



# AUTOMATED CHEMICAL SOLUTIONS

Chemicals and Controllers for PWB Fabrication

## Technical Data Sheet

### ETCHpro CC-4000

Cupric Chloride Etch Controller



#### Description

The ETCHpro CC-4000 provides accurate and reliable control of your cupric chloride etching process through independent measurement and adjustment of the three critical control variables: cupric chloride concentration, free acid and total metal loading. Each process sensor is chosen specifically for optimum performance and maximum operating life in the harsh chemical etching process. The resulting Tri-Sensor System provides superior process capability and performance. The ETCHpro CC-4000's user friendly, easy-to-install design allows it to be readily adapted to control all conventional etching equipment systems. For increased etch rates and etch factors, use with REGENERATOR CC-4405 or CuRep-40 etch replenisher.

#### Features

- 💡 Tri-Sensor System (ORP, Conductivity and Specific Gravity)
- 💡 Toroidal (non-contact) conductivity measurement
- 💡 Multi-junction ORP electrode design

#### Benefits

- ⚙️ Optimize each control variable for specific performance requirements
- ⚙️ Superior sensor performance and durability provides accurate, reliable control of free acid
- ⚙️ Unparalleled accuracy and sensor life

## Theory of Operation

The three critical control variables in controlling the cupric chloride etching process are cupric chloride concentration, total copper concentration (cupric and cuprous) and free acid concentration. The ETCHpro CC-4000 allows the user to optimize throughput, quality and operating costs according to their specific requirements through independent adjustment and control of each of the control variables.

As boards are processed, cupric chloride and acid are consumed while total copper concentration increases. The ETCHpro CC-4000 monitors process ORP, specific gravity and conductivity as indicators (manipulated variables) of cupric chloride concentration, total copper loading and free acid concentration, respectively. The ETCHpro CC-4000 replenishes REGENERATOR CC-4405 to maintain cupric chloride concentration, hydrochloric acid to maintain free acid normality and water to maintain specific gravity.

A continuous process sample loop is drawn from the spray manifold, passes ORP, conductivity and specific gravity sensors and returns to the process sump. When any of the manipulated variables is outside its specified range, the ETCHpro CC-4000 automatically delivers the appropriate replenishment chemical from its storage location (drum or bulk) directly to the process. Spent etchant is purged to the collection system automatically when process solution level reaches a predetermined height. A system of alarms and interlocks notifies process operators when replenishment chemicals or the spent drum need replacement or if the process is out of spec.

## Typical Operating Ranges and Tolerances

Parameter	Common ranges	Control Tolerance
copper loading	150 g/L – 225 g/L	± 10 g/L
HCl concentration	0.5 N – 3.0 N	± 0.15 N
ORP	450 mV – 650 mV	± 10 mV

## System Requirements

Electrical	120 VAC, 60Hz, 20 amps
Dimensions	70" X 36" X 24" (H X W X D)
Water	5 – 10 gpm

## System Options

Data acquisition  
Bulk delivery  
Chlorine gas detection

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