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TECHNICAL DATA SHEET

Polyfix Dental Resin Stain Kit

Model: PRS-S-R Series (R01–R20 + Diluent + Glazes)

Brand: ZonMed PRS Ecosystem

Product: Polyfix Resin Coloring Gel System

Spec: 3g / 5g per bottle

Compatible Materials: PMMA, PEEK, Composite Resin, 3D-Printed Denture Bases

Compatible Equipment: 385–405 nm Wavelength Light-Curing Lamps

1. Product Features

- High Color Stability — Nano-inorganic pigments, $\Delta E < 2.0$ after aging, no fading
- Fast Curing Speed — ≤ 30 s surface cure, 30–50s full cure (depending on thickness)
- Intelligent Color Matching — 20 VITA + gingiva + effect shades, intermixable
- Nano Technology — Added nano silica: antibacterial, wear-resistant, corrosion-resistant; thixotropic gel, no slumping
- PRS Open Ecosystem — Compatible with 99% of dental LED curing lights; open system, no printer lock-in

2. Technical Specifications

Item	Specification	Test Method / Standard
Type	Light-curing thixotropic gel	Visual
Composition	Polyurethane Acrylate + UDMA (72869-86-4) + Methacrylate Resin + TMO (270586-78-2) + Inorganic Pigments	FTIR + TGA
Viscosity	1000–3000 cps (thixotropic, brushable)	Brookfield
Color System	R01 Light Pink to R20 Glaze (Soft), plus R18 Diluent 21 shades total	Visual
Curing Wavelength	385–405 nm	—
Curing Time	30–50s (0.07–0.15mm); multi-layer: cure each layer individually	LED 1000 mW/cm ²
Coating Thickness	0.07–0.5mm per layer; thin multiple layers; no single thick coat	Micrometer / Digital Caliper
Hardness (cured)	≥ 70 Shore D	ASTM D2240
Bond Strength	≥ 25 MPa to PMMA/Composite (after sandblasting)	ISO 10477
Color Stability	$\Delta E < 2.0$ after 7 days water immersion + UV aging (ISO 7491)	—
Biocompatibility	Pass ISO 10993-5 Cytotoxicity (cured state)	—
Storage	5–25°C, sealed, light-proof, vertical; 6 months after opening	—

3. Shade Guide — Full System

Category	Shade Code	Common Use / Description
Gingiva / Base	R01 Light Pink, R02 Bright Red, R03 Dark Red, R04 Pink	Simulating gingival tissues; denture base characterization
VITA Standard	R05 BL (Bleach), R06 A3, R07 B3, R08 C3	Natural tooth layering; standard tooth repair
Special Effect	R09 Dark Blue, R10 Light Blue, R11 Light Yellow, R12 Dark Yellow, R13 Brown, R14 Green, R15 Dark Gray, R16 Light Purple	Characterization; imitation of natural tooth flaws and staining effects
Auxiliary / Finish	R17 Transparent, R18 Diluent, R19 Glaze, R20 Glaze (Soft)	Transparency adjustment; viscosity modification /thinning; surface gloss finishing

3.1 Individual Shade Descriptions

Code	Shade Name	Usage & Application (Shade-Specific)
R01	Light Pink	Engineered for simulating light gum tissues, mucosal highlights, and delicate soft-tissue transitions on 3D printed hybrid dentures and implant-supported provisionals. Ensures outstanding fluorescent mimicry under varied lighting conditions and maintains exceptional color fidelity after repeated autoclave and thermal cycling.
R02	Bright Red	Designed for replicating vivid vascular details, mucosal inflammation accents, and hyper-realistic soft-tissue characteristics on denture base polymers and 3D printed gingival masks. Maintains intense chroma saturation without pigment migration, ideal for high-fidelity aesthetic characterization in full-arch prosthetics.
R03	Dark Red	Tailored for deepening gingival contours, root-area shadows, and natural mucosal pigmentation simulations on full-arch resin restorations. Ensures high color stability under long-term intraoral moisture exposure, with optimized pigment suspension for streak-free blending in deep crevice anatomical features.
R04	Pink	Formulated as a core standard shade for general gingival tissue matching, papilla contouring, and aesthetic soft-tissue characterization on 3D printed denture bases. Delivers balanced pink chroma with natural vascular undertone simulation across diverse gingival biotypes.
R05	BL	Specialized high-value bleach shade optimized for whitening aesthetics, ultra-bright bleaching customizations, and high-value anterior veneer/crown characterizations. Achieves exceptional brightness (VITA BL equivalent) while retaining natural translucency depth, preventing the flat, opaque appearance typical of low-quality bleach stains.
R06	A3	Matched to standard VITA A3 dentin shades, this versatile stain is ideal for body shading, cervical warmth imitation, and general chromatic blending on 3D printed provisionals. Offers reliable batch-to-batch color consistency and smooth intermixability with adjacent VITA shades.
R07	B3	Formulated for yellow-brownish dentin characterization, natural chroma enhancement, and matching VITA B-series shades on posterior and anterior polymer restorations. Enables seamless shade transition in multi-layered build-up techniques with precise chromatic control.
R08	C3	Designed to replicate greyish-brown dentin undertones, cervical aging effects, and specific chromatic adjustments for complex natural tooth blending on resin restorations. Provides the subdued chroma essential for geriatric and heavily restored dentition aesthetic simulation.
R09	Dark Blue	Utilized for neutralizing high chroma values, creating deep incisal halo effects, and simulating cool occlusal or translucent depth variations on anterior polymer crowns. Functions as a complementary opalescence modifier for high-end aesthetic cases.
R10	Light Blue	Engineered for subtle incisal edge transparency, cool opalescent halo simulation, and value adjustment on high-aesthetic 3D printed temporary crowns and veneers. Imparts a natural bluish-white translucency without overpowering underlying dentin shades.
R11	Light Yellow	Perfect for simulating bright developmental grooves, youthful dentin characterization, and occlusal fissure highlights on anterior and posterior resin teeth. Provides vibrant warm-yellow accents that mimic natural tooth fluorescence and youthful chroma distribution.
R12	Dark Yellow	Tailored for mature dentin chroma enhancement, root exposure shading, and internal warmth accentuation within multi-layered 3D printed crown workflows. Delivers deep amber-toned saturation ideal for geriatric and heavily worn dentition simulations.
R13	Brown	Designed for accentuating proximal shadow depths, root cracks, cervical lines, and natural staining details on polymer provisional crowns. Enables precise micro-characterization for hyper-realistic aesthetic restorations with controlled pigment density.

R14	Green	Formulated for specialized internal characterization, masking excessive red/yellow undertones, or simulating natural developmental anomalies on complex aesthetic cases. Acts as a complementary color corrector for neutralizing unwanted warm chroma in multi-layer restorations.
R15	Dark Gray	Utilized for down-shifting value, mimicking wear facets, metallic framework masking accents, and age-related occlusal darkening on resin surfaces. Provides controlled low-value characterization essential for posterior occlusal anatomy simulation.
R16	Light Purple	Ideal for fine-tuning reddish-blue undertones, neutralizing high brightness, and executing high-end aesthetic characterization on complex multi-layer restorations. Adds subtle violet-cool depth for premium cosmetic dental applications.
R17	Transparent	Formulated as a clear dilution and depth-enhancement agent, allowing technicians to control stain opacity and fluid consistency without altering color hue. Essential for creating translucent incisal effects and managing stain saturation levels.
R18	Diluent	Professional-grade liquid modifier designed to adjust the viscosity and flow rate of resin stains, ensuring optimal thixotropic brush handling and film-thickness control. Compatible with all PRS-S-R series stains without affecting cure kinetics or final mechanical properties.
R19	Glaze	Functions as a high-gloss protective surface sealant to lock in color stains, improve wear resistance, and provide a smooth, plaque-resistant finish for 3D printed dental restorations. Cures to a durable, high-luster coating with excellent intraoral longevity.
R20	Glaze (Soft)	Provides a resilient, satin-soft surface protective finish with optimized flexibility and comfortable intraoral wear performance for resin-based dental prostheses. Ideal for flexible denture base applications where a softer tactile feel and enhanced bend-resistance are required.

4. Recommended Operation (IFU Summary)

Step 1 — PPE: Wear nitrile gloves, anti-splash goggles, and KN95 mask. Work on a ventilated bench.

Step 2 — Mixing: Open cap, take needed amount of gel. If too thick, add 1 drop of diluent (R18) and adjust to honey-like consistency. Close cap immediately after use to prevent ambient light curing.

Step 3 — Coloring: Use a fine brush. Apply thin, even coats — small amount, multiple times. For multi-layer application, wait for the previous layer to level before overlaying. Recommended thickness: 0.07–0.5mm per layer. Do NOT apply a single thick coat — this may cause incomplete internal curing.

Step 4 — Curing: Use a 385–405 nm dental LED curing light. Standard curing: 30–50s. For thicker layers, extend curing time. For multi-color work, cure each layer individually; after all layers are complete, perform one final overall cure.

Step 5 — Finishing: After full curing, lightly polish with fine sandpaper or a polishing wheel to increase surface durability and gloss.

⚠ R20 Special Note: Specifically designed for flexible resins and elastic materials (e.g., flexible denture bases). Curing time adjusted to 150 seconds. Always refer to the specific IFU for R20 application.

5. Validated System & Compatibility — PRS Open Ecosystem

Compatible Curing Lights: All 385–405 nm dental LED curing lights (Valo, Woodpecker, etc.)

Compatible Substrates: ZonMed PRS 3D Printing Resins (Best); all PMMA, PEEK, Composite resins (SprintRay, Asiga, etc.)

Printer: Open System — No Lock-in, Printer-independent

Ecosystem: Part of ZonMed PRS Ecosystem: Resin (Print) + Stain Kit (Color) + Glaze (Gloss)