

MF Dental VPP Portfolio for SLA, DLP and LCD: Material Selection by Intended Laboratory Workflow

Formulation attributes, measured properties and validation boundaries for dental manufacturing materials

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Highlights

- The portfolio includes grades positioned for dental laboratory workflows, subject to each product's current TDS and IFU.
- Selection begins with intended use, geometry, mechanical and optical targets, printer conditions and post-processing requirements.
- Monomer-free and TPO-free are formulation attributes where documented; they do not authorize or certify the final dental device.
- ISO 4049 and ISO 20795-1 apply only within their defined material and indication scopes.
- ISO 10993-1:2025 frames biological evaluation of the finished device and does not determine MDR class.
- Direct aligners, implant-adjacent components and prolonged-contact devices require dedicated validation by the legal manufacturer.

Abstract

Dental VPP workflows impose different requirements according to the intended article. A dental model, surgical-guide candidate, splint, denture-base component, try-in and direct-printed aligner do not share a single mechanical, biological or regulatory specification. Material selection must therefore be based on the intended workflow and measured properties of the applicable grade rather than a family-wide clinical claim.

The 3Dresyns MF dental portfolio includes materials with different rigidity, flexibility, optical appearance and formulation attributes. Where documented, the MF designation indicates manufacture without intentionally added reactive monomers. Product-specific TDS and IFU documents define available measured properties and processing boundaries.

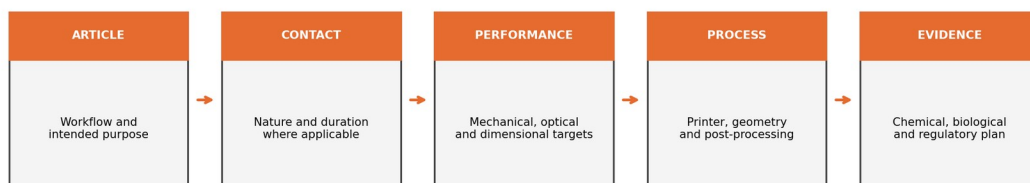
The materials are supplied for professional manufacturing and development. Final dental-device suitability depends on printer calibration, geometry, cleaning, post-curing, finishing, storage, sterilization where relevant, intended use and legal-manufacturer validation. ISO 10993-1:2025 supports biological evaluation within risk management; ISO 4049 and ISO 20795-1 apply only within their scopes. None provides general portfolio certification.

Keywords dental VPP · MF formulation · laboratory workflow · aligner development · ISO 10993 · ISO 4049 · ISO 20795-1

Source use. Product evidence is controlled in [1]; biological and risk-management frameworks in [2–7]; dental/QMS/legal scope in [8–11]; photopolymer context in [12].

1. Selection inputs

- Intended laboratory workflow and intended purpose of the final article.
- Nature and duration of patient contact, if any.
- Required rigidity, flexibility, toughness, dimensional stability, colour and transparency.
- Printer wavelength, measured irradiance, layer strategy, geometry and orientation.
- Cleaning, drying, post-curing, finishing, storage and sterilization conditions.
- Applicable mechanical, chemical, biological and regulatory validation plan.



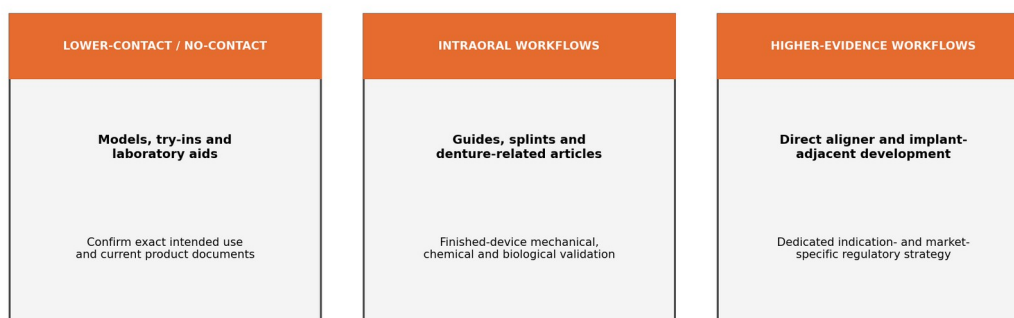
The intended workflow generates requirements; a family name does not authorize the final device.

Figure 1. Workflow-led selection inputs. Requirements are defined before a product candidate is chosen.

2. Product-positioning and evidence boundaries

Laboratory workflow	Selection focus	Required verification	Boundary
Models / laboratory aids	Accuracy, handling and surface	Geometry, stability and workflow fit	No patient-contact claim
Guide development	Accuracy, rigidity and processing	Mechanical, chemical, biological and regulatory plan	Current product indication controls wording
Splint development	Toughness, water exposure and fit	Ageing, mechanics, chemistry and biology	No universal ISO 4049/20795 threshold
Denture-related development	Denture-base or other exact scope	Apply ISO 20795-1 only where in scope	Component and finished-device evidence remain distinct
Direct-aligner development	Force, relaxation, creep, water and ageing	Indication- and market-specific validation	No FDA claim without specific documentation
Implant-adjacent research	Contact context and foreseeable risks	Dedicated classification, chemistry, biology and pathway	Not an automatic Class IIa route

Final suitability and regulatory conformity depend on the complete printed-device workflow and remain the responsibility of the legal manufacturer. Product-to-application mappings should be described as professional development or laboratory workflows unless the exact product and intended use have the necessary market-specific regulatory documentation.



These are development-workflow categories, not clinical indications or MDR classes.

Figure 2. Development-workflow categories and increasing evidence needs. The categories are not clinical indications or MDR classes.

3. Dental standards and biological evaluation

ISO 4049 applies to polymer-based restorative materials within its scope. ISO 20795-1 applies to denture-base polymers within its scope. Their water sorption, solubility, flexural or other values must not be treated as universal thresholds for guides, aligners, splints, mouthguards or every intraoral article.

ISO 10993-1:2025 frames biological evaluation within risk management. The plan considers the finished device, intended contact, materials, manufacturing process, chemical characterization and available evidence. Device classification under Regulation (EU) 2017/745 is determined separately by the legal manufacturer. ISO 13485 concerns quality-management systems and does not certify a resin or authorize an indication.

KEY INSIGHT

A product name, MF or TPO-free attribute, resin coupon result or standards citation cannot replace evidence on the final or justified representative dental article.

4. Direct-printed aligner development

Materials positioned for direct-printed aligner development require validation of dimensional accuracy, force delivery, stress relaxation, creep, water uptake, chemical stability, ageing, cleaning, post-curing and biological safety under intended conditions. PETG-like or TPU-like may be used only as qualitative descriptors and do not imply chemical or performance equivalence.

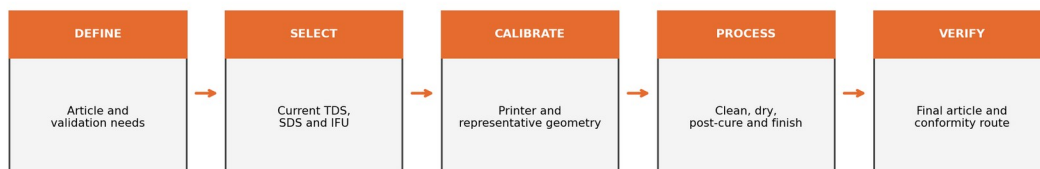
Professional material for aligner-development and validation workflows. Regulatory authorization of the final device is not implied. No FDA claim should appear unless a specific product and intended use are covered by verifiable FDA documentation.

5. Implant-adjacent research and development

Material positioned for implant-adjacent research and professional development where supported by current product documentation. Any device involving tissue, bone or implant contact requires a dedicated intended-use assessment, MDR classification, chemical characterization, biological evaluation and regulatory pathway established by the legal manufacturer.

6. Controlled manufacturing workflow

- Define the intended article and applicable validation requirements.
- Select a product using current TDS, SDS and IFU.
- Calibrate the product–printer combination.
- Manufacture representative articles using controlled geometry and orientation.
- Apply validated cleaning, drying, post-curing and finishing.
- Verify required mechanical, physical, optical and chemical properties.
- Conduct device-specific biological evaluation and conformity assessment where applicable.



No universal degree-of-conversion value is a regulatory release criterion.

Figure 3. Controlled dental-manufacturing workflow. Final verification and conformity follow the processed article.

7. Limitations

- Portfolio inclusion does not establish suitability for every dental indication.
- Product names and formulation attributes do not replace verification on the printed article.
- Data for one shade, viscosity, printer or post-cure protocol cannot automatically transfer to another.
- Direct-printed aligners require indication- and market-specific validation.
- Implant-related applications require a dedicated regulatory strategy.
- The legal manufacturer retains responsibility for classification, validation, labelling and conformity.

8. Conclusions

The MF dental portfolio provides materials with different formulation attributes and measured-property profiles for professional dental manufacturing and development. Selection must be workflow-specific and followed by printer calibration, controlled post-processing and validation of the final or representative article. Monomer-free formulation and product-specific test results may support this process, but they do not constitute device authorization, ISO certification or automatic conformity with Regulation (EU) 2017/745.

Revision note

Version 5.5 removes clinical-indication, FDA, ISO-release, material-level MDR-class and fixed conversion/test-panel claims; replaces the portfolio map with workflow-specific positioning and evidence boundaries; and updates ISO 10993-1, ISO 10993-10 and ISO 10993-23 framing.

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Disclosure. Dr. Juan Segurolo is founder and Scientific Director of 3Dresyns by Resyner Technologies S.L. Current product-specific controlled documentation governs use and positioning.

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