

VPP Photopolymers for Optics and Photonics Development

Wavelength-, thickness-, cure- and method-specific characterization with final-device boundaries

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Highlights

- Refractive index and transmission identify wavelength, temperature, thickness, cure state and method.
- Feature size, lateral resolution, voxel size and roughness are kept distinct.
- Clear appearance does not establish suitability across a detection band.
- Monomer-free and SDS classification do not establish finished-device biological suitability.
- Medical optical devices require ISO 10993-1:2025 risk-based evaluation where relevant.

Abstract

Optical and photonic development requires quantitative characterization of the exact printed and post-cured system.

Every index, transmission, feature-size or optical-loss statement identifies wavelength, specimen thickness, cure/conditioning and method. Nanoscale figures are retained only with a named route, pattern, metrology and source.

Monomer-free configurations and hazard classification are reported from controlled documents. Biological suitability remains a final-device and intended-contact question.

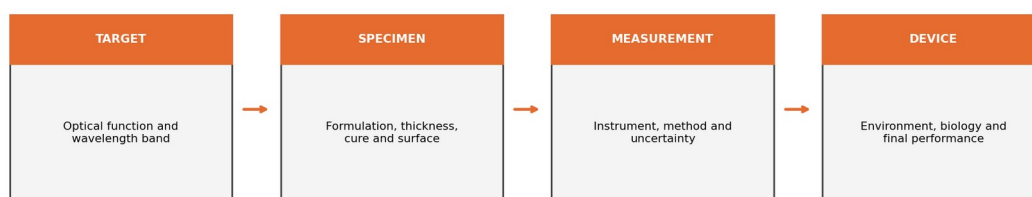
Keywords optics · photonics · refractive index · transmission · resolution · optical loss

Source use. Product evidence is in [1]; optical methods in [2–4]; biological and OSS controls in [5–6].

1. Optical measurement record

The record defines wavelength/spectrum, specimen thickness, surface finish, cure, temperature, instrument, calibration and uncertainty.

- Measure dispersion where relevant.
- Report haze/scattering and loss.
- Distinguish clear from quantified transmission.



Release requires traceable evidence at every gate; a catalogue label cannot bypass the chain.

Figure 1. WP-46 evidence gates from controlled material description to final acceptance.

2. Lithographic/metrology scope

Feature size, voxel, lateral resolution and roughness use distinct definitions. Values require exact print route, test pattern and measurement.

- State acceptance definition.
- Avoid universal nanoscale claims.
- Link source beneath figures.

3. Device/biological boundary

SDS pictograms, monomer-free composition and a cytotoxicity result do not establish overall biological suitability of an optical device.

4. Minimum controlled evidence before release

Control field	Required record	Release interpretation
Target	Optical function and wavelength band	Catalogue description only until evidence is linked
Specimen	Formulation, thickness, cure and surface	Control process variables and change triggers
Measurement	Instrument, method and uncertainty	Report method, result, uncertainty and limits
Device	Environment, biology and final performance	Apply final acceptance and responsibility boundary



Description ≠ measured result ≠ certification or finished-device approval

Figure 2. WP-46 separates catalogue positioning, measured evidence and final application decisions.

KEY INSIGHT

Precise product or application language is retained only when the exact formulation, method, processed specimen and controlled evidence can be traced.

5. Limitations

- Absolute safety wording is removed.
- Clear is not quantified optical performance.
- Nanoscale values require route-specific metrology.
- One biological endpoint is not overall biocompatibility.
- Final optical-device validation remains required.

6. Conclusions

- Refractive index and transmission identify wavelength, temperature, thickness, cure state and method.
- Feature size, lateral resolution, voxel size and roughness are kept distinct.
- Medical optical devices require ISO 10993-1:2025 risk-based evaluation where relevant.
- This corrected candidate remains local and on HOLD until series-wide scientific, metadata and visual release checks are complete.

Revision note

Version 5.5 removes absolute safety and pictogram-based biological implications, separates optical quantities and requires exact wavelength, thickness, cure, route and metrology.

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Disclosure. Dr. Juan Segurola is founder and Scientific Director of 3Dresyns by Resyner Technologies S.L., the supplier of the materials discussed.

References

- [1] 3Dresyns. Current optical-product TDS and controlled optical/metrology reports.
- [2] ISO 489:2022. Plastics—Determination of the refractive index.
- [3] ISO 13468 series. Plastics—Determination of total luminous transmittance of transparent materials.
- [4] ISO 14782:2021. Plastics—Determination of haze for transparent materials.
- [5] ISO 10993-1:2025. Biological evaluation of medical devices—Part 1.
- [6] 3Dresyns WP-19. Optical Selection System, corrected candidate.