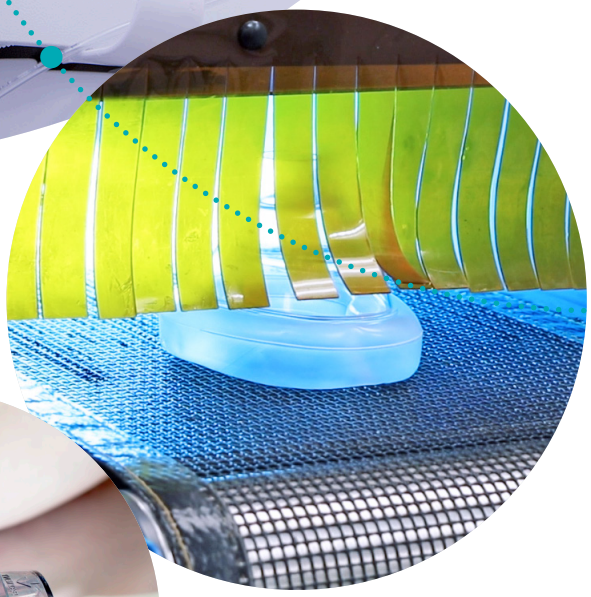
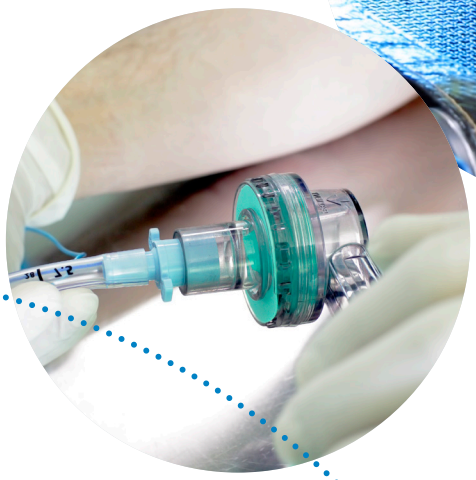
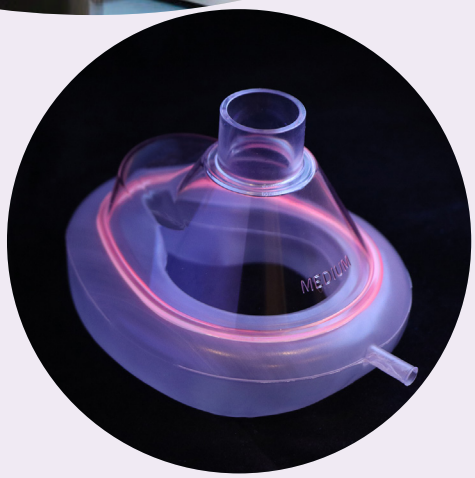




MD ADHESIVES® FOR AIRWAY MANAGEMENT DEVICE ASSEMBLY

DYMAX®

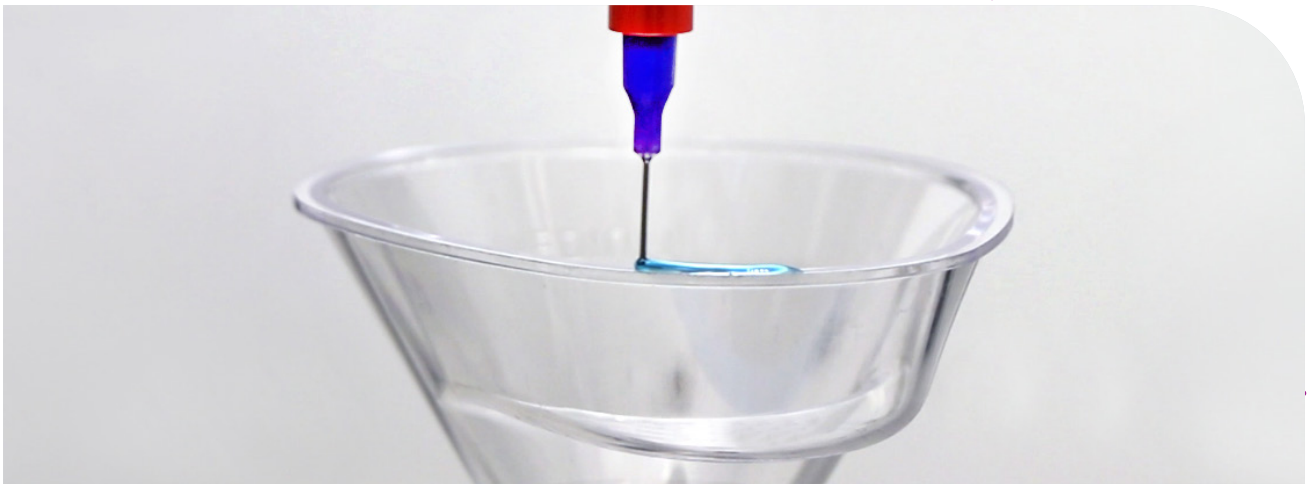


Only Dymax offers expert knowledge of light-cure technology, along with a full array of light-cure products. Dymax is committed to developing a true collaborative partnership — applying our extensive process knowledge to your specific application challenges.

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 Our Products

Since pioneering light-cure technology over 40 years ago, Dymax has continued to develop innovative ways to optimize medical device assembly. We understand the demands of the medical device market and are ready to assist you with every step of the product development process including adhesive selection, dispensing options, curing recommendations, biocompatibility testing, component design, and process validation. We are continually developing new technologies to help you build safer, higher quality products that increase your manufacturing efficiency, and deliver the best possible outcomes.



MD® Adhesives

Dymax MD® adhesives are specially formulated for disposable medical device assembly and used in a variety of applications.*

- Optimize assembly speeds enabling faster processing, greater output, and in-line inspection of bond lines
- Solvent free and RoHS compliant
- Many meet ISO 10993 biocompatibility and/or USP Class VI standards

*MD® adhesives are intended for use in short-term (<29 days) or single-use disposable-device applications only. Dymax does not authorize their use in long-term implant applications. In all cases, it's the user's responsibility to determine and validate the suitability of these adhesives in the intended medical device.

Compatible sterilization methods include gamma irradiation and ethylene oxide. Sterilization by autoclaving may be limited to certain applications. It remains the user's obligation to ascertain the effect of sterilization on the cured adhesive.

MSK Adhesives

Dymax MSK light-curable adhesives are formulated for bonding respiratory devices such as anesthesia masks, resuscitator bags, and breathing circuits.

- Strong, flexible bonds to a variety of substrates used in the assembly of respiratory devices, including highly plasticized plastics
- Solvent free and ISO 10993-5 Cytotoxicity approved
- Compatible with gamma, EtO, and E-Beam sterilization
- Easily dispensed by syringe, dipping well, screen print, or spray
- Ability to bond at line speeds greater than 20 ft/min for increased throughput without additional labor or line expansion
- Adhesives available that fluoresce upon exposure to low-intensity "black" light for easy in-line inspection

Recommended Products

Product	Unique Product Feature	Recommended Substrates	Nominal Viscosity, cP	Rheology	Durometer Hardness	Tensile Break, MPa [psi]	Elongation at Break, %	Modulus of Elasticity, MPa [psi]	Fluorescing*
108-MSK	Fast, Tack-Free Adhesive	PC, PS, PVC, SAN	600	Newtonian	D75	25 [3.700]	70	388 [100.000]	Blue
104-MSK-GEL	Flexible, General Purpose Adhesive	PCTG, PETG, PU, PVC, SAN	23.500	Thixotropic	D60	19 [2.750]	205	147 [21.370]	No
111-MSK	Flexible, Moisture-Resistant Adhesive	ABS, PC, PS, PU, PVC, SEBS	250	Newtonian	D55	6,9 [1.000]	400	99 [14.500]	Blue
1121-M	LED UV Curable Adhesive	ABS, PC, PU, PVC	450	Newtonian	D65	15,8 [2.300]	225	175,8 [25.500]	Blue
1187-M	Flexible, Moisture-Resistant Adhesive	ABS, PC, PET, PVC	450	Newtonian	D60	19,9 [2.900]	200	158 [23.000]	Blue

SC See-Cure (Patented Color-Change Technology)

UR Ultra-Red® (Patented Fluorescing Technology)

Featured Product

* U.S. Patents 6,080,450 & 7,892,386

Substrate Bonding Guide

Product	**ABS** acrylonitrile-butadiene-styrene	**CAP** cellulose acetate propionate	**PA** polyamide	**PC** polycarbonate	**PCTG** poly(ethylene terephthalate)glycol	**PEBA** polyether block amide	**PEEK** polyether ether ketone	**PEI** polyetherimide	**PET** poly(ethylene tere-phthalate)	**PETG** poly(ethylene terephthalate)glycol	**PI** polyimide	**PMMA** poly(methyl methacrylate)	**PS** polystyrene	**PU** polyurethane	**PVC** poly(vinyl chloride)	**SAN** styrene-acrylonitrile	**SEBS** styrene-ethylene/butylene-styrene	**Silicone** (platinum cured)	**TPU** thermoplastic polyurethane
108-MSK	❍	●		●		❍	●			❍		●	●	●	●	●		*	●
104-MSK-GEL	●			●	●				❍	●	❍		❍	●	●	●		*	
111-MSK	●			●							●	●	●	●	●	●	●	*	●
1121-M	●			●	●		❍	❍	❍	●		●	●	●	●				●
1187-M	●	●		●	●				●	●					●				

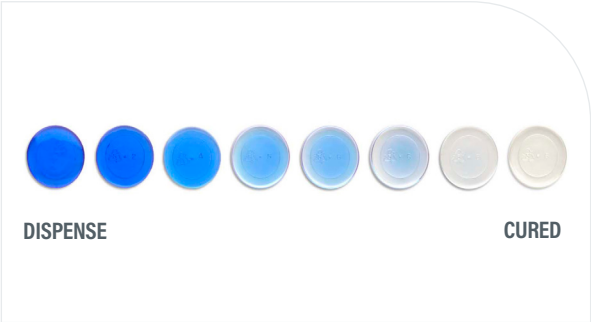
- ● Recommended adhesive
- ❍ Limited applications
- **ST** Requires surface treatment (e.g., plasma, corona treatment, etc.)

*Please contact Dymax Application Engineering for assistance.

Individual Product Data Sheets (PDS) list complete test data, with copies of test reports available upon request.

Adhesive Technologies

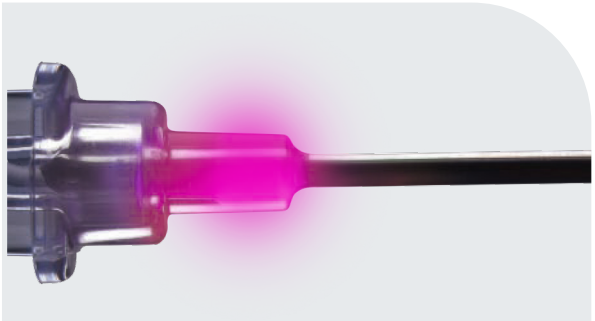
As an innovator in the adhesive and coating industries, Dymax strives to create new technologies that help manufacturers increase process efficiency, productivity, and throughput while decreasing costs and inventory. Through the years, our dedication to innovation has resulted in over 30 patents and numerous awards for our innovative technologies and service.



See-Cure Technology

Confirm Adhesive Placement & Cure

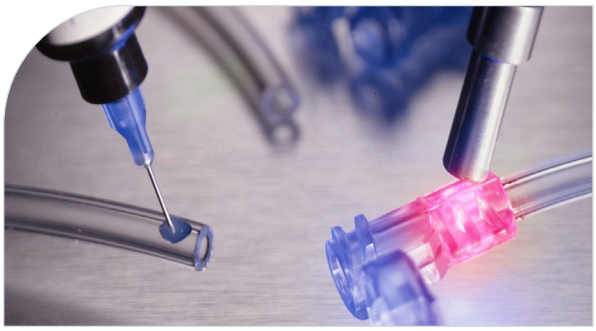
- Material transitions color when cure is complete
- Provides critical safety feature for manufacturing processes
- Simple visual confirmation of cure, no special equipment needed



Ultra-Red® Technology

Enhance Bond-Line Inspection

- Fluoresces bright red when exposed to low-intensity black light so bond lines can be easily inspected
- Produces a unique energy peak exclusive to Dymax so products can be marked and positively identified



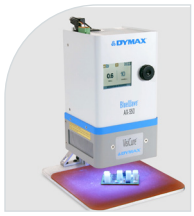
Encompass® Technology

Enhance Bond-Line Inspection & Confirm Cure

- Ultra-Red® and See-Cure technologies incorporated into one product
- Manufactures gain efficiencies from rapid curing with easy cure confirmation and post-cure bond-line inspection

Dispensing & Light-Curing Equipment

Dymax dispensing and light-curing systems are perfectly matched to our adhesives' chemistry. Our field-proven dispense solutions are designed to fit many adhesive dispensing applications and include various automatic and manual dispense systems, spray valves, and related components for seamless integration into your assembly process. We also offer a complete line of conventional and LED light-curing equipment including spot, flood, and conveyor systems, as well as radiometers for measuring light intensity. Our equipment can be configured as stand-alone units or integrated into existing manufacturing assembly lines for fast processing. Visit the dymax.com website for a complete listing of our equipment.



Dymax Dispensing Systems

- Pneumatic dispense and spray systems
- Available with suck back control for crisp shutoff even with stringy/tacky materials
- Valves with disposable fluid paths available for contaminate-free dispensing

BlueWave® MX-150 LED Spot-Curing System

- Emitter design for set up flexibility and consistent intensity
- LED curing emitters in 365, 385, and 405 nm
- PLC interface for easy integration into fully automated lines

BlueWave® AX-550 LED Flood-Curing System

- Compact, all-in-one design
- 12.7 cm x 12.7 cm curing area with up to 800 mW/cm^2 initial intensity
- Available in 365, 385, and 405 nm

UVC Conveyor Systems

- High power conveyors with adjustable belt speed
- Fully shielded lamp enclosures for optimum protection
- Available in a bench-top or free-standing model

Radiometers

- Provides accurate measurement of system lamp intensity and dosage
- UV broad-spectrum and LED compatible radiometers
- Wand and puck style radiometers available for spot, flood, and conveyor systems

Reference Tables

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

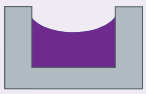
T = Thick

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



LV Low Viscosity
Newtonian

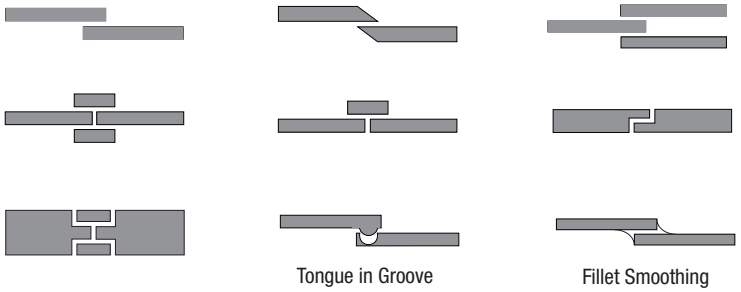
T Viscosity
Slightly Thixotropic

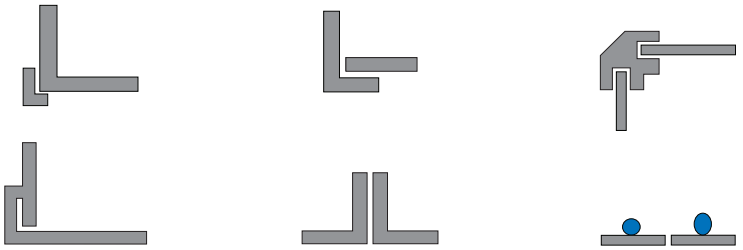
VT Viscosity
Thixotropic

GEL Viscosity
Highly Thixotropic

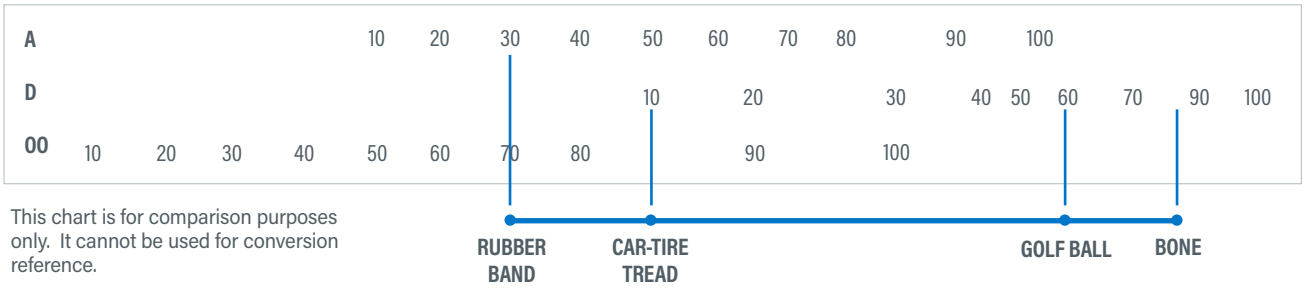
Dots

Volume of a dot is 1/2 the volume of a sphere V=.2618D^3						
	·	•	•	●	●	●
Volume (ul)	0,10	0,51	0,05	0,01	00,0	25,0
Volume (mL)	0,0001	0,00050	0,0010	0,0050	0,0100	0,025
Diameter (mm)	0,73	1,241	0,56	2,673	0,37	4,57
Diameter (in)	0,0290	0,0490	0,0610	0,1030	0,1330	0,180

Avoid butt joints: cleavage or asymmetric-type forces can result in part failure	Suggested alternatives: (Recommended bond gaps: 0,002" - 0,006" [0,05 -0,15 mm])
	

Avoid corner butt joints: Cleavage-type forces can result in part failure	Suggested alternatives: (Recommended bond gaps: 0,002" - 0,006" [0,05 -0,15 mm])
	

Hardness



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

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 8-hour shifts.

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" (0,79 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)

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