



# TECHNICAL BULLETIN

## Pad Printing

### Polymer Cliché Processing Instructions for DURAPRO

The **DURAPRO** red photo polymer clichés are ideal for all your pad printing cliché making needs. **DURAPRO** clichés are easy to process and are extremely durable. Our **DURAPRO** clichés are well suited for medium sized production runs (maximum cycles: 100,000) and are formulated to work with both open inkwell and closed ink cup pad printing machinery.

Using our **PROSERIES** cliché making accessories you will achieve consistent results with less down time and minimal defects. The **PROSERIES** alcohol wash-out solution, washout tub, washout brush, screen tint film, 21 step grey scale and anti-static accessories have all been specially selected and field-tested to ensure that the **DURAPRO** clichés perform well.

#### Required Materials:

- DURAPRO** Polymer clichés (many sizes are available, see our catalog for details)
- PROSERIES** Screen tint film (recommend 280 line 85%)
- PROSERIES** 21 step grey scale (required to properly calibrate exposure times)
- PROSERIES** Washout solution
- PROSERIES** Washout Tank
- PROSERIES** Washout Brush
- PROSERIES** Anti-static accessories (optional)

#### PROCESS OVERVIEW:

The **DURAPRO** polymer clichés consist of a UV sensitive photo-polymer emulsion laminated to a thin steel backing plate. This special photo-polymer emulsion makes the **DURAPRO** clichés easy to process in most standard UV exposure units (a unit equipped with vacuum frame is best). The clichés are exposed twice in the exposure unit to produce the etched image. The first exposure is done with the film positive artwork (right reading) positioned over the cliché and then the second exposure is done with the **PROSERIES** screen tint film covering the entire artwork image area (film positive has been removed). Next the exposed cliché is hand washed in the **PROSERIES** alcohol-based washout solution using the tank and brush. The washout solution combined with a circular rubbing action causes the soft unexposed material (where the film positive blocked out the light) to be removed from the (unexposed) artwork area. The cliché is then dried and re-exposed in the UV exposure unit to further harden the clichés emulsion. Finally the cliché is "baked" in an oven for approx. 30 minutes to dry out excess moisture and complete the curing/ hardening of the cliché.

**STEP 1 - FILM POSITIVE EXPOSURE:** The photo-polymer emulsion on the cliché will harden when exposed to a UV light source. By using a film positive artwork (matte film is required), the areas of the cliché emulsion which are blocked by the film positive (the black image on the clear film) will not harden, while the open area of the cliché will harden. This first exposure creates the actual image in the cliché.

- 1** Remove a single **DURAPRO** cliché from the black protective bag under "UV safe" light source to prevent pre-exposure of the emulsion by any ambient light sources.

**TECH TIP:** Clear or yellow UV sleeves are available from DECO TECH for making your 4 ft. or 8 ft. fluorescent tubes UV safe. Call customer service for details and pricing.

- 2** Remove and discard the translucent protective film cover from the cliché. (Figure 1)



Figure 1

- 3** Ensure that all dust and dirt is removed from the film positive (Figure 2) as well as the exposure units' blanket & acetate or glass cover. (Figure 3)

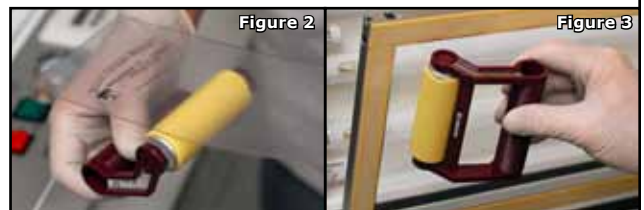


Figure 2

Figure 3

**TECH TIP:** To remove dust, it is best to use an anti-static film cleaner or use an anti-static brush.

**4** Lift the vacuum frame and place the cliché into the center of the UV exposure unit with the clichés emulsion side facing the light source. (Figure 4)



Figure 4

**NOTE:** Depending upon your exposure unit this may be face-up or face-down. On the Deco Tech **X-POSÉ** units this is face-up.

**5** The film positive is now placed onto the cliché with the emulsion side (matte side) facing down and in direct contact with the clichés emulsion side. **MATTE FILM IS REQUIRED** (Figure 5)



Figure 5

**6** Close the exposure units vacuum frame (cover) over the cliché and film positive

**7** Turn on the vacuum (Figure 6) and allow the film positive to be pulled down into contact with the cliché and remove any trapped air bubbles. (Figure 7)



Figure 6



Figure 7

**8** Close the exposure unit and set the exposure time to  $\frac{1}{2}$  of the value determined through the use of the 21 step grey scale. (For example, if the grey scale indicates a proper exposure time of 2 minutes, the first exposure would be  $\frac{1}{2}$  of that time, or 1 minute)

**NOTE:** The use of the 21 step scale is vital in determining the proper exposure time for your actual exposure unit. Please consult with our technical department for assistance and instruction in the use of this scale. Also, it is recommended that you periodically recalibrate your exposure settings to ensure consistent results. This is necessary because over time the power/intensity of the UV bulbs will decrease and values will change.

**9** Once the first exposure is complete, open the exposure unit and bleed off the vacuum to release the cliché and film positive. (Figure 8)



Figure 8

**10** Lift the vacuum frame (acetate) off of the cliché and remove the film positive from on top of the cliché, leaving the cliché still in the exposure unit.

**STEP 2 - SCREEN TINT EXPOSURE:** The screen tint film is used in conjunction with the **DURAPRO** clichés to produce up to a 280 line screen in the artwork etched area. This screen tint is etched into the artwork itself and appears as a series of raised dots which provide "peaks" for the doctor blade or ring to ride on. These peaks help to prevent the blade or ring from dipping into the larger open areas of the etched image and thus removing some ink from the etched cliché image.

**11** Place the screen tint film over the cliché with the emulsion side (matte side) of the tint screen film facing down and in direct contact with the cliché. (Figure 9)



Figure 9



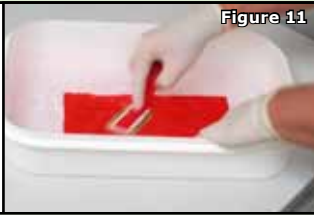

**12** Close the exposure unit frame (acetate cover) over the cliché & tint film and turn on the vacuum (Figure 6) and allow the tint screen film to be completely pulled down onto the cliché and again remove any trapped air bubbles that remain between the acetate and the tint screen film. (As in Figure 7 above)

**13** Close the exposure unit lid and set the exposure time as pre-determined through the use of the 21 step grey exposure scale.


**14** Once the exposure is done, open the exposure unit and bleed off the vacuum to release the cliché and tint film. (Figure 8 above)

**15** Remove the tint film and the cliché from the exposure unit.

**STEP 3 - WASHOUT AND ETCHING PROCESS:** In this step the unexposed emulsion in the cliché is removed by the PROSERIES alcohol based washout solution. This allows the solution to remove all unexposed soft emulsion in the artwork image and creates the actual etching in the cliché. The washout tray should be prepared by filling it with the PROSERIES washout solution to a depth of ¼ to ½ inch. The solution should be at or above room temperature (72° F) for optimum performance results.

<p><b>16</b> Place the <b>DURAPRO</b> cliché into the washout tank filled with our alcohol based washout solution with the emulsion side of the cliché facing up. Let sit in solution for at least 1 ½ minutes. (Figure 10)</p>	 <p>Figure 10</p>	<p><b>18</b> Remove the cliché from the tank and rinse off the excess fluid by running the cliché under a stream of warm tap water at room temperature for approximately 30 seconds. (Figure 12) This will stop the alcohol from further softening the cliché.</p>	 <p>Figure 12</p>
<p><b>TECH TIP:</b> The washout solution should be at room temperature or higher. A warmer solution will speed up the processing time. Use caution when warming the alcohol based solution. Do not use an open flame heat source and heat up alcohol solution to a maximum of 90°-100° F.</p>			
<p><b>17</b> Using the <b>PROSERIES</b> washout brush, apply light hand pressure and brush the cliché in a circular motion, brushing for at least 3 minutes (or sufficient amount of time to remove all of the unhardened emulsion.) (Figure 11)</p>	 <p>Figure 11</p>	<p><b>19</b> If available, use a compressed air nozzle to blow off the excess water from the etched cliché <b>NOTE:</b> This step is optional see tech tip below for alternative. (Figure 13)</p>	 <p>Figure 13</p>
<p><b>TECH TIP:</b> Alternate your brush strokes &amp; direction every 10 to 15 seconds and brush the entire cliché surface. Staying in one area will create an uneven depth of the etch.</p>		<p><b>TECH TIP:</b> If compressed air is not available, then pat dry with a paper towel.</p>	

**STEP 4 - FINISHING EXPOSURE:** In order to finish the curing process of the cliché, which will remove any water that has been absorbed into the photo-polymer emulsion, the cliché must be cured/ hardened in an oven. The recommended oven type will have air circulation and the ability to maintain the desired temperature without fluctuation. Testing may be necessary to ensure the optimum operating conditions for your oven.

<p><b>20</b> Place the cliché into an oven with the etched image facing up for a minimum of 30 minutes at 275° F. As an alternative, we also suggest using a lower temp. of 225° F for 60 minutes. (Figure 14)</p>	 <p>Figure 14</p>	<p><b>21</b> After curing time is completed, using thick heat resistant gloves, remove the cliché from the oven. Allow the cliché to return to room temperature before using on press.</p>
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