

Premium Teeth Resin

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Premium Teeth Resin is a light-curable polymer-based resin designed for the fabrication of 3D printed dental and prosthodontic appliances, such as denture teeth for removable complete and partial removable dentures, try-in dentures and provisional full-arch implant-supported restorations. This Manufacturing Guide will give equipment, printing and post-processing recommendations and requirements to ensure the correct and safe usage of this material.

Specific Manufacturing Considerations

Premium Teeth Resin specifications have been validated using the hardware and parameters indicated below. For biocompatibility compliance, validation used a dedicated resin tank and mixer, build platform, wash unit and post-processing equipment that were not mixed with any other resins.

1. Hardware:

- a. Formlabs 3D Printer: Form 2, Form 3B/3B+, Form 3BL, Form 4B
- b. Print Accessories: Formlabs Build Platforms, Formlabs Resin Tanks

Do not use the Stainless Steel Build Platform as the material might experience over-adherence to the build plate surface.

2. Software:

- a. Formlabs Preform

3. Printing Parameters:

- a. Layer Thickness:
 - Form 3B/3B+: 50 μ m, 100 μ m
 - Form 3BL: 50 μ m
 - Form 4B: 50 μ m, 100 μ m
- b. Part Orientation: Intaglio surface facing away from the build platform at a 0 - 30° tilted angle
- c. Minimum wall thickness: 1.0 mm

4. Recommended Post-Processing Equipment and Accessories:

- a. Formlabs Processing Accessories: Form Auto, Resin Pumping System
- b. Formlabs Validated Wash Unit: Form Wash, Form Wash (2nd Generation), Form Wash L, Ultrasonic Wash Unit
- c. Formlabs Validated Cure Unit: Form Cure, Form Cure L, Fast Cure

A. PRINTING

1. **Shake cartridge:** Shake the cartridge before every print job. Color deviations and print failures may occur if the cartridge is shaken insufficiently.
2. **Set up:** Insert resin cartridge into a compatible Formlabs 3D printer. Insert resin tank and attach mixer to the tank.
3. **Printing:**
 - a. Prepare a print job using PreForm software. Import desired part STL or OBJ file.
 - b. Orient and generate supports.
 - c. Send the print job to the printer.
 - d. Begin print by selecting a print job from the print menu. Follow any prompts or dialogs shown on the printer screen. Printer will automatically complete the print.

B. PART REMOVAL

Remove the build platform from the printer. To remove parts from the build platform, wedge the part removal tool under the printed part raft, and rotate the tool. Formlabs Build Platform 2 or Build Platform 2L may be used for easy, tool free removal. For detailed techniques visit support.formlabs.com.

C. WASHING

Place the printed parts in a Formlabs-validated wash unit with 99% Isopropyl Alcohol (IPA).

1. Form Wash, Form Wash (2nd Generation) - High speed*, or Form Wash L:
 - a. Wash for 10 minutes or until clean.
 - b. If parts do not appear clean after washing, consider replacing used Isopropyl Alcohol in Form Wash or Form Wash L with fresh solvent.

*For Form Wash (2nd Gen), High speed settings are validated for use.

2. Ultrasonic Wash Unit:

NOTE: Using Isopropyl Alcohol in an ultrasonic bath presents a risk of fire or explosion. When using an ultrasonic wash read and follow all safety recommendations from the ultrasonic wash manufacturer.

- a. Use clean 99% Isopropyl Alcohol for each wash.
- b. Place parts in a secondary disposable plastic container or plastic resealable bag then fill with 99% Isopropyl Alcohol, ensuring parts are fully submerged.
- c. Place the secondary container in the ultrasonic unit water bath and sonicate for 2 minutes or until clean.*
**Washing efficacy depends on the ultrasonic unit size and power. Formlabs testing was conducted with ultrasonic units at 36 W/L or higher.*

D. DRYING

1. Remove parts from Isopropyl Alcohol. Leave to air dry at room temperature for at least 30 minutes. Alternatively, parts can be dried using compressed air. **NOTE:** Dry times can vary depending on the design of parts and ambient conditions. Do not let parts sit in Isopropyl Alcohol for longer than needed.
2. Inspect printed parts to ensure that parts are clean and dry. No residual solvent, excess liquid resin or residue particles should remain on the surface before proceeding to subsequent steps.
3. If the residual solvent is still present, dry parts longer. If resin residue is still visible, rewash parts until clean and dry.

E. POST-CURING

Place the printed parts in a Formlabs-validated post-curing unit and cure for the required time.

1. Form Cure or Form Cure L:
 - a. Cure for 30 minutes at 80 °C
 - b. Allow the Form Cure or Form Cure L unit to cool down to room temperature between cure cycles.
2. Fast Cure:
 - a. Cure for 4 minutes at Light Intensity 3 on each side of the printed part.
 - b. Allow the Fast Cure unit to cool for at least 10 minutes between cure cycles.

F. SUPPORT REMOVAL & POLISHING

1. Support marks can cause abrasion if not removed and polished. Remove supports using a cutting disk and handpiece, cutting plier, or other appropriate finishing tools.
2. Polish the printed appliances using typical dental polishing methods prior to clinical use.
3. (OPTIONAL) If desired, use a sandblaster with glass bead blasting material to remove any surface artifacts or residual resin on the part surface.
4. (OPTIONAL) Light-cured glaze and characterization can also be used. Follow the instructions from the material manufacturer.
5. Inspect the parts for any cracks. Discard if any damage or cracks are detected.

G. DENTURE TEETH ASSEMBLY

Premium Teeth Resin may be bonded to 3D printed denture bases after curing using bonding systems designed for PMMA-based denture materials such as Ivoclar Ivotion Bond Kit. Refer to the instructions provided by the bonding system manufacturer. Before assembling the denture, remove supports on denture teeth while in an uncured printed state.

H. CLEANING & DISINFECTION

1. Denture Teeth for Removable Digital Dentures: Appliances may be cleaned using a dedicated tooth brush with neutral soap and water or effervescent dental appliance cleaning tablets (used according to manufacturer's directions).
2. Appliances may be disinfected by soaking in 70% IPA for five minutes per FDA guidelines.
3. Inspect appliances for cracks after cleaning or disinfection. Discard if any damage or cracks are detected.

I. HAZARDS, STORAGE & DISPOSAL

1. Cured resin is non-hazardous and may be disposed of as regular waste.
2. See SDS for more information at support.formlabs.com

