

P-NIL (Photo Nano-Imprint Lithography) Resins

For Hybrid, Monolithic or Wafer-Level -Optics Lens, and Micro-Array Lens

- Acrylate resins
- Spin-coating, Gravure Coating, Ink-jet
- Optically Clear
- UV-NIL Resins Refractive index: 1.515 to 1.602 @ 589 nm
- Photo-NIL Resins UV-cure, suitable for solder reflow

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• Easy to process



P-NIL Resins for Lenses

Resin	Viscosity (cps) at 25 °C	Tg (°C)	RI (25 °C, 589 nm) cured film
L2002-C42	2,600 – 3,000	150	1.515
L2007	8,000 - 10,000	109	1.567
L2061-B	1,800 - 2,200	130	1.602



Refractive Index vs. Wavelength

Refractive Indices of cured films

L2002-C42

L2007

L2061-B

L2002-C42 film refractive index at 25 °C

Refractive Index of L2007 at 25 °C

L2061-B Refractive Index at 25 °C





Optically Clear Films

L2002-C42

L2007

L2002-C42 125 micron free-standing film air reference, no correction for surface reflection

L2007, 60 micron free-standing film air reference, no correction for surface reflection

% Transmission % Transmission Transmission % Wavelength (nm) Wavelength (nm) Wavelength (nm)

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L2061-B

L2061-B, 125 micron free-standing film Air reference, no correction for surface reflection



Results after 1000 hrs of 85 °C, 85% Relative humidity: Optically clear - excellent, no delamination, no cracking, good candidates for electronics and automotive applications.

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Thermal Shock Studies Thermal Shock: 150 °C / -40 °C, 1 cycle = 30 minutes at each temp

L2002-C42 1000 cycles

L2007 1000 cycles

L2061-B 1000 cycles

L2002-C42 50 micron on Gorilla Glass air reference, no correction for surface reflection L2007 50 micron on Gorilla Glass air reference, no correction for surface reflection

L2061B 50 micron on Gorilla Glass air reference, no correction for surface reflection



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Conclusions

- ACW P-NIL resins for lens applications have good adhesion to glass under both heat/humidity conditions and thermal shock conditions. ACW offers a wide range of refractive indices for ease of lens design.
- ACW P-NIL resins offer excellent optical clarity against heat/humidity and thermal shock conditions.
- The excellent resistance against heat/humidity and thermal shock conditions of ACW P-NIL lens resins make them suitable for many types of electronic applications including lenses for modules or sensors for automotive use.