

Printing To Glass - Best Practices

Surface Prep

Printing on glass can result in stunning, high-quality designs, but it presents unique challenges due to the material's smooth surface and low surface energy. To achieve optimal results, it's essential to follow specific techniques and prepare the substrate effectively. Here's a guide to help ensure success when printing on glass with Fluid Color LED inkjet printers.

Understanding the Challenge: Low Surface Energy of Glass

Glass has a low surface energy, typically around 20–30 dynes/cm, which makes it difficult for inks to adhere properly. For inkjet printing to bond effectively, the surface energy should ideally exceed 42 dynes/cm or higher. Without proper treatment, prints may not adhere well and can be prone to peeling or flaking.

Make sure that you also understand that there are many different varieties of glass. Not every glass type will work properly with the below recommendations. It is up to you to test that glass for your applications.

Step 1: Test the Surface Energy of Glass

Before printing, test the surface energy of your glass substrate. This can be done using dyne test pens or fluids. The goal is to determine whether the surface energy is sufficient for proper ink adhesion. If the surface energy is below 42 dynes/cm, treatment is required to improve adhesion.

Step 2: Surface Preparation

1. Cleaning the Glass

Remove dust, dirt, and oils using a lint-free cloth and isopropyl alcohol (IPA). Ensure the glass is completely dry before proceeding with any treatments.

Printing To Glass - Best Practices

Adhesion Testing

2. Surface Treatments

To raise the surface energy and enhance ink adhesion, consider one or a combination of the following treatments:

Wipe-On Primers

Apply a primer designed for glass substrates using a clean, lint-free cloth or applicator. Ensure even coverage and allow the primer to dry completely before printing.

Flame Treatment (e.g., Pyrosil™)

Pass a flame or Pyrosil™ torch over the glass surface to modify its chemistry and increase its surface energy. This treatment is highly effective but requires proper equipment and training for safe application.

Here is a link to learn more about Pyrosil™.

Plasma Treatment

Plasma treatment can also enhance surface energy but is generally suited for specialized applications or production environments.

Step 3: Conduct Adhesion Testing

Before full-scale production, conduct adhesion tests:

Print a small sample on the treated glass. Allow the ink to cure fully under the LED UV lamp. Perform a crosshatch or tape adhesion test to ensure the ink adheres securely. Test each individual color that is in the printer. Each color behaves slightly differently.

Step 4: Printing Best Practices

Optimize Printer Settings

Adjust your Fluid Color LED inkjet printer settings for glass substrates. This may include lowering the printhead height slightly to maintain consistent ink placement.

Printing To Glass - Best Practices

Adhesion Testing continued

Use High-Quality Inks

Ensure you are using inks compatible with LED UV printing and glass substrates. Fluid Color's advanced inks provide excellent adhesion and vibrancy.

Control Curing

Use the printer's LED UV curing system to ensure inks are fully cured during the printing process. Incomplete curing can lead to poor adhesion and durability issues. Over curing can leave the ink brittle and with poor adhesion due to ink shrinkage.

Step 5: Post-Printing Care

Inspect for Quality

Verify the print for consistency, vibrancy, and adhesion.

Protect the Prints

Consider applying a clear protective coating to enhance the durability of the printed glass, especially for applications exposed to wear, moisture, or UV light.

Additional Tips

Always run a test batch before full production to confirm adhesion and appearance. Store untreated glass in a clean, dust-free environment to prevent contamination.

Keep a log of the treatments and printer settings used for specific glass types to streamline future jobs.

By following these best practices and leveraging the precision of Fluid Color LED inkjet printers, you can achieve vibrant, durable, and professional-quality prints on glass substrates, transforming challenges into opportunities for stunning results.