



VeroClear™ RGD810™

Application Note



Overview

VeroClear RGD810 is a colorless transparent, rigid material featuring great dimensional stability. As a rule, best clarity is achieved when parts are printed with a matte finish, and treated as explained below.

Combined with rubber-like or color materials, you can produce models with unique material combinations, opacities, hues and hardness.

This Application Note describes tips and recommendations for obtaining optimum results for VeroClear parts.

- A. Material Replacement
- B. Cleaning Printer Components
- C. Printing Preferences
- D. Part Thickness
- E. Polishing Parts
- F. Gluing Parts
- G. Photobleaching Parts

Recommendations and Tips

A. Material Replacement

Traces of previous materials affect the clarity of VeroClear. Before printing with VeroClear, replace one or both of the currently installed cartridges with a VeroClear cartridge. Run the Material/Resin Replacement Wizard and select the flushing option appropriate for your printer.

- When replacing RGD720 , RGD515Plus, TangoPlus or Agilus30 Clear, select:
 - *High Performance* cycle, and run the wizard once.
 - *Short* cycle, and run the wizard four times.
 - *Single* cycle, and run the wizard four times.
 - *Full* cycle, and run the wizard once.
- When replacing other Model materials, select:
 - *High Performance* cycle, and run the wizard once. Then, run the wizard again (once), and select the *Economy* cycle.
 - *Short* cycle, and run the wizard five times.
 - *Single* cycle, and run the wizard five times.
 - *Full* cycle, and run the wizard once.



Figure 1: Polished and lacquered part, printed with VeroClear

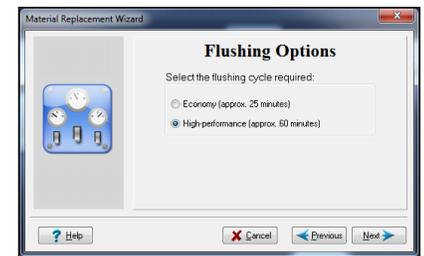


Figure 2: Material Replacement wizard flushing cycles (sample)

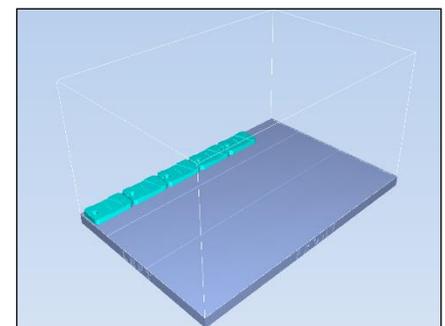


Figure 3: Parts with similar heights

B. Cleaning Printer Components

Before printing with VeroClear, clean the print heads, wiper, and roller waste collector thoroughly. This ensures that traces of previous materials (lines, spots, etc.) do not appear in the VeroClear part.

C. Printing Preferences

Prolonged exposure to UV radiation during printing may produce parts with a yellowish tint. The printing mode and surface finish you choose affect the clarity of VeroClear parts. To achieve maximum clarity, use the following guidelines.

Printing Mode

- Desktop printers—Prefer the High Quality mode (if available)
In Desktop printers that are enabled for printing modes, always prefer to print VeroClear parts in High Quality mode.
- All Other printers—Prefer the High Speed mode
In High Speed mode, printed layers are 30-microns thick compared to 16 microns with High Quality mode. Therefore, fewer print-head and UV lamp passes (along the x-axis) are needed to complete the part.

Surface Finish

- Matte surface finish (recommended)—
When printing VeroClear parts, always prefer a matte surface finish. The support material that covers matte surfaces helps protect the part's layers from excessive UV radiation, thereby improving clarity.
- Glossy surface finish—
When printing glossy parts, arrange them so they have *similar heights*. This ensures that the parts are not exposed to unnecessary UV radiation, since parts with similar heights require the same number of print-head and UV-lamp passes. When printing parts with different heights on the same tray, the print block passes over all parts even after the shorter parts have been completed. This causes the shorter parts to absorb more UV radiation than necessary, which reduces clarity.

D. Polishing Parts

Polishing VeroClear parts improves their clarity. Applying a coat of clear lacquer gives parts a shine and protects their surfaces. For polishing instructions, refer to the “Guide to Post Process Applications” on creating translucent 3D parts. When removing support material with the WaterJet, keep cleaning time to a minimum.

E. Gluing Parts

When gluing parts printed with VeroClear, use clear glue to ensure clarity in the joint areas. Apply glue only where necessary; minimize the glued surfaces.

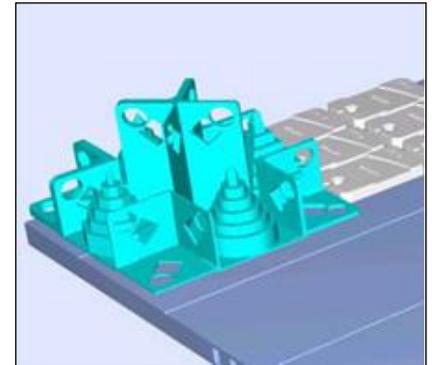


Figure 4: Parts with different heights—glossy finish is not recommended

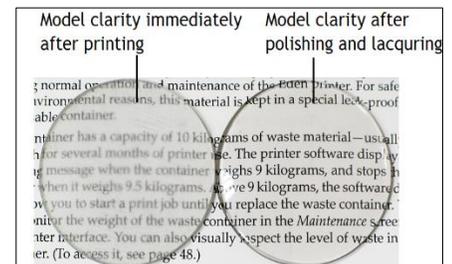


Figure 5: : Parts printed in High Speed with a Matte finish

F. Part Thickness

Parts that are less than 15-millimeters thick offer the best clarity and color. Parts thicker than 15 millimeters may have a tint.

G. Photobleaching Parts

Parts printed with VeroClear have a slightly yellow tint when removed from the printer. This is especially true for parts printed with a glossy finish. The yellow tint fades naturally over time, but you can greatly accelerate this process by using a suitable photobleaching treatment. This involves exposing parts to intense fluorescent light. Within six hours of exposure, there is a tint reduction of approximately 70%. After 24 hours, there is tint reduction of 90%.

Two photobleaching methods are recommended by Stratasys—

Method 1: Using an Illumination Chamber (Figure 5)

- Off-the-shelf product
- Enables control of temperature and light intensity
- Assures predictable results

Method 2: Using Desk Lamps (Figure 6)

- Self-assembly from readily available components
Note: The fluorescent lamps should be rated 23W, Daylight.
- Low cost solution
- Varying results, due to the lack of precise control over temperature and light intensity

Photobleaching Instructions:

1. When using desk lamps, place the parts in a container. The inside of the container must be covered with aluminum foil. Use at least two lamps, more when treating part in a large container.
2. Arrange the printed parts in the chamber/container with enough distance between them to allow light to reach all sides of each part.
3. Turn on the lights. Verify that the ambient temperature around the parts is approximately 40°C (104°F). Higher temperatures may cause part distortion; lower temperatures may not produce satisfactory results. When using desk lamps, you can achieve the required temperature by positioning the lamps approximately 10 cm (4 in) above the models.



Figure 6: Illumination chamber for photobleaching (sample)



Figure 7: Using desk lamps for photobleaching

4. Inspect the model tint after six hours of treatment.
 - For parts with a matte finish, this should be enough.
 - For parts with a glossy finish, continue the photobleaching treatment for up to 18 hours to achieve the desired results.

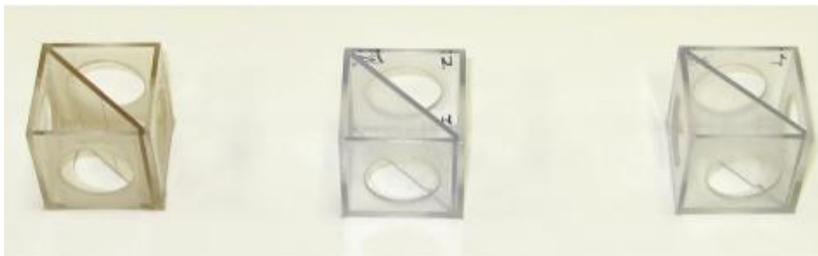


Figure 8: Sample model before photobleaching treatment (1); after photobleaching in chamber (2); after photobleaching with desk lamps (3)

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