

# NORLAND PRODUCTS INCORPORATED

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## Norland Optical Adhesive 65

Norland Optical Adhesive 65 ("NOA65") is a clear, colorless, liquid photopolymer that will cure when exposed to ultraviolet light. Since it is a one part system and 100% solids, it offers many advantages in bonding of optical materials where the bonding surface can be exposed to light. The use of NOA 65 eliminates premixing, drying and heat curing operations common to other optical adhesive systems. Curing time is remarkably fast, and is dependent upon the thickness applied and the amount of ultraviolet light energy available.

The cured adhesive is very flexible and was designed to minimize strain. NOA 65 is especially suitable where the adhesive cross section would be relatively thick. NOA 65 has enough elasticity to keep strain to a minimum even when dissimilar materials with different coefficients of expansion are bonded together. Typical applications would be potting of lenses in metal mounts, bonding plastic to glass and cold blocking.

NOA 65 is cured by ultraviolet light with a maximum absorption within the range of 350-380 nanometers. The recommended energy required for full cure is 4.5 Joules/sq. cm of long wavelength UV light. The polymer has minimum oxygen inhibition, and therefore any surfaces in contact with air will be non-tacky when fully cured.

For cleanup of the adhesive, acetone can be used if the cure has not progressed to far. If fully cured, methylene chloride can be used to soak assemblies apart.

<b>Typical Properties of NOA 65</b>	
Solids	100%
Viscosity at 25° C	1200 cps
Refractive Index of Cured Polymer	1.524
Elongation at Failure	80%
Modulus of Elasticity (psi)	20,000
Tensile Strength (psi)	1,500
Hardness - Shore D	50
Temperature Range	-15 to 60° C

Some of the light sources that can be used to cure the adhesive are sunlight, mercury lamps, and fluorescent blacklights.

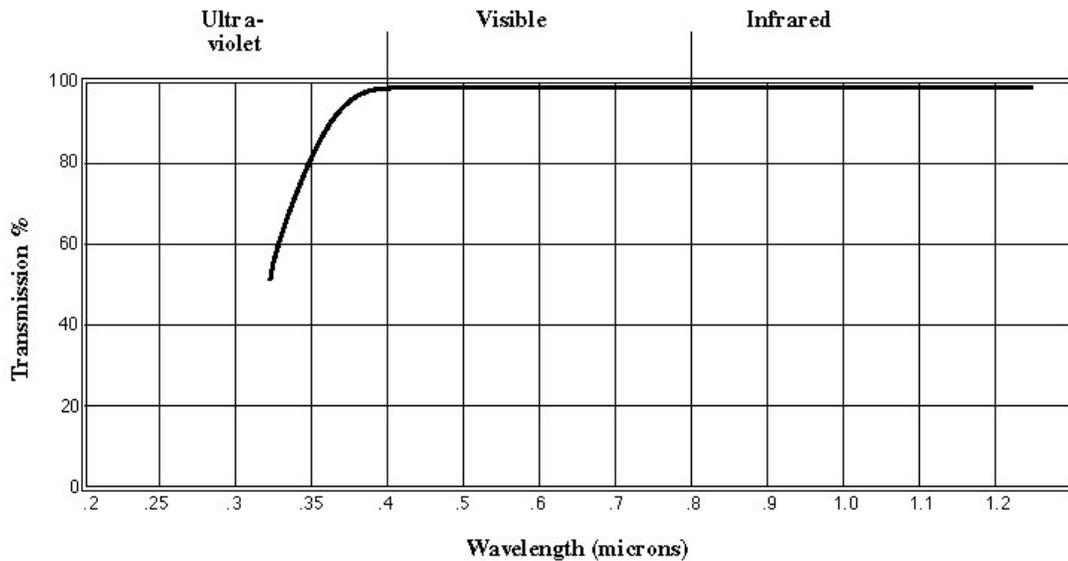
Typical Cure Times			
LIGHT SOURCE	FILM THICKNESS	PRECURE	FULL CURE
100 Watt Mercury* Spot Lamp at 6 inches	1-10 mil	15 seconds	5 minutes
2-15 Watt Fluorescent* Black Lights at 3 inches	1-10 mil	60 Seconds	20 minutes

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Shelf life of the liquid is at least 6 months from the date of shipment if stored in a cool (5-22° C), dark place in the original container. If refrigerated, allow the adhesive to come to room temperature prior to use.

Care should be taken in handling this material. The Material Safety Data Sheet should be read for this product as well as for any associated products such as alcohol, acetone or methylene chloride. Prolonged contact with skin should be avoided and affected areas should be thoroughly washed with copious amounts of soap and water. If the adhesive gets into the eyes, flush with water for 15 minutes and seek medical attention. Use the material in a well ventilated area, otherwise a NIOSH approved organic vapor mask is recommended.

### Spectral Transmission of NOA 65



The data contained in this technical data sheet is of a general nature and is based on laboratory test conditions. Norland Products does not warrant the data contained in this data sheet. Norland does not assume responsibility for test or performance results obtained by users. It is the users responsibility to determine the suitability for their product application, 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 technical data sheet shall act as a representation that the product use or application will not infringe a patent owned by someone other than Norland Products or act as a grant of a license under any Norland Products Inc patent. Norland Products recommends that each user test its proposed use and application before putting into production.