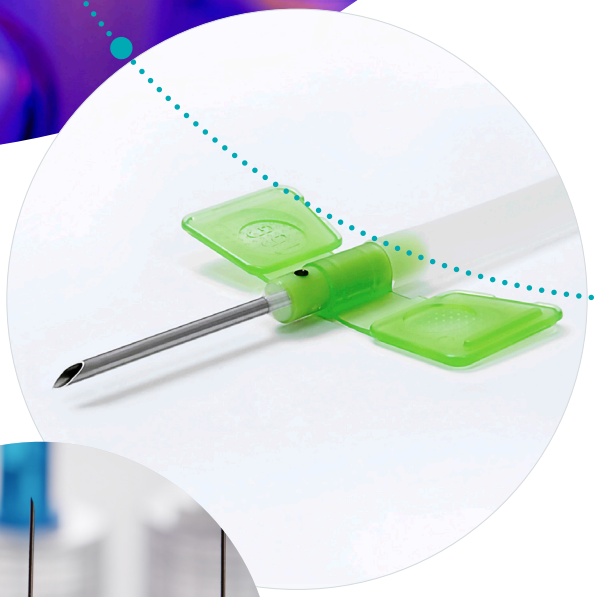
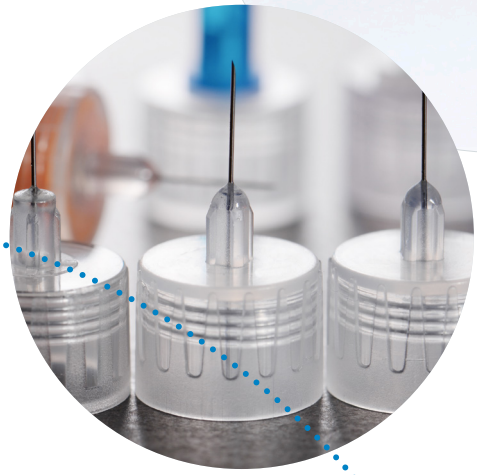




MD® ADHESIVES FOR NEEDLE ASSEMBLY

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
- No added solvents
- 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.

Dymax Adhesives for Needle Bonding

Dymax has a portfolio of adhesives specially designed for for bonding cannulas to hubs in various hypodermic and biopsy needles, syringes, and winged infusion sets made from multiple plastics, metals, and glass.

- Ideal for automated high-speed assembly lines that incorporate immediate in-line testing and packaging
- Single component
- Rapid cure with UV/visible light
- The ability to cure with visible light allows for bonding of UV-blocking or heavily tinted plastics
- Fluorescing grades available for easy detection of coverage and volume

Recommended Products

Product	Unique Product Feature	Recommended Substrates	Viscosity, mPas	Rheology	Durometer Hardness	Tensile Break, MPa [psi]	Elongation at Break, %	Modulus of Elasticity, MPa [psi]	Fluorescing*
1045-M	LED UV Curable Adhesive for Prefilled Syringes & Injection Devices	ABS, Glass, PC, SS	475	Newtonian	D78	23,4 [3.400]	20	1861,6 [270.000]	No
1405M-T-UR-SC-Z	LED UV Curable Plastic & Metal Bonder; Encompass Technology	ABS, PC, PMMA, SAN, SS	8.500	Thixotropic	D75	20 [2.900]	160	855 [124.000]	Ultra-Red
1406-M	LED UV Curable Adhesive for Small Gauge Needles	PP, PE, SS	150	Newtonian	D70	15 [2.200]	120	419 [60.800]	Blue
1401-M-UR	LED UV Curable Adhesive for High-Speed Needle Bonding	ABS, PC, PMMA, PS, SS	2.800	Thixotropic	D70	22 [3.300]	200	284 [41.300]	Ultra-Red
1404-M-UR	Low Wicking, LED UV Curable Plastic & Metal Bonder	PC, PS, SS	6.000	Thixotropic	D65	23 [3.400]	150	447 [65.000]	Ultra-Red
1405-M-UR-SC	LED UV Curable Plastic & Metal Bonder; Encompass Technology	ABS, PC, PMMA, SAN, SS	150	Newtonian	D70	18,6 [2.700]	150	397 [57.600]	Ultra-Red
1501-M-UR	LED UV Curable Bonder for Lightly Colored, Opaque, or Translucent Substrates	ABS, PC, SAN, SS	275	Newtonian	D75	17,9 [2.600]	80	427,5 [62.000]	Ultra-Red

T Thick

Z TPO Free

SC See-Cure (Patented Color-Change Technology)

UR Ultra-Red® (Patented Fluorescing Technology)

Featured Product

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

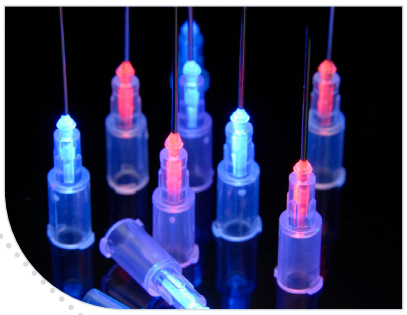
Our Commitment to Greener, Safer Manufacturing

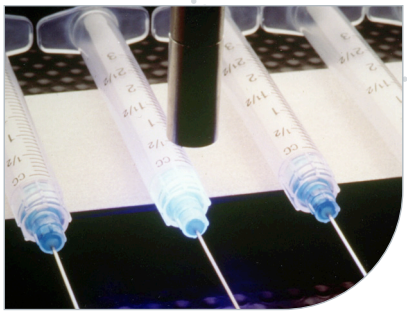
Dymax is committed to green manufacturing that reduces environmental impact, conserves energy, and provides greater worker safety. Over the last 40 years, our light-curable materials and curing equipment have become the industry standard for fast, environmentally conscious assembly. Dymax products are 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 for improved worker and user safety
- Fast curing products and equipment designed for less energy consumption
- Dymax meets global statutory and regulatory requirements

Substrate Bonding Guide

PRODUCT	**ABS** acrylonitrile-butadiene-styrene	**PC** polycarbonate	**PE** polyethylene	**PMMA** poly(methyl meth-acrylate)	**PP** polypropylene	PS polystyrene	PU polyurethane	**GL** glass: borosilicate, quartz, mica	**SS** stainless steel
1045-M	•	•		❍			•	•	•
1405M-T-UR-SC-Z	•	•		•	ST	•	•		•
1406-M	•	•	•	❍	ST	•			•
1401-M-UR	•	•		•	ST	•		❍	•
1404-M-UR	•	•		❍	ST	•			•
1405-M-UR-SC	•	•		•	ST	•	•		•
1501-M-UR	•	•			ST				•



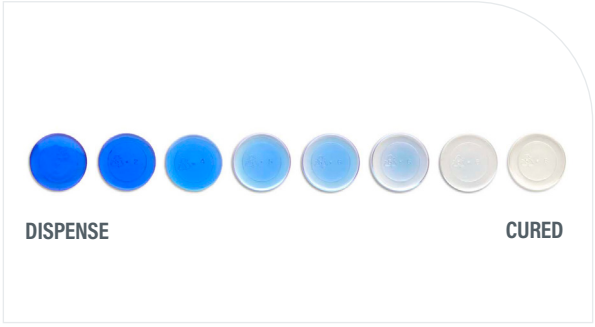


- • Recommended adhesive
- ❍ Limited applications
- **ST** Requires surface treatment (e.g., plasma, corona treatment, etc.)

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

Innovative Products &Technologies

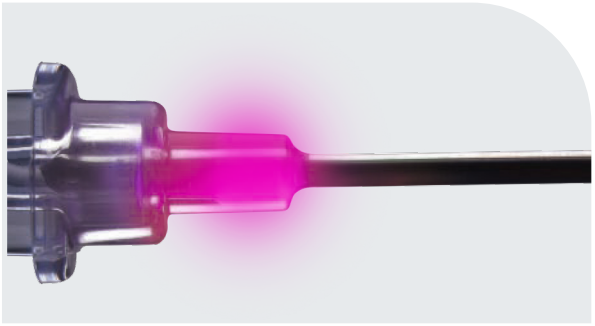
As an innovator in the adhesive and coating industries, Dymax strives to create new products and technologies that help manufacturers increase process efficiency, productivity, and throughput while decreasing costs and inventory. Through the years, our dedication to innovation has resulted in over 30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



See-Cure Technology

Confirm Adhesive Placement & Cure

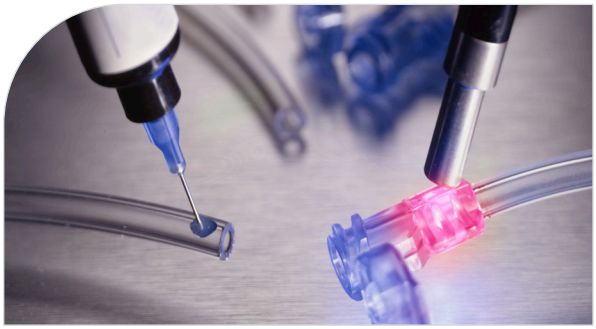
- Material transitions color when cure is complete
- Provides critical safety feature for manufacturing processes
- Simple visual confirmation of cure, no special equipment needed



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

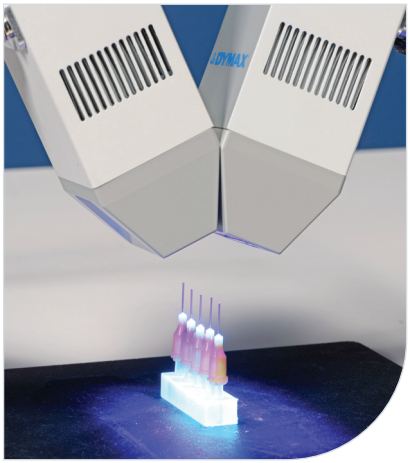
TPO-Free Adhesives

Trusted Quality, Future-Ready Formulations

- Formulated without Trimethylbenzoyl Diphenylphosphine Oxide (TPO)
- Same trusted performance and reliability while supporting long-term product planning and compliance

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-Series LED-Curing Systems

- Emitter design for set up flexibility and consistent intensity
- LED curing emitters in 365, 385, and 405 nm
- Spot, flood, and line-pattern emitter configurations
- 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

Systems Integration Services

- Custom automation and robotic solutions for medical manufacturing processes
- Dispensing and curing solutions for all size processes, from bench-top assemblies to standalone stations or sub-assemblies within larger production lines

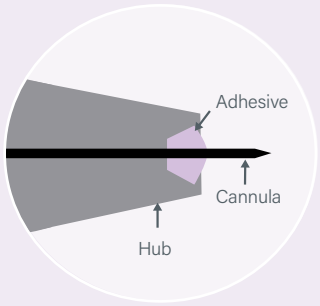
Radiometers

- 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

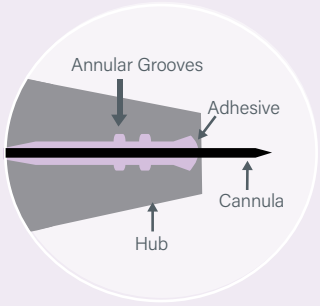
Joint Design

An adhesive should be chosen according to the needs of the application and joint design.



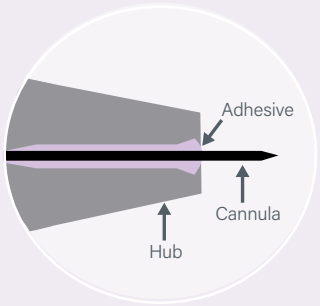
Well Configuration

A hub that is flared at the distal end is described as a “well” configuration. Filling the well with adhesive secures the needle in place. In many cases the hubs are opaque but can be cured from above so UV light is not required to pass through the plastic. In the “well” design, adhesion to both the hub substrate and cannula are of critical importance. The well in this configuration is usually large enough to permit using mid-range viscosities.



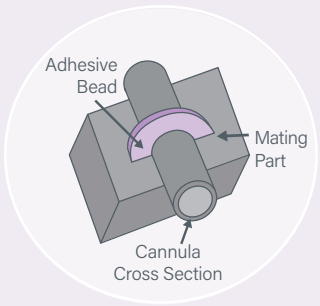
Mechanical Lock

A hub can be molded with annular grooves in its inside diameter. The annular rings are typically 0,005” to 0,008” (0,127-0,2 mm) deep per side subject to molding limitations. This allows the cured adhesive to form a mechanical lock, substantially increasing pullout strength. Adhesives will form a structural bond with the stainless steel cannula and lock in place with the added groove feature. With this design, a low- to medium-viscosity adhesive is used to wick between the stainless steel cannula and hub forming a mechanical lock.



Cylindrical Hub

The close-fitting cannula-to-hub design is commonly encountered in medical disposable syringes. A cylindrical hub that is closely fit to the cannula requires a low-wicking-grade-viscosity adhesive. It is also critical to choose an adhesive that has superior bond strength to both substrates. Recommended gap: 0,002”-0,004” (0,05-0,1 mm) per side.



Bridge Bonding

The cannula can be attached to the mating part by bridge bonding, which entails placing an adhesive bead over the top of the cannula. This design overcomes the problem of getting light into a shadowed area for the purpose of curing the adhesive.

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

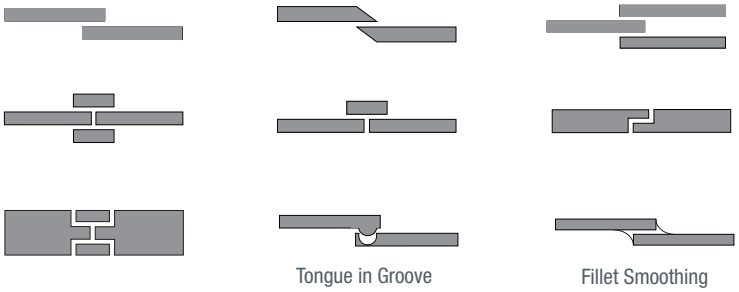
T Viscosity
Slightly Thixotropic

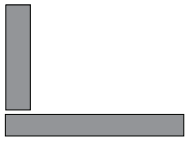
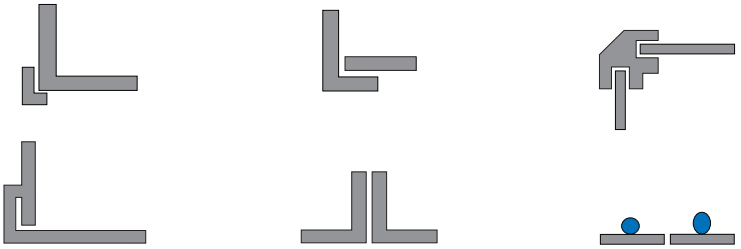
VT Viscosity
Thixotropic

GEL Viscosity
Highly Thixotropic

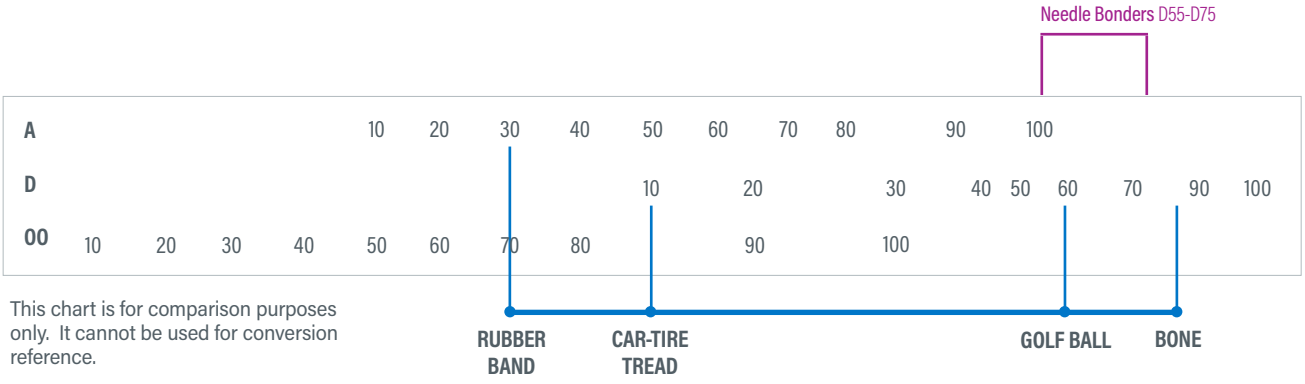
Dots

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" (,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)

Learn more about setting up a successful needle bonding process in our white paper

Visit our website to learn more about our syringe and needle bonding adhesives

DYMAX®

www.dymax.com

Americas
USA | +1.860.482.1010 | info@dymax.com
Mexico | +1.915.315.9381 | info-LATAM@dymax.com

Europe
Germany | +49 611.962.7900 | info_de@dymax.com
Ireland | +353 21.237.3016 | info_ie@dymax.com

Asia
Singapore | +65.67522887 | info_ap@dymax.com
Shenzhen | +86.755.83485759 | info@hanarey.com
Hong Kong | +852.2460.7038 | dymaxasia@dymax.com
Korea | +82.31.608.3434 | info_kr@dymax.com

 SG026EU 13 May 2025