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Dealer Technical Sales Support

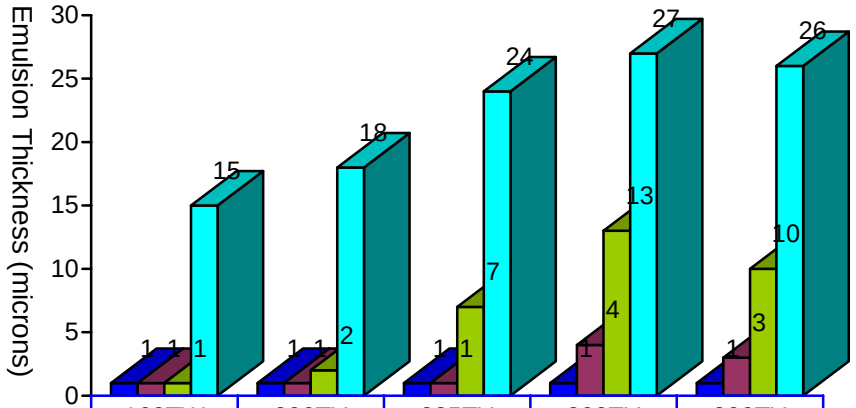
Product: **Murakami SBQ Capillary Film**
MS Film & MS Graphic Film (SBQ Film Technology)

<Application Methods & Stencil Thickness>

The most frequently asked question from capillary film users is;
What emulsion thickness can I expect from stencils produced by either a water capillary method or by a direct/indirect method.

1. Capillary Method.

Films are applied to a screen using water only or water and 15% of IPA mixture as a adhering liquid. The capillary method is a convenient and fast way to adhere films.

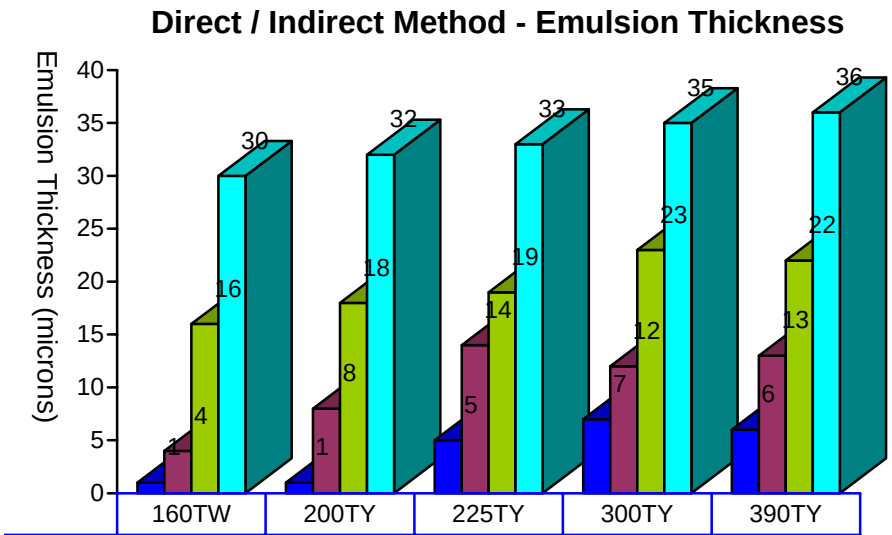


	160TW	200TY	225TY	300TY	390TY
MS-15	1	1	1	1	1
MS-20	1	1	1	4	3
MS-30	1	2	7	13	10
MS-40	15	18	24	27	26

Screens do not have to be dried after degreasing. Capillary films may be applied directly to the wet screen, eliminating one drying cycle. The typical finished film thickness of a capillary film applied with water is thinner and may have a higher Rz value (surface roughness) than films adhered using the direct indirect method.

Capillary method is recommended when using 20 micron or thicker films.
In graphic printing applications including CD printing, printers may use 20micron film by capillary method to resolve finer lines or halftone images on higher mesh count. It is not recommended to use 7, 10, 12 and 15 micron films with capillary method. The finished film thickness becomes too thin to resist the wear on press and could result in premature stencil breakdown.

2. Direct/Indirect Method.
Films are applied with direct liquid emulsion, ONE POT SOL-C, by squeegee, coating trough or automated film applicator.



	160TW	200TY	225TY	300TY	390TY
MS-15	1	1	5	7	6
MS-20	4	8	14	12	13
MS-30	16	18	19	23	22
MS-40	30	32	33	35	36

The direct/indirect method is generally preferred when stencil thickness control and increased durability are required. The resolution qualities of the film will not be affected by using the direct/indirect method. Printers requiring specific tolerance controls for ink deposit (circuit board printers and high end graphics printers) prefer the use of this method. The stencils present a higher EOM and lower Rz value when direct emulsion is used to adhere capillary films. Increased durability on press is also a benefit of direct/indirect stencils because the mesh is completely encapsulated by the film on the print side and by the emulsion on the squeegee side.

<Application Approach – FAQ>

- ***Is there any other way of speeding up my drying time with direct/indirect method?***

Speeding up the drying time of coated screens can be accomplished by introducing heat to the drying process. One way is to put a floor heater in front of drying fan. The best

suggestion is to use a heat controlled drying cabinet that circulates and exhausts the heated air. Drying temperature up to 110° Fahrenheit will not affect the film.
The other way of speeding up drying time is; Apply films by capillary method first. After drying, peel off a clear cover polyester film. Use direct emulsion, ONE POT SOL-C, and coat on the squeegee side with a sharp edge coating trough two times. Then dry the screen. The screen is ready for exposure. This method will speed up drying time slightly faster than direct/indirect method.

- ***Which method do you recommend for images that contains critical line pitching or spacing?***

Jobs that contain specific requirements for pitch, line spacing, or critical line art, require a stencil that has as little distortion or image shifting as possible. The control of the shift or distortion is critical to the completion of the job. Control of ink or paste deposit is also an important issue when printing close tolerance jobs. The direct/indirect method will produce stencils that have better dimensional stability on press. These stencils will also have more consistent and predictable EOM that will help in controlling in or paste deposit.

- ***What are the distinctive advantages of your* Murakami SBQ *capillary films?***

Murakami capillary films are manufactured by SBQ technology. The benefits that SBQ technology in Murakami films offers are as follows;

	Murakami SBQ Capillary Films	**Conventional Diazo based Capillary Films**
Resolution Power	Excellent	Average
Line Definition	Excellent	Average
Color hardening*	None	Yes
Shelf Life	1 year +	Short
Humidity Resistance	High	Poor
Exposure time	Fast	Slow
Surface Hardness	Slightly Hard	Soft
Solvent Resistance	Excellent	Poor
Swelling Ratio*	Less	High
Thickness control	Better and consistent	Fair and less consistent
Post exposure effect	Working	Not working.

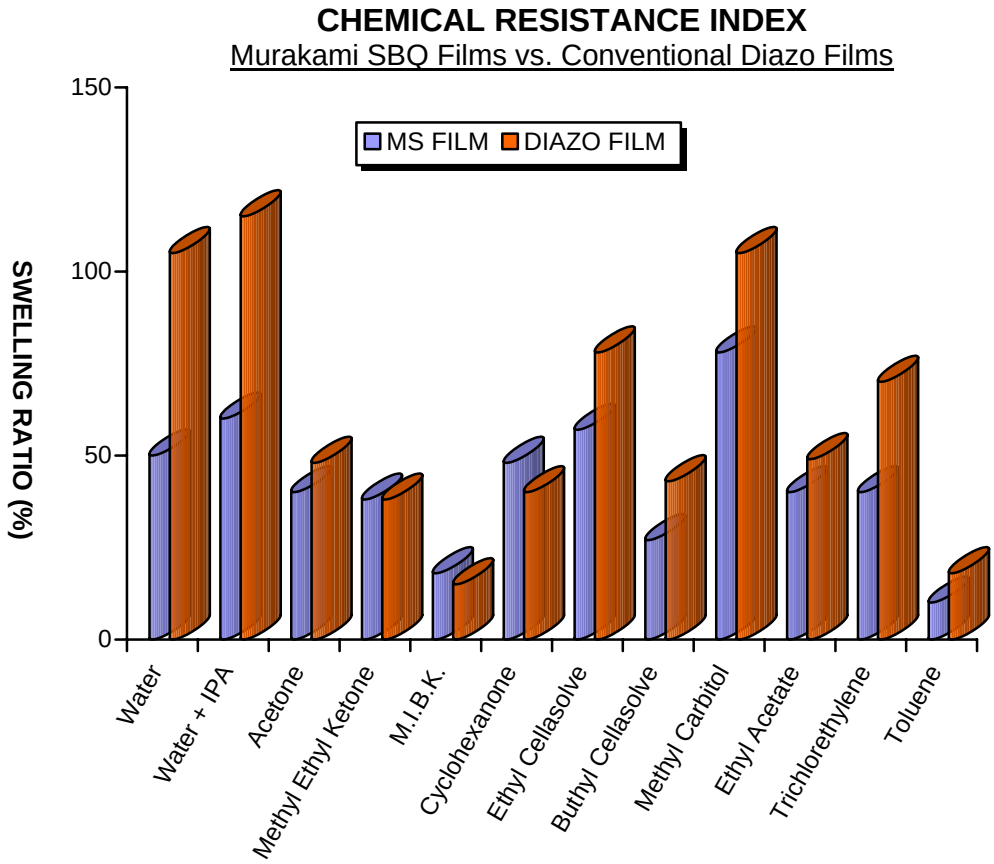
*Color hardening: During exposure, Murakami SBQ films do not change color while diazo based films do have a color change. Color hardening comes from the chemical properties of the diazo sensitizer. As the stencil thickness increases, color hardening of diazo films may cause undercutting of UV energy as it approaches the squeegee side.
* Swelling ratio against water, water+IPA and acetone. (Refer to the chemical resistance index chart in this report for other chemicals).

- ***I am currently using a direct emulsion. Can I expect better quality from MS capillary films?***

Yes. We have conducted our own print test with MS films vs. direct emulsion. Line images width= 145 microns, Stencil E.O.M=10 microns. The result demonstrated; MS film is reproducing close to 145 microns in width while direct emulsion is expanding line width with excessive saw-toothed definition.

- ***Can you tell me about* Murakami SBQ *film's resistance power against various different kinds of chemical ingredients?***

There are many graphic, electronic, or specialty printers that may use aggressive chemical substances. Please refer to the resistance index chart.



As you can find in the index chart, **Murakami SBQ** films offer less swelling ratio against most of commonly used chemicals.

For further technical support, contact us at 1-800-562-3534.

MURAKAMI USA INC. 2004

<Sales Guideline by Thickness & Application Methods>

Film Thickness	**Capillary Method (4 parts water, 1 part IPA)**	**Direct/Indirect Method (Using OPS-C emulsion)**
7 microns 10 microns 12 microns	Not recommended	For finer mesh count only (380 to 420) UV inks. Resist inks. 100lpi + halftone printing Close tolerance line reproduction works.
15 microns	Not recommended	For finer mesh count only (350 to 420) PCB etch resist inks, UV inks. Fine line halftone printing, 4 color process. Close tolerance line reproduction works.
20 microns 25 microns	Fine line halftone printing General Graphic printing (Paper, card, plastic, panels, P.O.P., signs etc.)	PCB Legend printing, Etch resist printing General Graphic printing requiring durability. (Wall papers, dials, membranes, ceramic transfer printing etc.)
30 microns 35 microns	General screen printing Using with 150 mesh up to 350 mesh	PCB solder mask, hybrid and ceramics, name plates, dials. Membrane switch, conductive inks Graphics on flat stocks. Direct printing on ceramics or ceramic transfer paper.
40 microns 50 microns	General screen printing Using with 125 mesh up to 200 mesh	Coarse mesh under 180 Thick film printing Conductive inks Reactive glazes in glass and ceramic printing
80 microns 100 microns	General screen printing Using 86 mesh to 160 mesh Specialty printing for heavy ink Deposit.	Not recommended