



OP-4-20655

Adhesive for Fiber Optical Assembly

APPLICATIONS

- Bonding and Laminating
- Fiber Optic Couplings

FEATURES

- Fast, Total Cure In Seconds with UV or Visible Light

RECOMMENDED SURFACES

- Glass
- Ceramics
- Plastics
- Metals

Dymax OP-4-20655 is a clear, low shrinkage, UV or visible light-curing adhesive. OP-4-20655 is very soft, shock absorbing, low modulus adhesive designed for thermal cycling of fragile optical components. 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. This product is in full compliance with the RoHS directives 2015/863/EU.

UNCURED PROPERTIES *

Property	Value	Test Method
Solvent Content	None - 100% Reactive Solids	N/A
Chemical Class	Urethane Acrylate	N/A
Appearance	Optically Clear	N/A
Solubility	Alcohols/Ketones/Chlorinated Solvents	N/A
Toxicity	Low	N/A
Flash Point	Over 93°C (>200°F)	N/A
Viscosity, cP	800 (nominal)	ASTM D1084
Shelf Life at Recommended Conditions from Date of Manufacture	18 months	N/A

OTHER CURED PROPERTIES *

Property	Value	Test Method
Refractive Index	1.480	ASTM D1218
Boiling Water Absorption, % (2 h)	2.4	ASTM D570
Water Absorption, % (25°C, 24 h)	0.7	ASTM D570
Linear Shrinkage, %	1.9	ASTM D2566
Tensile Compression Shear, Glass to Glass	200 psi	ASTM D250‡

CURED MECHANICAL PROPERTIES *

Property	Value	Test Method
Durometer Hardness	00-40	ASTM D2240
Tensile at Break, MPa [psi]	0.7 [100]	ASTM D638
Elongation at Break, %	250	ASTM D638
Modulus of Elasticity, MPa [psi]	1.4 [200]	ASTM D638
Glass Transition Tg, °C	-57	ASTM E831
Thermal Range (brittle/degrades)	-55 to +180°C (-65 to 350°F)	DSTM D200‡

* Not Specifications

N/A Not Applicable

‡ DSTM Refers to Dymax Standard Test Method

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CURING GUIDELINES

Fixture time is defined as the time to develop a shear strength of 0.1 N/mm² [10 psi] between glass slides. Actual cure time typically is 3 to 5 times fixture time.

Dymax Curing System (Intensity)	Fixture Time or Belt Speed ^A
5000-EC (200 mW/cm ²) ^B	1 s
2000-EC (50 mW/cm ²) ^B	2 s

^A Curing through light-blocking substrates may require longer cure times if they obstruct wavelengths used for light curing (320-400 nm for UV light curing, 320-450 nm for UV/Visible light curing). These fixture times/belt speeds are typical for curing thin films through 100% light-transmitting substrates.

^B Intensity was measured over the UVA range (320-395 nm) using a Dymax ACCU-CAL™ 50 Radiometer.

Full cure is best determined empirically by curing at different times and intensities, and measuring the corresponding change in cured properties such as tackiness, adhesion, hardness, etc. Full cure is defined as the point at which more light exposure no longer improves cured properties.

Dymax recommends that customers employ a safety factor by curing longer and/or at higher intensities than required for full cure. Although Dymax Application Engineering can provide technical support and assist with process development, each customer must ultimately determine and qualify the appropriate curing parameters required for their unique application.

OPTIMIZING PERFORMANCE AND HANDLING

1. This product cures with exposure to UV and visible light. Exposure to ambient and artificial light should be kept to a minimum before curing. Dispensing components including needles and fluid lines should be 100% light blocking, not just UV blocking.
2. All bond surfaces should be clean and free from grease, mold release, or other contaminants prior to dispensing the adhesive.
3. Cure speed is dependent upon many variables, including lamp intensity, distance from the light source, required depth of cure, bond gap, and percent light transmission of the substrate.
4. Oxygen in the atmosphere may inhibit surface cure. Surfaces exposed to air may require high-intensity UV light to produce a dry surface cure. Flooding the bond area with an inert gas, such as nitrogen, can also reduce the effects of oxygen inhibition.
5. Parts should be allowed to cool after cure before testing and subjecting to any loads.
6. In rare cases, stress cracking may occur in assembled parts. Three options may be explored to eliminate this problem. One option is to heat anneal the parts to remove molded-in stresses. A second option is to open the gap between mating parts to reduce stress caused by an interference fit. The third option is to minimize the amount of time the liquid adhesive remains in contact with the substrate(s) prior to curing.
7. Light curing generally produces some heat. If necessary, cooling fans can be placed in the curing area to reduce the heating effect on components.
8. At the point of curing, an air exhaust system is recommended to dissipate any heat and vapors formed during the curing process.

DISPENSING SUPPORT

The Dymax Application Engineering team is ready to discuss your application requirements to provide the most appropriate dispensing and/or spraying solution. Visit our current dispensing equipment portfolio [here](#) or consult our [global contact](#) phone numbers and online chat feature (available in North America only) during normal business hours for instant support.

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 shelf life is noted on page 1 of this document, when stored between 10°C (50°F) and 25°C (77°F) in the original, unopened container

CLEAN UP

Uncured material may be removed from dispensing components and parts with organic solvents. Cured material will be impervious to many solvents and difficult to remove. Cleanup of cured material may require mechanical methods such as ultrasonic bath, water jet, vacuum tweezers, air knife, and/or warming to aid in the removal.



GENERAL INFORMATION

This product is intended for industrial use only. Keep out of the reach of children. Avoid breathing vapors. Avoid contact with skin, eyes, and clothing. Wear impervious gloves. Repeated or continuous skin contact with uncured material may cause irritation. Remove material from skin with soap and water. Never use organic solvents to remove material from skin and eyes. For more information on the safe handling of this material, please refer to the Safety Data Sheet before use.

The data provided in this document are based on historical testing that Dymax performed under laboratory conditions as they existed at that time and are for informational purposes only. The data are neither specifications nor guarantees of future performance in a particular application. Dymax does not guarantee that this product's properties are suitable for the user's intended purpose.

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