Printing on Large / Tall Items - Best Practices

Fluid Color RF84HG High Gantry

- **Preparing Your Substrate**
    - Measure Twice: Always confirm the height, width, and length of your substrate. The RF84HG accommodates items up to 19.68" (500mm) tall.
    - Clean Thoroughly: Ensure the surface is dust-free, oil-free, and static-free to improve ink adhesion. Static can build on plastic substrates from the metal carriage moving over the plastic substrate, the printer has ionization bars that help to reduce static, but be mindful that static can still occur. This is why we have a humidity range for operating the printer.
    - Surface Compatibility: Confirm the material is compatible with UV ink and will not warp or deform during printing. Make sure the material is compatible with UV/LED ink and determine if it needs an adhesion promoter or a flame treatment for better adhesion. When in doubt, test a small portion of the media first.
    - Another test to help determine adhesion is to test the surface energy of the item. Use Dyne Pens to find the surface energy of the substrate and make sure it is over 42 dynes for ink adhesion without an adhesion promoter.

- **Printer Setup**
    - Table Clearance Check: Verify that gantry clearance is sufficient for the item's maximum height. Otherwise you could have head strikes, and damage your carriage, printheads, and gantry.
    - Z-Axis Calibration: Use automatic height detection or manually set the print head clearance to prevent head strikes. When measuring the media thickness make sure to measure for the highest point of the media if it is not perfectly flat.

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- **Printer Setup - Continued**
    - Vacuum Zone Setup: For flat-bottomed items, engage specific vacuum zones to stabilize the part. For irregular bottoms, consider custom jigs or risers. You can also use scraps of sheet material to mask the holes on the table and create more suction under the part being printed.
    - Registration: Use physical guides or printed templates on the bed for accurate placement and repeatability.
    - If you are printing a full bleed (edge to edge) you need to have a jig that is the same height of the substrate. This way the lamp will not be on over the gap between the table and the printheads. This would create massive stray light that will cause the ink in the nozzles to cure. To reduce any potential clogged nozzles, make sure to purge and wipe after printing to get any ink that may have been exposed to stray light out of the nozzles.

- **Artwork & File Preperation**
    - Scaling Matters: Confirm artwork is sized accurately for the print surface—use a scaling template if possible.
    - Perspective Considerations: Avoid designs that visually distort when viewed at eye level—use mockups or renders before committing to print.
    - Layering & Passes: For dark or non-white substrates, plan for multi-layer printing (white + CMYK + varnish)if needed.
    - If printing textured images make sure that you have enough of a gap between the printheads and the substrate for the ink to be built up.

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- **Printing Process**
    - Print Mode Selection: Choose appropriate print resolution and speed (e.g. "Quality" mode for detailed graphics). For a higher quality try printing uni-directional for a higher quality image.
    - Curing: Ensure UV lamp intensity and exposure time are optimized for the material thickness and color density.
    - Monitor Height Changes: Stay attentive to uneven surfaces or tall features that may trigger a head collision or ink misfire. Make sure that if you are printing in a high quality mode that the substrate can handle the heat from the lamps and not curl or distort.

- **Safety & Handling**
    - Secure During Print: Use non-marking clamps, edge bumpers, or custom fixtures to secure irregular shapes. If you print the same images over and over, you should create a jig for easier and faster placement. Jigs also help to create repeatable, high quality prints every time. The investment in a jig will pay for itself very quickly.
    - Avoid Overhead Hazards: Ensure there is sufficient clearance around the gantry area for safe operation.

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- **Post Print Inspection & Finishing**
    - Visual Inspection: Check for any banding, misregistration, or ink pooling on vertical features.
    - Ink Adhesion Test: Use a simple tape test to verify mechanical ink bond, especially on non-porous surfaces. If you follow the directions in steps 1 and 2 you should have good adhesion at this point.
    - Dry Time & Handling: Even with UV curing, allow printed items to sit for 15–30 minutes before handling or packaging.

- **Maintenance Tips**
    - When printing a full bleed make sure to purge and clean the nozzles after printing in case stray light has been exposed to the ink in the nozzles. Curing ink is a chain reaction so if you do not clean out ink that may have been exposed to stray light it could cure in the nozzle and work its way backwards in to your printhead and ink lines.
    - Clean Sensors & Rails Regularly: Especially important when printing tall or dusty substrates that can cause build-up.
    - Inspect Head Clearance Mechanisms: Regularly check the Z-axis encoder and height sensors for proper function.
    - Update Firmware/Software: Stay up-to-date with Fluid Color's latest print modes and system updates.