Visible light cure in seconds ▪ No mixing required ▪ Heat resistant to 100°C ▪ Resistant to long-term UV exposure ▪ High light transmittance ▪ Durometer between silicone and epoxy	▪ Instant casting of LEDs ▪ Rapid forming of protective optical lens	0.79	12,000	HF HALOGEN FREE

LED Airport Flight Display

LED Light

- *One component, no mixing required*
- *Enhances light transmittance*
- *Resistant to heat-induced yellowing*
- *Fast cure*
- *Solvent free*
- *Optically clear*

Display Bonding and Laminating

Product Number	Description	Applications	Volumetric Shrinkage (%)	Nominal Viscosity (cP)	Halogen Free?
9701	▪ Excellent re-workability ▪ Good thermal shock resistance ▪ Low shrinkage ▪ Non-yellowing	Optical display lamination and touch screen bonding	4.9	200	HF HALOGEN FREE
9702	▪ Excellent re-workability ▪ Good thermal shock resistance ▪ Low shrinkage ▪ Non-yellowing	Optical display lamination and touch screen bonding	4.2	950	HF HALOGEN FREE
9703	▪ Excellent re-workability ▪ Good thermal shock resistance ▪ Low shrinkage ▪ Non-yellowing	Optical display lamination and edge damming	4.2	30,000	HF HALOGEN FREE

Touch Screen Lamination with 9700-Series Adhesives

Touch Screen or Cover Window Optical Bonding

- *One component, no mixing required*
- *Flexible*
- *Resistant to yellowing*
- *Fast cure*
- *Bonds various substrates*
- *High optical clarity*

Wire Tacking

Photocurable Technology Offers Lower Costs and Increased Productivity

Product Number	Description	Nominal Viscosity (cP)	Durometer Hardness	Tensile @ Break MPa [psi]	Halogen Free?
9-911 Rev A	▪ On-demand cure for optimal positioning ▪ Exposed areas cure in seconds for immediate strength	36,000	D80	28 [4,000]	HF HALOGEN FREE

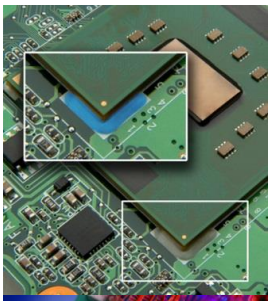
Wire Tacking

- *Instant UV cure*
- *One part*
- *Solvent free*
- *Unlimited pot life*
- *Fluorescing additive for in-line quality control*
- *Excellent adhesion to solder masks and wires*
- *Thermal shock and moisture resistance*

Dymax Adhesive Technologies

See-Cure Technology

Dymax light-curable adhesives with patented See-Cure technology have built-in cure validation that makes it easy for operators or simple automated inspection equipment to confirm cure without investing in additional specialized equipment. See-Cure technology is an indicator of cure that intentionally transitions the color of the adhesive after it has cured and builds a visible safety factor into the assembly process.



Ultra-Red® Fluorescing Technology

Ultra-Red® fluorescing technology, formulated into Dymax adhesives, enhances bond-line inspection processes and product authentication. The adhesives remain clear until exposed to low-intensity UV light at which point they fluoresce bright red. This is particularly effective while bonding plastics that naturally fluoresce blue, such as PVC and PET. Ultra-Red technology also produces a unique spectral signature that can be used by manufacturers for product authentication.

Multi-Cure® Light/Heat-Cure Technology

Multi-Cure adhesives combine the high-speed cure of UV or UV/Visible light with secondary cure mechanisms that enhance polymerization. Secondary cure mechanisms, which include thermal (heat) cure or activator cure, are useful when light can only reach a portion of the bond line, or when tacking a part prior to thermal cure to allow easier handling and transport during the manufacturing process.

Dual-Cure Light/Moisture-Cure Technology

Dual-Cure coatings are formulated to ensure complete cure in applications where shadowed areas on high-density circuit boards are a concern. Previously, areas shadowed from light were managed by selective coating – eliminating the need to cure in shadowed areas – or a secondary heat-cure process. Shadowed areas cure over time with moisture, eliminating the need for that second process step or concerns of component life degradation due to temperature exposure.

LED Light-Curable Adhesives

Dymax offers specially formulated LED light-curable adhesives for use with Dymax LED UV/Visible light-curing systems. The adhesives range from fast to ultra-fast cure speeds in order to accommodate specific electronic assembly needs.

Flood Chambers and Conveyor Curing Systems

for Electronic and Photonic Applications

Successful UV processing demands that the curing equipment be matched to the resin to optimize both performance and cost savings. Dymax manufactures UV light-curable resins and UV light-curing equipment and specializes in the optimization of UV light-curing processes. Our technical specialists are ready to help you optimize your process, and maximize your profit and product performance. For resin and equipment selection assistance please contact Dymax Application Engineering.

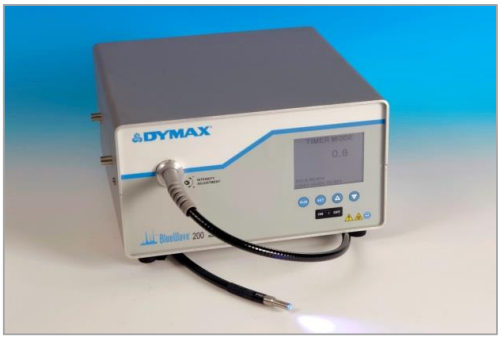
Dymax ECE 5000 Flood Lamp Systems
Most Popular and Versatile
Ideal for potting, sealing, and encapsulating applications

Dymax ECE 2000 Flood Lamp Systems
Largest Cure Area
Ideal for LED and masking applications

Dymax Conveyor Systems UVC-5
Medium Intensity

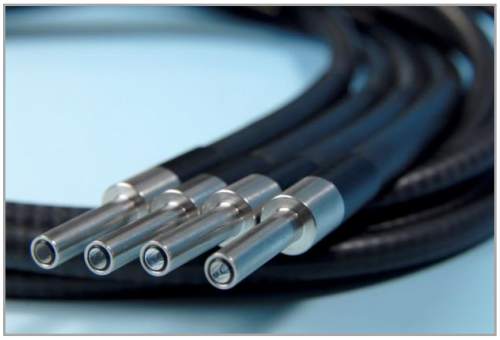
Dymax Conveyor Systems UVC-8
High Intensity

UV Light-Curing Spot Lamps
for Electronic and Photonic Applications



Dymax BlueWave® 200 Version 3.0
UV-Curing Spot Lamp
Ideal for fastest processing of small curing areas

Dymax BlueWave® LED Prime UVA
Visible Spot Light-Curing System
Ideal for cool spot curing coatings

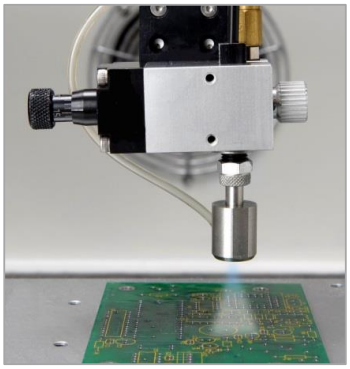


Liquid Lightguides
Come in an assortment of sizes and split wand configurations

ACCU-CAL™ 50 Radiometer
Ideal for process monitoring

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, 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.



Reduced environmental impact and energy conservation are core pillars of the Dymax mission. Over the last 30 years, Dymax light-curable materials and curing equipment have become the industry standard for fast, environmentally conscious assembly. Dymax products replace technologies that contain hazardous ingredients, produce waste, or require higher amounts of energy to process. Dymax understands that safe ecologically friendly products benefit our customers, the environment, and us. We have created materials with attributes that lower product costs, life-cycle costs, and ecological impact.