

# Creative Printing

Techniques for combining inkjet printing with unique materials

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Years ago, when we chose the computer as a printmaking tool, few artists worked within the limitations of the digital medium (at the time, computers offered eight colors and printers were dot-matrix). We found those limitations demanded the addition of traditional media, so we began exploring the integration of digital printing with traditional art materials.

When large-format inkjet printers were just being developed, we identified them as tools with great artistic potential. Wanting to understand the



Handmade paper lent depth to Karin Schminke's "September" inkjet print

new technologies, and gain access to equipment we couldn't afford to own, we became liaisons — between other artists interested in using these new tools, and manufacturers who needed to understand such important artistic concerns as ink permanence and the ability to

print on heavy substrates. As we developed new techniques, we wrote about our findings and presented workshops and seminars at such diverse venues as universities, tradeshows and art museums.

After 10 years of exploration, we documented the processes we had created in a book, *Digital Art Studio* (Watson-Guptill Publications, New York City, 2004. Also sold by ST Media Group, [www.stmedia-group.com/stbooks](http://www.stmedia-group.com/stbooks)). In this article, we'll highlight a few techniques that allow shops with inkjet printers to experiment with different substrates.

## Preparing White Matte, Precoated Surfaces

To illustrate how to prepare this type of precoated surface, we coated Strathmore Aquarius II synthetic watercolor paper, because it doesn't stretch or shrink when moistened. Before you start, protect your work surface with newspaper or a large plastic sheet. As with any art material, wear protective gloves when applying inkAID's precoat. Use a sponge brush for smooth application.

**Step 1:** Place the paper face up on a protected surface. Stir the white-matte precoat. With a sponge brush, apply an even coat. One coat will suffice, but, to ensure a perfect covering, apply a second coat after the first has thoroughly dried.

**Step 2:** After the precoat is no longer runny, hang the sheet from one end to reduce wrinkling.

**Step 3:** Wait until the precoat completely dries. Check if the paper is flat enough to feed through your printer without the printheads striking or dragging on the paper. If the paper is still too curled, press it flat under a heavy board overnight.

Large sheets to be fed through large-format printers can be formed into a soft roll (6-in. diameter or larger, with precoated side out), and bumps in the paper will often even out in five to 10 minutes, so that it feeds easily through the printer.

**Step 4:** Feed into the printer and print normally.

## Terms

Some understanding of both digital and classic tools is recommended, but not required. Here are a few terms or materials:

**Precoats.** A precoat adheres the waterbased ink to the printing surface in order to control inkjet dot size and color, and to speed drying time. Three types of commercially applied precoats are used:

1. Gel precoats feels sticky when pressed with a wet finger.
2. Microporous precoats dry immediately, exhibit no dot-gain, and



## Precoating Surfaces

Although commercially precoated materials are dependable, coating your own materials enables you to produce images on more unique surfaces.

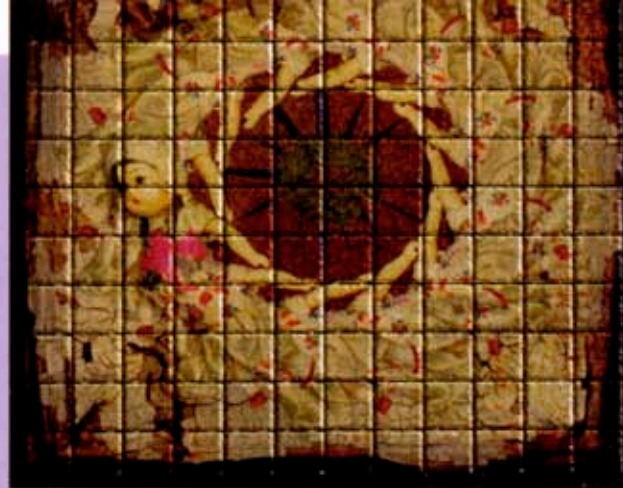
A precoat allows you to transform many "non-art" materials, such as leather, aluminum, Plexiglas® acrylic, tile and wood veneer, into printable surfaces — as long as those materials don't exceed the printer manufacturer's recommended thicknesses. For example, some printers can print on mat-board thickness (typically 1.5mm). Thinner materials can be precoated and fed through the printer. Just be sure the materials aren't too heavy in weight or uneven.

Printers with extra head clearance (in this example, an Encad 880) open up many dimensional-printing opportunities. Building a reusable "tray," to hold substrates as they pass through the printer, allows you to capitalize on the 880's half-inch head clearance and keep the printhead away from irregular surfaces. Of course, flatbed printers can typically print on surfaces up to 4 in. thick, but not everyone can afford one.

A small desktop printer with paper-guide "pizza



A Fome-Cor® lightweight, laminated, board tray holds pre-coated ceramic tiles as they're printed on an Encad 880 flexible-media printer.



wheels" can still perform the process described here (after a precoat of inkAID or rabbitskin glue), provided the precoat is applied to an absorbent, porous surface. Clear precoats on such non-porous substrates as plastic can stay wet after printing, long enough to pass under the paper-guide "pizza wheels" or rollers, which ruins your print. On a non-absorbent surface, use the white-matte precoat if any rollers touch the print after printing. Again, ensure printhead clearance.



Use a slot ruler to avoid head strikes. Place coins or other objects equal to your printer's clearance at the ends of two square, aluminum tubes, and secure them with duct tape. Slide your substrate through to check for high spots before printing. Printers that accept mat board have 1.5mm clearance, the thickness of a new penny.

tend to be water resistant.

3. White matte precoats are also water resistant.

Few do-it-yourself products are sold for preparing surfaces for inkjet printing. Rabbit-skin glue, which has been used by artists for centuries as an adhesive, a binder and a sizing agent, works as a precoat with some inks but requires preparation and must be used immediately after mixing.

InkAID (Watertown, NY) offers ready-to-use, clear, gloss and semi-gloss precoats, as well as a white matte precoat, which applies as a milky film, but dries to a very flat and bright-white surface that is water-resistant when printed with pigmented inks.

No matter what precoat you

use, test it on your substrate with your printer/ink combination before using it.

*RIP.* Most desktop printers and some wide-format models allow prints to be made directly from such image-editing software as Photoshop®. They come with simple-to-install, printer-driver software. A RIP (see page 100) is a separate software program that interfaces between the computer and printer to transform the image on the screen to the image sent to the printer. RIPs provide more options than drivers, but they can be as expensive as the printers they control. Many wide-format printers require a RIP.

*Waterbased pigment and dye inks.* Most inkjet printers use waterbased inks that comprise distilled water,

glycol, dyes or pigments, and small amounts of UV inhibitors and drying agents. We recommend pigment inks for the processes described in this article, due to their higher fading resistance.

If you're a digital-printing ace, explore the following techniques to use your foundation and expand your capabilities. Consider becoming an expert in one or two of these techniques and offering them as a high-end service to artists.

Alternately, offer artists time on your printer with a technical support person at hand. You could offer half- and whole-day "Digital Studio" access, where the artists pay by the hour and supply their own materials. Weekends and evenings often work well for this. ■





## Aligning Multiple Layers

Creating a "sandwich" print requires aligning the image in the printer for multiple passes. Remember that inkjet printers won't register printing layers in perfect alignment. To achieve optimal alignment, your printer must accommodate manual loading or automatically load to the same position with reasonable accuracy.

On a manually loading printer, you can open a paper-release lever, align your paper and close the lever to grab the paper. This capability lets you control paper position. Desktop printers generally don't allow you to manually position the paper, so an "approximate alignment" is your only choice.

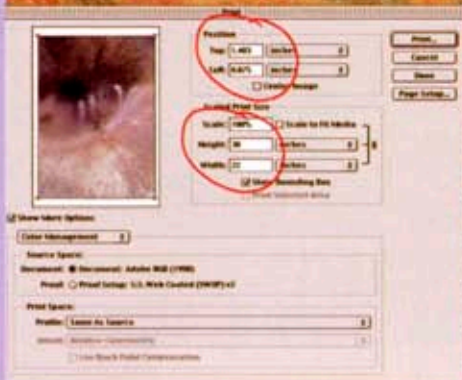
Here are two alignment methods:

**Approximate alignment.** You can align image layers within approximately  $\frac{1}{8}$  to  $\frac{1}{4}$  in. To do so, create all images you plan to print slightly larger than the final size. Select paper slightly smaller than the image so that, when they print sequentially, they'll fit the entire allotted printing area. Then trim or mat your final image to the desired size, to remove or cover any misalignment visible at the edges.

**Marking for repositioning.** This method requires a manual paper-load lever. As you load your paper for the first layer, mark the position in pencil on the paper, prior to closing the lever. Place tape pieces on your printer to create relative marking spots, if necessary.

## Printing in Layers

Layering printed images with other media can create interesting results. In order to print a "sandwich" of three image layers (two transparent, digitally printed layers sandwich a third layer of painted elements, for example), plan your image to build up your layers from light to dark. Dark areas applied first will only darken further as subsequent print layers are printed. However a middle layer of light paint or collaged paper can lighten the value level of the original base print, giving you more options for the overprint.



As you prepare to print, record the paper size, margins and print size chosen in your software or RIP. When you're ready to print a subsequent layer, carefully reposition your paper according to the alignment marks. Set the paper size, margins and print size in your software to match the first print's settings.

Misalignments at the image's edges can be overcome by creating full-bleed images. Extend the paper edges with drafting tape, print beyond the paper's edge into the tape on all four sides, and then remove the tape.

For images with margins, print your first image centered on the paper, then tape up to its edge with low-tack drafting tape, which releases easily. Create overprint images approximately a quarter-inch wider in each direction. Realign your paper in the printer and print subsequent images, which should also be centered. The subsequent images will overprint on the taped area. When you remove the tape, your edges will be perfect.





### Materials

- Protective gloves
- Commercially precoated, inkjet, art paper
- Acrylic paint
- Acrylic medium
- Soft gel medium
- Pearlized or metallic acrylics
- Paint brushes
- inkAID semi-gloss or gloss precoat

### Making a "Sandwich" Print

**Step 1:** Prepare two or more images in Photoshop for printing, or prepare a single Photoshop image with two or more layers that you plan to print separately. Decide how to align the layers and edges (approximate alignment is recommended for beginners).

**Step 2:** On commercially printed paper, print an image as the base layer, or under-image. To ease realignment, the edges of this example have taped extensions, and the image is printed full bleed.

**Step 3:** To the printed image, apply acrylic paint, mixed with acrylic medium to thin the pigments. Create a glaze, and allow the underimage to show through. Use a soft gel medium to emphasize brushstrokes or to add slight relief. Experiment with pearlized or metallic acrylics to add luminescence to the final image. Allow the art to dry overnight, then apply a clear-gloss or semi-gloss precoat, and let it dry overnight.

The overprint image is ready for the printer. Make sure your paper aligns correctly with your overprint. (Refer to "Aligning Multiple Layers," page 106.) Pay close attention to how the paper will be oriented (top or bottom first) as it emerges from the printer.

Remember that even mistakes can often be rescued. An unsuccessful image can be wholly or partially covered with white matte precoat. Let selected areas show through the precoat, or apply it thinly, then print another image on the substrate. What might have been a failure can add interest to another work.







Each of these large, transparent banners was printed in one piece by a service bureau using a solvent-ink flatbed printer.

## Creating Banners

**Step 1:** To plan banner placement, draw a floor and elevation plan to position panels in relation to walls and traffic patterns. Also, take a digital photo of the installation space to plan and visualize your ideas.

**Step 2:** If multiple fabric widths must be placed together, allow for seaming. In this example, the 10 × 12-ft. centerpiece is flanked by two 10 × 8-ft. banners. If your banners need bottom weights to keep them straight, allow enough fabric for hems, grommets or hanging rods. Print your image on the precoated banner material.

## Creating 3-D Work

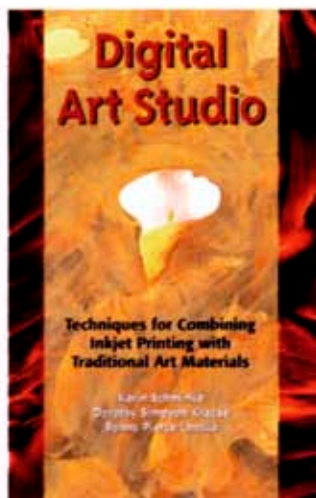
Specialized printers can create multi-dimensional objects. Printers that use a powder-binder technology build a solid object layer by layer, alternately printing thin layers of powder and binder in an additive-printing process. Milling machines, designed for prototyping, let artists carve 3-D forms into various materials, including wood, aluminum, brass and copper. Other printers cut out vinyl shapes for installations and cardboard that can be scored, folded and assembled into 3-D structures.

UV and solvent flatbed printers may print directly on slightly irregular surfaces up to 4 in. thick without a precoat.

Many of these processes require specialized, expensive equipment beyond most artists' pocketbooks. However, a service bureau that has one of these printers may work with artists to explore various dimensional possibilities.

Many signshops that produce banners may also wish to explore suspended banners that comprise sheer fabric. Many banner fabrics — cotton, polyester, polyolefin, polyethylene, vinyl scrim, silk and combination materials — are sold precoated for inkjet printing.

Commercially coated inkjet fabrics are currently available for creating artworks that aren't washable. Special acid and reactive dyes can be printed by inkjet to raw materials for wearable garments, but they will require post-processing and a dedicated inkjet printer for the inks. InkAID-coated fabrics can be used for collage, decorative quilt or art pieces, but they aren't washable.



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## Recycling Your Old Printer for Fabric Printing

You can print on fabric using older, discontinued or obsolete printers, because 300-dpi resolution is adequate for many textile applications. Old printers may even be preferable, because newer models usually have chipped ink cartridges that inhibit them from using third-party inks. (Some third-party ink manufacturers have developed ways of bypassing the chipped cartridge.) Bulk, or continuous, ink systems are preferable; they are most cost effective in terms of ink.

Although technology is continually advancing, the most important component of creative printmaking is a spirit of adventure — using what you know and what you have in unique ways.