

Colour Stability and Light Fastness in VPP Printed Systems

Distinguishing manufacturer positioning from measured and certified performance

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Highlights

- Colour stability is a property of the complete cured system and exposure history.
- Portfolio descriptions are qualitative manufacturer positioning unless a comparative report is cited.
- Numerical claims require exact colour, host resin, dose, print, post-cure and exposure conditions.
- Food-contact, dental or biomedical suitability is assessed for the final article.
- Testing is not automatically certification and TDS values are not automatically certified.

Abstract

Colour stability depends on the complete cured system, substrate, processing and exposure history, not on the colour additive alone.

The portfolio provides qualitative manufacturer positioning for colour families. Numerical light-fastness or colour-difference values require controlled testing of the exact colour, host, dosage, print, post-cure and environmental conditions.

Measured results are distinguished from certification. Food-contact, dental and biomedical suitability require final-article assessment; a product name does not establish those outcomes.

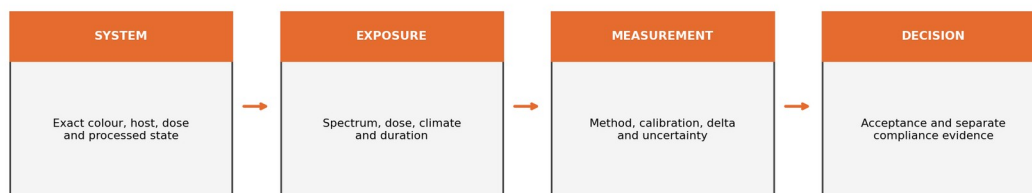
Keywords colour stability · light fastness · colour difference · ageing · VPP · exposure

Source use. Product evidence is controlled in [1]; colour and ageing methods in [2–4]; dental scope and cross-paper controls in [5–6].

1. Exposure and measurement record

A report defines exposure spectrum, irradiance, temperature, humidity, duration, substrate, specimen geometry, conditioning and colour-difference method.

- Use baseline and time-resolved measurements.
- Report instrument geometry and calibration.
- State uncertainty and acceptance criterion.



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

Figure 1. WP-25 evidence gates from controlled material description to final acceptance.

2. Formulation and post-cure effects

Host resin, pigment/dye, concentration, dispersion, cure, post-cure and residual reactive species can affect colour stability. Comparative statements require direct data on the named systems.

- Do not infer lower yellowing from chemistry labels alone.
- Use validated post-curing language.
- Recheck optical and dimensional performance after ageing.

3. Application boundary

Fastness testing does not establish food-contact, dental or biological suitability. Those decisions require applicable final-article evidence and legal scope.

4. Minimum controlled evidence before release

Control field	Required record	Release interpretation
System	Exact colour, host, dose and processed state	Catalogue description only until evidence is linked
Exposure	Spectrum, dose, climate and duration	Control process variables and change triggers
Measurement	Method, calibration, delta and uncertainty	Report method, result, uncertainty and limits
Decision	Acceptance and separate compliance evidence	Apply final acceptance and responsibility boundary

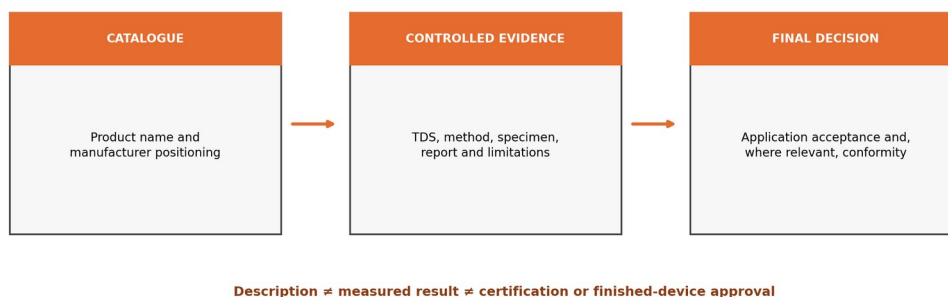


Figure 2. WP-25 separates catalogue positioning, measured evidence and final application decisions.

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

- Manufacturer positioning is not measured performance.
- TDS values are not automatically certified.
- One exposure does not cover all service environments.
- Colour stability does not establish migration or biology.
- Application compliance belongs to the final article.

6. Conclusions

- Colour stability is a property of the complete cured system and exposure history.
- Portfolio descriptions are qualitative manufacturer positioning unless a comparative report is cited.
- Testing is not automatically certification and TDS values are not automatically certified.
- This corrected candidate remains local and on HOLD until series-wide scientific, metadata and visual release checks are complete.

Revision note

Version 5.3 aligns terminology with WP-22, separates manufacturer positioning, measured data and certification, and removes unsupported safety, food-contact and clinical implications.

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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 colour-product TDS and controlled comparative ageing reports.
- [2] ISO 11664 series. Colorimetry.
- [3] ISO 4892 series. Plastics—Methods of exposure to laboratory light sources.
- [4] CIE 015. Colorimetry, current controlled edition.
- [5] ISO 4049:2019. Dentistry—Polymer-based restorative materials.
- [6] 3Dresyns WP-22. Colour Additives for SLA, DLP, LCD and VAM Formulations, corrected local candidate.