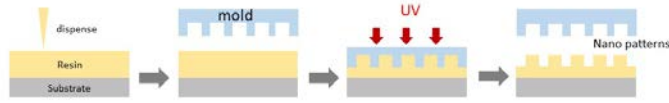




PR-1612

UV-Curable Optical Resin for Nano Imprint Lithography



PRODUCT DESCRIPTION:

- Base chemistry: acrylate, radical polymerization
- One component resin ready for use, solvent-free, UV curing

PRODUCT USE:

- Nano imprint Lithography
- Lens and prism bonding
- Optical brightness enhancement films.

FEATURES:

- High refractive index

UV CURING CONDITIONS: PR-1612 is required to cure in between two substrates, in nitrogen or in the absence of air.

- UV curing conditions: UV dose (mJ/cm² in nitrogen) >500
- Light sources:
 - * Metal halide/Mercury UV: UV-A (320-400 nm), intensity: 100-1,000 mW/cm²
 - * or LED-365 nm, UV light intensity: 100 to 1,000 mW/cm²

LED-365 nm		Metal Halide/Mercury(UV-A: 320-400 nm)	
UV intensity(mW/cm ²)	time (sec)	UV intensity(mW/cm ²)	time (sec)
100	10 to 20 sec	100	10 to 20 sec
or 200	5 to 10 sec	or 200	5 to 10 sec
or 400	3 to 5 sec	or 400	3 to 5 sec
or 500	2 to 4 sec	or 500	2 to 4 sec
or 1,000	1 to 3 sec	or 1,000	1 to 3 sec

TYPICAL PROPERTIES

Uncured resin

Viscosity at 25 °C, mPa.s or cps 1,650 – 1,800

Density (g/mL) 1.1

Cured film

Appearance of cured adhesive optically clear

Shrinkage (volume, %) 5

Glass transition temperature (DMA, °C) 60

Depth of cure > 1mm

Physical properties tested at 25°C, 50% RH (ASTM D638)

Tensile strength, MPa 25

Elongation (%) 20

Young's Modulus, MPa 900

Refractive index of cured film (25 °C)

@ 589 nm (D) 1.6116

@ 486 nm 1.6281

@ 656 nm 1.6047

Abbe Number at 25 °C (V_d) 26

GENERAL USAGE INFORMATION:

Shipment: no restriction on shipment

Storage: After receipt in black syringes or amber HDPE bottles, room temperature storage (15-30°C) in the original container is required.

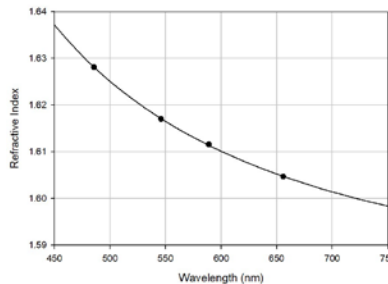
Shelf life (20 - 25°C): 6 months

Pot life or working life (20 - 25°C): 3 months

SAFETY AND HANDLING

The uncured adhesive can be cleaned with isopropyl alcohol (IPA), methyl ethyl ketone (MEK), acetone, or xylene. Avoid direct skin and eye contact. Use only in well ventilated areas. Use protective clothing, gloves and safety goggles. Read [Safety Data Sheet](#) before handling.

PR1612 Refractive Index at 25 °C



The data was fit to a one-term Sellmeyer Equation to give the following function where n is the refractive index and X is the wavelength in microns (μm)

$$n = (1 + (1.4924 * (x^2)) / ((x^2) - 0.02264))^{0.5}$$

Operating temperature (cured film), °C: -40 to 110

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PR-1612 Viscosity

The viscosity is described by the following function

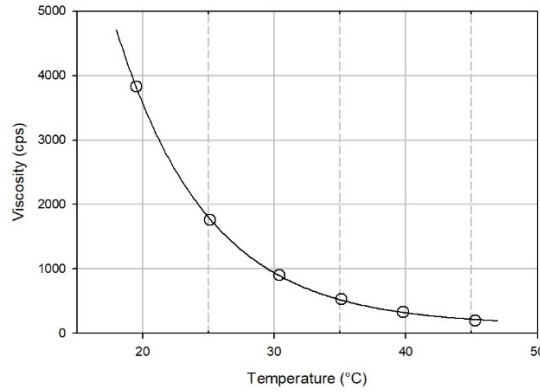
$$\eta = 124.2 + (60,910) \cdot \text{EXP}(-0.1437 \cdot T)$$

where η is the viscosity in cps and T is the temperature in °C.

Table. Observed and Calculated Viscosity of PR-1612 versus Temperature

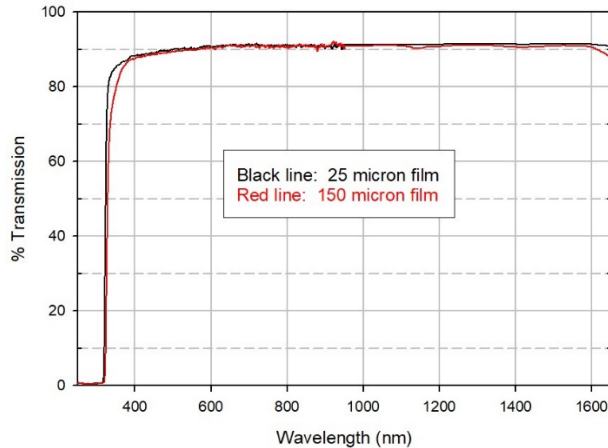
Temperature (°C)	η obsd (cps)	η calcd (cps)
19.5	3823	3820
25.1	1761	1777
30.4	905.1	896.0
35.1	530.2	517.0
39.8	329.1	324.1
45.3	198.8	214.9

PR-1612 Viscosity vs Temperature Plot



UV-VIS and NIR spectra:

PR1612 Free-Standing Films
air reference, no correction for surface reflection



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