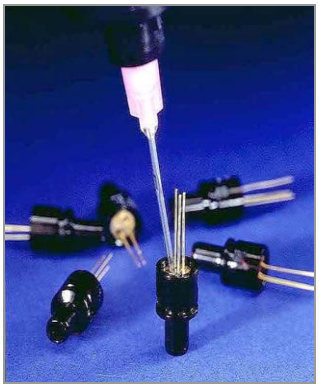
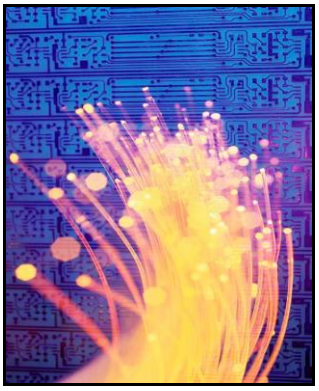
UV Light-Curable Lens-Bonding and Fiber Optic Adhesives

Dymax high-strength, low-stress, OP-Series optical assembly adhesives cure in seconds upon exposure to UV/Visible light. Dymax optical adhesives are single component, low outgassing, low shrinkage, and have a gap-filling capability to 0.25 in [6.4 mm] or more. High-performance fiber optic adhesives minimize movement of parts during cure and thermal excursions. By combining new ingredients in novel ways, Dymax fiber optic adhesives offer improved durability and reliability along with superior optical transmission, low outgassing, and complete cure in seconds.

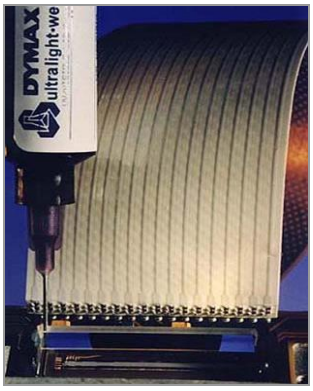


VCSEL Potting



Fiber Optic Bundling

Lens Curing



Lens Positioning

Features and Benefits

- Low to no movement during cure and thermal excursions (from -50°C to 200°C)
- Exceptionally low shrinkage to 0.1%
- Low to high glass transition points (T_g)
- A range of refractive indices
- Low outgassing to 10^{-6} grams/gram
- Superior optical transmission
- Single component, no mixing required
- Gap filling to 0.25 in [6.4 mm] or more
- Environmentally resistant
- Very low VOCs
- Low odor

Dymax offers a complete line of high-performance light-curable adhesives and light-curing equipment for optical applications for the industrial, commercial, medical, military, aerospace, and electro-optical markets. Over 30 years of experience in this industry has led to a superior product line of adhesives, applicators, and UV light-curing sources.

The First Adhesives Developed for High-Speed Fiber Optic Assembly

Easily automate production of products such as lenses, fiber optics, prisms, mirrors, and other assemblies. Dymax OP Series UV light-curable fiber optic adhesives cure in seconds, have unlimited pot life, long shelf life, and are not frozen.

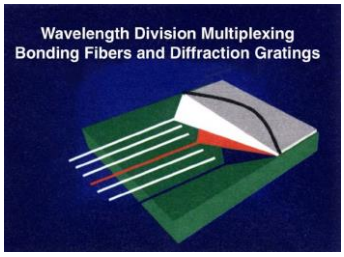
Want to learn more?

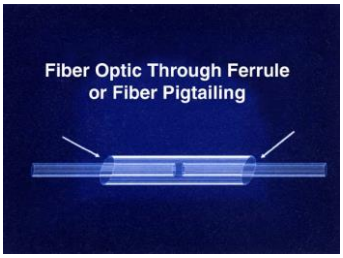
Visit www.dymax.com to register to download the white paper *"Advances in Light-Curing Adhesives"*

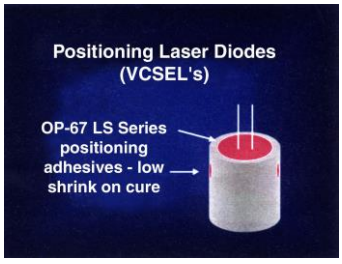
Product Selector Guide

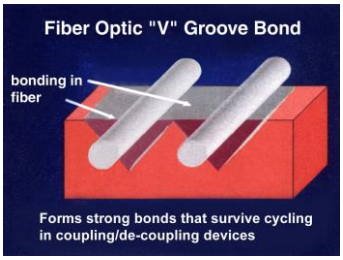
Products	Description	Linear Shrinkage	Refractive Index (cured)	Viscosity (cP)	Durometer Hardness	Adhesion			
					D=Rigid A=Elastic OO=Soft	Ceramic	Glass	Metal	Plastic
OP-24-REV-B (501-E)	Clear; Multi-Cure® (UV/light/heat/activator); tack and bond with UV, heat, or activator where light won't reach; lens mounting	0.39%	1.50	800	D80		✓	✓	✓
OP-29	Clear; UV light cure; doublet bonding; lens mounting; fiber optic splicing	0.79%	1.50	2,500	D60		✓	✓	o
OP-29-GEL	Clear; UV light cure; doublet bonding; lens mounting; fiber optic splicing	0.79%	1.50	20,000	D65		✓	✓	o
OP-67-LS	White/opaque; UV/Visible light cure; low shrinkage; low outgassing for alignment stability; doublet bonding	0.08%	N/A	135,000	D80	✓	✓	✓	✓
OP-4-20632	Clear; tenacious adhesion to glass and metal; low shrink on cure; T_g increases with heat exposure; moisture resistant; resists yellowing	0.39%	1.55	480	D80		✓	✓	✓
OP-4-20632-GEL	Clear; tenacious adhesion to glass and metal; low shrink on cure; T_g increases with heat exposure; moisture resistant; resists yellowing	1.10%	1.54	57,500	D80		✓	✓	✓

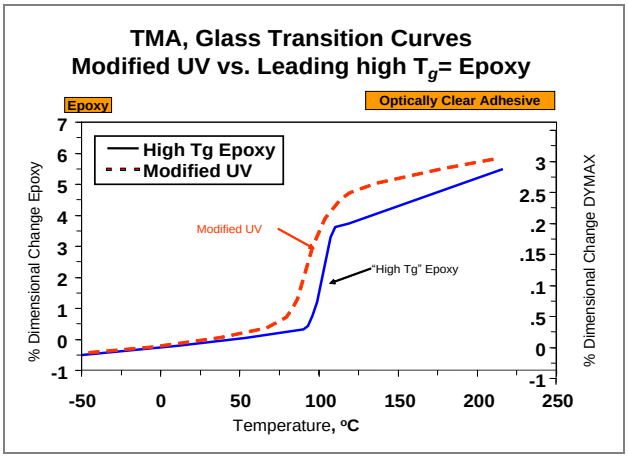
✓ Recommended o Limited Applications



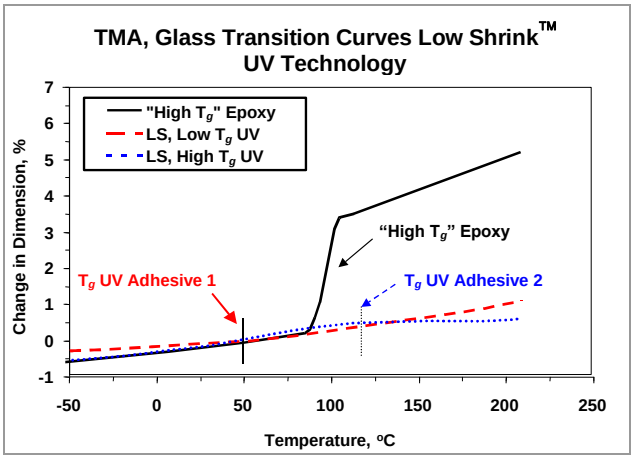








High T_g's of new UV's compared to those of epoxy



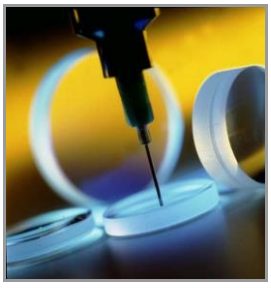
Minimal movement with temperature change means improved durability

Product Selector Guide

Products	T_g, Glass Transition Temperature °C (By TMA)	Outgassing ASTM E595-77 85°C at 5x10^{-6} torr for 24 Hours TWL[1]/CVCM[2]	Tensile Bar Strength ASTM D638			Bond Strength Compressive Shear		
			Tensile (psi [MPa])	Modulus of Elasticity (psi [MPa])	Elongation	Glass to Glass (psi [MPa])	Steel to Glass (psi [MPa])	Steel to Steel (psi [MPa])
OP-24-REV-B (501-E)	79 [u] 92 [uh]	5.2% <0.04%	5,200 [36]	320,000 [2,206]	35%	4,000 [28]	5,000 [34]	2,900 [20]
OP-29	64 [u] 67 [uh]	3.66% 0.25%	3,000 [22]	34,000 [234]	110%	2,300 [16]	1, 700 [12]	N/A
OP-29-GEL	56 [u] 58 [uh]	3.66% 0.25%	3,500 [24]	30,000 [200]	80%	2,300 [16]	1, 700 [12]	N/A
OP-67-LS	86 [u] 125 [uh]	nm	4,000 [28]	83,000 [570]	6.5%	nm	nm	N/A
OP-4-20632	78 [u] 87 [uh]	nm	6,200 [43]	134,000 [923]	3%	2,200 [15]	525 [3.6]	N/A
OP-4-20632-GEL	78 [u] 87 [uh]	nm	4,100 [28]	131,000 [903]	2%	2,200 [15]	525 [3.6]	N/A

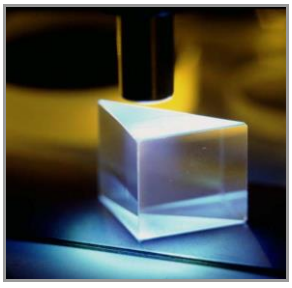
[uh]=UV plus heat (75 minutes @ 110°C) cure [u] = UV-only cure **nm** = not measured

Diode Curing

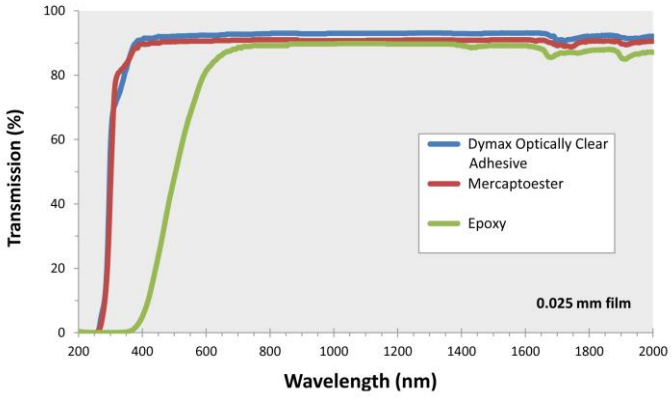


Lens Bonding

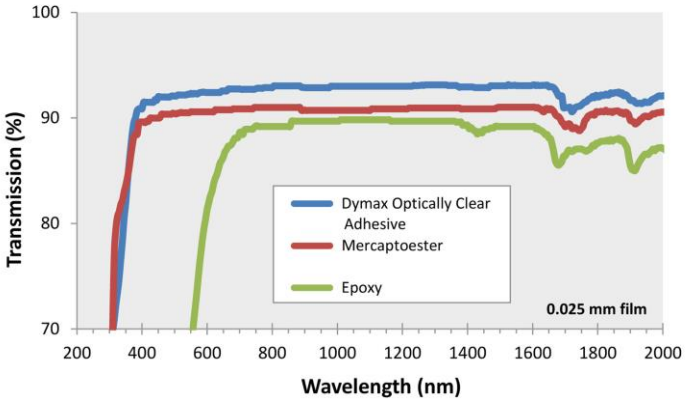
Lens Laminating



Prism Curing



Dymax OP series adhesives show superior optical transmission



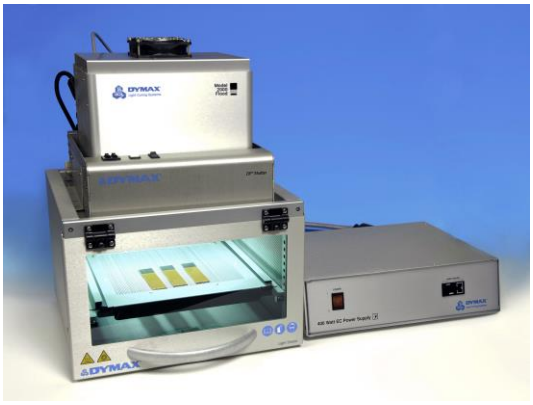
Transmission curves from graph on left expanded from 70% level and higher

UV Light-Curing Systems for Optical Adhesives

Tired of short storage and shelf life, of mixing two components, and waiting for adhesives to thaw? Dymax UV light-curable adhesives and systems cure completely in seconds. Make automation easier!

Dymax BlueWave® 200 UV-Curing Spot Lamp with patented intensity adjustment feature provides high-intensity UV/Visible light in a concentrated area. Ideal for integration with automated equipment and multiple-output lightguides. CE Marked.

Dymax BlueWave® 75 UV-Curing Spot Lamp Shown with single lightguide includes a patented intensity adjustment feature and an auto-switching power supply to neutralize the effects of variations in line voltage.



Dymax 2000 UV-Curing Flood-Lamp System Shown with Light Shield protective enclosure and manual shutter. Ideal for single-component or batch-curing processes requiring moderate intensity and an 8" x 8" (20.3 cm x 20.3 cm) cure area. CE Marked. ECE Series Flood Systems available for European production facilities.

Dymax 5000 UV-Curing Flood-Lamp System Shown with Light Shield protective enclosure and ZIP™ shutter. Ideal for single-component or batch-curing processes requiring moderate intensity and a 5" x 5" (12.7 cm x 12.7 cm) cure area. CE Marked. ECE Series Flood Systems available for European production facilities.

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