Jackie Kierans
Lee Arts Center Workshop
9/27-9/28/2008

IN-GLAZE WATERSLIDE DECALS

Why in-glaze? Jackie's process is the result of research and experiments conducted to find a less toxic decal process.

On-glaze Decals	**In-glaze decals**
Most commercial decals and those made with inks derived from china paints	Made using the process described below; inks made with acrylic medium and Mason stains or underglazes
Usually fire △018-△017	Firing temperature varies. Based on the firing temperature required by the transparent glaze used in the application process and the optimal firing range for the Mason stains used in the ink. Can be △06-△10 (but fire below the temperature of the ware's existing glaze)
Can be removed by chemical or physical abrasion (you can scratch them off)	Pigments are absorbed into glaze and can't be scratched off. Depends on Mason stain used in ink, but nearly always food safe.
Making custom decals is more smelly and toxic	Making custom decals is pretty clean and safe except for the final step: the cover coat
Could be used on glass	**???**

Selecting Images
Realize that the screen doesn't understand gray. Choose or generate high contrast images. For screen exposure these can be on mylar (clear or frosted); transparencies for the printer or photocopier, or even cheap, thin paper.

Preparing Screens for Printing
[Jackie presented information that differs from the "best practices" taught at the Corcoran; writing out the full notes anyway…]

- Choose a mesh size. 215 is good if you are printing photographic images; 175-200 is good "general use."
- Make sure screen is free of blockage from earlier uses; de-grease if screen is new
- Mix photo emulsion with sensitizer. If kept in the fridge, this mixture should be usable for up to 6 months.
- Coat the screen
    - Start with a clean, dry screen.
    - Try to coat the screen in a darkened room (doesn't have to be light tight)
    - Pour the amount of light-sensitive emulsion you think you will need in a clean plastic cup. Wipe the rim of the larger container of emulsion clean before closing the container; it gets goopy.
    - Pour emulsion along bottom of screen
    - Skim coat the screen, lightly pulling the emulsion across the screen using a flat edge (a credit card works). Coat both sides.
    - Scrape off any excess and drips. Avoid streaks.
- Place the screen in a dark place, the more light-tight the better.
- Dry for 20-30 minutes.

[Bonus! You can keep coated screens in a contractor trash bag, well wrapped, for up to a week before exposing them.]

- Expose the screen

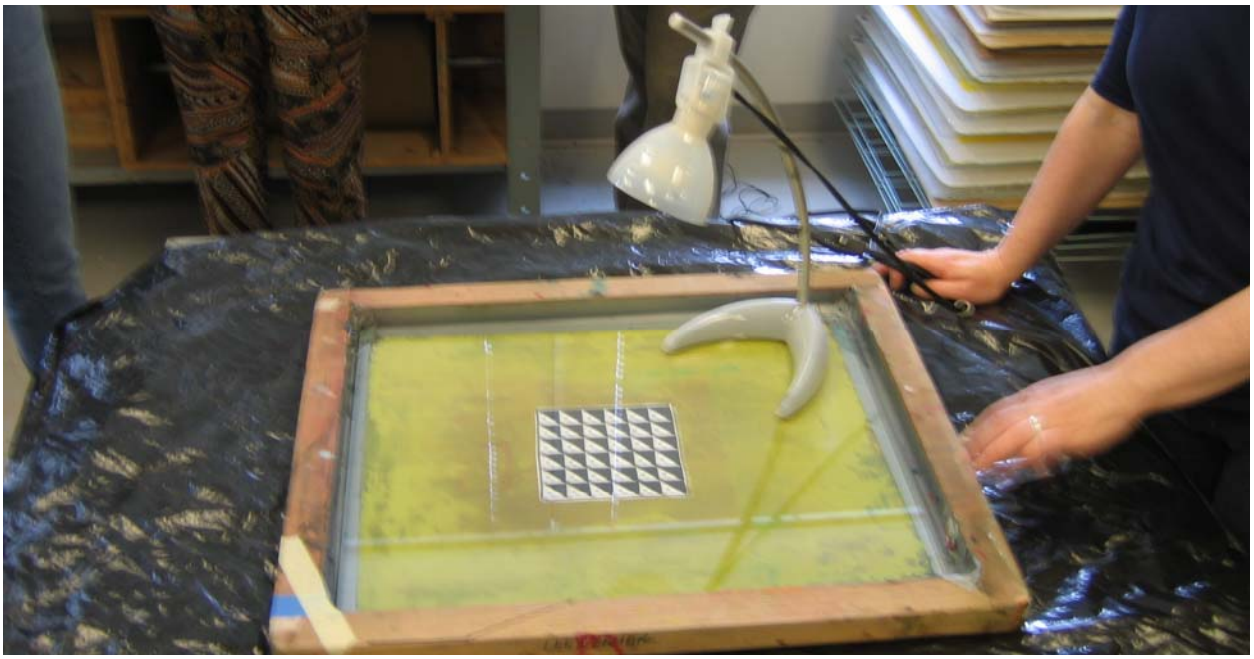
There are three ways you can expose a screen: exposure unit (at school); with a light table or spotlight lamp (at home)

For a light table, make this sandwich:

Top ↕ Bottom	Anything and everything to weight the screen down and create a light tight seal. Here, phone books and t-squares.
	Black, light blocking something. In this case a contractor trash bag
	Screen, surface down
	Image on paper/mylar/etc
	Light table

For a clip lamp, make this sandwich:

Top ↕ Bottom	Light centered above image
	Plate glass or thick, transparent acetate to hold image in place atop screen. (You want a material that won't buckle or warp from the heat during exposure
	Image on paper/mylar/etc
	Screen, surface up
	Black, light blocking something. In this case a contractor trash bag



Clip lamp pros: you can do this at home. Cons: Much stronger exposure in the center; only works well for smaller images.

[To determine the proper exposure for your light table or lamp setup, test as you would for photography. Expose for 60 seconds with the image mostly covered by a piece of cardboard, move the cardboard to reveal more of the image and expose 30 seconds additional, repeat to 2 or 3 minutes total exposure time. Testing process is same for exposure unit but times are much shorter]

[Renting a space to expose screens. Locally, Pyramid Atlantic and the Thomas Jefferson Rec Center]

- Rinse the screen. Wet on both sides and rinse with the spray attachment on the sink using a sweeping motion.

Mixing the Inks

The inks for this technique are made from Mason stains and frit mixed with an acrylic screenprinting ink extender OR Amaco velvet underglazes mixed with the acrylic extender. The acrylic extender is crucial: it makes the ink flow and it encapsulates and makes waterproof the ceramic pigments—this is why they hold up through the waterslide application process.
The acrylic extender has to be the "permanent" one that is water-based but NOT water-soluble.

Bear in mind that not all Mason stains will respond to the recipe the same way. Some will make a runnier mixture and require adjustments.

Oh yeah, the ink can get nasty moldy. A drop or two of bleach should do the trick.

Basic ink recipe:
1 part frit (3124 or 3134) to 2 parts stain
Enough water to mix these into a paste
Extender in approximately the same volume as the paste

[Jackie says precision isn't key. "Heaping tablespoon" was our unit of measure and the tablespoons were plastic picnic ware.]

- Put a little water in a plastic container (you want to add powder to water, not vice-versa)
- Dump in frit and stain
- Mix into a paste. If it's too watery, let the water evaporate some.
- Double volume of ink with acrylic extender
- Mix well and sieve!!

The ink is the right consistency when it's a little softer than gel toothpaste but still holds a blobby shape. It should not be runny. You will be very sorry if you try to use runny ink.
For more opacity, use less extender. For more transparency, use more extender.

To adapt an underglaze, just mix with extender.

[Bonus! Tip for screen printing directly onto clay. Suspend the screen above the slab—there should be about 2mm between the slab and the screen when you are not pulling the ink. This way the screen lifts off the clay right after contact. How do you suspend it? Rig up as necessary.]

Printing

Note the decal paper is shiny on one side and matte on the other. Prink on the shiny (gelatin release) side.

(Set up with clamps, etc.)

[BONUS!! You can screen print with regular, cheap tempera paint onto clay and fire it! Just pick out the right—oxide bearing—paints. Like this brown one (iron oxide in spades).']

- Pour stripe of ink the width of the image
- Gently flood up
- Firmly and evenly pull down

When the screen sticks to the paper, try "putting little shoes" on the frame. Shoes being cardboard, mat board or plastic lids taped to the screen frame to raise it further above the printing surface.

If it comes out thin, let it dry then pull again.

Is it a decal yet?

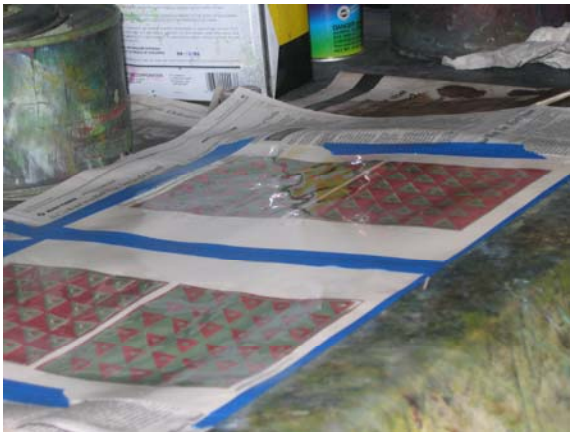
Cover coat

This is the only part of the process Jackie hasn't been able to de-toxify. She's tried egg white, sugar mixtures, you name it. She thinks Kamar varnish works best but you can also use polyurethane.

When ink is dry on decal paper, spray with Kamar. Spray close to paper in sweeping, circular motion. Let this initial coat dry for 24 hours, ideally. Then do another coat and let dry again. This makes the decals strong for application and they won't break up during firing.

Make sure no varnish gets on the underside of the paper. This makes separation of the decal from the paper impossible or at least very, very difficult.

Best practice: use masking tape to secure decal paper to newspaper or a board before spraying. Tape around all edges to make sure none gets underneath. This is especially helpful if you have printed very close to the edge of the paper.



Application!

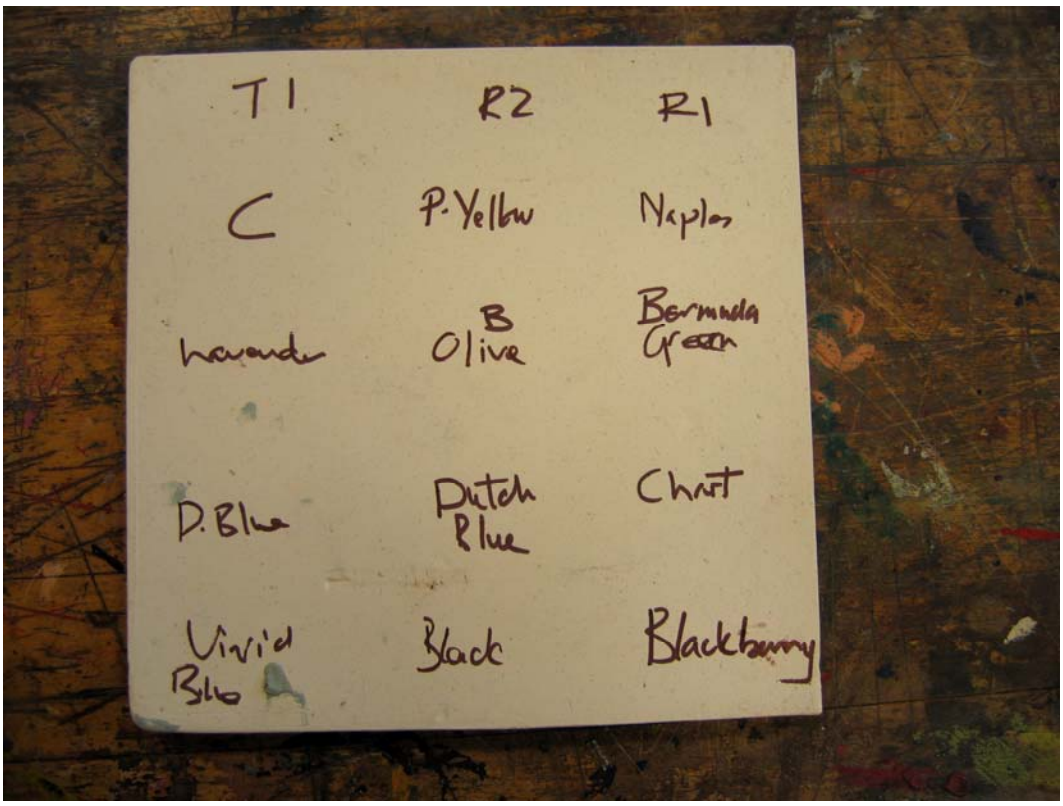
Like commercial waterslide decals, these custom in-glaze decals are applied to ware that is already glazed and fired.

- Select the location for the decal. On 3-D forms, stick to the shoulder or belly or other places the glaze is less likely to move.
- Paint a thin layer of transparent glaze at the application site. Jackie's favorite is Spectrum low fire satin clear glaze for △04-△6. You try any transparent glaze!
- Soak the decal. It will curl up and then flatten out. Then it should be ready.
- Slide the decal onto the wet glaze puddle
- Gently press out any air bubbles but be careful not to squish the glaze out from under the decal
- Clean up any excess glaze
- Let dry 24 hours and then fire.

BONUS! Decals for paper, wood, etc.

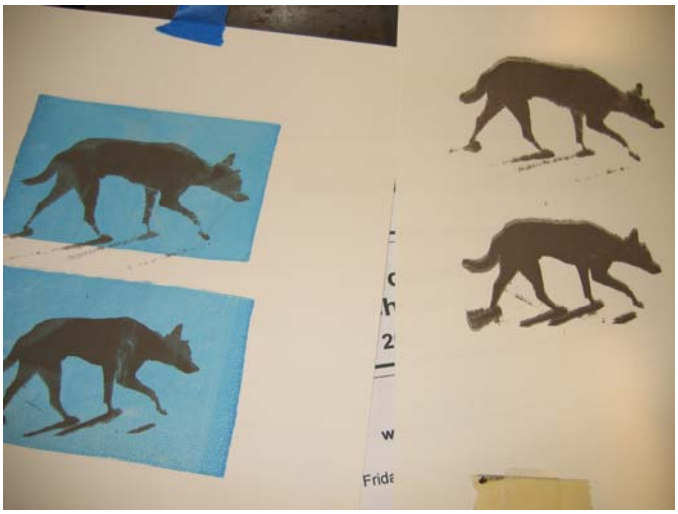
Basically the same process with different materials. Just use regular acrylic screenprinting ink instead of the ceramic ink and liquitex matte varnish or similar for the cover coat (this is not nearly as awful as the Kamar). These dry much faster (can use in a few hours). You can apply directly or float on a layer of more of whatever you use for the covercoat.

Some ink tests. Painted on, not screened.



Key for above. (L-R reversed from image above)

Inks all lined up for printing!


Student’s single and two-color prints.


Too much or runny ink = blurred image