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TECHNICAL INFORMATION

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THICKFILM STENCILS

FOTECOAT 1845 SOLO

Ready-to-use presensitized screen emulsion for the production of extra thick solvent resistant stencils by the wet in wet coating method.

Suitable for the following print media: plastisols, Braille, gaskets, peelable solder masks and relief printing on various substrates.

FOTECOAT 1845 SOLO has many unusual aspects and must be used by following the described processing technique.

FOTECOAT 1845 SOLO should be coated on synthetic fabric numbers from 12-64 / cm or on equivalent stainless steel meshes.

FOTECOAT 1845 SOLO can be coated by hand or machine wet in wet. It is possible to apply between 5 to 20 strokes from the squeegee side.

No mask or frame build up is necessary. The final stencil thickness depends entirely on the number of strokes from the squeegee side.

Stencil thicknesses of approx. 100 - 2000 microns proud of the mesh can be achieved, depending on fabric type and number.

To achieve high quality, bubble free stencils, the following coating technique is necessary:

1. by hand:

- 2 coats print side, 2 coats squeegee side wet in wet
- scrape well off from both sides
- apply the needed number of coats from the squeegee side only, all wet in wet.

2. by machine:

- 2 coats print side alone
- as many coats as necessary from the squeegee side only
- all wet in wet

The tables under point 9 explain the context between mesh, stencil thickness, drying time, exposure and wash-out.

1. Description of FOTECOAT 1845 SOLO

- Presensitized polymer screen emulsion.
- Colour: blue.
- Solids content: 49 %.
- Viscosity: extra thick – similar to putty.
- Degassing is very slow because of the high viscosity; avoid stirring.
- Should FOTECOAT 1845 SOLO become cold (transportation, refrigeration), the viscosity will increase; make sure it reaches at least 25°C before coating or warm up the emulsion in a water bath.

2. Stencil making with FOTECOAT 1845 SOLO under yellow or tungsten light

- a) Degrease and dry mesh in the usual way.
- b) Use a standard trough (1,0 mm lip radius) for coating by hand or machine.
- c) Coat very slowly; coating sequence see page 1.
- d) **Important:** Dry first with print side down for approx. 15 min. then finalize drying with print side upwards. Important for coarse meshes!
- e) Temperature of circulating air: maximum 30°C (86°F) to avoid skin forming.
- f) Drying time: The best is to let the stencil dry over night. It must be completely through-dried before exposure. As long as the stencil has a light colour, it is not yet completely dry.
- g) Exposure: A step wedge based on the information under point 9 is necessary. Only high intensity light sources should be used.
- h) Wash-out: The exposed stencil must be immersed in lukewarm water; then use an adequate water spray to open the unexposed area. In this condition the stencil is soft and must be treated carefully and without high pressure. See table 9.1.
- i) Make ready: Let the stencil dry and block the surrounding open mesh area with tape or solvent resistant emulsion.
- j) Stencil cleaning: It can be cleaned with water free solvents.
- k) Stencil removal:
 - Immerse in a strong concentration of stencil remover until it breaks off. (FOTECHEM 2042 diluted with water 1:10). Then brush with remover liquid (if necessary) and finally rinse thoroughly with a mild water spray before using the high pressure gun.
 - Stencil removal can also be done by application of the remover paste or solution on the squeegee side. After a few minutes the film can be peeled off from the print side and emulsion residues can be removed with a second application on both sides.

CLEAN-MIX is NOT recommended.

3. Stencil quality

- Stencil thickness: The tables under point 9 show a few examples. It is important to realize that the mesh type, the mesh number, the thread diameter, the weave and the colour, together with the trough lip radius, the coating speed and the number of strokes applied control the repeatability and the effective thickness. Tests are necessary.
- Fabric stretching: Thick stencils have tendency to become brittle. Maintain screen tension at 30 N/m or higher in order to ensure that the mesh will snap-off and release the ink in a slow and controlled manner.

- To reduce the brittleness (mainly in very dry rooms) a 10% solution of glycerine can be applied immediately after the wash-out and before the drying cycle. Apply the solution with a sponge or a rag or a soft brush and let the stencil dry afterwards.
- Stencil opening/resolution
 - Thumb rule: $3 \times \text{total stencil thickness (mesh + EOM)} = \text{minimal stencil opening}$.
 - Example: stencil thickness 500 microns $\times 3 =$ line width minimum 1,5 mm.
- Stencil edge sharpness / definition
 - The bridging of the mesh is excellent. Practically no crawl feet.
 - The stencil shoulder is crisp and corresponds closely with the film positive.
 - The stencil opening however is conical (smaller in the mesh) with the result that printing becomes more difficult because of obstructed ink flow.
 - By increasing the distance between lamp and vacuum frame and adapting the exposure time, the conical structure can be reduced.
- Dyed mesh allows to achieve residue-free, crisp mesh openings.

4. Storing

- Shelf-life of FOTECOAT 1845 SOLO: 1 year
- Storing time for coated screens: 1 month
(in complete darkness)

5. Exposure (see examples under point 9)

- Light source: Necessary is a high light intensity in the wave length of 340-400 nm. Metal halide lamps need a photopolymer bulb (not diazo or gallium); the type of instant starter (without shutter system) is generally well suited. Mercury vapour lamps need very long exposure times. Fluorescent tubes are not recommended.
- The metal halide bulb should have less than 500 operating hours.
- Distance light source to vacuum frame: to reduce the exposure time for thick stencils a reduction from 100 cm down to 80 cm can be of advantage. This results in approx. 35% shorter exposure time. The conical structure however increases.
- It is essential to make first a test exposure (step wedge) to find the optimum exposure time in relation with the mesh colour, the number of threads, the thread diameter, the weave and the coated stencil thickness.
- Thumb rule:
 - white mesh: per 100 micr. total stencil thickness = 1 minute
 - yellow mesh: per 50 micr. total stencil thickness = 1 minute
 - steel mesh: per 30 micr. total stencil thickness = 1 minute

Examples: total stencil thickness = 1000 microns
 white mesh: 10 minutes exposure time
 yellow mesh: 20 minutes exposure time
 steel mesh: 33 minutes exposure time

Valid for a 3.5 KW Akticop S metal halide lamp at 100 operating hours and 100 cm distance.

6. Wash-out / developing

- Because of the high stencil thickness special processing is necessary.
- The exposed stencil should be immersed in lukewarm water of 25 - 30°C depending on stencil thickness.
- A good spray only must be used to rinse the softened stencil until the reachable openings are clear.
- Ideal is the use of a Flottmann pistol.
- At this stage the stencil is soft and does not allow a maltreatment by excessive water pressure (maximum 20 bar).

7. Chemical hardening:

Do not harden FOTECOAT 1845 SOLO chemically. A post-exposure does not offer advantages.

8. Printing:

The snap-off during printing should not exceed 1 mm. A sharp, hard squeegee is necessary for sharp printing. Stretch the mesh with at least 30 Newton. Avoid wooden frames.

9. Parameters:

The tables below give examples to assist in determining the number of coating strokes on various fabric numbers to achieve the wanted stencil thickness and the resulting exposure, wash-out and drying time.

9.1. Exposure, drying, wash-out, resolution

Fabric No.	Coating sequence*	Approx total stencil thickness	Drying time at 25°C	Exposure*			Immersion time before wash-out	Theoretical resolution white fabric
					seconds			
	after scrape off	microns	hours	distance cm	white fabric	yellow fabric	minutes	microns
10-270	5 x	700	6	100	460	920	60-120	2700
	10 x	1000	8	100	600	1200	60-120	3300
15-250	5 x	550	6	100	330	660	60-120	2400
	10 x	950	8	100	570	1140	60-120	3000
21-150	5 x	400	2 1/2	100	240	480	45	1350
	10 x	575	4	100	345	690	60	2300
32-100	5 x	250	2	100	150	300	30	1100
	10 x	375	3 1/2	100	225	450	60	1800
43-80	5 x	200	1	100	120	240	30	700
	10 x	275	2	100	165	330	30	1100
55-70	5 x	175	1	100	105	210	20	600
	10 x	250	1 1/2	100	150	300	30	1000

* with 5KW metal halide (Akticop S 3,5 KW) and photopolymer bulb 340-400 nm at 100 operating hours.

9.2. Stencil thicknesses depending on number of manual coating strokes**
(the indicated measurements in microns are for the total stencil thickness)

Fabric No.	Approx. stencil thickness in microns if coated after scrape off ...				
	4 x	6 x	8 x	12 x	16 x
10-270	680	750	850	1200	1400
15-250	500	600	700	800	1200
21-110	300	400	480	600	800
32-100	220	250	300	400	600
43-80	160	200	225	290	400
55-70	130	160	190	260	350

** counted after the application of 2 coats each side wet in wet followed by complete scrape off on both sides. No intermediate drying.

The stencils are approx. 10% thicker after wash-out.

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