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

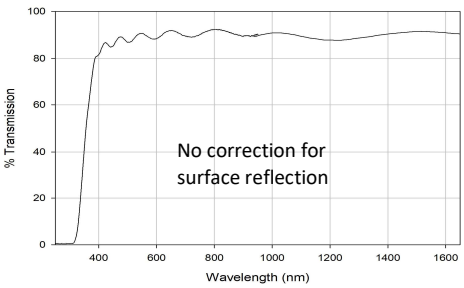
PRODUCT DESCRIPTION:

- 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.

TYPICAL PROPERTIES

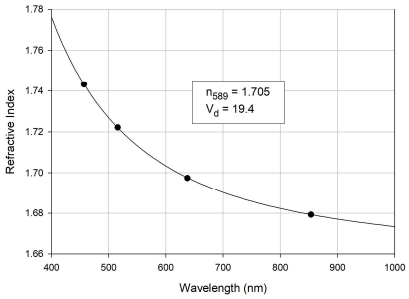
Uncured resin	
Solid content:	50%
Viscosity at 25 °C, mPa.s or cps	2-4
Shelf life (20 - 30°C):	6 months
Pot life or working life (20 - 30°C):	3 months
Cured film	
Shrinkage (volume, %)	<1
Glass transition temperature (tan delta DMA)	110°C
Refractive index of cured film (25 °C)	
@589 nm	1.71
Abbe No (V_d)	19

LuxNIL® P270-U optical properties

Properties	LuxNIL®P270-U
n_{589}	1.71
Transmission*§	89%
Haze*	0.2%
Clarity*	100%

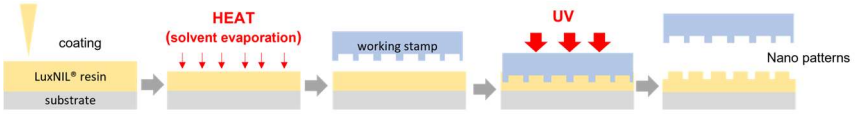
*1 micron film on borosilicate glass.
§No correction for surface reflection

LuxNIL® P270-U RI vs wavelength



Operating temperature: -40 to 100 °C

PROCESS FLOW



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^2
*or LED-365 nm, UV light intensity: 100 to 1,000 mW/cm^2
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^2 x 100 sec**. Cure is done between 2 substrates or in an inert atmosphere.

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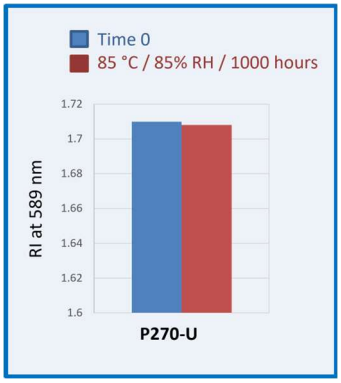
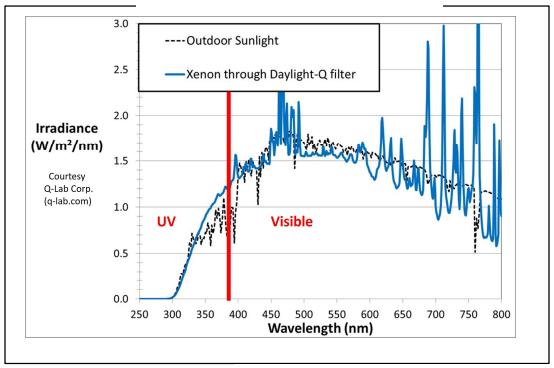
LuxNIL® P270-U high heat and high humidity reliability study



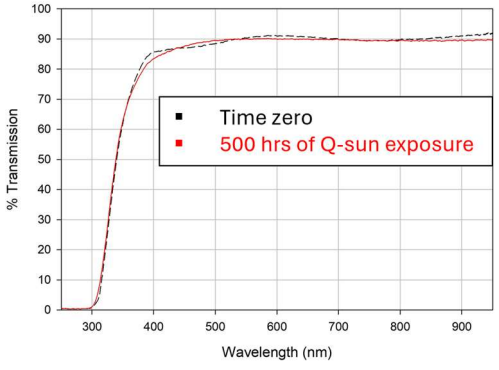
LuxNIL® P270-U UV-VIS and NIR spectrum for Q-Sun exposure study with Xenon arc through Daylight-Q filter:

Daylight Q-filter spectrun



Q sun testing conditions:
300 – 400 nm (UV): 41.5 W/m^2
300 – 800 nm (UV + Visible) 365 W/m^2
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