Low Shrink™ OP-61-LS
UV-Curable Positioning Optical Adhesive

INTRODUCTION

DYMAX high-performance optical adhesives cure upon exposure to UV or visible light in seconds. Because of their solvent-free and rapid-cure features, they increase productivity, lower assembly cost, and enhance worker safety. When cured with DYMAX spot, beam or flood lamps, they deliver optimum speed and performance for a variety of optical applications.

DESCRIPTION

DYMAX Low 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. DYMAX OP-61-LS offers very low shrinkage and improvement over OP-61, suggesting its use in the accurate positioning of lenses, prisms, fibers, and other optical components. OP-61-LS was designed not to move or shrink during UV curing. Laboratory tests show minimal movement during heat cycling. DYMAX OP-61-LS cures completely in seconds upon exposure to either UV or visible (blue) light. This product is in full compliance with the RoHS Directives 2002/95/EC and 2003/11/EC.

OP 60-LS is suggested for glass, metal, or plastics.
OP 61-LS is suggested for difficult-to-bond plated metals to glass.

SUBSTRATES BONDED:	**• Glass • Metal • Plastics**
FEATURES:	**• Low-to-No Movement from Curing** **• Low Movement During Thermal Excursions** **• Low Outgassing**
APPLICATIONS:	**• Lens and Prism Positioning**

TYPICAL UNCURED PROPERTIES (not specifications)

Solvent Content	None - 100% Solids	
Composition	Urethane (Meth) Acrylate	
Appearance	White to Off-White Paste	
Solubility	Alcohols/Ketones	
Flash Point	>93.3°C (200°F)	
Density	1.2 g/mL	ASTM D-1875
Viscosity (Brookfield, 25ºC, 20 rpm)	60,000 cP (nominal)	ASTM D-2556

TYPICAL CURED PROPERTIES (not specifications)

Linear Shrinkage	< 0.1% (during UV Cure)	ASTM D-2566
	< 0.1% (after 24 hr, 120°C)	ASTM D-2566
Tensile at Break	7,300 psi	ASTM D-638
Compression/shear, glass to glass	3,800 psi	
Elongation at Break	0.4 %	DSTM D-250*
Modulus of Elasticity	2,000,000 psi	ASTM D-638
Glass Transition, T_g	65°C	DSTM 256*
CTE α_1 (below T_g)	27 x 10^{-6} in/in/°C	ASTM E-831
CTE α_2 (above T_g)	120 x 10^{-6} in/in/°C	ASTM E-831
CTE (-50°C to 200°C)	74 x 10^{-6} in/in/°C	ASTM E-831
Durometer Hardness	D70	ASTM D-2240
Water Absorption (24 hr)	1.3 %	ASTM D-570
Thermal Limit (brittle/degrades)	-45° to 180°C (-50° to 350°F)	DSTM D-200*

* DSTM refers to DYMAX Standard Test Method

RoHS Compliant

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RECOMMENDED UV CURING SYSTEMS

Lamp	5000-EC	BlueWave™ 200
Light Type	UV/Visible	UV/Visible
Lamp Type	5" x 5" Flood	3/16" Spot
Maximum Lamp Intensity @ 365 nm	300 mW/cm^2	20000 mW/cm^2
Intensity @ time of test @ 365 nm	150 mW/cm^2	18000 mW/cm^2
Adhesive Absorption Range (nm)	300-500	300-500
Equipment Output Range (nm)	300-500	300-500
Typical Cure speed (seconds)		
Fixture between glass slides	1	<1
1/16 inch bead	<5	<5
Tack free surface cure	<5	1

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 affect the adhesive cure rate and depth of cure include: part geometry, bond-gap size, percent light transmittance through the substrate at 365 nm and/or 436 nm, distance from the light source to the adhesive bond area, UV and visible light 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 DYMAX Application Engineering.

STORAGE AND SHELF LIFE

Store the material in a cool, dark place when not in use. Do not expose to light. This product may polymerize upon prolonged exposure to ambient and artificial light. Keep covered when not in use. This material has a four-month shelf life from date of shipment, unless otherwise specified, when stored between 10˚C [50˚F] and 32˚C [90˚F] in the original, unopened container.

DISPENSING AND HANDLING ADHESIVE

This material may be dispensed with a variety of manual and automatic applicators or other equipment as required. Questions relating to dispensing and curing systems for specific applications should be referred to DYMAX Applications Engineering.

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 before use.

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