MURAKAMI

September 2009

Technical Newsletter

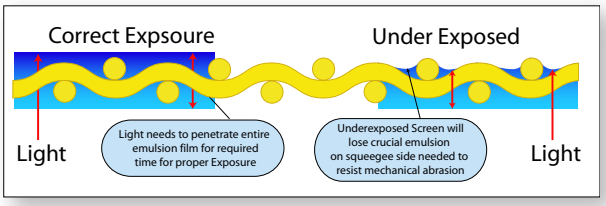
MURAKAMI SCREEN U.S.A., INC. *745 Monterey Pass Rd. Monterey Park, CA 91754 Tel 323.980.0662*

Creating an Exposure Step Test:

How to maximize Murakami Emulsions

Proper emulsion exposure is crucial to your bottom line. Nothing is more costly than having a press stop during production. Quite often the problem can be traced back to poorly exposed screens that exhibit pinholes, stencil breakdown, or poor quality prints that will affect production yields.

The cross section of a screen below shows the dramatic loss of emulsion on the squeegee side of the screen. During development precious microns of protective emulsion are washed off leaving the screen susceptible to pinholes and breakdown.



Step 1: The Exposure Unit

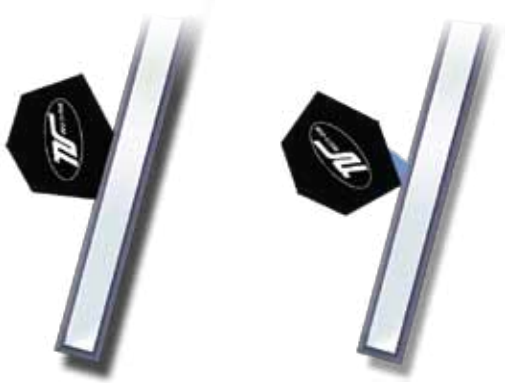
1. **Use units**, not seconds if your expsoure system has a built in integrator. Lamps age and lose potency over time. Units measures the amount of light, not time. So if you are using seconds you will be under-exposing as the lamp ages and loses strength. Change to units or perform an exposure step test every 2-3 months. You can also use a hardness scale when you shoot to verify emulsion exposure.

2. **How old is the lamp**? If you haven't replaced your lamp in a year or more it needs to be replaced. Your lamp may strike and put out light and expose a screen, but it may lack strong UV wavelengths needed for *completely* exposed screens. Install a new one and keep the old one as a spare.

3. **What type of Exposure Unit are you Using?** The stronger the lamp the better the exposure. Exposure units could be compared to engines, you have a wide range from lawn mower engines to V-8's. Exposure units likewise have differing strengths (wattage and spectral output.) The step test that follows is designed to fine tune the exposure time needed for your particular exposure unit.

Tip #1:

Standardize Your Coating Procedure:
In the diagram below have all personnel adopt the coating method on the left. Your screens will all have consistent stencil thickness (EOM - emulsion over mesh).



Correct Contact with mesh equals consistent EOM (emulsion thickness)

Incorrect Contact with mesh equals uneven coating

Consistent EOM creates consistent emulsion exposure. If the stencil thickness varies so does the quality of exposure. The affects of underexposure show up on press in the form of pinholes, stencil breakdown, low production yields and your profitability.

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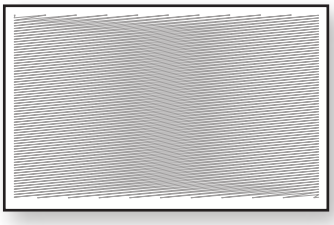
Step 2: Preparing for the Step Test

Items you will need:

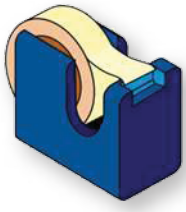
1. **A highly detailed positive;** large enough to cover the print area of the screen. A large rectangle of 50% halftone set to 55 line at 22.5 degrees is good for 200 - 460 mesh. For screens under 200 mesh try using a 1-2pt line at 22.5 degrees again at 50%. Or you can use a large detailed film positive from existing art as well.



2. **A piece or rubylith, amberlith, or thin cardboard** as wide as the frame that you will use to protect unexposed emulsion.

3. **Marker** to draw the panel lines and to note the times for each panel.

4. **Tape** - to secure the test positive to the coated screen. Use more tape than normal since you will be moving the screen and rubylith or light blocking board ten times.

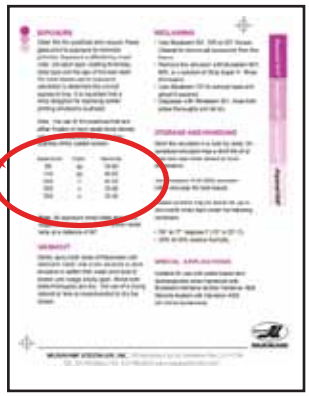


Estimating Test Exposure Time

Exposure systems vary in strength. There are several fluorescent tube models, all with varying strength, and various metal halide lamps from 1.25K to 7.5Kw. All sytems described above will have different test exposure times. (see next page for estimated times.)

The **Murakami Technical Data Sheet** provides estimated exposure times for a 5kw lamp by mesh count and by mesh color. Estimated times for fluorescent bulb systems and lower wattage lamps will need to be increased and may need more time beyond these estimates if complete emulsion exposure (no slime on squeegee side) is not seen during washout.

The times shown are the starting point for a step test calculation.



Depending on your exposure unit you may need additional time for the test to be accurate.

You can download your technical data sheet at www.murakamiscreen.com

Step 3: Estimating Starting Times for Tests:

5kw Lamps: Double Time on Technical Data Sheet

3kw Lamps: Multiply by 3

1.25kw to 1.75kw Multiply by 4

Fluorsescent Tubes - Multiply 5-9 times TDS sheet times. Fluorescent tube systems vary in strength. Increase/decrease test time until complete emulsion exposure is seen on at least half the test panels.

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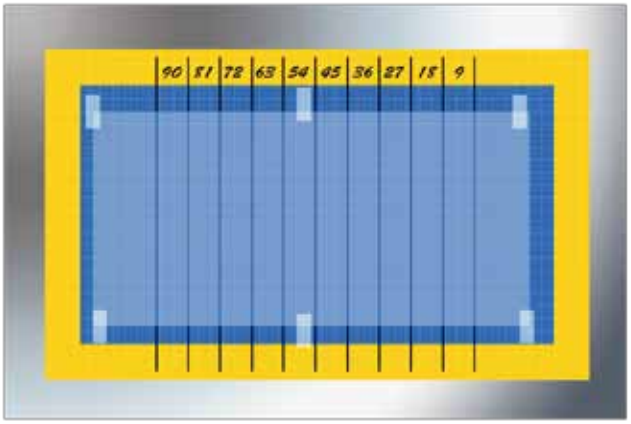
Estimating Test Exposure Time cont.

Select your light source stength from the chart below. These times are for **Aquasol HVP**, check the TDS for estimated exposure times for your specific emulsion.

Exposure Lamp:	Fluorescent Bulbs	1.25kw	1.75kw	3 kw	5kw
Technical Data Sheet Time	na	na	na	na	45
Multiply TDS time by	9	5	4	3	2
Overall Time in seconds	405	225	180	135	90
Individual Panel Exposure	40	22	18	13	9
(Overall time divided by 10)					

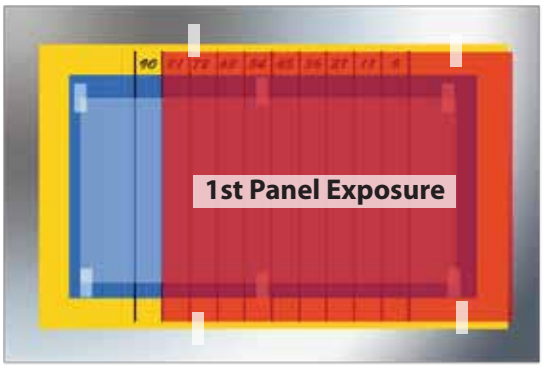
The test step estimated time is twice the normal exposure time for each exposure lamp strength listed. The end goal is to have the panels range from under-exposure to over-exposure so that you can select from panels in the middle of the test that exhibit the best *complete emulsion exposure*.

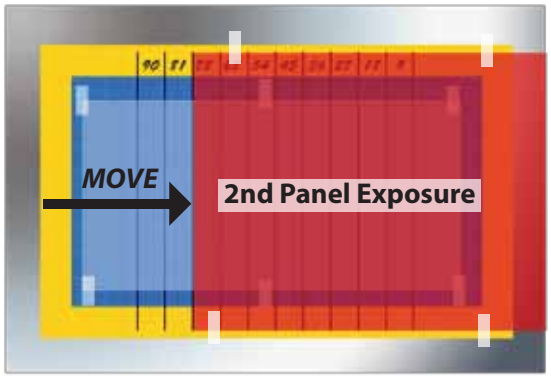
Mark your screen as shown below. This example is for a 5kw lamp. Use the chart above to determine the individual panel times for your type of exposure unit. Multiply this **individual panel time** shown above by 10x, 9x, 8x, 7x, 6x, 5x, 4x, 3x, 2x, 1x for overall time and mark the panels as shown below, then securely tape down your detailed test positive

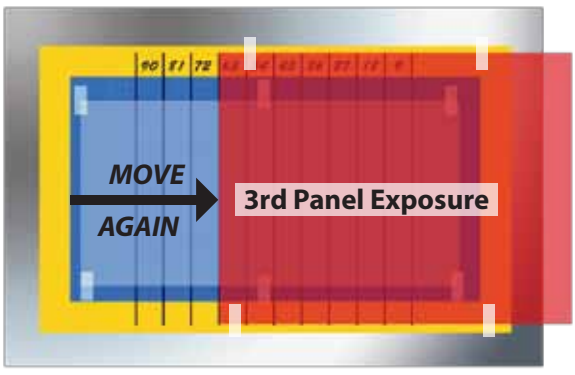


In the example shown, the screen will be exposed 10 times at 9 seconds for each exposure. Your time may vary depending on your exposure unit. Attach the blockout media as shown in the next graphics

Expose the screen ten times using the Individual Panel Exposure as determined in the previous section. Move the rubylith, amberlith, or thin cardboard over one row for every exposure. Make sure not to move the positive







Repeat for all 10 Panels

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Evaluating the Step Test Exposure

Once all ten panel exposures are complete develop the screen. Wet both sides and let emulsion soften for a minute or two. Start developing with a pressure washer on fan spray or use an adjustable garden nozzle on hard fan spray.

Wash screen from print side *only during development*. The squeegee side of the screen needs to be examined for underexposed emulsion. At some point one of the middle panels will transition from underexposed emulsion to complete exposure, no slime, and feel the same as the print side.

Image Checklist:

The best panel time will show the following:

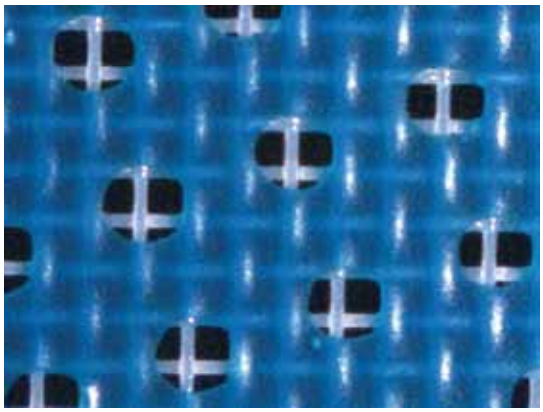
1. No unexposed emulsion on squeegee side.
2. Excellent resolution of image details.
3. With a loupe or magnifying glass the image or halftones do not show any under or over exposure.
4. Wipe the chosen panel with a white piece of cloth, if you see color try the next panel with more exposure time and chose a panel that doesn't show color.

Murakami Emulsion is designed to be completely exposed and still develop fine 3-5% halftones accurately. A pressure washer on fan spray is a good tool to develop a fully exposed screen and still allow complete image details to be developed.

Additional Information:
www.murakamiscreen.com

Image Evaluation Graphics:

Halftone Evaluation:



Halftones will show good edge definition with no over exposed emulsion blocking the small partial openings in the mesh.

Edge quality shows a vertical side wall with good sharp edges that will create a gasket with the substrate and accurately reproduce the original art. Line art or vector art will show the same, crisp sharp edges no sawtoothing and complete exposure on the squeegee side.

Are we done yet? If you like the results yes. However you can fine tune this test even further. You can try bumping times up or down slightly from chosen step test panel time to see if it improves your image quality.

? Questions? Give us a call, we here to help.

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