

Colour Additives for SLA, DLP, LCD and VAM Formulations

Optical-density, suspension and shade-selection effects with final-article validation boundaries

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Highlights

- Fourteen products are listed; listed does not mean every performance claim is verified.
- Colour changes cure depth, lateral cure, exposure, sedimentation and final appearance.
- Ultra safe is not used as descriptive safety language.
- Food-related, dental or Bio designators do not establish final-article compliance or biological suitability.
- ISO 4049 applies only to restorative or luting materials within its scope.

Abstract

The colour portfolio contains additives and kits for general tinting, suspension-controlled transparent colour, custom/optical effects and selected dental manufacturing workflows.

Every colour addition changes the host formulation and requires recalibration in the exact base resin, dosage, printer and post-cure. Numerical light-fastness, migration or biological claims require the tested final system and conditions.

A product name or food-related, dental or Bio designation does not establish compliance of the printed article. ISO 4049 is applied only where the finished material is within its restorative/luting scope.

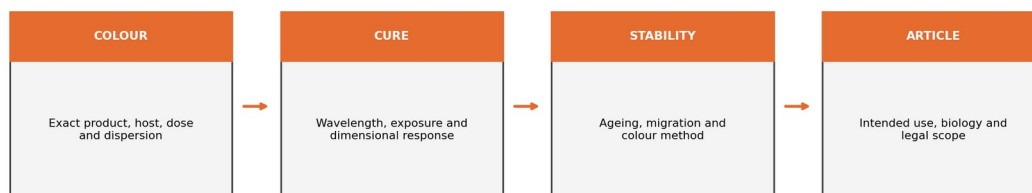
Keywords colour additive · pigment · optical density · cure calibration · dental manufacturing · food-contact assessment

Source use. Product evidence is controlled in [1]; colour and ageing methods in [2–3]; dental/biological scope in [4–5]; photopolymer context in [6].

1. Optical and process effects

Pigment or dye identity, concentration, dispersion, absorption, scattering and sedimentation can alter cure response and dimensional accuracy.

- Record exact host resin and dosage.
- Rebuild working curves and exposure windows.
- Verify shade and geometry after post-cure.



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

Figure 1. WP-22 evidence gates from controlled material description to final acceptance.

2. Stability and migration evidence

Colour stability needs exposure spectrum, irradiance, temperature, humidity, duration, substrate and colour-difference method. Food-contact projects require final-article composition, migration and applicable legal assessment.

- Treat TDS values as data, not automatic certification.
- Separate catalogue positioning from measured results.
- Control dispersion and storage stability.

3. Dental and biological boundary

Dental manufacturing stages have different intended uses. ISO 4049 and biological-evaluation claims are retained only for exact products and scopes; a colour additive does not transfer compliance to the mixture.

4. Minimum controlled evidence before release

Control field	Required record	Release interpretation
Colour	Exact product, host, dose and dispersion	Catalogue description only until evidence is linked
Cure	Wavelength, exposure and dimensional response	Control process variables and change triggers
Stability	Ageing, migration and colour method	Report method, result, uncertainty and limits
Article	Intended use, biology and legal scope	Apply final acceptance and responsibility boundary

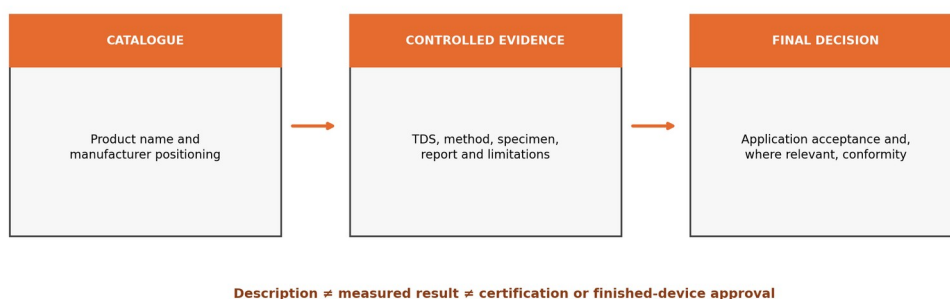


Figure 2. WP-22 separates catalogue positioning, measured evidence and final application decisions.

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

- Product names do not prove safety or compliance.
- Listed products are not automatically performance-verified.
- Food-contact assessment belongs to the final article.
- Dental colour options do not establish clinical suitability.
- Any colour change requires recalibration.

6. Conclusions

- Fourteen products are listed; listed does not mean every performance claim is verified.
- Colour changes cure depth, lateral cure, exposure, sedimentation and final appearance.
- ISO 4049 applies only to restorative or luting materials within its scope.
- This corrected candidate remains local and on HOLD until series-wide scientific, metadata and visual release checks are complete.

Revision note

Version 5.3 removes descriptive safety and automatic food-contact/clinical claims, replaces verified with listed where appropriate, restricts ISO 4049 to scope and adds final-mixture validation.

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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/SDS and controlled optical/migration reports.
- [2] ISO 11664 series. Colorimetry.
- [3] ISO 4892 series. Plastics—Methods of exposure to laboratory light sources.
- [4] ISO 4049:2019. Dentistry—Polymer-based restorative materials.
- [5] ISO 10993-1:2025. Biological evaluation of medical devices—Part 1.
- [6] Bagheri, A., & Jin, J. (2019). Photopolymerization in 3D printing. <https://doi.org/10.1021/acsapm.8b00165>