

## Appendix F

# Screen Printers Technical Foundation (SPTF) Testing Methodology

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### Purpose of Testing

Performance data will be collected for each product system in a laboratory setting at the Screen Printing Technical Foundation (SPTF) and also in production runs at 23 volunteer facilities. The testing methodology for the both phases of the demonstrations was developed by consensus with the involvement of EPA, product manufacturers, and screen printers. The protocol was designed to allow the evaluation of the maximum number of product systems given the resources available to the project.

The intent of the SPTF evaluations is to assure that the product systems sent to printers would provide an acceptable level of performance. Screening at SPTF will also provide another set of observations to compare with in-facility demonstration results. All evaluations will be conducted under consistent screen conditions (e.g., tension, mesh type, emulsion type, thread count, image) and each product system will be tested on three imaged screens; one with solvent-based ink, one with UV-cured ink and one with water-based ink.

### Testing Methodology

Evaluate each product system as follows:

- Prepare three screens for printing according to the parameters listed in section C.
- Place a sufficient quantity of the solvent-based ink in the stenciled screen and thoroughly work into the screen with a squeegee. Card out extra ink and allow the screen to sit for approximately 15 minutes. Remove the ink from the screen following the instructions provided to SPTF by the manufacturer. Wipe or wash off the ink (depending on instructions) until it appears that no more ink is coming off on the cloth or in the rinse. Use only enough product to accomplish ink removal to this degree. Record the application procedure, the time it takes to complete the ink removal (time using a digital stop watch), the amount of product used (measure to the nearest 0.5 ounce), the temperature, humidity, product dilution ratio, number of wipes used, ease of use, and comment on the product performance.
- Repeat step 2 on the second screen using UV-cured ink and on the third screen using water-based ink.

- Allow each screen to sit for approximately 8 hours to simulate a shop situation. Record the time delay for each screen. Apply the emulsion remover to the screen according to the manufacturers instructions. Record the application procedure, the time it takes to complete the emulsion removal (time using a digital stop watch), the amount of product used (measure to the nearest 0.5 ounce), product dilution ratio, number of wipes used, and ease of use. Also document if the stencil dissolved easily or slowly, an evaluation of how much scrubbing was needed, if any emulsion was still present, and if any ink haze or stencil stain remained on the mesh. If an initial attempt to remove all the stencil fails, record the screen condition and apply the product again.
- Apply the haze remover product according to the instructions supplied by the manufacturer. Record the application procedure, the time it takes to complete the haze removal (time using a digital stop watch), the amount of product used (measure to the nearest 0.5 ounce), product dilution ratio, number of wipes used, and ease of use. Also report if any ink haze or stencil stain is present on the mesh. If an initial attempt to remove the haze fails, document the screen condition, and apply the product to the screen again.
- Based on the testing method described above, SPTF will determine the effectiveness of all of the products submitted. This will include evaluating the manufacturer's application instructions for each product and ensuring that the application technique specified for that product will enable the product to work effectively. If the application technique specified for a particular product is determined to limit the effectiveness of the product or in any other way negatively affect performance, a second application technique will be chosen and tested. **Only products deemed effective by SPTF will be used in the field demonstration portion of the project.**

### Testing Parameters

For each ink type tested (solvent-based, UV-cured, and water-based), use the following screen parameters:

Mesh Count per Inch/Thread Diameter:	390/34 LE for UV ink 260/40 LE for solvent- and water-based ink
Supplier/Manufacturer:	Tetko/Swiss Silk of Switzerland
Brand Name of Fabric:	PeCap LE (Low Elongation)
Mesh Opening:	26 microns
Fabric Thickness:	60 microns
Twill or Plain Weave:	Twill Weave
Suggested Tension:	26 N/cm for UV ink 20 N/cm for solvent- and water-based ink
Frame Type:	Aluminum

Frame Size: 18" × 20" Outside Dimensions  
Tensioning System: Tetko SST Pneumatic Clamp System  
Adhesive: KIWO Kiwobond 1000 HMT  
Tensioning Procedure:

- Bring screen directly up to tension using predetermined pressure settings on pneumatic gauges.
- Let screen set 5 minutes.
- Check tension, and retension if necessary.
- Adhere with frame adhesive.
- Check final tension and record.

Stencil Brand and Type: KIWO Poly Plus SRX dual cure direct emulsion

Scoop Coater Brand and Edge: Tetko Pro-EM round edged coater 12" length

Coating Method: 2 coats on print side, 3 coats on squeegee side, wet on wet.

Image Description: A 10" × 8" pattern of ½" checkers and a ByChrome halftone exposure image  
Exposure System Description: Olec 5KW Metal Halide lamp with 36" distance and light integrator

Wipe Type: Molnlycke brand P-Tork made from rayon and pure cellulose.

Ink Types

- Solvent-based Ink: Naz-Dar 9700 Series All Purpose Ink  
9724 Black
- UV Ink: Nor-Cote CD 1019 Opaque Black
- Water-based Ink: TW Graphics WB-5018 Black