

# Creative Effects for Glass Decoration

## UV inks create endless possibilities

By George Koch

**F**or centuries, manufacturing for surface decoration of glass was a hot, dirty and difficult process. This resulted in useful, but utilitarian designs. Designers found that process constraints limited their ability to create packages and showcase products. With the range and quality of UV inks today, there are endless possibilities when enhancing and designing product images.

Since the debut of UV-based inks for the decoration of glass and ceramics more than six years ago, glass and ceramic printers have enjoyed the benefits of switching from ceramic-and solvent-based inks to organic UV-based inks. Users have benefited from an increased high-gloss level, lead-free formulations, chemical and dishwasher

resistance, and the ability to reduce the lehr temperature.

A new generation of UV-based inks has been developed to eliminate the need for a post-heat cure, allowing for even more streamlined manufacturing processes.

This new UV-ink generation cures under standard UV bulbs, eliminating the need for expensive and slow gas lehrs or batch ovens. Printers also enjoy UV ink's ability to withstand in excess of more than 2,500 industrial and more than 500 home dishwasher cycles (150°F for 90 min) plus chemical and abrasion resistance.

In addition to offering cost savings to printers, UV-curable inks for glass also offer innovative special effects while meeting the durability requirements of several diverse markets within the glass-printing sector.

This article summarizes what can now be done with UV-screenprinting inks. In addition, the flexibility of UV inks will allow users to be creative beyond these applications.

### Flat Glass

In the flat glass industry, the decoration of gaming machines, furniture, appliances, shower doors and mirrors are in high demand in regard to opacity, brilliance of special colors, matte and frosted finishes, as well as metallic effects. In addition, UV inks can withstand the silvering application in mirror manufacturing without the need for heat cure.



*UV-based ink printed wine bottle.*

UV-based inks create special effects such as fluorescent or transparent colors as well as four-color images, which cannot be achieved with ceramic inks.

Traditionally, an acid etching process is used for frosting shower glass. UV-screen printing inks can create special “frosted effects” as an alternative to the expensive glass etching process. UV inks also meet the water-resistant requirements for this application.

### Cosmetic Industry

The cosmetic packaging industry is very image conscious. This is evident in their packaging, advertising and labelling. With the use of UV inks, glass containers can be decorated in new and creative ways.

UV inks offer color range and brilliance as well as special effects that meet the needs of this very demanding sector of glass decoration. UV inks have shown a great resistance to chemicals, water and abrasion.

### Advertising Specialities

The advertising specialities industry is also looking for special effects such as metallic, glitter or matte and frosted finishes for bar wear including mugs, drinking glasses, ashtrays, etc. UV-based inks have a great advantage with this application when compared to decorations with ceramic inks.

### Beverage Packaging

UV inks can bring a lot of creativity to this industry, yielding wonderful results.

For example, with ceramic inks, to create a special “transparent window” effect onto an acid matte glass surface, it is necessary to first print a mask onto the glass surface and then use a special etching process to get a “clear transparent window” onto a matte finish. With UV-curable inks, the manufacturer can simply print this



*UV-based ink printed with metallic and pearlescent effects.*

“transparent clear window” effect directly onto the etched matte glass or matte-coated glass surface during the decoration process. Compared to the “masking and etching process,” this special decoration technique is much more economical.

### Creating Special Effects

UV-curable inks provide the following special effects to create unique and special decorations:

- **DayGlo & Fluorescent Colors**

Fluorescent and DayGlo effects demand customers’ attention. Look for these effects in the beverage (vodka bottles or drinking glasses) and cosmetic packaging industries.

- **Metallic**

Metallic effects are also available in UV-screenprinting inks, which use specially prepared metallic pigments. It is possible to combine these metallic pigments with colors. The cosmetic and flat glass industries (gaming machine production) use these formulations to create exciting and attractive designs.

- **Metal Flakes**

Metal flakes are metallics with very large grains of pigments. This effect is used in glass for gaming

machines, furniture glass and advertising specialties.

- **High Brilliance Imitation Gold & Silver**

In the cosmetic industry, the need to achieve a very high brilliance in gold or silver imitation is so important that manufacturers are often required to use a combination of screenprinting and hot or cold foil stamping.

In the ceramic ink industry, gold and silver mirror decoration and drinking glass decoration are based on a printing process utilizing an expensive gold or silver paste. The decoration of this gold or silver paste onto glass also requires a special heat post-curing process. Both application processes, hot and cold foil application or direct gold and silver decorations are costly from a material and processing standpoint.

With the advances in UV-printing ink technologies and their ability to produce brilliant silver and gold decorations, many of these problems and costs can be eliminated.

UV-screenprinting provides quality results as far as brightness is concerned, nearly equalling the brightness achieved in “hot stamping” or direct printing with gold and silver paste.

However, the UV-screenprinting process is far more economical and UV-based inks provide a perfect alternative.

- **Tinted Varnishes**

Tinted varnishes have been especially created for the flat glass industry to create a “stained glass” effect for use on mirrors and gaming machines.

- **Pearlescent Effects**

This effect has been created for the cosmetic industry.

- **Textures** (Matte, Glossy)

When using UV-screenprinting inks, interesting and special acid etching and sand blasted glass texture effects can be created. These effects in the cosmetic and drinking glass industry are used as well as for the application onto flat glass.

### What About Other Colors?

If a color exists, it is possible to match it including any Pantone colors as well as colors you create, fluorescent colors or four-color halftone printing colors.

When creating ceramic ink colors, the color shades will change after the post-curing process. When utilizing UV-based inks, the printed color shade can exactly match the color shade you choose. There is no post-heat curing necessary.

### UV Inks and the Environment

No presentation concerning UV-ink technology would be complete without touching on the environmental advantages of the process—especially as it relates to meeting the standards as spelled out in Proposition 65.

In 1986, California passed Proposition 65—the Safe Drinking Water and Toxic Enforcement Act. This regulation states that no one can knowingly discharge any chemical into water and onto land, which could result in cancer or reproductive problems.

Proposition 65 is not a static regulation in that regulators are constantly adding new chemicals to the list, but for glass decorating the primary concern is with heavy metals such as

lead, cadmium, mercury, etc.

Proposition 65 covers the entire life of the product, so production, recycling and disposal all need to be taken into account by the manufacturer who is responsible for the product from beginning to end of life. UV inks do not violate the conditions of Proposition 65.

Pigments available to ink manufacturers fall into two distinct categories—organic and inorganic. Organic inks are derived from organic sources while in-organic inks are based upon minerals and heavy metals.

Just like their organic source, organic inks will burn and discolor with very high temperatures. However, because of the lower temperatures required by UV inks, manufacturers can use organic pigments rather than the inorganic heavy metal-based pigments required by high-temperature firing of thermo-setting inks.

In addition, compliance is easier to accomplish because UV inks are typically manufactured in facilities completely free of heavy metals, eliminating the chance of accidental contamination.

### Conclusion

UV technology has become an established, economical and clean solution for glass product decoration. New developments in UV-ink technology are constantly offering printers new and innovative ways to meet customer demands. ▸

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