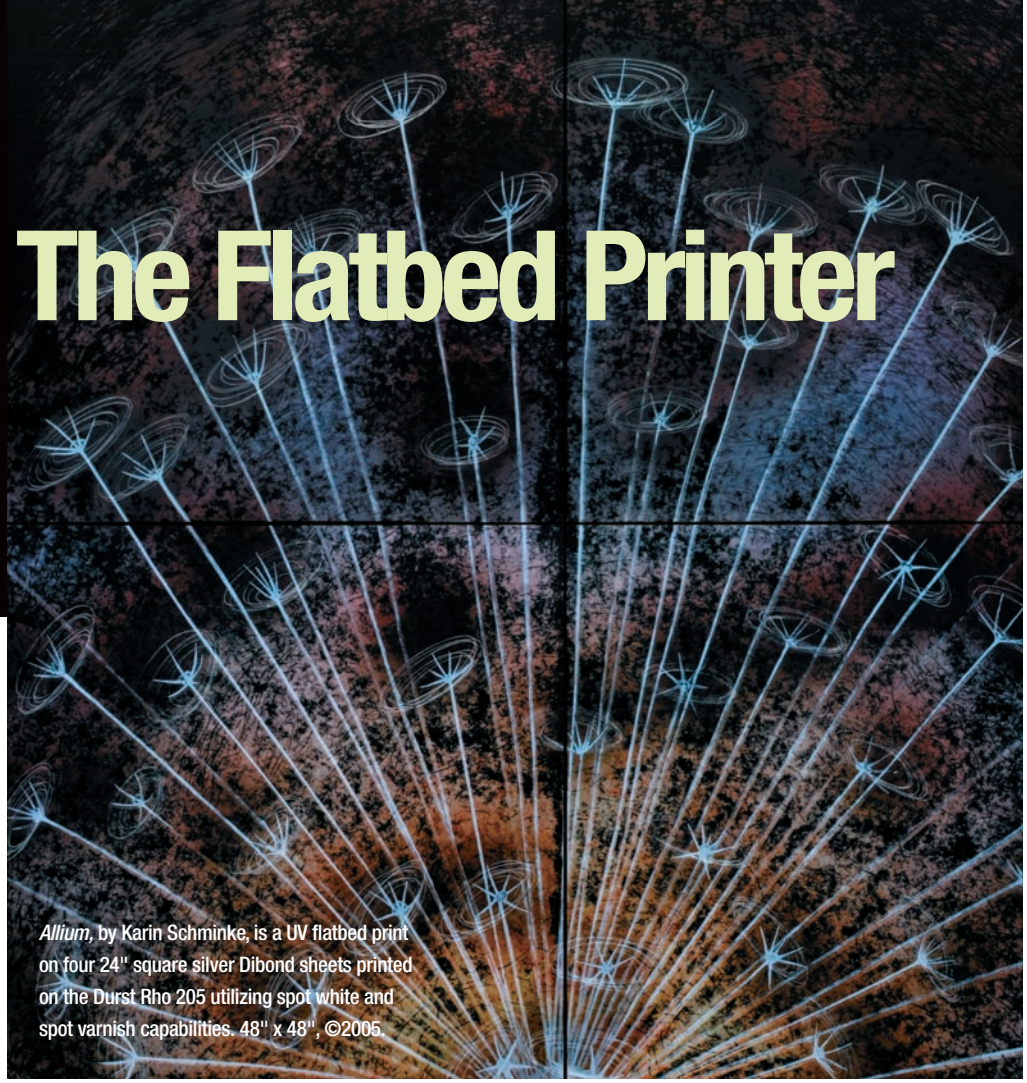
Flatbeds and Fine Art

Fine Art and The Flatbed Printer

Three professional artists spend some hands-on time with nine of today's digital flatbed printers.

BY BONNY LHOTKA, DOROTHY SIMPSON KRAUSE AND KARIN SCHMINKE

About the Authors: The three artists of Digital Atelier are traditionally trained artists who were early adapters and integrators of digital technologies. Their work is widely exhibited in both public and private collections. The trio co-authored Digital Art Studio: Techniques for Combining Inkjet Printing with Traditional Art Materials, *which was released by Watson-Guptill in 2004.*



Allium, by Karin Schminke, is a UV flatbed print on four 24" square silver Dibond sheets printed on the Durst Rho 205 utilizing spot white and spot varnish capabilities. 48" x 48", ©2005.

As fine artists who have worked closely with the digital printing industry for over ten years, we of Digital Atelier have been in a position to spot innovation in emerging technologies that has potential for use in the creation of fine art. Since the introduction of wide-format printers, nothing has excited us as much as the appearance of UV-curing flatbeds.

Our experience with flatbeds began in 1996, when we worked on the Alpha Merics Spectrum vertical phase-change flatbed. Since then, we have had access to a prototype Mimaki JF series T-shirt printer, a UV-curing Zünd 215 UVjet-C and three Encad NovaJet 880 water-based flatbed printers. With flatbeds, we saw new possibilities to create art on glass, metals, wood, corrugated cardboard, handmade paper and embossed tin ceiling tiles for the first time.

WHY FLATBED PRINTERS?

Flatbed printers offer much to the field of fine art printing. One drawback to using traditional roll-fed inkjet printers in producing fine art is that the printed surface must be flat. With UV-curing flatbed printers, flatness is no longer a problem — both the printing surfaces and the inks have dimensionality.

The ability to print on virtually any dimensional surface without pre-coating offers an enormous range of possibilities, such as printing on collage, assemblage, low-relief surfaces and even pre-stretched canvases. Prints are equally good on surfaces with combinations of porous and non-porous or matte and shiny materials.

UV-cured inks sit on the surface of the print with the physicality of paint or traditional printmaking inks. Additionally, white inks, which are becoming more common, offer startling effects for artists working on unusual non-white surfaces. And UV prints on glass have a look akin to etched glass — opening up the printing market for architectural art.

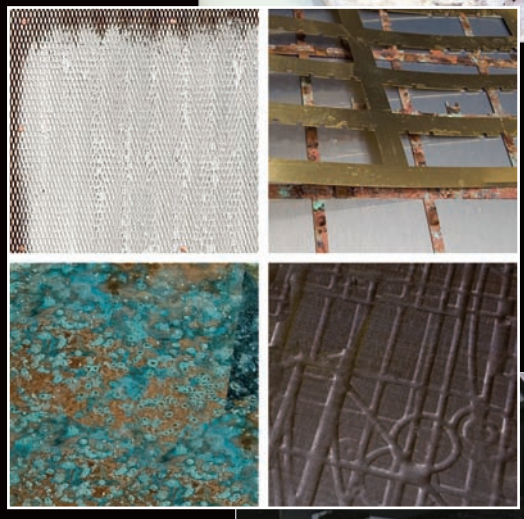
TESTING FLATBEDS FOR FINE ART

Over the last year, we have evaluated the fine art capabilities of nine current UV-curing printers from eight manufacturers. Listed in the chart below are the features most important to fine artists.

COMPANY	PRINTER	COLORS	WHITE	THICKNESS	WIDTH	LENGTH	RESOLUTION DPI	ROLL/RIGID
ColorSpan	72UVR	4		.25"	73"	120"	600 x 600	Both
Durst	Rho 160W Rho 205	4 4	w w+clear	1.58" 1.58"	62" 80"	any any	360 400 or 600	Both Both
Mimaki	UJF-605C	7	w	1.95"	19.5"	23.4"	1200 x 2400	Rigid
Océ	T220 UV	6		2"	62.5"	120"	309 x 309	Rigid
Raster	RP-720 UV	6		1.2"	72"	any	720 x720	Both
Scitex	VEEjet	4		1.57"	78.7"	118"	720 x720	Rigid
VUTEk	PressVu UV 200/600	4/6	w	1.55"	80"	any	360 x 600	Both
Zünd	UVjet 215-C	4		1.57"	84"	any	360 x 360	Rigid

VUTEk has a proprietary process for curing glass that increases ink adhesion. The glass emerging from this dryer is 24" x 24".

A 24" x 24" embossed tin ceiling tile is fed into the Zünd UVjet 215-C.



Some custom printing surfaces used were rusty wire screen, scrap metals, antiqued copper leaf and embossed lead.

Pieces of aluminum are positioned over 22" x 19" handmade bark paper, ready to be printed on the Mimaki UJF-605C.

SURFACES FOR PRINTING

For the range of media we wanted to test, we headed to recycle centers, junkyards and antique malls, and perfected the art of dumpster diving. We printed on glass, wire screen, cement, paper, leather, textiles, Venetian plaster, gold leaf, copper, rusted metals, lead, old drop cloths, tiles, glass, polycarbonate, polyethylene, wood scraps, doors and all manner of odd bits and pieces of rubble. Low-relief surfaces created by carving, etching or routing can also become a surface for a printed image.

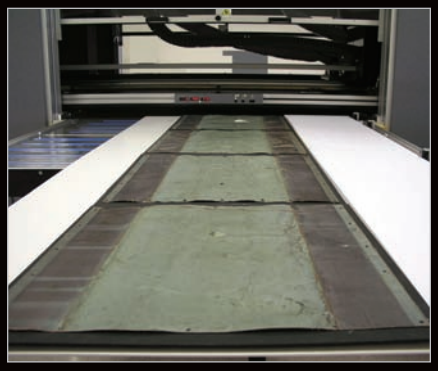
Among the finest commercial materials available for UV flatbed printing is Dibond by Alcan. Dibond's brushed aluminum and brushed gold surfaces quickly became our favorite substrates for more photographic art. Every printer we tested imaged well to this rigid board.

PRINTER FEATURES

Resolution and speed are not of primary importance to artists, but the ability to restart the print and do a double strike to build up ink layers is a great advantage. In general, it was difficult — but not impossible — to approximately re-register work on these machines.

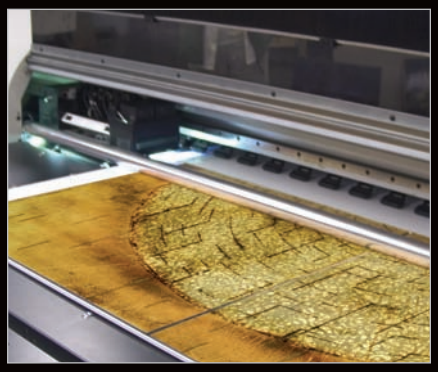
Printers featuring a vacuum table or conveyer belt for positioning media, such as the Scitex VEEjet, Océ Arizona T220 UV, Durst Rho 160 W and VUTEk PressVu UV 200/600, were easier to realign. These printers hold the material tightly in place without rollers coming in contact with the image. This transport method makes it possible to print edge-to-edge or even full-bleed on very irregular substrates. This feature also allows an artist to print an image, leave the substrate on the bed in order to add additional paint or collage elements, and then do a final overprint.

Another type of media feed uses grid rollers on the bottom and rubber rollers



Four pieces of old copper nailed to 24" x 24" black plywood are ready to be printed on the Durst Rho 160W.

Six 24" x 24" images are printed on brushed aluminum Dibond with the VUTEk PressVu UV 200/600.



A positioning tray was successfully used to overprint one image onto the edges of two gold Dibond panels with rice paper attached, using the Raster Printer RP-720 UV.

A test point is measured by hand and used to set the head height of the Océ Arizona T220UV.

that clamp the image from the top. The rubber rollers may catch when printing on assembled surfaces. The Raster Printer RP-720 UV, with its 1.5" head clearance, is an example of a printer with a grid roller feed. We found that by using a carrier tray that could be marked for positioning substrates and aligned with the printer's alignment bar, we could determine the position of the print more accurately.

Of equal importance to accurate positioning of print onto substrate is the ability to measure the often unequal surface of handmade substrates in order to appropriately set the printhead clearance. Some printers, like the Mimaki UJF–605C, use a laser system to read the head height; but with others it is necessary to measure a test point by hand.

Some printers are equipped with sensors that will stop the print if the printhead hits a high spot. An exceptional feature of the Océ Arizona T220, for artists, is the ability to move the carriage out of the way to pound down or remove an offending high spot. When printing is resumed, the printhead finds where printing was stopped and flawlessly completes the print.

WHITE INK

The addition of white ink to some UV-curing printers is one of the most powerful features for fine art printing. While some can print white only as an underprint behind the entire image, others can print white as an underprint, overprint, spot, underspot, overspot or as a fill color. For example, the Durst Rho 160W offers five ways to use white; the VUTEk PressVu 200/600 offers six options. "Spot" printing works with Photoshop layers or alpha channel masks, while with "fill" printing the RIP automatically places white in image areas without color.

Because white is highly viscous, printhead nozzles must be large enough for the heavy ink pigment to pass through, often resulting in lower resolutions.

Spot varnish, currently available only on the Durst Rho 205, is another creative option. It adds depth to blacks and can be used to create selected areas of gloss finish. Another unique feature of the Durst Rho 160W is the choice of applying a gloss or matte finish to the entire image without the use of a varnish.

FLATBED CONSIDERATIONS

Making art on a flatbed printer can push printers to new heights. The operator must be skilled and creative and the artist needs to understand the parameters of this new technology. It is good to be aware of the following:

- Visible color shifts, or "metamarism", can be caused by screening, ink density, order of ink layering, dither pattern or lighting conditions. Test ink on a variety of substrates and lighting situations to avoid surprises.
- The order in which ink is applied can tint clear media, such as polycarbonate or Plexiglas, giving a colorcast to one or both sides. If images are to be viewed from the back or from both sides, the ability to control the ink printing order would solve this problem. If the printer does not have that ability, test colors on the final material.
- The ability to make a double-strike with perfect re-registration allows users to build greater color opacity and ink density.
- A printer that allows the operator to stop prints to make adjustments (flatten a bump on an irregular surface) then re-start and complete the print is very helpful.

The spot white feature is especially effective when printing on Dibond. This detail shows white ink combined with spot varnish on the Durst Rho 205 to create deeper and richer blacks.

The ColorSpan DisplayMaker 72UVR uses a vacuum, pinch wheels and grid rollers for advancing rigid media.

Village, by Dorothy Simpson Krause, was printed on copper grid over wood and aluminum with white gesso using the Durst Rho 160W. 24" x 24", ©2005.

Evergreen, by Bonny Lhotka, was printed on the ColorSpan onto Dibond brushed aluminum with white paint under selected areas. 36"x 36", ©2005.

- To be certain that a surface works with a particular UV ink set, test for scratching or lifting.
- When using pinch-wheels and/or grid rollers on rigid media, the printer must have adequate motor strength. Vacuums and transport systems need to be powerful enough for heavy materials.
- Bi-directional printing on assembled or routed surfaces can result in apparent mis-registration or banding and result in a blurry image. Printing unidirectional alleviates the problem.
- On some roll-fed printers it is necessary to do a media feed calibration for each different substrate. Failing to do this can result in some prints finishing before reaching the end of the media, or banding.
- Some printers, like the ColorSpan DisplayMaker 72UVR, may need an extra six or seven inches of media at the end to clear the media sensor. To print full bleed, it is necessary to tape a tail of the same media to the substrate.

PRINTING FOR ARTISTS

The price of these printers range from $55,000 to $450,000, and physical space requirements, including, in some cases, ventilation, makes owning a UV-curing flatbed printer prohibitive for all but the most affluent artist. However, we have selected two that could be accessible to a group of artists wishing to share use. The MacDermid ColorSpan DisplayMaker 72UVR and Raster Printer RP-720 UV are both under $75,000. The ColorSpan can handle 1/4" media, and the Raster Printer prints on media up to 1.5" thick. The ColorSpan prints at 600 dpi and the Raster Printer at 720, both excellent resolutions for original art applications.

Service bureaus wishing to use their printers to enter into the fine art market may consider several innovative approaches to working with artists:

- Offer a demo/training session to a group of artists. Show them how to prepare files and substrates. Explain the limitations and potential of the equipment. Print sample images on a variety of surfaces.
- Sell artists half- or full-day sessions with exclusive use of a printer and the services of a technician/operator. If providing services by the hour, be sure to have fast computers to RIP and feed images to the printer to avoid frustrating bottlenecks.
- Consider training select artists to run the printer themselves and allow them fee-based access during off-business hours.

THE FUTURE IS HERE

As the technologies mature and economies of scale make them more affordable, UV-curing flatbeds will become the printers of choice for fine artists. The physical quality of the UV-cured ink and the ability to print onto virtually any surface opens many new possibilities for creating art.

Art utilizing this new technology has already moved beyond the experimental stage. As evidence of this, an exhibition of the authors' art produced on UV-curing flatbed printers was held at the Danforth Museum of Art in Framingham, Mass., April 15 to June 24, as part of the Boston Cyberarts Festival. It is the first museum exhibition of fine art produced on UV-curing flatbed printers. An additional exhibition of Krause's work with UV flatbed prints was held at the Judi Rotenberg Gallery in Boston, May 12 to June 4. Lhotka will have a one-person exhibition of UV art at Walker Fine Art, in Denver Colo., Nov. 11 to Jan. 3, 2006. For more information on the artists/authors and their work, visit www.DigitalAtelier.com. DG