DYMAX CORPORATION

PRODUCT DATA SHEET

3 December 2004

No Shrink™ OPTICAL ADHESIVE
High T_g UV Cure Positioning Adhesive
OP-66-LS

INTRODUCTION

DYMAX high performance optical adhesives cure upon exposure to UV light in seconds and are designed to increase productivity, lower assembly cost and enhance worker safety. These results were obtained using very high speed DYMAX spot, beam and flood lamps. DYMAX lamps deliver optimum speed and performance for a variety of optical applications.

DESCRIPTION

DYMAX "No Shrink™" adhesives are from a patented technology that significantly reduces shrinkage and movement of positioning adhesives both during UV curing and during service life conditions. Multi-Cure OP-66-LS is a very low shrinkage, low outgassing, and low CTE adhesive, suggesting it may be useful for accurately positioning of lenses, prisms, fibers and other optical components. OP-66-LS was designed to minimize movement during UV curing. Laboratory tests show minimal movement during heat cycles, and the product returns to its original position at room temperature. OP-66-LS completely cures in seconds upon exposure to UV light. Additional areas not in contact with air and inaccessible to light may be cured by secondary mechanism using heat (1/2 hour at 120°C).

SUBSTRATES BONDED:	**• Glass • Ceramics • Metal**
FEATURES:	**• Low-to-No Movement During Curing or Thermal Excursions** **• High Glass Transition Temperature (110°C) • Low Outgassing** **• Fast, Total Cure In Seconds with UV Light**
APPLICATIONS:	**• Fixturing Fiber Optic Couplings, Lens and Prisms**

TYPICAL UNCURED PROPERTIES (not specifications)

Solvent Content	None - 100% Reactive Solids	
Composition	Urethane (Meth) Acrylate	
Appearance	Lt. Yellow/White Paste	
Solubility	Alcohols/Ketones	
Toxicity	Low	
Flash Point	Over 93°C (200°F)	
Density	1.2 g/mL	ASTM D-1875
Viscosity (Brookfield, 25ºC, 20 rpm)	80,000 cP (nominal)	ASTM D-2556

TYPICAL CURED PROPERTIES (not specifications)

Linear Shrinkage (during UV cure)	< 0.1%	ASTM D-2566
Linear Shrinkage (after 24 hr, 120°C heat cycle)	< 0.1%	ASTM D-2566
Glass Transition, T_g	110°C	ASTM E-831
CTE α_1 (below T_g)	67 x 10^{-6} in/in/°C	ASTM E-831
CTE α_2 (above T_g)	110 x 10^{-6} in/in/°C	ASTM E-831
CTE (-50°C to 200°C)	95 x 10^{-6} in/in/°C	ASTM E-831
Tensile at Break	4,700 psi	ASTM D-638
Elongation at Break	0.1 %	ASTM D-638
Modulus of Elasticity	1,500,000 psi	ASTM D-638
Tensile Compression Shear, glass to glass	3,100 psi (exceeds glass strength)	DSTM D-250*
Durometer Hardness	D85	ASTM D-2240
Water Absorption (24 hr)	5.0%	ASTM D-570
Thermal Limit (brittle/degrades)	-55° to 190°C (-65° to 375°F)	DSTM D-200*
Outgassing	0.18% (85°C for 24 hr)	DSTM D-220*

* DSTM refers to DYMAX Standard Test Method

DYMAX Corporation - 51 Greenwoods Road - Torrington, CT 06790 - Phone: 860-482-1010 - Fax: 860-496-0608
E-mail: info@dymax.com - www.dymax.com

DYMAX Europe GmbH - Trakehner Strasse 3 - D-60487 Frankfurt am Main - Germany - Phone: 0049-69-7165-3568
Fax: 0049-69-7165-3830 - E-mail: dymaxinfo@dymax.de - www.dymax.de

DYMAX®, Light-Weld®, Light-Welder®, Multi-Cure®, Ultra Light-Weld®, *MEDI-CURE*® and MD® are trademarks of DYMAX Corporation

DYMAX CORPORATION

PRODUCT DATA SHEET

OP-66-LS, 3 December 2004

RECOMMENDED CURING SYSTEMS

UV Light:

Lamp	DYMAX® 2000-EC	DYMAX® 5000-EC	DYMAX® Bond Box	DYMAX® BlueWave™ 50	ADAC 50
Light Type **Lamp Type**	UV/Visible 8" x 8" Flood	UV/Visible 5" x 5" Flood	UV/Visible 8" Rotating stage	UV/Visible 3/16" Spot	UV/Visible 3/16" Spot
Maximum Lamp Intensity @ 365 nm **Intensity @ time of test @ 365 nm**	50 mW/cm^2 20 mW/cm^2	300 mW/cm^2 150 mW/cm^2	150 mW/cm^2 50 mW/cm^2	4,000 mW/cm^2 2,500 mW/cm^2	4,000 mW/cm^2 2,500 mW/cm^2
Adhesive Absorption Range (nm) **Equipment Output Range (nm)**	300-400 300-500	300-400 300-500	300-400 300-500	300-400 300-500	300-400 300-500
Typical Cure speed (seconds) **Fixture between glass slides** **Tack-free surface cure** **1/16-inch bead**	 2 10 12	 1 1 3	 1 8 10	 1 1 2	 1 1 2

The required intensity and cure time should be determined during the initial process validation stage. Factors that should be considered during process validation which can effect the adhesive cure rate and depth of cure include: part geometry, bond-gap size, percent light transmittance through the substrate at 365 nm, distance from the light source to the adhesive bond are, UV intensity and spectral output of the light source, the desired margin of safety to be built into the process, etc. For specific technical recommendations relating to the application, please call the DYMAX Technical Center at (860) 482-1010.

Secondary Heat Cure:

Heat may be used after UV cure to cure shadowed areas. The following guideline depends on the amount of adhesive.

Minimum Adhesive Bond Line Temperature	**Time**
120°C (250°F)	30 Minutes
150°C (300°F)	15 Minutes

STORAGE AND SHELF LIFE

Store material in cool, dark place when not in use. Do not expose to UV light or sunlight. Material may polymerize upon prolonged exposure to ambient light. Replace lid immediately after use. When stored below 90°F in the original, unopened container, the shelf life is six months, except for 3-mL and 5-mL packages sizes, which have a one-year shelf life.

DISPENSING AND HANDLING ADHESIVE

DYMAX OP-66-LS is available in 3-mL, 5-mL, 10-mL, and 30-mL manual or machine-ready syringes. It may be dispensed with a variety of automatic bench-top syringe applicators or other equipment as required. Direct questions relating to dispensing and curing systems for specific applications to the DYMAX Technical Center at (860) 482-1010.

SAFETY

Wear impervious gloves and/or barrier cream. Repeated or continuous skin contact with liquid adhesive will cause irritation and should be avoided. Do not wear absorbent gloves. Remove adhesive from skin with soap and water. Never use solvents to remove adhesive from skin or eyes.

CAUTION

For industrial use only. Avoid breathing vapors. Avoid contact with eyes and clothing. In case of contact, immediately flush with water for at least 15 minutes; get medical attention. Wash clothing before reuse. Keep out of reach of children. Do not take internally. If swallowed, induce vomiting at once and call a physician. Repeated or continuous skin contact with liquid adhesive will cause irritation and should be avoided. For specific information, refer to the product's Material Safety Data Sheet.

© 2004 DYMAX Corporation
The data contained in this bulletin is of a general nature and is based on laboratory test conditions. DYMAX does not warrant the data contained in this bulletin. Any warranty applicable to the product, its application and use is strictly limited to that contained in DYMAX's standard Conditions of Sale. DYMAX does not assume responsibility for test or performance results obtained by users. It is the user's responsibility to determine the suitability for the product application and purposes and the suitability for use in the user's intended manufacturing apparatus and methods. The user should adopt such precautions and use guidelines as may be reasonably advisable or necessary for the protection of property and persons. Nothing in this bulletin shall act as a representation that the product use or application will not infringe a patent owned by someone other than DYMAX or act as a grant of a license under any DYMAX Corporation Patent. DYMAX recommends that each user adequately test its proposed use and application before actual repetitive use, using the data contained in this bulletin as a general guide.

DYMAX Corporation - 51 Greenwoods Road - Torrington, CT 06790 - Phone: 860-482-1010 - Fax: 860-496-0608
E-mail: info@dymax.com - www.dymax.com

DYMAX Europe GmbH - Trakehner Strasse 3 - D-60487 Frankfurt am Main - Germany - Phone: 0049-69-7165-3568
Fax: 0049-69-7165-3830 - E-mail: dymaxinfo@dymax.de - www.dymax.de

DYMAX Adhesives and Light Curing Systems

DYMAX®, Light-Weld®, Light-Welder®, Multi-Cure®, Ultra Light-Weld®, *MEDI-CURE*® and MD® are trademarks of DYMAX Corporation