



TECHNICAL DATA SHEET

PHOTRAK[®]

ETP240

Aqueous Developable
PHOTOIMAGEABLE ETCH-RESIST
FOR UNIVERSAL APPLICATION

PRODUCT DESCRIPTION

Photrak[®] ETP240 is a contact exposure, negative working photoimageable etch-resist, formulated for use as a cost effective alternative to dry film-resist in the manufacture of high density multi-layer printed circuit boards.

It can be applied by screen-printing (SP), curtain-coat (CC), electrostatic spray (ES), air-spray (AS) or roller-coating (RC) and is suitable for use with acid etchant solutions.

After etching it is easily removed in a sodium hydroxide solution or proprietary resist strippers.

FEATURES & ADVANTAGES

- **<25mm (1 mil) resolution capability.**
- **Fast exposure.** Approx. 5s using standard 5kW PC equipment. Avoids bottle necks at photoprinting stage and maintains fast throughput particularly with automatic exposure units.
- **Excellent adhesion and conformance to copper surfaces.** The liquid system flows into copper/laminate defects leading to increased fine line yields.
- **Single pack system.** No mixing or weighing.
- **High acid-etch resistance.** High copper weights are easily processed without attack to the resist.
- **Reduced developer and stripper costs.** Reduced resist thickness leads to 60% less waste treatment.
- **Low cost. No waste.** 100% material utilisation.



PROCESSING

Surface preparation:

Copper surfaces should be mechanically (brush or pumice) or chemically cleaned to give a waterbreak-free surface.

Viscosity reduction:

SCREEN-PRINT (SP)

ETP240 is supplied press ready. If viscosity adjustment is required prior to, or during printing, then this may be achieved using **ElectraReducer ER13**. No more than 5% reducer should be added or deterioration of the printing and drying properties may occur.

ROLLER-COATING (RC)

ETP240 RC is supplied ready to use at roller-coating viscosity. Any further viscosity adjustment or control should be carried out using **ElectraReducer ER10**.

ELECTROSTATIC-SPRAY (ES), CURTAIN-COAT (CC) & AIR-SPRAY (AS)

ETP240 should be reduced to a viscosity of 180 to 200s at 25°C (Ford N°4 cup) with **ElectraReducer ER10**.

Note: Where ER10 is not available, an equivalent from an approved source may be used. The use of non-approved solvents is not recommended as they can cause contamination and other processing problems.

COATING PARAMETERS:

<u>Screen-printing</u>	Mesh count:	62-77T (160-195) polyester.
	Squeegee:	70 to 80 shore.

Curtain-coating, electrostatic-spray, air-spray and roller-coating:

Coating parameters will vary slightly depending on machinery type and manufacturer. Parameters will be determined by Electra Technical Service Department during product testing and installation.

RESIST THICKNESS:

For optimum performance **ETP240** should be coated to obtain a dry-film thickness of **8 to 10µm** (0.3 to 0.4 mil). Excessive deposits will impair resolution capability and thinner deposits reduce resistance to etchants.

Wet thickness:

RC	30µm (±3µm)	(Typically achieved with 48TPI rollers)
CC, AS and ES	30µm (±3µm)	(Typically achieved with 30gm ⁻² wet-weight)
SP	15µm (±3µm)	



TACK-DRY

The aim of the tack-drying stage is solely to remove the solvents. It is important for the drying chamber (static or conveyerised) to have good air circulation with clean-air supply and adequate extraction facilities.

ETP240 has a proven wide drying window allowing the use of higher temperatures.

Temperature range: 100 to 110°C (212 to 230°F) panel temperature
Time range: 5 to 15 minutes

(A) **Convection Dry**

Typical setting: 10 mins at 110°C (230°F)

(B) **Infra-red Dry**

Typical setting: 2 mins at 100 to 110°C (230°F) panel temperature

When applying **ETP240** by curtain-coating or roller coating, drying should be carried out in a horizontal position to avoid sagging. If this is not possible, then initial drying should be carried out in a horizontal position using forced air, before racking for drying in a vertical position. The initial solvent evaporation may be carried out at room temperature, or at a slightly elevated temperature. When applied by screen-printing or air-spray, horizontal drying is not necessary.

After drying it is recommended that boards should be processed within 24 hrs to avoid increasing the risk of dust collection on the resist surface. However boards may be held for over four weeks without effecting further processing times.

Boards **must** be at room temperature before exposure.

EXPOSURE

Exposure: Spectral output: 310-420 nm.
Energy requirement: 75-150 mJcm⁻²
Step wedge: 5-6 clear (Stouffer 21 step)

Determination of the correct exposure should be carried out after setting the developing speed since this will affect the step wedge reading obtained.

Step wedge determination should be carried out on pre-cleaned copper and the step-wedge reading taken through the phototool.

It is important to recognize that the energy level should only be used as a guide for setting the correct exposure and the step wedge should be used for determining the actual exposure setting.

After determining the correct setting, the energy level can be measured and monitored, using an industry recognised light-bug, as a means of checking for any decrease in output from the lamp with age.



DEVELOPING: Solution: 1.0% solution (w/w) sodium or potassium carbonate.
 Spray pressure: 0.75-1.0 kgcm⁻², 10-15psi.
 Spray time: 15-30s (in developing chambers).
 Temperature: 25 to 30°C (75-90°F)

Note:

1. The optimum developing speed is set when an unexposed board develops off completely, 75% of the way through the machine. This speed should be ascertained by preliminary tests prior to making exposure tests.
2. Where desired line speed is not attainable to achieve recommended break-point, lower developer concentrations (down to 0.25%) can be utilised.

STRIPPING: 5% NaOH solution at 40° to 50°C (100-120°F)

CLEANING: Screens and equipment should be cleaned using **Universal Cleaner SW100 or ER10.**

STORAGE: Store between 10 to 25°C (50-75°F) in a dry store.
 Avoid subjecting containers to temperatures below 5°C (40°F) because of risk of splitting.

SHELF LIFE: Minimum 9 months from date of manufacture when stored in cool dry conditions.



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