MURAKAMI

January 2010

Technical Newsletter

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

Coating Screens for Consistent Results

We visit many shops each year to evaluate stencil issues and to shed some light on the various processes involved in making screens. Larger shops often have automatic coaters while smaller shops perform hand coating. First the auto coaters:

Auto Coaters are predictable when set up correctly. By predictable I mean their EOM (percentage of emulsion over mesh) is more consistent. No matter who uses the machine it will consistently apply emulsion the same every time. The key is dialing in coater pressure and speed to achieve the desired EOM.

I have gone into shops where they are coating 3 times on the squeegee side and 2 times on the print side and the EOM is close to 0% because the coater pressure is too high. Coating Pressure, Speed, and the type of emulsion used need to be balanced to achieve the desired EOM. When changing to a new emulsion the EOM should be measured on a test screen and pressure and speed adjusted to meet the target EOM percentage.

More Pressure or More Speed equals lower EOM percentages, or less emulsion on the mesh.

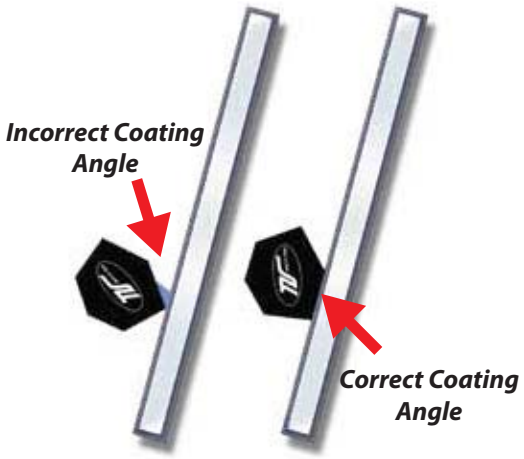
Less Pressure or Less Speed increases EOM.

Auto Coaters can be programmed with different coating recipes. While a 305 may utilize a 1:2 coat with a sharp edged coater, a 60 mesh may need slower coating speeds, and may provide better results with a 2:3 coat using the dull edge. It all depends on the mesh, the coater settings, and the flow qualities of the emulsion. Generally three to four recipes are all that is needed for textiles, and for UV graphics only one or two is needed since mesh counts are usually in the 300-380 range.

Manual Coating

Too often manual screen coating is left for the end of the day. The screen room worker rushes to get 50 screens ready for tomorrow and coats as fast as possible. Worse the night worker and he do not use the same angle or speed. The result? Unpredictable EOM, under or over exposure, and lots and lots of pinholes. Auto coaters coat slowly to keep air bubbles from forming. Hand coaters ignore this and whip air into the emulsion with very fast coating speeds. Slow down coating speeds and use more pressure. Let the emulsion flow through the mesh instead of gliding a fast coat on. EOM can vary by 20% from screen to screen using a fast coating speed, so will the quality of exposure causing breakdown on press.

The diagram below shows the correct placement of the scoop coater, hey the end cap is pointed for a reason! (fyi). If all coating workers use the end cap and coat at the same speed then screen exposure will be predictable. This will preserve crucial details while exposing the emulsion completely for difficult inks like discharge and waterbase that require complete stencil exposure to avoid breakdown on press.



Lay End Cap flat on mesh surface for consistent EOM, Use a firm pressure with a slow coat speed.

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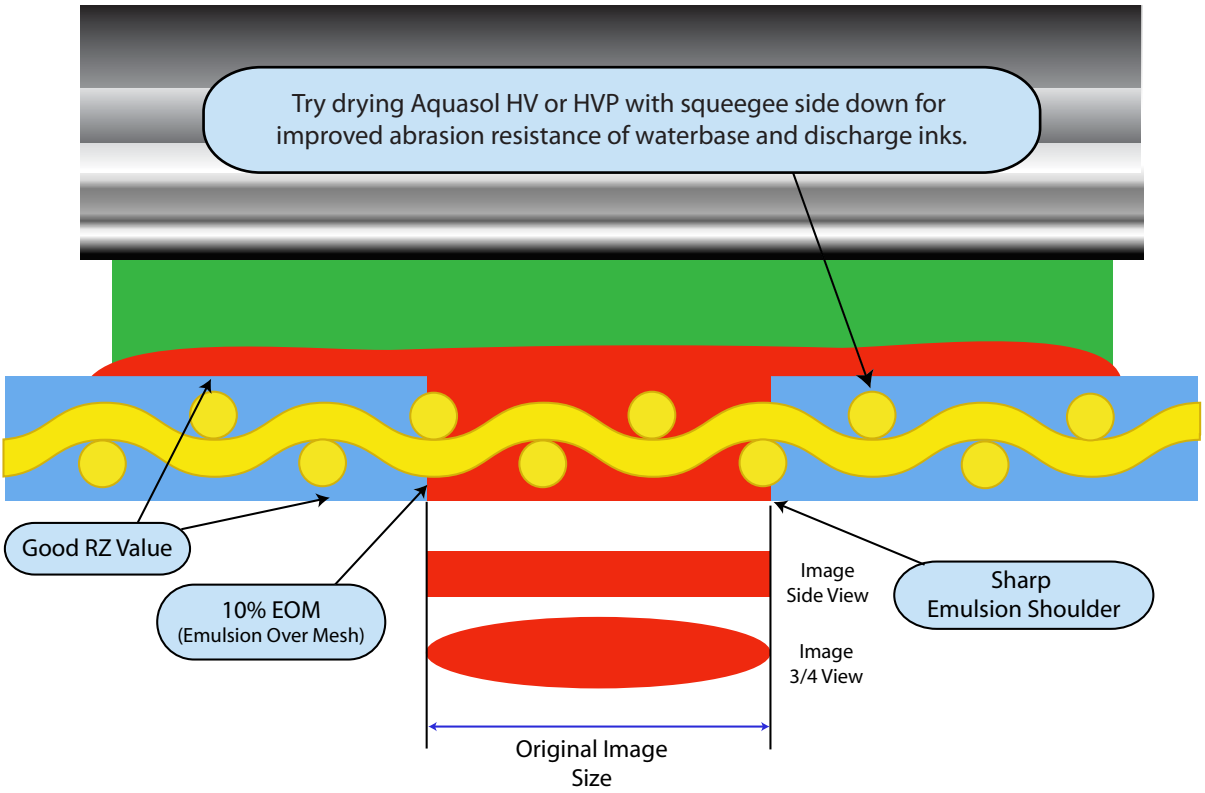
Why is EOM so important?

Emulsion over mesh controls the print quality. Proper EOM creates a gasket with the substrate to print sharp dots for simulated process minimizing dot gain as well as creating sharp edges for spot color printing.

For waterbase and discharge the EOM is crucial to the durability of the stencil. If the exposure calibration was done on a screen with 8% EOM and a screen with 20% EOM is exposed to the 8% time/units the 20% screen will be very underexposed and will breakdown sooner. Develop a policy on hand coated screens. The following list will create predictable EOM.

Hand Coating Checklist:

1. Lay the End Cap of the Coater flat on the mesh.
2. Coat slowly with a firm pressure, let the emulsion flow through the mesh not over it.
3. Keep the scoop coater at least half full for consistent coating.
4. Create coating recipes for each mesh noting:
   a. Emulsion Type
   b. Coating Edge used, thick or thin.
   c. Coating Speed
   d. Scoop Coater used.
   e. Mesh Count with thread thickness
      ex: 150/48 where 150 is the threads per inch and 48 is the thread thickness in microns.
      Mesh specs are available at:
      www.murakamiscreen.com>Smartmesh>
      Mesh Guide.



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Low EOM Percentage

The large graphic at the bottom of the page shows the effect of minimal Emulsion Over Mesh percentage. Screens will exhibit dot gain due to poor shoulder definition, saw tooth on straight lines, and will pinhole and breakdown sooner. For Sim Process printing the result is loss of important quarter tone values in the 75%+ areas as dot gain eliminates the shadows of a design and causes banding at these shadow values.

The screen below shows the results of coating too fast with minimal pressure. The scoop coater 'floats' over the mesh instead of allowing the emulsion to flow through the mesh. EOM can vary dramatically from 8% along the edges up to 20% in the center. This affects the quality of the exposure and severe underexposure in the print area. On discharge and waterbase screens this will lead to the emulsion peeling off since it was never exposed completely. Pinholes will also form behind the mesh knuckles since the emulsion is coating too fast to flow around the mesh.

Scoop Coaters; Which edge to Use?

Dull edge: 15T-200T Mesh- Spot Color Plastisol, Water base, Discharge, Glitters, High Density Build Up.
Thin edge: 200T-460T Mesh- Simulated Process Plastisol, Halftones, Stochaistic, Fine Line Art.

To develop accurate coating recipes it is necessary to measure EOM accurately. Murakami stocks thickness gauges (shown) to accurately measure stencil thicknesses. We also perform screen room analysis for our customers to help determine optimum stencil coating. If you are using Aquasol HV or HVP a 1:1 or 1:2 coat using the thick edge and laying the scoop coater over on the flat end cap will yield 8-12% EOM on 110-200T mesh. Once a coating recipe is determined the final step is to perform an exposure calculation using a step test or an emulsion exposure calculator. You can find instructions for a step test at www.murakamiscreen.com under support. We also stock calculators at Murakami USA as well as at distributors.