This backlit was direct printed on Lexan, and is a nice addition to the brew-pub atmosphere. (image courtesy Sheffield Plastics)

# Brighter from Behind?

## Choosing the best backlit materials for the job.

### By Dave King

*Dave King is "Commander of Results" at MarketKing, a marketing agency that offers the Print Shop Makeover. The program is designed to visit and teach business owners about digital printing. For more information, e-mail him at david@themarketking.com.*

A few months back I wrote an article on making the perfect backlit display, but not all applications call for a day/night backlit display. This article is to help you understand the various choices available to you to create backlit displays.

### LIGHTING CONSIDERATIONS

It's important to realize that it's the *opacity* level of the product that determines the quality of a backlit — how the light will be diffused, how much light will pass through the ink, and what color will be added to the inks based on the color of the media. I wish I could tell you that 30 percent opacity is the ideal choice for backlits, but I would be misleading you. The answers are all based on the light source, light power, distance between the light source and the image, viewing conditions, and size of the backlit.

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• The light source should always be as close to 5000k as possible.

• Light power is much more complicated than you might think. For example, if your light box is in a retail store with bright lights all around it, then your light source needs to be powerful enough to overpower the lights in the room, but not so powerful that they wash out the blacks in the print.

• The distance between the light source and your backlit is also important. Too close may cause hot spots and/or premature fading. Too far and the graphic loses brilliance.

### BACKLIT OPTIONS

**Duratrans** – This is a very popular backlit material, and perhaps creates the best quality images of all backlit options. Duratrans (Kodak's trademark name) backlits are produced using Durst Lambda- and Océ LightJet- type image setters. Special lasers image to an emulsion-coated polyester film which gets run through a chemical processor. The imaged film is then laminated (or not) and mounted to acrylic sheet using optically clear mounting adhesive from MACtac, Seal/Neschen, etc.

*\* Pros* – Very fine image quality, almost perfect color.

*\* Cons* – Very little UV durability; Duratrans film is expensive; requires an image-setter device to produce; must be lit from behind for proper viewing.

**Aqueous Backlit Film** – This is the next most popular choice for backlit prints. For this method reverse-print the image with a water-based inkjet printer onto a specially coated polyester film which is then laminated and rear-mounted to an acrylic sheet. This type of coated backlit film is available through LexJet and other suppliers.

*\* Pros* – Anyone with an aqueous printer can produce a backlit; quality is

This Duratrans backlit application required a butt-seam that is quite visible, typical of what you might see at airports. But a well-made vinyl banner would eliminate the need for a seam.

very good; when laminated, the prints are very durable since they are rear-mounted.

*Cons* – Very little UV durability; film is expensive; requires laminating; must be lit from behind for proper viewing.

**Vinyl Backlit Film** – These outdoor-durable backlits are solvent printed onto either a white translucent vinyl or a clear backlit vinyl. This is a very popular option since so many print shops have a solvent printer. Quality backlit vinyls are available from numerous manufacturers including Oracal, Catalina, LG Chem, Arlon, Avery and 3M, to name a few. There are four major types of backlit displays for solvent onto vinyl:

•Single-strike on white translucent vinyl, face mounted.



Here is a great example of an outdoor sign mounted to poly-carbonate. This one is printed on LG Chem's LD4910M backlit vinyl. A sign like this would be very difficult to create the conventional way. (Image courtesy LG Chem)



Mark Lewis, who owns Studio 121 in Loveland, Colo., created this storefront backlit display for his studio with six light boxes stacked together (four in one window and two in the other). He printed the images on LexJet TOUGHcoat Water-Resistant Polypropylene on his aqueous Epson 9880 printer. (Image courtesy LexJet)

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*"The back lit vinyl banner is*

*an inexpensive solution when*

*compared to other options."*

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*\* Pros* – Easy to produce; easy to install; looks like a poster during the day; and they are quick to change out.

*\* Cons* – The image may look washed-out at night, as the single layer of ink is not enough to create a good solid image when lit from behind.

•Double-strike on white translucent vinyl, face mounted.

*\* Pros* – Easy to produce; looks great day or night; easy to install; quick to change out.

*\* Cons* – Image can appear too dark during the day due to the double strike needed to look good when backlit.

•Double layer, with clear print first, than white translucent, rear mounted

*\* Pros* – Looks great both during the day and at night; will last a long time; very durable for outdoor signs (as the film is rear-mounted to the Lexan/polycarbonate).

*\* Cons* – Very difficult to make; requires a light table to light the source as you are making the image; requires two sets of prints which means a higher cost to produce; the white layer should be laminated with a UV laminate to help protect the ink from the UV given off from the internal light source.

•Double layer, with clear print first, then white translucent, face mounted.



This framed backlit was created using fabric backlit material from Neschen America. (image courtesy Neschen America)



Here we see a nice example of a vinyl backlit banner. This one was produced on Vulite Pro BL from UltraFlex. (image courtesy of UltraFlex)

*Pros* – Looks great both during the day and at night; will last a long time (but not as long as the rear mounted); somewhat durable for outdoor signs.

*Cons* – Not as durable as a rear-mounted image.

**Backlit Banner Material** – The backlit vinyl banner is an inexpensive solution when compared to Duratrans or other options that require mounting to clear sheet. Very large backlits can be created without having to create a seam. A few months ago, I was in Vancouver, Canada, and saw a huge, stunning backlit display (8' x 16' wide). No seams. It was – you guessed it – a huge vinyl backlit banner.

*Pros* – Backlit banner material comes up to 196" wide; the cost of the material is low; the durability is good (depending on the inks you use); it is easy to ship and easy to install.

*Cons* – It can be easily cut with a sharp object; in most cases, it requires a special box, as the vinyl must be pulled tight across the surface.

**Direct Print to Substrate Backlit** – For this application the image is printed directly onto the rigid sheet using a flatbed UV-curing printer. In most cases, the images are printed to PETG for indoor use (PETG offers better ink adhesion with UV-cure inks than other clear rigid materials), or on polycarbonate sheet for outdoor applications. I often use PETG and/or polycarbonate from either Sheffield or Sabic (GE). For this application you need to either have a flatbed printer that prints white ink, or you must back the print with a translucent white vinyl after printing.

*Pros* – UV-curable inks produce exceptionally solid colors and are very vibrant; easy to produce since no mounting is required; good fade-resistance/durability; costs less to produce since vinyl film is not needed.

*Cons* – Not all UV-curing printers can print white ink; if unlaminated the image can scratch during handling; printing mistakes are costly.

**Direct Print to Clear Film Backlit** – This application involves a special coated polyester film that is similar to Duratrans, but instead of an emulsion coating, it has an inkjet-receptive coating. It is best printed with UV-curable inks and can be mounted or slipped between two pieces of Plexiglas. The product is called "litho printable polyester" from Sabic and it is available inkjet coated in thicknesses up to 10 mil.

*Pros* – Very durable; great adhesion with UV-curable inks; stiff film (10 mil) does not curl under UV cure lamps; very low cost; available in 61" wide rolls.

*Cons* – Solvent inks don't stick as well as UV-curable inks.

**Backlit Fabric** – Most fabric is translucent by nature and can work well for backlits. The choices are vast for the types of fabric that can be used. Good fabric sources for backlit applications include Neschen America and Glen Raven. And a European company, Junkers & Müllers, is targeting backlit fabric applications with a specially coated new product called Mediatex Lightbox fabric (available in the U.S. through Graphics Media), which they claim has great light diffusing properties.

*Pros* – Light-weight; can be dye sublimated or direct printed (solvent or UV); easy to stretch across frames; come in widths up to 16.5'; lights up great when double struck; can be welded or stitched together for larger displays.

*Cons* – Fabric can be difficult to finish (requiring a heat knife and/or sewing machine).

In all cases we here at *Digital Graphics* try to help you learn a little more with each issue, and I am proud to be part of the team that brings you this information. Hope you enjoy this one. See you on the tradeshow floor. **DG**