Color Quality

This Best Practices document will highlight some of the basic steps you can take and apply to every print job to achieve vibrant part colors and superior part quality.

Applies To Powders/Machines

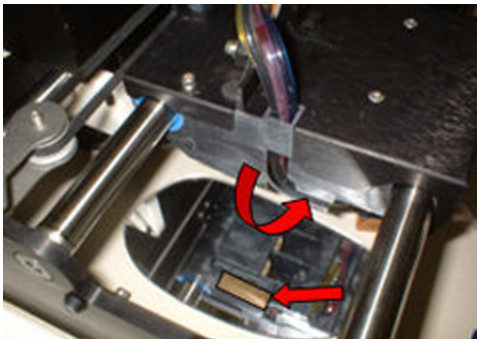
zp®130
zp®102
zp®131
zp®140

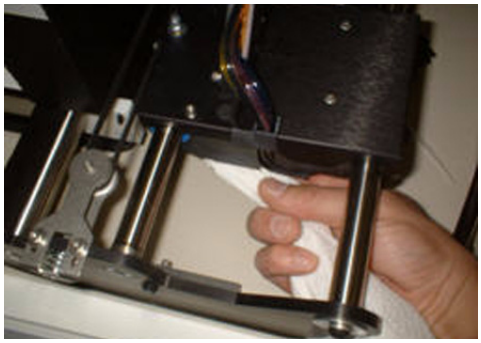
Spectrum Z™510®/DESIGNmate™ Cx
ZPrinter® 450
Z™810

Printer Maintenance

Besides the overall benefits of maintaining a clean printer, with respect to color quality, it is equally important to clean the Alignment Sensor Window before each alignment and to ensure that the Service Station is properly cleaned.

- Use a mirror to determine the location of the Alignment Sensor Window on your printer.
- Gently wipe the Alignment Sensor Window clean with a soft cloth moistened with distilled water.
- Refer to the *Hardware Manual* for your printer for details on how to clean the Service Station.

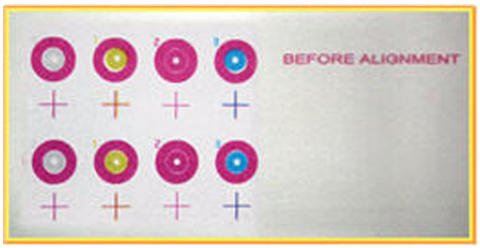




Printer Alignment

Use the Auto-Alignment feature in ZPrint every time you change a print head, or open the Carriage cover to clean the pogo pins.

After running an Auto-Alignment, visually inspect the pattern that is printed. Pay particular attention to the bull's eye circles located near the edge of the pattern. The print heads are properly aligned when these bull's eye circles are centered. If the circles do not appear to be centered, run the Auto-Alignment again.

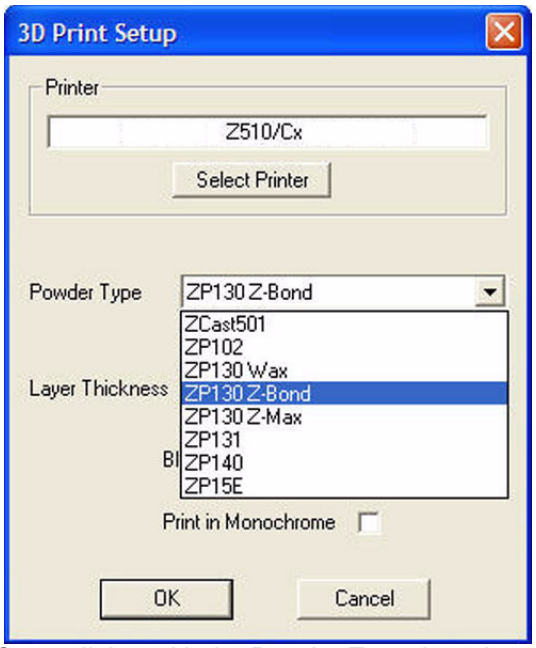


Spectrum Z510/Cx Alignment Pattern

ZPrinter 450 Alignment Pattern

Powder Type Selection

Choose the correct powder/binder option on the **Powder Type** drop-down list in the ZPrint **3D Print Setup** dialog. Choosing the correct setting will result in the most accurate color and aesthetically pleasing part.



The 3D Print Setup dialog with the Powder Type drop-down list expanded

Remember, in the **3D Print Setup** dialog, select the same powder/infiltrant combination you are using to print with to optimize color.

Part Orientation

Correct orientation will result in the highest level of accuracy and part feature quality with great colors. While optimal orientation will vary from part to part, a general rule is that long, thin, or flat parts are best printed in the horizontal X- and Y-Axes direction. Parts with finer details such as threads, or parts that are cylindrical in shape, are best printed vertically along the Z-Axis.

Orienting a part that is cylindrical in shape, or one that has fine features, along the hoizontal directions may decrease color quality and part accuracy. It also increases the potential for ‘squash’ to occur. Squash is a phenomena represented by the displacement of loose powder due to spreading. Features can ‘squash’, or droop, because powder becomes less densely packed along the Y-Axis from left to right during the printing process, and thus less capable of supporting the part geometry.

Use A Witness Part

To minimize the result of shadowing and to assure the best possible color quality, use a ‘Witness’ part in your build file. A ‘Witness’ part is simply a black block that is approximately the same height and width as the part you are building. Place the Witness part in front of the part along the Y-Axis to reduce the possibility of shadowing on the finished printed part.

The thickness of the Witness part is not critically important, but Z Corporation recommends using Witness parts that are at least 2mm thick. We also recommend using ZPrint/ZEdit to paint the Witness part black.

Post-Processing

A little attention given to post-processing will dramatically increase the overall part quality and color. Follow these simple, post-processing guidelines for achieve excellent color quality results.

1. Dry the part and remove the loose powder.

    - It is recommended that you leave printed parts in the Build Bed for a minimum of one hour. Some powder types may require leaving the part in the Build Bed longer. Check the drying time for your powder type for the correct amount of time.

    - After the part has dried, clean off excess powder from the part. Remove as much powder as possible to increase color quality and part strength. Failure to remove excess powder from the part will adversely affect the color and/or part texture.

    - After the loose powder has been removed and depending on the powder type the part was printed with, the part should be air-dried for up to 2.5 hours, depending on the part thickness.

    - Printed parts should be air-dried in an environment that has low humidity. If low humidity is not possible, a convection oven can be used. Convection drying at 165 degrees F will cut the drying time in half.

2. Lightly sand or brush dried parts to eliminate any color variations on the surface.

    - Brushing or sanding parts before infiltration will greatly enhance the color quality. Most parts can be brushed or sanded in just a few moments and will result in dramatically improved color.

    - Use a fine-grade sandpaper, such as 220 or 320-grit, or a nylon bristle brush, to prepare the part surface for infiltration.

    - After brushing or sanding a part, fine depowder the part to remove all remaining loose powder.

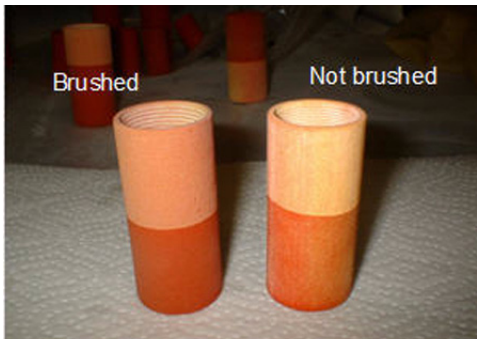
3. Infiltrate the part using the Dip Method. Dipping the part will give it in uniform, vibrant colors. Please review all safety information and properly prepare your post-processing station before using any infiltrants.

    - Fill a container with enough Z-Bond 101 to fully submerge the brushed or sanded part.

    - Allow the part to sit submerged in the Z-Bond for approximately 10 - 20 seconds and remove. If you see bubbles rising while the part is submerged, wait until you don't see any bubbles before removing the part.

    - Use paper towels to wipe off any excess Z-Bond on the part. Keep the part moving in your hands to keep it from sticking to your gloves.

    - Place the part on a non-stick surface, such as wax paper or tephlon, to dry.



Color Quality Checklist

- Ensure the Service Station and the entire printer is clean before starting a print job.
- Clean the Alignment Sensor Window every time you run the Auto-Alignment feature in ZPrint.
- Inspect the bull's eye pattern every time you run an Auto-Alignment. If the circles are not centered, run the Auto-Alignment again.
- Select the correct Powder/Infiltrant setting in ZPrint.
- Correctly orient your parts in the Build Bed to optimize color quality and to reduce 'squash' effects.
- Add a 'Witness' part to improve color quality and to eliminate shadowing.
- Ensure the part has sufficiently dried before infiltration to reduce the possibility of surface blemishes and to increase part strength.
- Lightly sand or brush parts before infiltration to greatly enhance the color quality.
- Use the Dip Method for infiltrating the part to optimize the part surface quality and to give the part uniform, vibrant colors.

Contact Information

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