Product Information

INFINAM® RG 3101 L

Phabulous

HIGHLY VERSATILE AND TOUGH PHOTOPOLYMER FOR ADDITIVE MANUFACTURING

INFINAM® RG 3101 L resin is a black-colored easy to process (low viscosity, 1-part system) liquid photopolymer formulation. The fully cured material exhibits excellent mechanical and thermal properties (high impact strength combined with high temperature resistance).

Storage conditions

INFINAM® RG 3101 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 ± 200	MPa	ASTM D638
Ultimate Tensile Strength	52 ± 5	MPa	ASTM D638
Elongation at Break	30 ± 10	%	ASTM D638
Flexural Modulus	2100 ± 40	MPa	ASTM D790
Flexural Stress at 5% Strain	82 ± 2	MPa	ASTM D790
Izod Notched Impact	45 ± 5	J/m	ASTM D256
Charpy Notched Impact Strength	4 ± 1	kJ/m²	ISO 179

Note: Tensile bars were tested with Type V specimen at 1 mm/min

Thermal Properties	Value	Unit	Test Standard
Heat Deflection Temperature, 0.455 MPa/66 psi	80 ± 3	°C	ASTM D648
Heat Deflection Temperature, 1.82 MPa/264 psi	60 ± 2	°C	ASTM D648
Glass Transition Temperature (tanδ)	106 ± 3	°C	ASTM D4065
Coefficient of Thermal Expansion (CTE) (35-95 °C)	155	µm/(m.K)	ISO 11359-2

Physical Properties	Value	Unit	Test Standard
Liquid Density, 25 °C	**1.07**	g/cm³	ASTM D4052
Liquid Viscosity, 25 °C / 1 Hz	**1700 ± 250**	mPa.s	ASTM D4287
Shore D Hardness	**80 ± 2**	–	ASTM D2240
Water Absorption (24 h)	**0.9**	%	ASTM D570
Water Absorption (7 d)	**1.7**	%	ASTM D570
Poisson's Ratio	**0.44**	–	ISO 527

Electrical Properties	Value	Unit	Test Standard
Dielectric Constant @ 100 Hz	**4.7**	–	ASTM D150
Dielectric Constant @ 1 MHz	**4.1**	–	ASTM D150
Dissipation Factor @ 100 Hz	**0.023**	–	ASTM D150
Dissipation Factor @ 1 MHz	**0.038**	–	ASTM D150
Dielectric Strength	**27**	kV/mm	IEC 60243-1
Volume Resistivity	**3.0 E15**	Ohm.cm	ASTM D257
Surface Resistivity	**6.8 E14**	Ohm	ASTM D257
CTI, test solution A, 50 drops value	**600**	–	IEC 60112

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

Burning Behavior	Value	Unit	Test Standard
Burning Behavior at 3.2 mm	**HB**	class	UL 94
Burning Behavior at 1.6 mm	**HB**	class	UL 94
Glow Wire Flammability Index (GWFI) at 1.5 mm	**625**	°C	IEC 60695-2-12
Glow Wire Ignition Temperature (GWIT) at 1.5 mm	**650**	°C	IEC 60695-2-13

Material handling recommendations

Resin preparation

- Shake the bottle of **INFINAM® RG 3101 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 3101 L** is designed to print optimally on digital light processing (DLP) and LCD machines at 385 or 405 nm (see table below for exposure time)
- At 405 nm: Critical exposure energy Ec = 10 mJ/cm² – Depth of penetration Dp = 180 µm
- It is advisable to use standard separation speed (e.g. peeling and separation speed of 2–4 mm/s)

Wavelength (nm)	Intensity (mW/cm²)	Layer thickness (µm)	Burn-in exposure time (s)	Layer exposure time (s)
385	9	100	**7**	**4**
385	9	50	**5**	**3**
405	11	100	**7**	**4**
405	11	50	**5**	**3**

Support structures settings

- **INFINAM® RG 3101 L** is designed to be printed with support contact size of 0.3–0.5 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
- 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

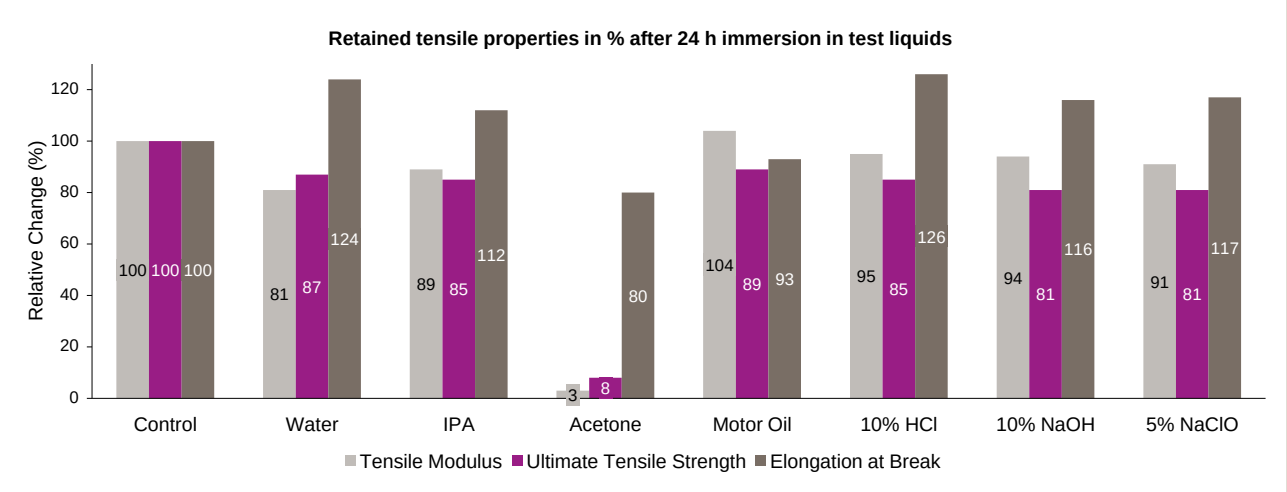
- After washing, the parts should be post-cured in order to achieve specified properties
- Below are two recommended procedures (it is recommended to flip printed parts once during UV-curing):

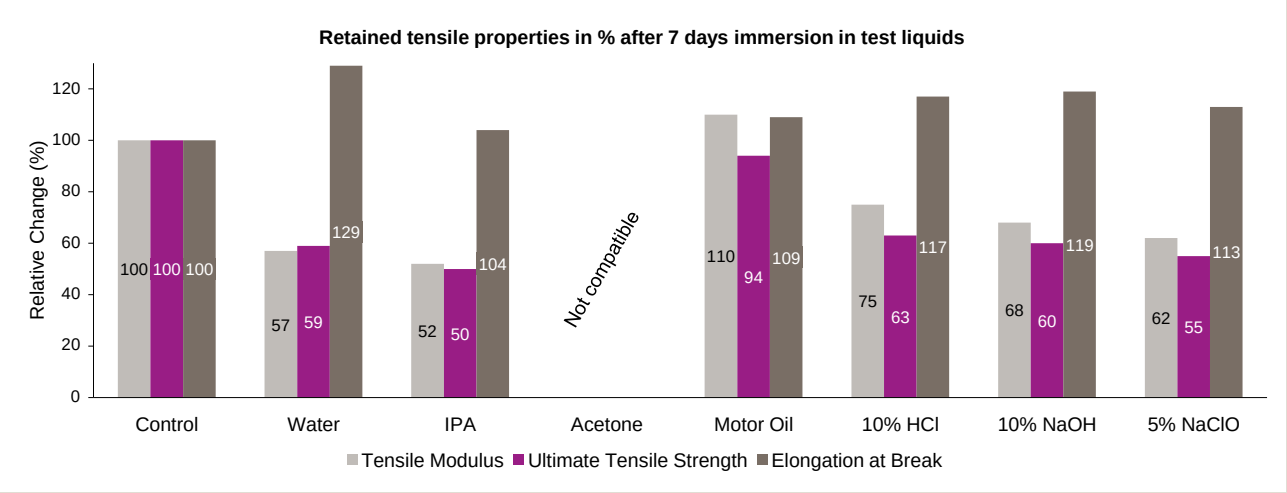
Method	UV-curing	Thermal-curing
Option 1	405 nm lamp (LED, 40 W) at 80 °C for 120 min	80 °C for 180 min
Option 2	Broad-spectrum lamp (metal-halide, 400 W) for 30 min	–

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). In **Option 2**, thermal-curing is induced in the post-curing apparatus due to the high intensity of the lamp, although temperature control is not possible.

Chemical resistance

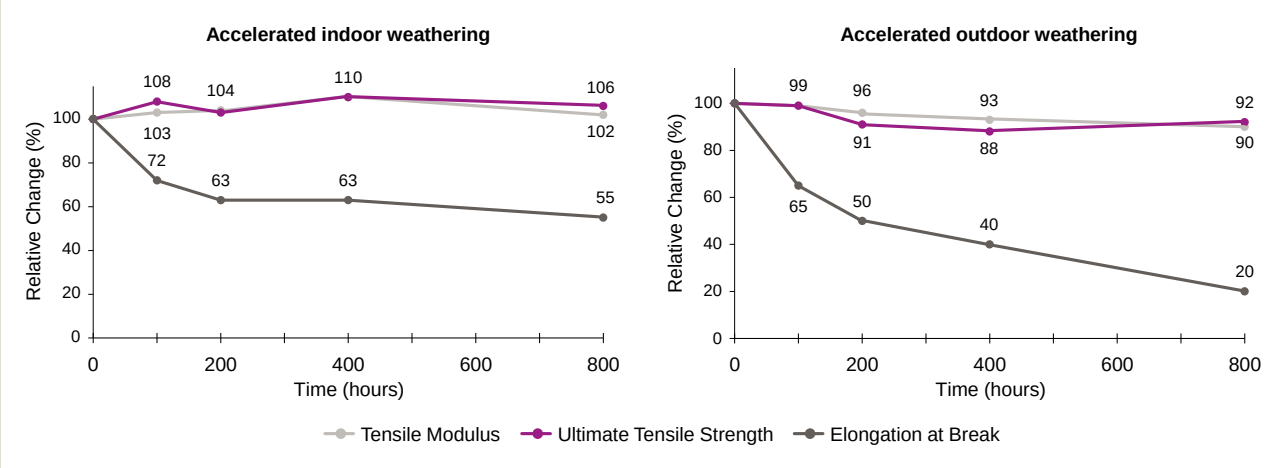
INFINAM® RG 3101 L was tested for solvent compatibility following standard ASTM D543. Tensile specimens were immersed in various liquid media for either 24 hours or 7 days (see charts below) and tested following ASTM D638.

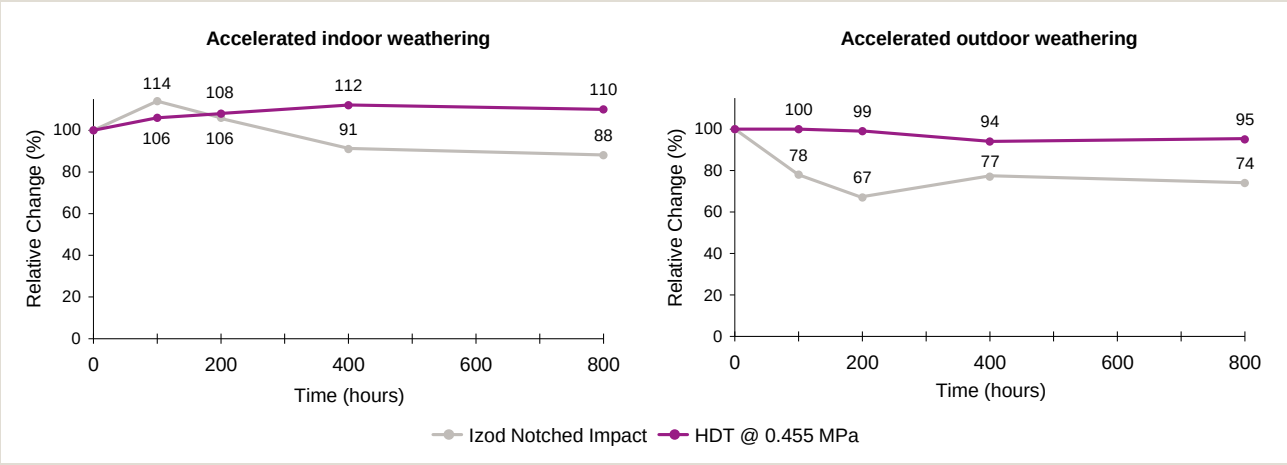




Long term environmental stability

INFINAM® RG 3101 L was tested for its stability towards indoor and outdoor weathering conditions. The method is intended to reproduce the weathering effects that occur when the material is exposed to either solar radiation through glass (indoor conditions, ASTM D4459, Q-Sun) or to sunlight and moisture as rain or dew (outdoor conditions, ASTM G154, Cycle 1, QUV).





Note: For the indoor method, it is possible to infer that accelerated weathering times of 400 and 800 hours correspond to ca. 5 and 10 years of ageing in normal conditions, respectively. For the outdoor method, it is possible to infer that accelerated weathering times of 400 and 800 hours correspond to ca. 8 and 16 months of ageing in normal conditions, respectively.

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