

Product Information

# INFINAM® RG 2001 L

## Phisible

CLEAR AND TOUGH PHOTOPOLYMER FOR ADDITIVE MANUFACTURING



INFINAM® RG 2001 L resin is a clear, fast-curing and easy to process (1-part system) liquid photopolymer formulation optimized for digital light processing (DLP) at 405 nm. The fully cured material exhibits excellent mechanical properties (high toughness) and low water absorption.

### Storage conditions

INFINAM® RG 2001 L resin is a light-sensitive product protected by its original packaging. Store product in a dry location with optimum storage temperature of 10–30 °C. Storage beyond this recommended temperature range can adversely affect both print and product properties. Exposure of the liquid formulation to daylight and especially UV light should be minimized during storage and handling to ensure consistent print quality.

### Statement on reported properties

The values reported in this document are derived from printing various parts with one specific bottom-up DLP machine, and follow the recommended procedures as detailed in this document. Those values reflect an approximation of the mean value given as a range of values and are intended for reference and comparison purposes only. Using different printers, post processing, or not following the material handling recommendations as indicated might lead to different values.

Mechanical Properties	Value	Unit	Test Standard
Tensile Modulus	2100 ± 100	MPa	ASTM D638
Ultimate Tensile Strength	50 ± 10	MPa	ASTM D638
Elongation at Break	45 ± 10	%	ASTM D638
Flexural Modulus	2050 ± 50	MPa	ASTM D790
Flexural Stress at 5% Strain	85 ± 3	MPa	ASTM D790
Izod Notched Impact	30 ± 5	J/m	ASTM D256
Charpy Notched Impact Strength	2.9 ± 0.3	kJ/m²	ISO 179

Note: Tensile bars were tested with Type V specimen at 10 mm/min

Thermal Properties	Value	Unit	Test Standard
Heat Deflection Temperature, 0.455 MPa/66 psi	82 ± 5	°C	ASTM D648
Glass Transition Temperature (tanδ)	117	°C	ASTM D4065

Physical Properties	Value	Unit	Test Standard
Liquid Viscosity, 25 °C / 1 Hz	1710 ± 100	mPa.s	ASTM D4287
Shore D Hardness	84	–	ASTM D2240
Water Absorption (24 h)	0.39	%	ASTM D570
Water Absorption (7 days)	0.79	%	ASTM D570

Biocompatibility	Result	Test Standard
Cytotoxicity	Passed	ISO 10993-5
Skin Irritation (in-vitro method)	Passed	ISO 10993-23

Optical Properties	Value	Unit	Test Standard
Transmittance	98	%	ASTM E1348
Haze (C)	70	–	ASTM D1003
L*	98.53	–	ASTM E1348
a*	0.16	–	ASTM E1348
b*	1.52	–	ASTM E1348
C* (C)	1.53	–	ASTM E308
h (C)	84.25	–	ASTM E308

## Material handling recommendations

### Resin preparation

- Shake the bottle of **INFINAM® RG 2001 L** for ca. 30 sec until the material is homogenous before filling into the printer
- The resin needs to be bubble free prior to printing: allow the resin to rest before printing in order to allow air bubbles to dissipate (prior degassing of the resin can help to expedite this process)

### Print settings

- INFINAM® RG 2001 L** is designed to print optimally on digital light processing (DLP) and LCD machines at 405 nm (see table below for exposure time)
- At 405 nm: Critical exposure energy  $E_c = 6\text{--}9 \text{ mJ/cm}^2$  – Depth of penetration  $D_p = 300\text{--}400 \text{ }\mu\text{m}$
- It is advisable to use standard separation speed (e.g. peeling and separation speed of 2–3 mm/s)

Wavelength (nm)	Intensity (mW/cm <sup>2</sup> )	Layer thickness (μm)	Burn-in exposure time (s)	Layer exposure time (s)
405	11	100	3	2

### Support structures settings

- INFINAM® RG 2001 L** is designed to be printed with support contact size of 0.2–0.5 mm for easy support removal from printed parts
- For complex geometries, lattice support structure is recommended to ensure high print success rate

### Washing procedure

- Wash printed parts with isopropanol (IPA) to remove uncured resin and use compressed air to accelerate the removal of residual solvent from the surface of the parts (for better surface finish, parts can first be washed with tri(propylene glycol) methyl ether, followed by a quick wash with isopropanol)
- Recommended wash cycles: rinse 2–3 times (each rinse for 1–2 min) until excess resin has been completely removed
- Let the parts dry for at least 30 min before the next post-processing step
- Contact with washing fluids like IPA should be minimized, as prolonged immersion or sonication of the uncured parts may result in loss in the mechanical properties: do not exceed more than 10 min total exposure to IPA
- When support structures are used, they should typically be removed before post-curing

### Post-curing procedures

- After washing, the parts should be post-cured in order to achieve specified properties
- Below is our recommended procedure (it is recommended to flip printed parts once during UV-curing):

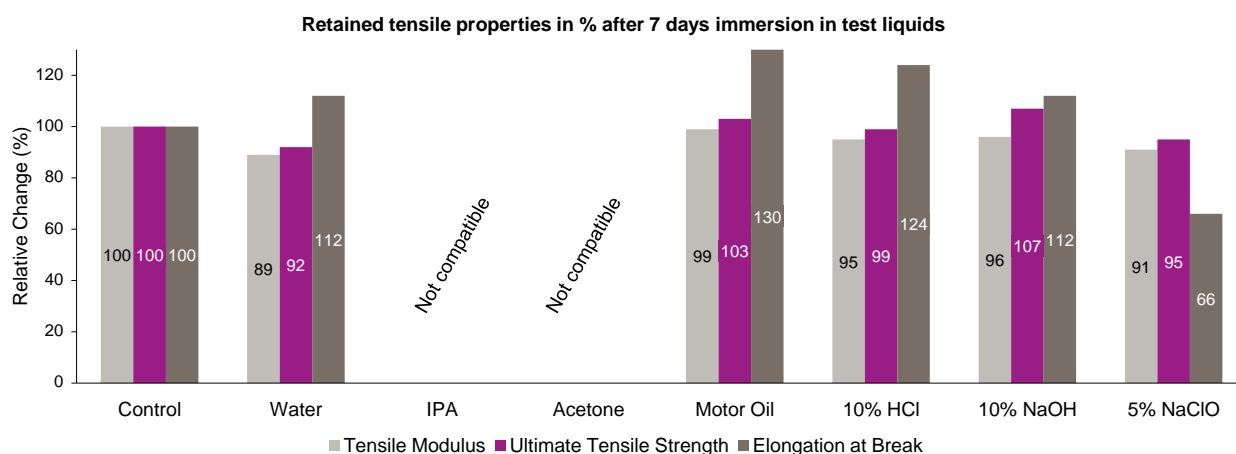
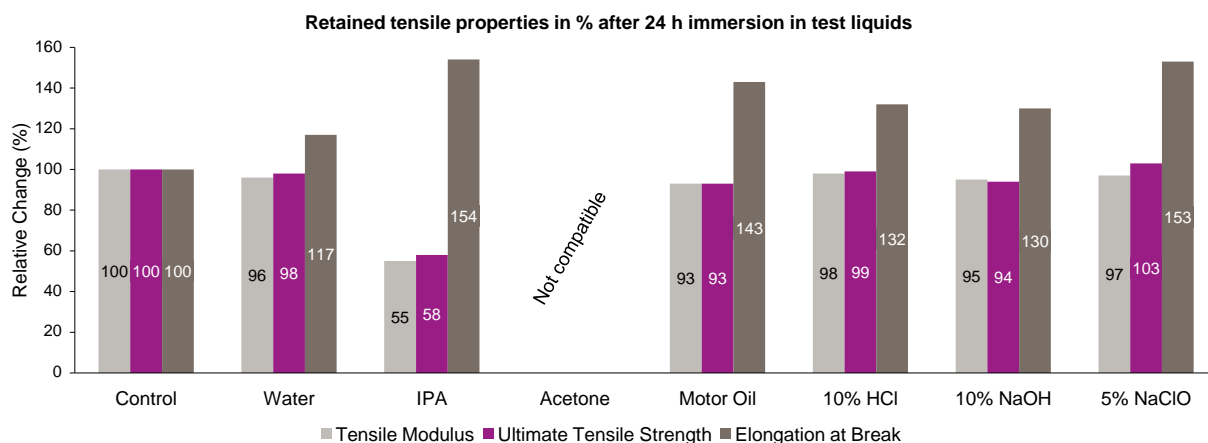
Method	UV-curing	Thermal-curing
Option 1	405 nm lamp (LED, 40 W) at 80 °C for 120 min	80 °C for 180 min

Note: TDS values with their ranges, as reported in this document, were obtained following **Option 1** with minimal exposure to IPA (using wipes wetted with IPA).

- It is possible to obtain higher clarity of finished parts by using mechanical polishing/tumbling, potentially followed by varnishing

## Chemical resistance

INFINAM® RG 2001 L was tested for solvent compatibility following standard ASTM D543. Tensile specimens were immersed in various liquid media for either 24 hours or 7 days (see charts below) and tested following ASTM D638.



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