



Fotec AG

Phone:

e-mail:

Eigenheimstr. 22

P.O.Box 1123

+41 44 913 30 00

[info@fotec.ch](mailto:info@fotec.ch)

CH-8700 Küsnacht

Switzerland

Fax: +41 44 910 45 25

[www.fotec.ch](http://www.fotec.ch)

TECHNICAL INFORMATION

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## THICKFILM STENCILS

# FOTECOAT 1835 SOLO (water resistant)

**Ready-to-use presensitized screen emulsion for the production of extra thick stencils.**

**Suitable for the following print media: plastisols, thermoplastics, silicones, textile inks, aqueous inks and adhesives, granulates, glitter, frit, special inks for the ceramic tile printing, 3-D (high density) printing on jeans, baseball caps and T-shirts.**

FOTECOAT 1835 SOLO has many unusual aspects and must be used by following the described processing technique.

FOTECOAT 1835 SOLO should be coated on synthetic fabric numbers from 8 - 54 / cm or on equivalent stainless steel meshes.

FOTECOAT 1835 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 1835 SOLO

- Presensitized polymer screen emulsion, water resistant.
- Colour: dark, high contrast purple.
- Solids content: 58 %.
- Viscosity: extra thick – similar to putty.
- Degassing is very slow because of the high viscosity; avoid stirring.
- Should FOTECOAT 1835 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 1835 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. The dried stencil must have a dark purple colour.
- 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 a good 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 water resistant emulsion.
- j) Stencil cleaning: FOTECOAT 1835 SOLO is a water resistant emulsion; cleaning with white spirit or mild solvents only.
- 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
  - or use standard remover and apply from squeegee side only, then peel away the thick stencil from the mesh and rinse with water pressure. 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.
- 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 1835 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: 33% (1/3 of total stencil thickness)
  - yellow mesh: 50% (1/2 of total stencil thickness)
  - steel mesh: 100% (total stencil thickness)

Examples: total stencil thickness = 1000 microns  
white mesh: 5 – 6 minutes exposure time  
yellow mesh: 8 – 9 minutes exposure time  
steel mesh: 16 – 18 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:

Use FOTECHEM 2100, 2110 or 2130 following the respective Technical Information. Hardened stencils might become very brittle. They are no longer decoatable.

**8. Printing:**

The snap-off during printing should not exceed 1 mm. A sharp, hard squeegee is necessary for sharp printing.

**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	900	6	100	300	450	60-120	2700
	10 x	1100	8	100	360	550	60-120	3300
15-250	5 x	800	6	100	260	400	60-120	2400
	10 x	1000	8	100	330	500	60-120	3000
21-150	5 x	450	2 1/2	100	150	225	45	1350
	10 x	770	4	100	260	390	60	2300
32-100	5 x	370	2	100	125	185	30	1100
	10 x	600	3 1/2	100	200	300	60	1800
43-80	5 x	230	1	100	75	120	30	700
	10 x	360	2	100	120	180	30	1100
55-70	5 x	200	1	100	70	100	20	600
	10 x	310	1 1/2	100	105	160	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	720	830	900	1100	1250
15-250	630	720	810	900	1180
21-110	360	430	520	630	780
32-100	270	320	400	470	590
43-80	180	210	270	320	380
55-70	150	180	220	270	320

\*\* 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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