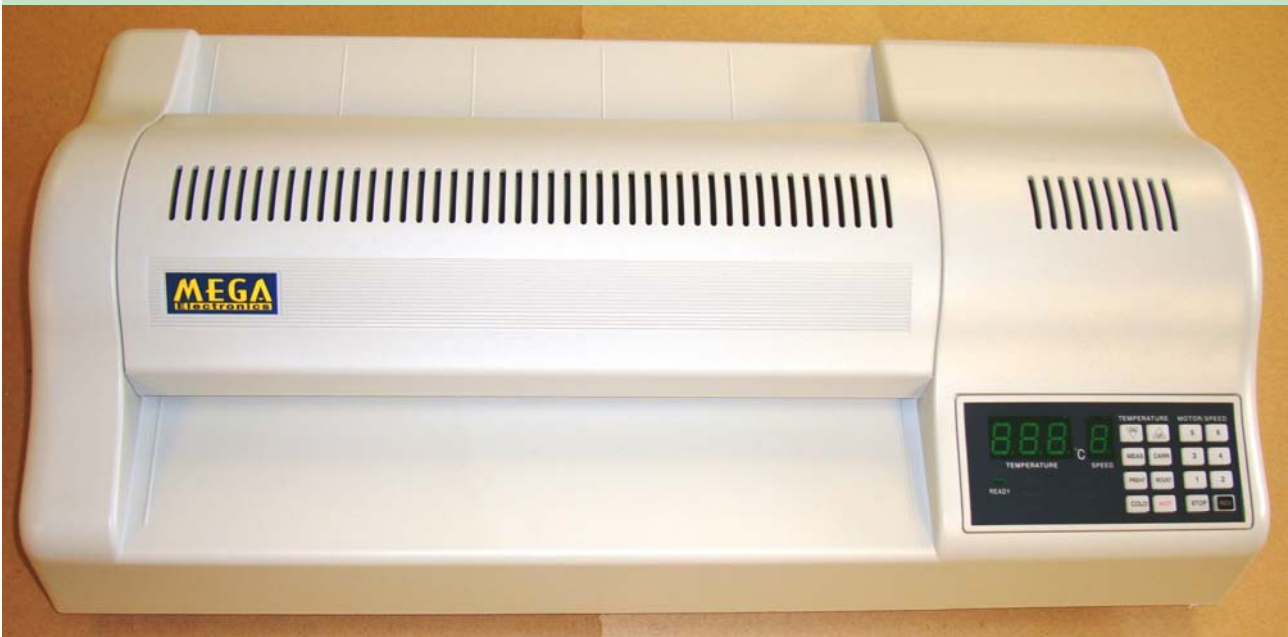




# Mega Drive Laminator

## Part No: 27-4007 - A3

### USER AND FILM PROCESSING INSTRUCTIONS



For smaller volume production, these Hot Roll Laminators enable the user to apply Dry Film Photo-Resist and Dry Film Solder Resist sheets to a wide range of materials, such as Copper, PCB Laminates, Stainless Steel and Brass etc.

For 'one-off ' or very small scale production they offer an economical alternative to the roller laminators

Mega Electronics Ltd.,  
Mega House, Grip Industrial Estate,  
Linton Cambridge, England. CB21 4XN  
Tel: +44(0) 1223 893900 Fax: +44 (0) 1223 893894  
Email: sales@megauk.com Web: www.megauk.com

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Mega Electronics Ltd., : Tel +44 (0) 1223 893900



## WARNINGS

1. This appliance connects to a 240V mains power supply. Switch off and disconnect before removing cover.
2. Avoid moving parts.
3. Keep appliance away from flammable substances.
4. Ensure that the appliance is operated in a dry, clean environment.

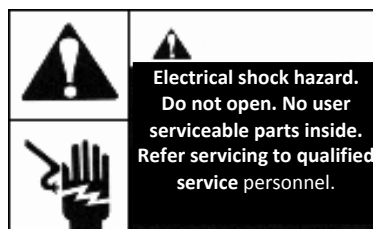
## CAUTIONS

Maximum thickness of material that can be laminated must not exceed 3.175 mm (1/8”).



**SAFETY ALERT SYMBOL – PRECEDES EACH SAFETY MESSAGE IN THIS INSTRUCTION MANUAL. THIS SYMBOL INDICATES A POTENTIAL PERSONAL SAFETY HAZARD THAT COULD HURT YOU OR OTHERS AND ALSO CAUSE PRODUCT DAMAGE OR PROPERTY DAMAGE.**

THE FOLLOWING  
WARNING MAYBE  
FOUND ON THE  
PRODUCT



WARNING



### ENVIRONMENT PROTECTION

Recycle unwanted materials instead of disposing of them as waste. All equipment, accessories and packaging should be sorted, taken to a recycling centre and disposed of in a manner which is compatible with the environment.

## 2. Technical Specifications

<b>Dimensions</b>	: A3 :W580mm x L295mm x H140mm
<b>Weight</b>	: A3: 14.1 kilos
<b>Power supply</b>	: 230V/50, 60Hz
<b>Power Consumption</b>	: A3 - 1000 Watts
<b>Maximum Laminating width</b>	: A3 - 330 mm
<b>Max. Laminating Speed</b>	: 0 - 105 cm / min
<b>Max. Laminating Thickness</b>	: 3mm
<b>Operating Temperature</b>	: 0 - 160 °C
<b>Warming-up Time</b>	: about 3 minutes
<b>Control System</b>	: Microprocessor
<b>Display System</b>	: LED
<b>Cooling System</b>	: DC Motored Fan
<b>Driving Motor</b>	: D.C. Gear Motor

### ***Regular Cleaning is easy, but essential.***

As the first sign of adhesive deposit on work, pass some plain copier paper backwards and forwards through the heated rollers, using Motor speed 3 and REV reverse alternately. This will quickly clear any adhesive build up.

**Warranty** 1 (one) year on parts.

## Contents

- Warnings & Cautions
- Technical Specifications
- Function of operation of control panel
- Control Panel Layout
- Recommended laminating temperatures & speed
- How to laminate Dry Film Photoresist.
- Fault finding

# Functions and operations of Control Panel

## A. Indicating lamp Functions

*Following indicating lamp is lit if function buttons are pressed accordingly*

**90**

TEMPERATURE

Indicate temperature

Number upon indicates "present temp", or "set temperature".

**5**

SPEED

Indicate speed

Number upon indicates "Running speed" of the rollers.

**COLD**

Indicate currently chosen function is cold (No- Heat)" laminating function.

**MEAS**

Indicate lamp "present temperatruue" of the rollers.

**PREHT**

Indecate currently chosen function is "Pre-Heat" function.

**HOT**

Indicate currently chosen function is "Hot (Heat)" Laminating function.

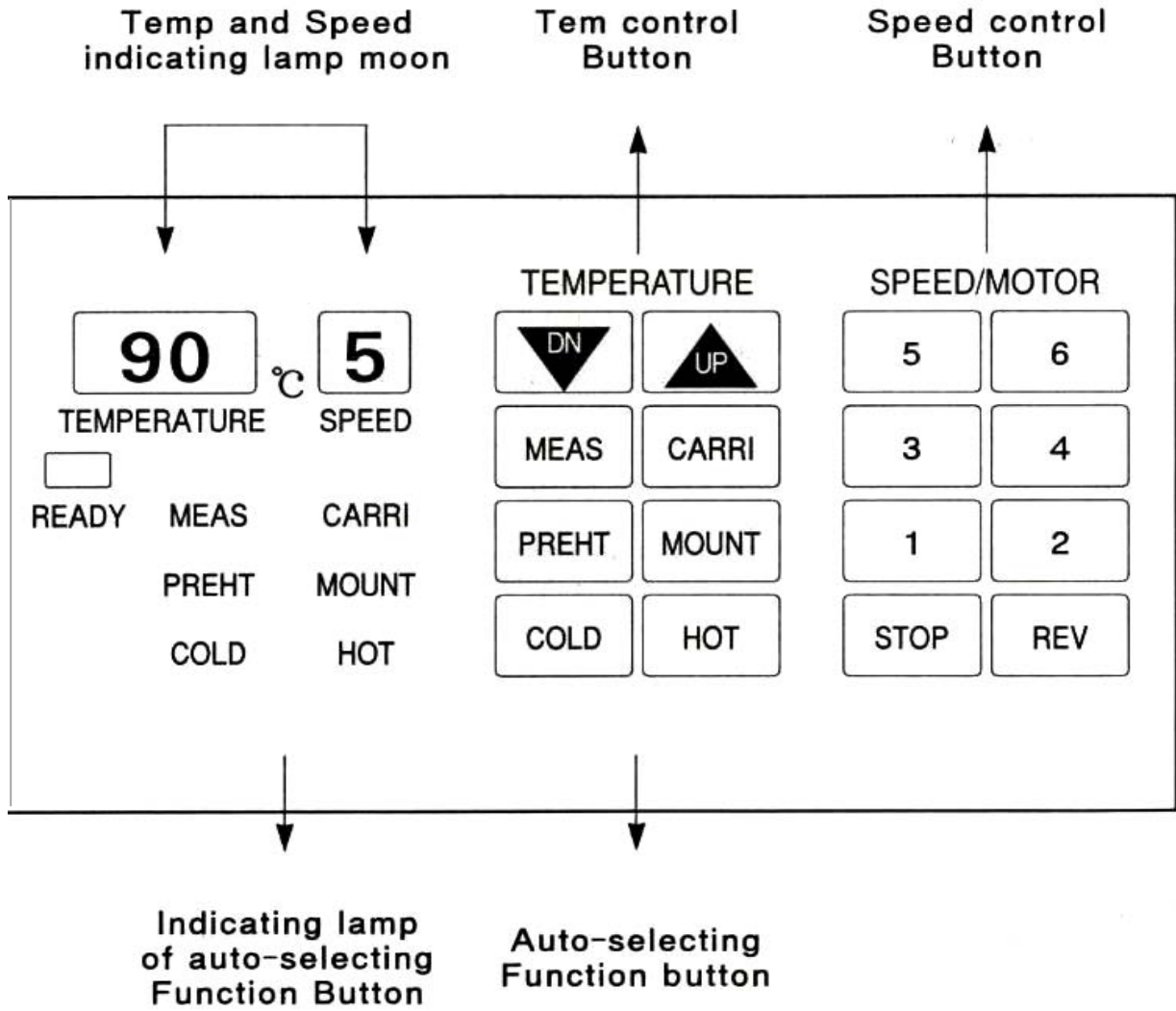
**MOUNT**

Indecate currently chosen function is "Mounting" function.

**CARRI**

Indecate currently chosen function is "Matting" function.

# Control Panel



## Auto-Selecting Function

COLD

Use when laminating Cold film. Temperature and speed of '0' are automatically set when selected. If present temperature is above 60°C, temperature '0' & speed '2' are selected to protect the rollers.

COLD laminating function will be automatically selected when power switch is turned 'ON'. Not used for photoresist applications

HOT

For laminating copper clad PCB material and thin metal (up to 0.8mm thick) set the temperature to 110°C and the speed to '2'

MOUNT

Use when laminating materials 1 to 3.175mm in thickness and set temperature as described in '2' above

CARRI

For matt laminating pouches.  
Not used for photoresist

PREHT

Stand-by function that can be selected for intervals during long time operation. Temperature of '80' is set automatically. If temperature of the roller is above 90°C, speed of '2' is set to protect the rollers, and once the temperature reaches 85°C, the motor stops at same time after speed is automatically set to '0'

REV

The rollers will operate in reverse at speed 5 once this is pressed. The '5' will blink on LCD and continuous beep will be heard. The laminated media can be removed by using this key once they are jammed / wrapped against the rollers.

STOP

Speed '0' will be displayed on LCD and the rollers will stop once this key is pressed.

READY

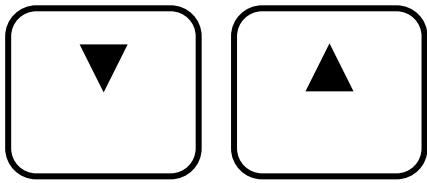
This shows whether the current temperature has reached the set temperature or under/over the set temperature.

No Display - When temperature is lower than the Set value

Display ON - When temperature reached the Set value

Display BLINKS - When temperature is higher than the Set Value

## Temperature Control



Use for increasing or decreasing temperature manually.

The temperature can be increased or decreased by units of 1°C when these keys are pressed. Temperature can be adjusted manually between 0°C – 160°C, and cannot be set below or above the range



Current temperature of roller is displayed while this 'MEAS' key is pressed. It is displayed for 3 seconds and then disappears

See Separate instructions for fitting the Load & Exit Platform Assembly with this Laminator.



Mega Part  
Number  
27-4009



**Mega Electronics Ltd., : Tel +44 (0) 1223 893900**

## How to laminate the Dry Film Photoresist

1. Cut a piece of dry film from the sheet or roll provided so that it is about 4cms longer and 1 to 2cms wider than the material to be laminated
2. Cut a piece of 200gsm paper or thin card so that it is bigger than the film
3. Using two pieces of adhesive tape e.g. Sellotape or masking tape, place a piece of tape on either side of one corner of the film, so that they stick to the film, but **not** to each other. Then pull the two pieces of tape away from each other and one of the polyester protective films will come away. (see figure 1 below).
4. The material to be laminated must be completely clean. PCB laminates should be mechanically scrubbed clean with a (Mega part: 500-017) Scouring pad or (Mega part 900-009) Scrub Block. Other metals should be cleaned by immersing in (Mega part: 500-172-2) 1320 Acid Cleaner for 7 – 8 Minutes cold or 5 Minutes at 40 – 45°C.  
This is **absolutely essential** to achieve a good bond of dry film.
5. Remove the film completely, as well as the tape and having placed the material to be laminated in the centre of the thick paper or card, lay the film over the material with the side where the protective film has been removed being placed in contact with the material. Then making sure that the dry film is flat on the card at the side which will enter the laminator first, tape this to the card. (see figure 2 below)



Figure 1

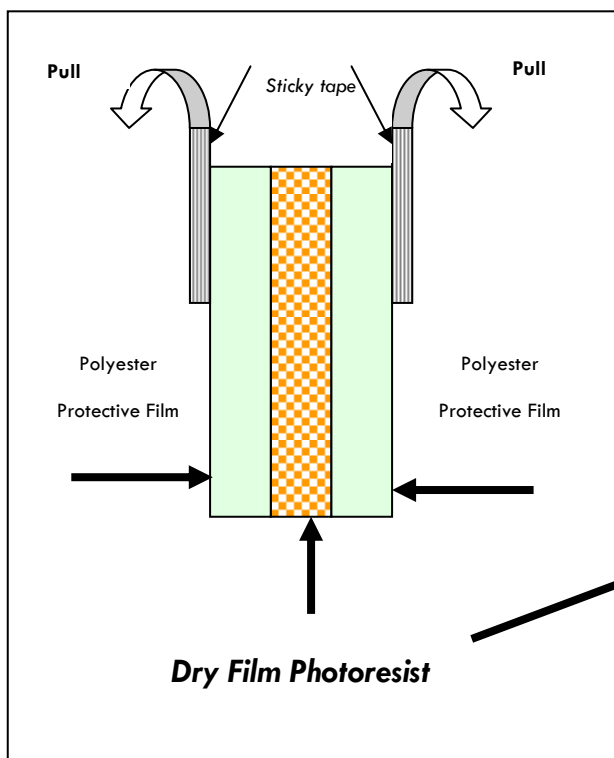
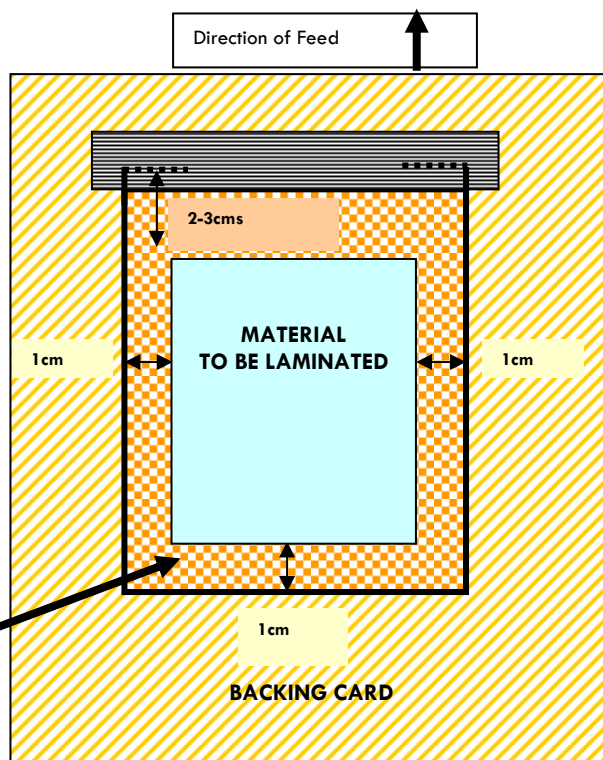


Figure 2



**PLEASE NOTE:** The dimensions shown are as a guide only and are not absolute

6. Select the temperature and speed required, typically 130°C and Speed 1 for metals and 110°C – Speed 1-2 for printed circuit boards.



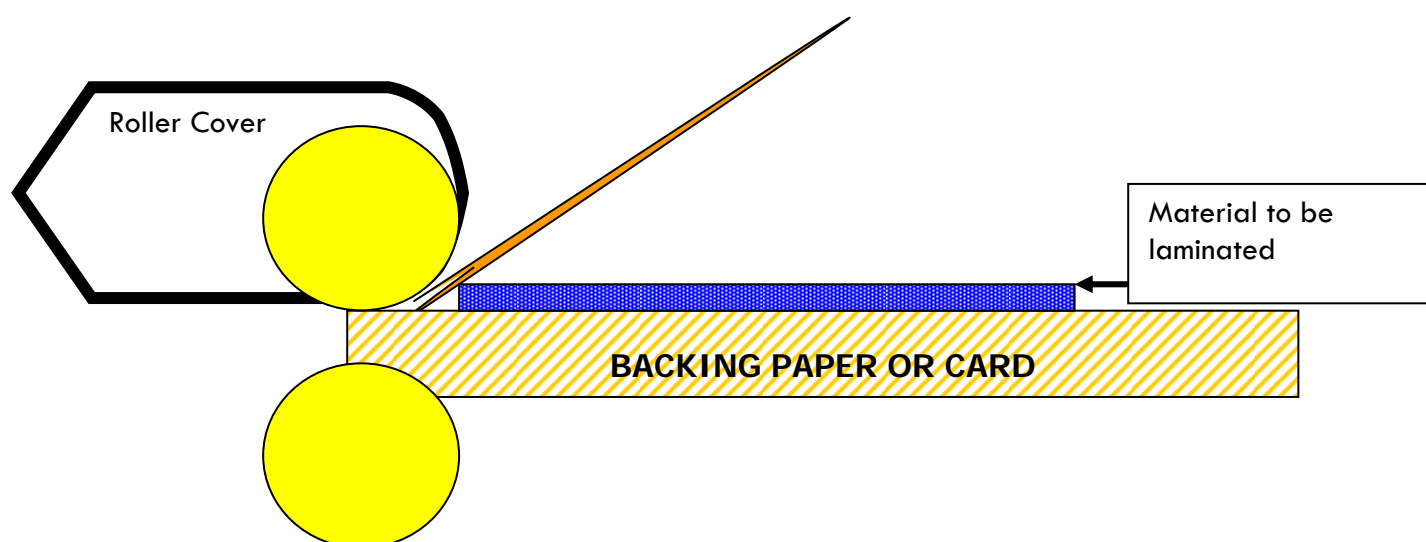
Make sure that the operating temperature has been reached by pressing the button.



Feed the card squarely into the middle of the rollers and hold the back edge of the dry film with both hands up against the edge of the plastic front edge of the roller cover firmly to ensure film is kept tensioned as it is going through the Laminator. (see figure 3 below)

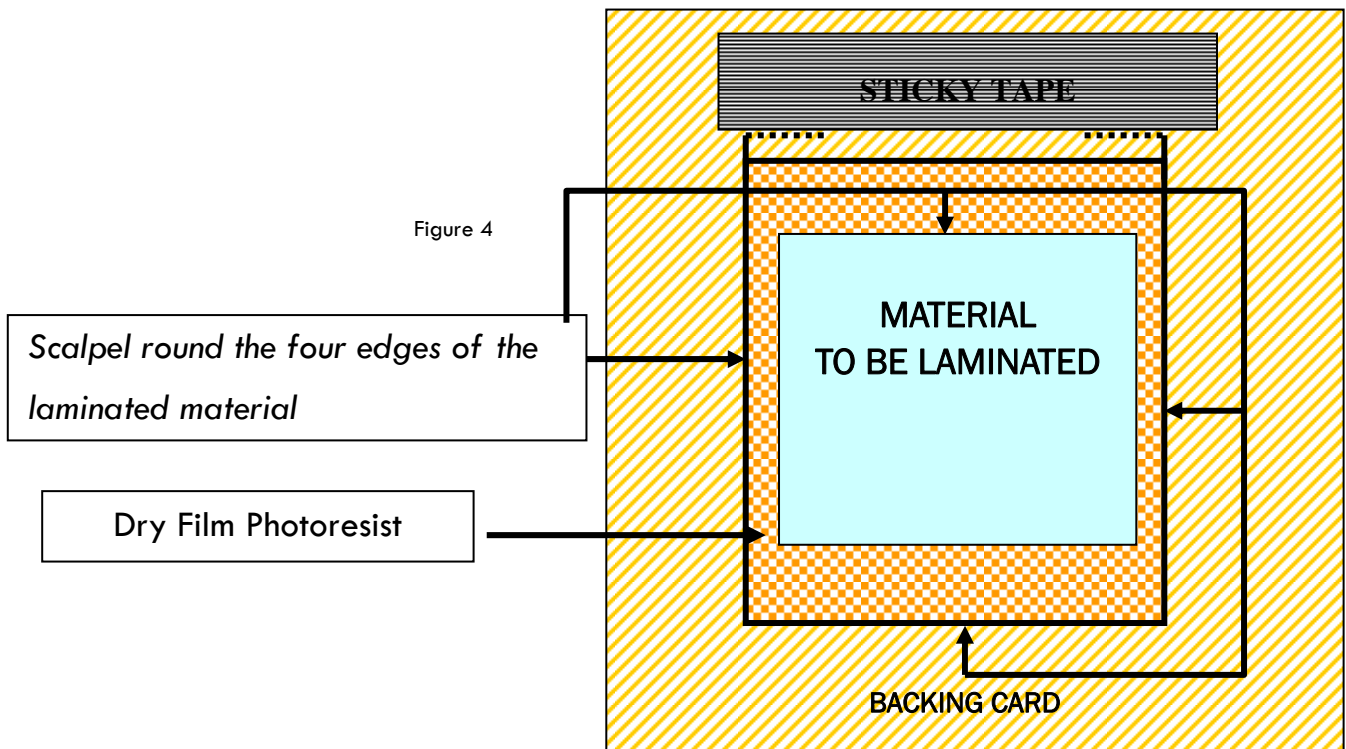
Figure 3

Dry Film to be held in both hands as card and material being laminated pass through the roller



Do not hold the film too tightly – just firm enough to keep smooth and to stop creasing

7. When the material has exited the laminator, leave it to cool for 2 to 3 minutes in a dark environment, and then taking a sharp scalpel, cut round the edge of the material that has been laminated and remove the material from the carrier sheet (see figure 4 below)



8. For double sided lamination, turn the material over and repeat steps 1 to 6. Always let the laminated panel stand for 10 – 15 minutes before exposure. Maximum hold time before exposing is 7 days.

**N.B.** The material to be laminated must be completely clean. PCB laminates should be mechanically scrubbed clean with a Scouring pad or Scrub block. Other metals should be cleaned by immersing in (500-172-2) 1320 Acid Cleaner for 5 minutes at 40 – 45°C or 7-8 minutes cold.

**This is absolutely essential to achieve a good bond of dry film.**

It is also very important to thoroughly wash the plate to ensure all scouring residue and surfactants are removed. Using a soft clean sponge with water running will give best results, and then thoroughly dry the material

## GENERAL INSTRUCTIONS FOR PROCESSING DRY FILM

In order to get the best results for etching ferrous and non-ferrous materials it is important to follow the procedure below.

### INITIAL SET-UP

- A) Please be aware that we have two dry film photoresists, one being for ferrous metals especially stainless steel (Mega part No: 500-052) and the other for non-ferrous metals such as brass and copper (Mega part No: 500-024). It is therefore very important to ensure that you use the correct film.
- B) If you are going to etch a mixture of ferrous and non-ferrous metals it is better to use one solution for ferrous and a separate solution for non-ferrous if the mix is more than 20% of either type.

To help having a clean even etch, we recommend that after you have etched 3 or 4 plates, you add 1-2% by volume of 36% Hydrochloric Acid i.e. for 5 litres of solution add 50-100 ml

**N.B. Always add the acid to the solution.**

### PROCESSING INSTRUCTIONS.

#### 1. CLEANING

Using our 1302 cleaner mixed at 4 parts water: 1 part 1302

Place plate in a tank for 7-8 minutes if cold, or 5 minutes if heated to 40°C.

If you are using one of our conveyors, you would use our 1302LF mixed at 2 parts water to 1 part 1302LF. The temperature should be 45°C and the conveyor speed set so that the plate is in the process chamber for 2 – 2½ minutes.

**2.** Remove the plate from the cleaning solution and thoroughly rinse under running water preferably using a soft clean sponge to wipe over the surface as you are washing the plate to ensure all the surfactants are removed.

**3.** Dry the plate carefully with paper towels and leave to stand for a few minutes before laminating.

#### 4. LAMINATING

If you are using our hand laminator – For ferrous metals press the MOUNT button and this will set the temperature to 130°C. Set the speed to 1. This setting should give you exit temperature of 51-52°C.

For good adhesion the exit temperature must be above 50°C. If you are using any other laminator, set the temperature and speed to achieve this. For non ferrous materials set temperature to 110 °C and the speed to 1or2. This should give you the required exit temperature of 40-45 °C for the non ferrous material dry film.

After laminating leave the plate for 15-20 minutes to ensure that it has cooled down to room temperature.

If you do not have a yellow light room, then place the plate in a drawer or black bag/bin liner whilst it is cooling down. Plate can be kept for up to 7 days before exposing.

## 5. EXPOSING

Very importantly before exposing - switch on the exposure unit for 4-5 minutes to ensure that the tubes are warmed up.

The exposure time will depend upon the type of unit you have and also which dry film you are using. As a guide, if you are using one of our 4 or 6 tube units, exposure time will be 45-50 seconds for our ferrous dry film and 15-20 seconds for our non-ferrous dry film.

However to be completely sure, you should do test exposure using our 21 step Stouffer step wedge (Mega part Number: 500-102). This is done by placing the step wedge onto a laminated plate and then placing a piece of the film on which you are going to print your artwork over the top of it. Then set a short exposure time and expose the plate through the step wedge with the rest of the plate covered by a piece of black film, so that it is not exposed. After exposure move the step wedge to the unexposed area and cover the exposed area with black film and then set the time to double the first setting. Then remove the plate and develop the image. This will show you if you are in the correct area of exposure.

What you are looking for is a solid 7 to 8 with a clear 9 to 10. You may have to repeat this process a few times to get the correct setting.

When you have this, set the required time, and then expose the dry film surface through your artwork, making sure that the ink side is always in contact with the dry film.

**6.** Remove the exposed plate and if you do not have a yellow light room, place it in a bag / drawer or black bag/ bin liner to ensure it cannot be exposed. Leave the plate for 20 minutes minimum before developing, and then remove the top protective clear film and plate is ready to be developed.

**NB:** Leaving the plate for 1 hour or more after exposure will give better adhesion.

## 7. DEVELOPING

Whether you develop in a heated tank or spray system, the developer should be at 28°C – 32°C Optimum 30°C. Developer should have a pH between 10.4 -11.4 when mixed. If pH goes below 10.4 (minimum 10.2) - change developer. Always make it up with deionised water.

In order to achieve the correct development time, you need to establish the break point. This is the point where the resist is just removed down to the metal surface. This will depend on the type of dry film being used and whether the developer is fresh or used. After this break point time has been established, the plate should be left in the developer for 40% of the time taken to reach this point. e.g. time to reach point 2 minutes, then total time in developer will be 2 minutes 48 seconds. Obviously a few seconds either way will not matter.

**N.B:** If you are using a static tank to develop the image, then every minute you need to move the board up and down a few times to create some agitation of the liquid. If the tank has bubbles blowing through it this is not necessary.

As a rule, tank developing will take 4-5 minutes and spray developing 1-2 minutes.

**NB:** If developer starts to foam add 1ml of anti-foam per 5 litres of developer.

**8.** Remove the plate from the developer and thoroughly wash under running water preferably using a soft clean sponge to wipe over the surface as you are washing the plate.

**9.** Your wet plate can now be placed in your etching machine, which should use Ferric Chloride Solution with a S.G. of 1.38 -1.42 for ferrous metals and a S.G. of 1.3 – 1.34 for non-ferrous metals (N.B. Non-ferrous metals can also be etched in the higher S.G ferric without any problems). Also please ensure that the S.G of the solution does not exceed 1.45, if this happens dilute it down to 1.42 with water.

To check the S.G. use our hydrometer set (Mega Part No: 500-174-11)

**In Spray Etchers always run the pump for 3-4 minutes before doing checks for both S.G. and acidity (see below)**

**It is also important to keep the acidity of the solution. This can be checked from time to time by taking 5-10ml of solution and adding it to 50 times the amount of water in a clear jug or beaker. The ferric should look a clear to green colour, however if it appears to be cloudy with particles floating in it then add 1% by volume 36% Hydrochloric Acid.**

**MOST IMPORTANT: PLEASE ENSURE THAT IF YOU NEED TO DO MORE THAN ONE PASS THROUGH THE ETCHING CHAMBER, DO NOT RINSE IT BETWEEN PASSES AS THIS CAUSES THE DRY FILM TO SHRINK AND STEPS IN THE ETCHING.**

As a general point – Fresh etchant will etch stainless steel at about 12 microns a minute and brass and copper at about 30 microns a minute. Obviously this will slow down as the etchant becomes more saturated with metal. Normally when the etch time is double the time to get the same depth, you need to replace the etchant.

For the disposal of spent chemicals, please contact: Richard Spreadbury of J&G Environmental Ltd. Telephone: 07970 204845/ email: sales@jg-environmental.com and let them know that you are our customer.

**10.** Remove the plate from the etching machine and wash.

## **11. STRIPPING**

Using our stripper, diluted 4 parts water with 1 part stripper, place the plate in the stripper either in a tray, dip tank or spray process and leave until all the dry film resist has been removed. If the stripper is heated to 45°C it will work much more quickly.

**12.** Remove the plate from the stripper and then wash and dry it.

**Your plate is now ready to be filled, cut etc.**

## **DRY FILM STORAGE CONDITIONS**

Store between 15°C – 20°C with a relative humidity of 40-60%

## MAINTENANCE INSTRUCTIONS FOR MEGA ETCHING MACHINES

Any spillage of the etchant should be wiped off the surface with a clean damp cloth. The cloth should then be thoroughly rinsed out and then the surface wiped again and then dried with paper towels. This will ensure minimum staining of the equipment.

When the etching time becomes twice as long as it was with fresh chemistry, to achieve the same etching results, the etching solution needs to be changed.

After you have emptied the tank twice, mix up a solution of our stain remover (Mega part: 600-039) using 500 grams mixed with water to make 5 litres (2.5 kilos for 25 litres).

Pour the mix into the etching tank (Bubble Etcher) or spray chamber in the Rota-Spray and conveyorised etching machines.

Heat solution up to working temperature and then run for 30 minutes.

Switch the machines off and empty the solution.

Rinse tank / etch chambers out with fresh water and then add the required amount of fresh etchant.

EXTRA requirements for Rota-Spray and FAPC range of conveyorised etchers after the 4<sup>th</sup> change of etching solution.

### Rota-Spray

a) After cleaning with the stain remover fill the unit to working level with water, then run the machine and check that the water is coming out of the holes in the tube. If any appear to be blocked, use a cocktail stick or similar to remove any debris and then test again.

b) Remove the orange sump guard and check that there is no sludge in the sump or round the heater or float switch.

If this is some sludge, carefully remove it using a damp cloth. Be especially careful around the heater. NB Do not use paper towels or issue.

c) Flush sump out with water.

### FAPC Conveyorised Etching Machines.

a) After cleaning the unit with the stain remover and emptying it, remove the top manifold, then the pinch rollers and transport rollers, then the bottom filter tray, which is slid out from the side of the machine and finally carefully remove the two sump cover plates.

b) Using a damp cloth, clean out any debris or sludge being careful around the heaters and float switch.

c) Flush the sump out with water.

d) Replace all the used spray nozzles in the manifold (Mega part number: 251300) If only one manifold has been used then only those need to be replaced.

e) Replace all the removed parts in the reverse order.

**NB** Before replacing the filter tray, wash it thoroughly.

f) Remove the front and rear outside pinch rollers and clean them with soap and water.

g) Finally remove the in-line filter and clean.

**Your unit is now ready to be filled with fresh etchant.**