FEATURE

UV-Inkjet Printing for Commercial Graphics

Markets and Applications

By Dan Marx

In just the past couple of years, UV-curing inkjet printing has made a strong entry into the wide-format inkjet graphics industry, leading a revolution within a process traditionally centered in water-based ink systems. This revolution is punctuated by the ability of digital imagers to successfully use inkjet printing on an increasingly wide range of substrates, allowing significant growth in the number of end products for which the process can be used.

UV inkjet printer.

UV-curable inks have been used in the traditional printing sectors of offset, screen, flexo and gravure for more than a decade. In all of these processes, UV inks continue to win market share from other ink types, often accounting for 20% or more of the ink market in such sectors. Features such as low-environmental impact, process stability, and rapid drying even on non-absorbent substrates (media) have been important drivers. For the offset litho process, introduction of waterless plates and UV-curable inks has enabled the litho process to challenge screen and even flexo in new applications on plastic substrates. By contrast, the introduction of UV inks into the inkjet industry has come very late in the day, but they are here to stay.

The use of UV-curable inks in digital graphics, coupled with the development of flatbed inkjet printing systems, has led to two significant developments in the industry. First, UV allows for printing onto a wide range of substrates. While it will not adhere to every surface, it is being successfully used on surfaces such as corrugated, rigid plastics, glass, metal and ceramic tile. Second, due to the durability of images printed with UV, imagers are

able to present a durable final product without the need for protective surfaces such as laminating film or liquid lamination. By skipping this step, imaging companies are able to deliver finished product more quickly and do so at a reduced labor cost.

Recently, opaque white ink has been introduced to a number of equipment manufacturers. Opaque white can be used as an undercoat, allowing color-correct printing on non-white or transparent substrates. It can also be used to add additional highlights to printed images.

Markets Overview

The following list outlines commercial graphics markets, which utilize UV-curable inkjet. The markets listed are part of a growing number of areas where the technology has the capability of achieving a commanding presence. This listing is by no means exhaustive, but it does portray the majority of UV-cured digital imaging work done today.

Retail Signage

In the past several years, inkjet has gained a significant segment of the retail signage market, mainly because it offers full color at low cost and is ideal for the image diversity required in today's retail markets. This prominent market is the "bread and butter" of many companies using digital imaging technology.

Point-of-Purchase Display

Working hand-in-hand with retail signage is point-of-purchase display (POP). POPs highlight a product, whether it is through digitally imaged "shelf hangers" promoting unique characteristics or price reductions, or elaborate displays constructed to simultaneously display and advertise.

Exhibit Displays

Inkjet printing has revolutionized the exhibit display industry, allowing companies to economically change the graphics of a display to highlight product launches, geographic location or the names of specific events. Exhibit displays are printed on rigid board, fabric, vinyl and other substrates.

Exhibit display.

Banners

One of the prominent markets for digital textile printing and rolled vinyl is the banner market. In retail establishments and restaurants as well as in public places and pubs, digitally printed banners have become a common sight. This process allows for attractive, affordable banners produced in captivating, full color.

Architectural Signage

Architectural signage produced with digital printing can be truly awe-inspiring—imagine a building wrap 100 meters high or a 7,500-square-meter likeness of a star athlete. Architectural signage can also be presented on a smaller scale in public places or private buildings, providing affordable, changeable and unique directional signage or advertising.

Interior Decoration Products

The use of inkjet for interior decoration will grow significantly in the next few years. Whether the process is used to image upholstery, curtains, carpeting, wallpaper or other interior elements, digital provides designers with a unique advantage over the traditional swatch-book shopping many interior designers currently use. Unique, one-of-a-kind interiors can be created, installed and customized to fit the space.

Vehicle Graphics

With the help of an experienced graphics installer, digitally imaged graphics can be "wrapped" around buses, trucks and other vehicles, providing striking mobile advertising for any client. Other vehicle graphics can also include massive displays on the sides of delivery vans or tractor-trailers.

Entire vehicles can be swathed in dynamic colors and eye-popping graphics in a process called "bus-wrap" advertising.

Attendees were able to learn more about UV inkjet at RadTech's e/5 2004 Technology Expo and Conference.

For transit graphics, digital imaging can provide economical short runs, allowing even small businesses to utilize the power of transit graphics.

Packaging Products

The use of inkjet technology, specifically UV-curable inkjet, holds strong yet untapped promise. Packaging printers have unique opportunities when using affordable full-color UV-inkjet printing in cooperation with mass customization. Imagine ordering a product and having it arrive in packaging specifically customized to your interests, affiliations or geographic area. Digital can do what others cannot.

From the Field

Those working within the industry may best state the strength of UV inkjet. In a recent interview on *www.dpia.org*, Terry Amerine, of Sericol, stated:

"We see digital imaging continuing a rapid penetration in the graphic imaging industry. The print speeds of the equipment will continue to increase at a fast pace. As a result of the increase in the print speed and capability of new printhead technology, we are firmly convinced that UV-curable inks will become the dominant technology. We base this on the fact that UV chemistry is the only technology that does not use an evaporative drying process. The issue with evaporative drying inks is that as the print speeds on the equipment increases these ink technologies, water and solvent, will reach a point where it is not possible to dry them quickly enough on the printed material while still not plugging the nozzles on the printhead. UV inks only cure upon exposure to the UV light itself so they will not be a constraining factor on the speed of the printer."

However, the process still has a way to go. Hoddy Peck, of Meisel Digital Imaging, an early adopter of UV inkjet, said:

"The image quality is sometimes image dependent. While normally everything looks great, there might be an image that shows banding because of a particular flat field of color. If image quality on a given job is marginal because of the image content, the response is to slow down the machine. This of course causes other productivity and schedule problems. In general, all of the manufacturers are working to speed up the machines while holding or improving "best quality" levels.

"Another issue that is being addressed is the optimal composition of the ink. Because only one type of ink can be used for all substrates, it is necessary to have properties that work best in different situations. Any change to the ink to improve adhesion, for example, must be balanced against the effect on the flow through the ink head. There are many tradeoffs."

Conclusion

Many in the digital imaging industry see UV-curable inkjet systems as a new and intriguing development they will continue to watch. However, others, whether they are imaging companies or companies developing the equipment, have made a strong commitment to the technology and are working to prove its value in the marketplace.

For digital graphics, UV-curable systems do have competition, specifically from solvent-based systems. Though solvent systems and related consumables are often less expensive, these systems do not allow for the wide variety of substrates found in UV systems. In addition, solvent systems are much more likely to contribute to the environmental emissions of a facility and to fumes within the facility.

Through a joint committee, the Digital Printing and Imaging Association and RadTech will continue to address issues specific to UV-inkjet printing and highlight new applications and developments in the technology.

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