



# Application Notes

## VUTEk Glass Primer System for VUTEk PV180 and PV200

Glass, while fragile and more difficult to handle and ship than other clear substrates, has its place in some high-end applications. Decorative dividers, showroom panels, awards, and shower doors are just a few. Glass is used primarily in second-surface applications. If used as first-surface, moisture will eventually weaken and break down the ink regardless of its adhesion level. The primer increases adhesion and durability as well as resistance to moisture, but applications that require the ink to be exposed to outdoor weather conditions should be avoided.

The VUTEk® Glass Primer System helps increase the abrasion resistance of UV curable ink on glass. The system consists of a cleaning agent and a primer. Both are packaged in aerosol cans. Refer to the part numbers listed below. Approximate coverage is 200 square feet per can for both the cleaner and the primer.

**What is in the kit:**

- Cleaning agent/aerosol can      Part # CC99831-xxx
- PressVu Primer/aerosol can      Part # CC99830-xxx

**What you will need:**

- Lint-free cloths  
(same as used with PressVu)      Part # P9450-A
- White cotton gloves      Part # P3775-A
- A darkened area for inspecting glass with UV light
- Glass (see glass section)
- Oven big enough for the glass being used (see oven section)
- Short/Long-Wave UV light, 4-watt/115 VAC/60 Hz  
(see supplier list)

**The Process**

- The VUTEk glass bonding primer process can be broken into five steps.
1. Determine the print side of the glass using the short-wave UV light in a dark room. (See below on how to determine print side).
  2. Clean the glass thoroughly using the supplied cleaner in the kit.
  3. Spray the primer on the clean glass and wipe over the surface using cloth wipes.
  4. Print on the primed side as normal with the PV200 printer.
  5. Heat the glass to the required temperature for the optimum time.

**Glass**

There are several types of glass available at local suppliers. Some are not suitable for this process. Refer to Figure 1 when deciding what glass is best for your needs.

**Plate glass:** The most commonly available type of glass available at local distributors. It is available in many thicknesses. It is easy to break, making it hard to handle and ship. It is the least expensive of all types listed here. It may be unsuitable in some instances where safety is an issue. It works with this process very well.

**Safety Glass:** Safety glass is divided in two types: laminated and tempered.

**Laminated glass:** Laminated is made by adhering two or more sheets of plate glass together with thin sheets of clear film in between each. The film holds the shards together upon breakage. It is unsuitable for this process because the film cannot withstand the temperatures used to set the bonding primer.

**Tempered glass:** Tempering is done by subjecting glass to high temperatures using specialized equipment. It is up to seven times stronger than plate glass and is more suitable for applications where safety is an issue. It also makes handling and shipping easier. Tempered glass is not readily available at the local supplier, but is usually ordered through them from a distributor. It has to be cut to size when ordering and prior to the tempering process. Tempered costs more than other glass but works well with this process.

Note: Glass is manufactured by rolling out liquid glass onto a molten zinc slab. The glass begins to set and hardens to its solid form. One side is exposed to the air and is called the air-side. The other side that is in contact with the zinc can contain contaminants. The air-side reflects the UV light waves while the zinc side only returns a cloudy reflection. The air-side is the side this process is designed to work with.

Glass Type	Market Availability	VUTEk Primer Adhesion	Glass Cost	Ship Ability
Plate	Yellow	Green	Green	Red
Tempered	Red	Green	Red	Green
Laminated	Green	Red	Yellow	Yellow

Figure 1

Excellent    Moderate    Poor



# Application Notes

## Directions

Follow these five steps with the VUTEK® Glass Primer for optimum adhesion to glass.

1. Determine the print side of the glass. Using the short-wave UV light in a dark room, shine it on both sides of the glass. One side will be cloudy and the other will reflect. The reflective side is called the air-side, while the cloudy side is the zinc side.
2. Clean the air-side of the glass thoroughly using the supplied cleaner in the kit. If the glass is greasy, pre-clean using a spray glass cleaner prior to cleaning with the cleaning agent supplied in the kit. Use lint-free cloth wipes such as the wipes used on the PV printer.
3. Spray the primer on the clean glass and wipe over the surface using the cloth wipes. At this point try not to touch the glass with anything other than white cotton gloves. Set the primed glass aside or print immediately, there is no time constraint.
4. Print on the primed side as normal with the PV printer. Use a cure energy setting range of 55% to 75% double cure on PV180 / Double-Cure High on PV200.
5. Heat the glass to the temperature required in your oven. See ovens.

## Ovens

The critical part of the process is baking the glass/primer/ink combination to the appropriate temperature to initiate the bond. The working temp/time is 380°-390°F (193°-198°C) for 10 minutes for the PV primer. The desired parameters to use in a hand-built foam oven or small lab stove shown in Figure 3 are 250°F (120°C) for 30 minutes.

For high volume glass production, one of several industrial ovens can be purchased. See the list of suppliers at the end of this document. However, testing needs to take place on the specific oven to be used.

For purposes of development and documentation, we used a screen print conveyor oven, shown in Figure 2. Using this oven, a temperature of 650° F (343°C) for 10 minutes was found to work with great success. This combination yielded a five on the ASTM adhesion ratings test (0-5, 5 is best). This set of parameters worked for both the PV180 and PV200 primers. Note: On this oven a setting of 650°F is actually 390°F.



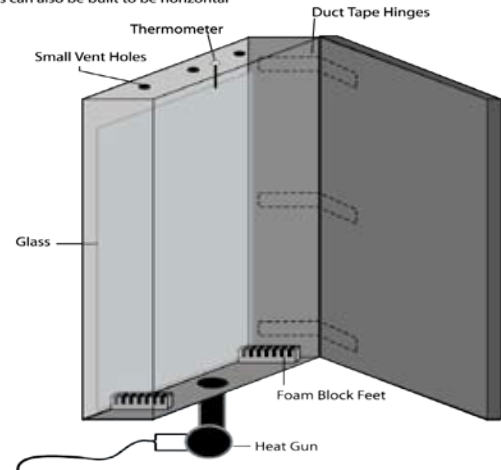
Figure 2. 2409-XL BBC Industries Conveyor Screen-print Dryer.

## Illustration of Typical Hand-Built Oven

For low volume glass production, an oven can be built in various ways. Determine the maximum size of the glass to be used and build a box using rigid foam insulation. A heat gun provides the heat source and a thermometer stuck through the top will do the job. See attached illustration of a typical rigid foam oven.

### Vertical Foam Oven

This can also be built to be horizontal



Assemble using duct tape on all seams. Once loaded with glass, tape seams around lid.

Figure 3

## List of Suppliers

Short/Long-Wave UV light, 4-watt/115 VAC/60 Hz

Cole Parmer Instruments, [www.coleparmer.com](http://www.coleparmer.com), 1-800-323-4340 (US)

Conveyor Oven Dryer, various sizes available

BBC Industries, Inc. [www.bbcind.com](http://www.bbcind.com), 1-800-654-4205 (US), 1-636-343-5600

### Oven sizes and pricing from BBC Industries, Inc.

	2409-XL-SS	3609-XL-SS	4809-XL-SS
Oven Length	108"	108"	108"
Oven Width	34"	46"	58"
Belt Width	24"	36"	48"
Belt Material	Stainless Steel	Stainless Steel	Stainless Steel
Oven Chamber Length	60"	60"	60"
Heater Wattage	8700	11,250	15,000
Oven Power Requirements 2	40V/36A	240V/47A	240V/62A
Price	\$4,995.00	\$6,930.00	\$8,738.00

12/04 kcc



One VUTEK Place  
Meredith, NH 03253  
603-279-4635  
[www.efi.com/VUTEK](http://www.efi.com/VUTEK)

Auto-Count, Bliss, Changing the Way the World Prints, ColorWise, Command WorkStation, DocBuilder, DocBuilder Pro, DocStream, EDOX, EFI, Fiery, the Fiery logo, Fiery Driven, the Fiery Driven logo, OneFlow, PrinterSite, PrintFlow, PrintMe, PrintSmith Site, Prograph, Proteus, RIP-While-Print, Setting the Standard in Digital Printing, Ultravu and VUTEK are registered trademarks of Electronics for Imaging, Inc. in the U.S. Patent and Trademark Office and/or certain other foreign jurisdictions. Bestcolor is a registered trademark of Electronics For Imaging GmbH in the U.S. Patent and Trademark Office. AutoCal, Balance, BioVu, BioWare, Build, ColorCal, Digital StoreFront, Estimate, Fiery Link, Fiery Prints, Fiery Spark, FreeForm, Hagen, Jetrion, Logic, MicroPress, PhotoXposure, PrintCafe, PrintSmith, PSI, PSI Flexo, Remoteproof, RIPChips, Scan, Screenproof, SendMe, Splash, Spot-On, UltraTex, UV Series 50, VisualCal, WebTools, the EFI logo, the Fiery Prints logo and Essential to Print are trademarks of Electronics for Imaging, Inc. Best, the Best logo, Colorproof, PhotoXposure, Remoteproof, and Screenproof are trademarks of Electronics For Imaging GmbH. All other terms and product names may be trademarks or registered trademarks of their respective owners, and are hereby acknowledged.

© 2008 Electronics for Imaging

Superwide Format Solutions