



# LuxNIL® P270-U (old name P270)

## High refractive index UV curable dispersion in PGMEA

**FEATURES:** High Refractive Index, EXCELLENT adhesion to plastic and glass substrates, OPTICALLY Clear

### PRODUCT DESCRIPTION:

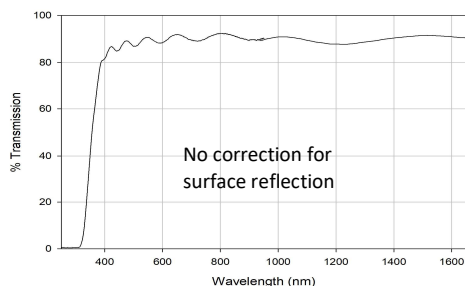
- LuxNIL® P270-U is a UV-curable inorganic organic dispersion in PGMEA suitable for AR/VR/MR applications.
- Base chemistry: Inorganic nano particles in acrylate binder.

### PRODUCT USE:

- Diffractive Optical Elements (DOE)
- AR/VR/MR
- Photo Nano-Imprint Lithography (P-NIL)

### LuxNIL® P270-U UV-VIS and NIR spectra:

Thickness: 1 micron, no correction for surface reflectance



### GENERAL USAGE INFORMATION:

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

### APPLICATION NOTES:

#### PROCESS:

- 1) Coating step for film forming: LuxNIL® P270-U is used as a nano imprint lithography resin. LuxNIL® P270-U can be applied by spin coat, roll coat, ink-jetting, etc.
- 2) Solvent removing step: after coating, heat is applied at 80 to 100 °C for 60 sec to remove PGMEA.
- 3) Nano-imprint-lithography: replication of nano features with a working stamper is conducted.
- 4) UV cure: UV cure to fix the nano features.
- 5) Working stamp is removed.
- 6) Final heat conditions at 150 °C for 4 hrs after imprint step will help remove all residual solvent and full refractive index can be obtained.

**Coating thickness for LuxNIL® P270-U:** 500 to 2000 nm

**PRE-CURE (for solvent removal):** 80 to 100 °C for 60 sec

#### UV CURING CONDITIONS:

\*Metal halide/medium or high Mercury UV: UV-A (320-400 nm), intensity: 100-1,000 mW/cm<sup>2</sup>

\*or LED-365 nm, UV light intensity: 100 to 1,000 mW/cm<sup>2</sup>

LuxNIL® P270-U should be cured between two substrates or in an inert atmosphere. If cured in air, the integrity of the film is reduced.

**RECOMMENDED UV Conditions:** LED-365 nm, 250 mW /cm<sup>2</sup> x 100 sec. Cure is done between 2 substrates or in an inert atmosphere.

### TYPICAL PROPERTIES

#### Uncured resin

Solid content:	50%
Viscosity at 25 °C, mPa.s or cps	2-4
Shelf life (20 - 30°C):	6 months
Pot life or working life (20 - 30°C):	3 months

#### Cured film

Shrinkage (volume, %)	<1
Glass transition temperature (tan delta DMA)	110°C

#### Refractive index of cured film (25 °C)

@589 nm	1.71
Abbe No (V <sub>d</sub> )	19

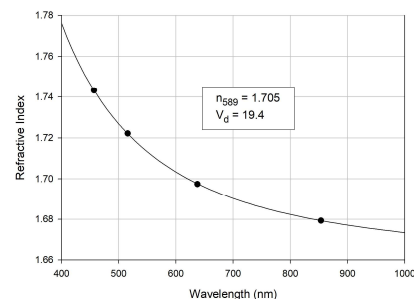
#### LuxNIL® P270-U optical properties

#### LuxNIL® P270-U RI vs wavelength

Properties	LuxNIL®P270-U
n <sub>589</sub>	1.71
Transmission* <sup>§</sup>	89%
Haze*	0.2%
Clarity*	100%

\*1 micron film on borosilicate glass.

§No correction for surface reflection



Operating temperature:

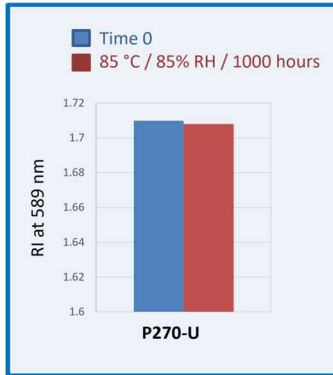
-40 to 100 °C

#### PROCESS FLOW

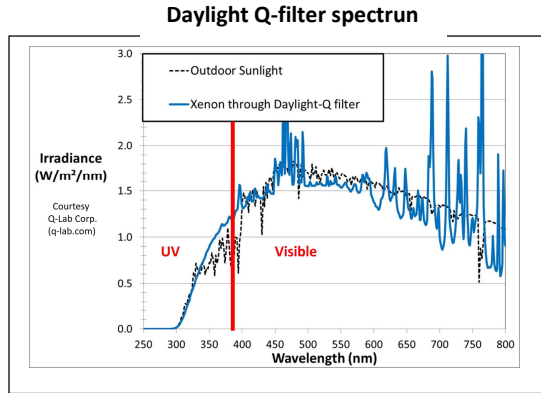




### LuxNIL® P270-U high heat and high humidity reliability study

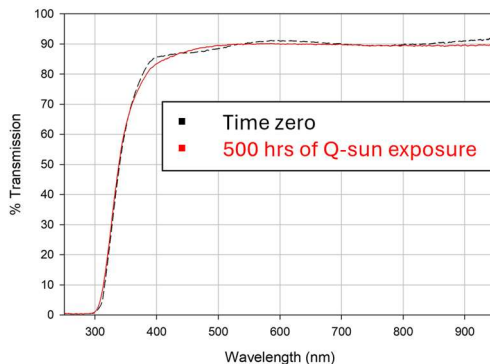


### LuxNIL® P270-U UV-VIS and NIR spectrum for Q-Sun exposure study with Xenon arc through Daylight-Q filter:

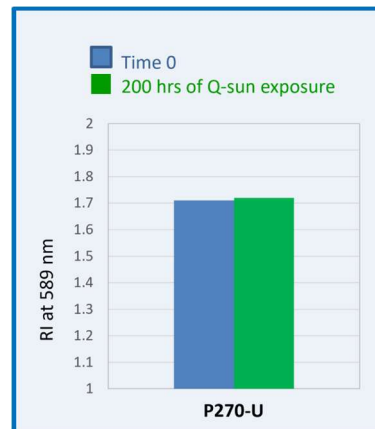


**Q sun testing conditions:**  
 300 – 400 nm (UV): 41.5 W/m<sup>2</sup>  
 300 – 800 nm (UV + Visible) 365 W/m<sup>2</sup>  
**2X average sunlight on Earth.**

### LuxNIL® P270-U spectra, ca 1 micron on glass no correction for surface reflection



### LuxNIL® P270-U, 1 micron on glass open exposure



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