

# PHOTOGRAPHIC EMULSION (DIRECT PROCESS)



## DUALFILM CE2



### PRODUCT:

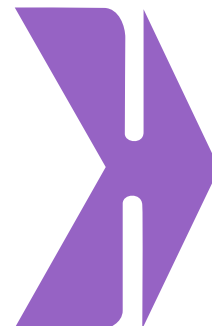
Dual cure photographic emulsion (Diazo + Photopolymer).

### APPLICATION:

For preparing stencils for ceramic printing.

### PROPERTIES:

- Dual cure emulsion with excellent abrasion resistance, specially designed for ceramic applications.
- For long print runs with products based on mineral oils, water based inks and plastisols.
- For printing fine and precise details.



INSTRUCTIONS

# AGABÉ

HIGH QUALITY STENCIL MAKING PRODUCTS

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## CHARACTERISTICS:

	DUALFILM CE2
<b>Resistant to:</b>	Water based, plastisol, sublimation and mineral solvents
<b>Definition:</b>	Excellent
<b>Resolution:</b>	Out Standing
<b>Sensitizer:</b>	Diazo + Photopolymer
<b>Type of Diazo:</b>	Diazo E
<b>Color:</b>	Blue
<b>Solid Content:</b>	50%
<b>Post exposition:</b>	Possible
<b>Reclaiming:</b>	Fair
<b>Use of meshes:</b>	140-305 threads/in (55-120 threads/cm)
<b>Pot life:</b>	24 months
<b>Pot Life of Sensitized Emulsion:</b>	3 months at 71°F/22°C or 6 months under refrigeration
<b>Shelf life of coated meshes:</b>	15 days (at 71°F/22°C, dark and dry area)

**Note:** Do not store below freezing (32°F/0°C).

## INSTRUCTIONS:

### CHOOSING THE MESH:

The correct choice of mesh is extremely important. The mesh is the structure that supports the photographic layer, determines the ink deposit and can affect the print definition and resolution.

To choose the ideal mesh, the following factors must be observed:

**a - Thread material:** Determines the physical and chemical properties of the mesh: flexibility, dimensional stability, abrasion resistance, and resistance to chemical products. The mesh can be made of nylon (good flexibility), polyester (excellent dimensional stability) or metallic (maximum dimensional stability and anti-static effect due to its electrical conductivity).

**b - Mesh Count (number of threads per inch or per centimeter):** Determines the ink deposit on the substrate. This factor is also related to the adhesion of the emulsion layer. For thicker ink deposits, we suggest coarser meshes (less threads per inch or per centimeter). For finer detail, use a mesh count which will ensure that the smallest dot of the stencil is supported by at least two threads of the mesh in each direction.

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**c - Thread type:** Due to its precision and ink flow characteristics, only use mesh made with monofilament threads.

**d - Thread diameter:** Influences the physical properties of the mesh (mechanical resistance), the ink flow and the resolution of the finest details.

**e - Color:** Dyed meshes (yellow or orange) avoid light diffraction thus allowing better image definition and resolution.

### **MESH STRETCHING:**

Stretch the mesh according to the values recommended by the fabric manufacturer. Each type of mesh has its proper tension value. Use pneumatic equipment or retensionable frames for better control of the final tension.

For stretch and glue, it is recommended to use DECAFIX® Adhesive (two components or instant dry), which provides a strong and permanent adhesion of all types of meshes on wood, aluminum or iron frames. After the curing time, the adhesive is completely resistant to all solvents used in screen printing.

### **MESH PREPARATION:**

Before coating the emulsion, clean the mesh thoroughly to guarantee the uniformity of the layer, a perfect adhesion of the emulsion and to increase the durability of the stencil.

For the removal of grease contaminants and dust particles, use the DECAPREP or HB10 Degreaser (paste or gel): Apply one of them on the wet stencil, over the whole surface - on both sides of the mesh. Rinse well with water, including the frame. After the treatment do not touch the mesh.

For coarse meshes, the adhesion of the emulsion can be improved by pre-treating the fabric with HB12 Abrasive Paste, which increases the surface area of the threads besides cleaning.

### **SENSITIZING:**

This emulsion comes partially sensitized, therefore even before adding the Diazo Sensitizer it should be handled anywhere free of ultraviolet lights.

For one quart (900ml of emulsion) add 90ml of water at 71°F/22°C (distilled if possible) to the bottle of sensitizer, close it well and shake it until the powder has dissolved completely. Add the solution of sensitizer to the pot of 900 ml of emulsion and stir well. Leave it resting for a period of 2 hours to eliminate air bubbles.

For one gallon (3.780 ml of emulsion after sensitizing), dissolve well in 344 ml of water and add to 3.440 ml of emulsion. For five gallons container (18,9 liters after sensitizing), dissolve well the diazo in 1,7 liters of water and add to 17,2 liters of emulsion.

## **COATING:**

For manual coating, use AGABE APLIC® Coating Through, made with anodized aluminum with plastic ends. Adequate design for easier handling and cleaning after use. Different edges allow thicker or thinner coats. The shape of the ends allows an adequate contact to the mesh.

Always use a coater long enough to cover the whole image area of the stencil. Never use a smaller coater in parallel passes which will create a layer of irregular thickness.

With the screen in a vertical position, slightly tilted, coat the emulsion 1 or 2 times on the print side, and 2 to 4 times on the squeegee side (without drying).

The ideal stencil thickness ranges from 10 to 25% of the mesh thickness. In special applications, different thickness can be used. We advise the use of a thickness gauge for perfect process control.

After the emulsion is dried, more emulsion can be coated on the print side to improve stencil flatness or making the layer a little thicker.

More emulsion can be coated on the squeegee side for improved abrasion resistance and long print runs.

## **DRYING:**

Dry the emulsion completely with the print side down. The drying time depends on the type of fabric, type of emulsion and coating thickness.

The dryer should have a filter for the incoming hot air. The exhaust air should not be recirculated to the work area. Do not dry stencils in temperatures over 120°F (50°C). If a dryer is not available leave the coated screens to dry in a clean, dry and dark place.

## **EXPOSURE TO UV LIGHT (Copying the image):**

The photographic stencil becomes insoluble in water when exposed to UV light. An image can be created if a mask is placed between the stencil and the light source. The perfect image reproduction depends on some factors:

- **Positive (film):**

Observe the quality of the positive. The dark areas must be opaque (optical density over 3.2) to block completely the light. The remaining areas must be transparent and free of dust and dirt, to avoid light filtering and pinholes in the stencil. The use of translucent films such as those commonly used for laser or inkjet printers is not recommended for precision work. It is best to use transparent films.

Use positives with at least 1200 DPI resolution. With less resolution the edges of the final print will not be sharp.

Place the positive on the print side of the screen and fix it with adhesive tape. The opaque layer of the positive should be in contact with the screen printing emulsion.

Maintain a perfect contact of the positive to the stencil during exposure. Otherwise there will be a space in which light will penetrate and cause loss of resolution. It is advisable to use a vacuum frame.



- **Light Source:**

**Type:** Diazo sensitized emulsions require the use of a source that emits light rich in UV rays, such as metal halide or halogen lamps.

**Geometry:** To achieve a perfect image definition and resolution the light source and the surface for the stencil should be, at least, equal to the diagonal measurements of the stencil. Larger distances reduces the loss of image resolution. The use of several tube lamps produces a diffuse and unfocused light, therefore making these inadequate for detail copying.

- **Exposure time:**

The exposure time is extremely important because it determines the quality of definition, the level of resolution and the durability of the stencil.

During the exposure, the print side of the stencil reacts initially with the light rays. After some time, the hardening also reaches the inner layer of the emulsion. If the exposure time is insufficient (under exposed stencil), the squeegee side of the emulsion layer will not be completely hard and will dissolve during wash out. If the exposure time is too long (over exposure) the light diffraction will cause the loss of detail and of edge sharpness.

The correct exposure time depends on the mesh count, thread diameter, fabric color, type and thickness of the photographic layer, power and age of the UV lamp, distance between lamp and stencil, correct drying of the emulsion and positive quality (transparency and opacity levels).

To determine the ideal exposure time, use the Agabe Test Positive. With this test, you may also evaluate the sharpness of the image and measure the loss of resolution.

The following table illustrates the ideal exposure times for **DUALFILM CE2** for the parameters indicated and may be used as a basis for initial tests.

Emulsion	Fabric	Coating	Lamp	Power	Age	Distance	Characteristic	Recommended Exposure Time
DUALFILM CE2	PES 305-35 (120-35) white	2 coats PS + 2 coats SS	AKTICOP 3500 S	5.000 W	Up to 100 hours of use	39 in (1 meter) distance	4'500mJ/cm <sup>2</sup> /min Spectral emission peak: 360-410 nm	40 Seconds



If the conditions are not the same as indicated, the following correction factors must be used to adjust the exposure time.

#### LAMP POWER (METAL HALIDE)

Power	Correction Factor	
MH 500 Watts	10,00	10 times longer than 5kW
MH 1000 Watts = 1kW	5,00	5 times longer than 5kW
MH 2000 Watts = 2kW	2,50	2,5 times longer than 5kW
MH 3000 Watts = 3kW	1,67	1,67 times longer than 5kW
MH 4000 Watts = 4kW	1,25	1,25 times longer than 5kW
MH 7000 Watts = 7kW	0,71	0,71 times longer than 5kW

#### COATING PROCESS

From - To	Correction Factor
From 1PS + 1SS to 1PS + 2SS	Multiply by 1,33
1PS+1SS - 2PS+2SS	Multiply by 1,50
1PS+1SS - 2PS+3SS	Multiply by 1,00
1PS+2SS - 2PS+2SS	Multiply by 1,25
1PS+2SS - 2PS+3SS	Multiply by 1,33
1PS+2SS - 1PS+1SS	Multiply by 0,57
2PS+2SS - 1PS+1SS	Multiply by 0,67
2PS+2SS - 1PS+2SS	Multiply by 0,80
2PS+2SS - 2PS+3SS	Multiply by 1,33
2PS+3SS - 2PS+2SS	Multiply by 0,75
2PS+3SS - 1PS+2SS	Multiply by 0,57
2PS+3SS - 1PS+1SS	Multiply by 0,50

#### MESH COUNT

Number of Threads	Correction Factor
455 threads/in (180 threads/cm)	Multiply by 0,75
420 threads/in (165 threads/cm)	Multiply by 0,85
381 threads/in (150 threads/cm)	Multiply by 0,87
355 threads/in (140 threads/cm)	Multiply by 0,90
305 threads/in (120 threads/cm)	Multiply by 1,00
230 threads/in (90 threads/cm)	Multiply by 1,20
195 threads/in (77 threads/cm)	Multiply by 1,60
107 threads/in (42 threads/cm)	Multiply by 2,00
81 threads/in (32 threads/cm)	Multiply by 2,50

#### DISTANCE BETWEEN STENCIL AND LIGHT SOURCE

From - To	Correction Factor
From 39 in (100 cm) to 24 in (60cm)	Multiply by 0,36
39 in (100 cm) -> 35 in (90 cm)	Multiply by 0,81
39 in (100 cm) -> 43 in (110 cm)	Multiply by 1,21
39 in (100 cm) -> 47 in (120 cm)	Multiply by 1,44
39 in (100 cm) -> 59 in (150 cm)	Multiply by 2,25
39 in (100 cm) -> 71 in (180 cm)	Multiply by 3,24
39 in (100 cm) -> 79 in (200 cm)	Multiply by 4,00
39 in (100 cm) -> 89 in (225 cm)	Multiply by 5,06
39 in (100 cm) -> 98 in (250 cm)	Multiply by 6,25

#### MESH COLOR

From - To	Correction Factor
White to Yellow	Multiply by 1,5 - 2,0
White to Metallic	Multiply by 2,5 - 4,0

#### AMBIENT CONDITIONS

From normal to	Correction Factor
High temperature and humidity	Multiply by 1,3 - 1,8

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## WASHING OUT:

Wash out the screen evenly, using a soft water spray over both sides of the whole stencil. Wash until the image fully appears and the non exposed areas are free from residues. Use higher pressure only on the print side.

Evaluate the quality of the stencil observing the Agabê Test Positive, to control exposure time, definition and resolution.

After washing out, apply the Liquid Light Exposure Enhancer HB70 on the stencil while still wet. Begin on the squeegee side using a soft sponge or spray. Wait some seconds and rinse it. This product reacts with the stencil completing the light exposure, fixing the emulsion and preventing residues to run down in open areas.

## FINISHING:

Dry the screen completely. For plastisols and water based inks, block the stencil edges with HB20 Acqua Permanent Blockout. Hb20 Removable Blockout (Normal or Fast Drying) is recommended for printing plastisols.

Seal the edges of the stencil, registration marks and the Test Positive with blockout chosen. Dry the stencil with hot air.

## POST TREATMENT:

**Hardening of the layer:** To increase the stencil resistance to abrasion and water based products, use catalyst HB74 or hardeners Decacure, HB72 or HB76.

### Post Exposure:

After washing out, you may re-expose the stencil to UV light to increase its chemical resistance.

## RECLAIMING (for reusing the mesh):

Use HB52 Ink Remover to eliminate any ink residues that create a barrier that block the action of the stencil decoaters. Apply the product using a nylon brush and wash it with running water.

Following this step, use HB50 Stencil Decoater to remove the emulsion layer. Apply HB50 on both sides and leave it on for a few minutes (do not let it dry on the stencil). Wash it with running water.

To remove the so called ghost images (mesh threads dyed by the printing ink) use HB54 Haze Remover mixed with HB52 Ink Remover. Apply the remover HB52 on both sides of the dry mesh with a nylon brush, followed by the Haze Remover HB54 mixing both products on the stencil until the stains are fully covered. Leave it for 15 minutes. Wash the stencil well using running water, prior to using high pressure jets.

**Obs.: Before using the cleaning products read the Technical manuals for detailed instructions and consult the Material Safety Data Sheets.**

## CAUTION:

The emulsion **DUALFILM CE2** does not present risks if the basic principles of work safety and hygiene are followed.

Please read the Material Safety Data Sheet before using the product

## OTHER INFORMATION:

The information on this document are based on the best of our current knowledge. This product is solely intended for industrial use. No warranties are made or implied. Agabe will not be held liable for claims related to any party's use or reliance on information or recommendation contained herein.