formlabs Form 4B Bio Med Clear Resin


# formlabs Form 4B Bio Med Clear Resin Instruction Manual



Contents



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**formlabs Form 4B Bio Med Clear Resin**


## Product Information

### Specifications

- **Product Name:** BioMed Clear Resin
- **Manufacturing Date:** 02/29/2024
- **Model Number:** PRNT-0101 Rev 02
- **Hardware Compatibility:** Formlabs 3D Printers Form 2, Form 3B/3B+, Form 3BL, Form 4B
- **Software Compatibility:** Formlabs Preform
- **Printing Parameters:** Layer Thickness – 100 µm and 50 µm

## Product Usage Instructions

### A. Printing

1. Shake cartridge: Shake the cartridge before every print job to avoid color deviations and print failures.
2. **Set up:**
    - Insert the resin cartridge into a compatible Formlabs 3D printer.
    - Attach the resin tank and mixer to the tank.
3. **Printing:**
    1. Prepare print job using PreForm software.
    2. Orient and generate support.
    3. Send a print job to the printer.
    4. Select a print job from the menu on the printer and follow the prompts on the screen for completion.

### B. Part Removal

Remove the build platform from the printer and use the part removal tool to wedge under the printed part raft for removal. Formlabs Build Platform 2 or Build Platform 2L can be used for easy removal.

**C. Washing**

Place printed parts in a Formlabs-validated wash unit with 99% Isopropyl Alcohol and follow the specific washing instructions provided for each type of wash unit.

**D. Drying**

Remove parts from Isopropyl Alcohol and allow them to air dry at room temperature for a minimum of 30 minutes. Avoid prolonged exposure to Isopropyl Alcohol.

**Frequently Asked Questions (FAQ)**

**Q: Can I use a different brand of resin tank or mixer with BioMed Clear Resin?**

**A:** To ensure biocompatibility compliance, it is recommended to use only the dedicated resin tank and mixer specified by Formlabs for BioMed Clear Resin.

**Q: How long should I wash the printed parts in the wash unit?**

**A:** The recommended washing time is 15 minutes or until the parts are clean. If needed, parts can be soaked in fresh Isopropyl Alcohol for an additional 5 minutes.

- BioMed Clear Resin is a USP Class VI certified, light-curable polymer-based material designed for the additive manufacturing of medical grade, biocompatible, clear, and rigid parts for long-term surface contact (more than 30 days).
- Users should independently verify the suitability of the printed materials for their particular application and intended purpose.
- 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

- BioMed Clear 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
2. **Software:**
    - **a.** Formlabs Preform
3. **Printing Parameters:**
    - **a. Layer Thickness:** 100 µm and 50 µm
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

## 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 the resin tank and attach a mixer to the tank.
3. **Printing:**
    - **a.** Prepare a print job using PreForm software. Import desired part STL file.
    - **b.** Orient and generate support.
    - **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. The printer will automatically complete the print.

### 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.

### WASHING

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

1. **Form Wash,** Form Wash (2nd Generation) – High speed*, or Form Wash L:
    - **a.** Wash for 15 minutes or until clean.
    - **b.** Remove parts from the wash unit and soak in fresh Isopropyl Alcohol for 5 minutes.
    - **c.** If parts do not appear clean after washing, consider replacing used Isopropyl Alcohol in the wash unit 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.

**DRYING**

1. Remove parts from Isopropyl Alcohol and leave to air dry at room temperature for at least 30 minutes.
    - **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.

**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 60 minutes at 60 °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 6 minutes at Light Intensity 5
    - **b**. Allow the Fast Cure unit to cool for at least 10 minutes between cure cycles.

## SUPPORT REMOVAL & POLISHING

1. Remove supports using a cutting disk and a handpiece, or by using other part removal tools. If there are rough marks left on the surface of the parts after support removal, polish/sand these down smoothly to improve the surface finish.
2. If needed, polish the printed parts using typical polishing methods. Make sure to verify the suitability of the polished printed material for the intended purpose.
3. Inspect the parts for any cracks. Discard if any damage or cracks are detected.

## CLEANING & DISINFECTION

1. The parts may be cleaned, disinfected, and sterilized according to facility protocols. The manufacturer is responsible for the validation of part performance depending on the application requirements post disinfection and/or sterilization.
    - **NOTE:** If alcohol-based disinfectants are used, do not leave parts in the alcohol solution for an extended time.
2. After cleaning and disinfection inspect the part for damage or cracks to ensure that the integrity of the designed part meets performance requirements. Discard if any damage or cracks are detected.

**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

## Documents / Resources

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|  | formlabs Form 4B Bio Med Clear Resin [pdf] Instruction Manual<br>Form 2, Form 3B-3B, Form 3BL, Form 4B, Form 4B Bio Med Clear Resin, Form 4B, Bio Med Clear Resin, Med Clear Resin, Clear Resin, Resin |

## References

- customer_v2
- User Manual