

# CT-160

## Catalyst/Activator Solution for OMEGA II

### DESCRIPTION

**CT-160** is an important part of the OMEGA II Direct Metallization™ plating process. It is designed to help produce a conductive coating on non-conductive surfaces. The final surface coating can either be plated with electroless copper or electrolytic copper.

**CT-160** contains a special blend of acidic and organic compounds that help it increase the coating's deposit energy. The CT-160 solution is followed by the **AC-171** conditioner step. It produces the final link of the coating that produces a highly conductive surface.

### OPERATING PARAMETERS

Make-Up	See section IV. Control Procedures below
Temperature	110°F to 115°F (43°C to 46°C)
Immersion Time	5 to 7 minutes
Process	Batch Tank
Agitation	Will speed through hole activation
Circulation	Continuous
Ventilation	Advised
Tanks	Polypropylene, Polyethylene, PVC
Racks/Baskets	Stainless Steel
Heaters	Teflon Coils

### PHYSICAL PROPERTIES

Appearance	Dark brown liquid
Specific gravity	1.40-1.45
pH	<1

## CONTROL PROCEDURES

### CT160 SOLUTION MAKEUP (using PD-155 liquid concentrate)

1. Fill the tank most of the way with **PD-155** liquid.
2. Add 0.5% by vol. hydrochloric acid (CP Grade) and mix.
3. Add 5 % by vol. **CT-160** and mix.
4. Bring the tank to level with **PD-155** liquid and mix.

### REPLENISHMENT

Replenishments can be made to **CT-160** working solution. Maintain by additions of **CT-160** based on square footage processed. Add 378 ml for every 1000 square feet of panels processed. You should be able to process a minimum of 12,000 sq. feet of surface area per gallon of liquid concentrate. This amount will vary, and will depend on the number of holes in the panel. Poor drainage of the parts is the major reason for low consumption values. The solution level of the **CT-160** working bath should be maintained with **PD-155** concentrate solution. **The preferred method of control is a simple bench analysis.**

## ANALYSIS

### **Determination of Acid Normality**

#### Reagents and Equipment

0.5 N Sodium Hydroxide  
Phenolphthalein indicator solution  
250 ml Erlenmeyer flask  
10 ml pipet  
50 ml buret

#### Procedure:

1. Pipet 10 ml of **CT-160** working solution into the 250 ml Erlenmeyer flask.
2. Add 3 to 4 drops of 50% H<sub>2</sub>O<sub>2</sub> to break the complex.
3. Add 75 ml of de ionized water and 1 to 2 drops of Phenolphthalein indicator solution.
4. While swirling the solution, titrate with 0.5 N sodium hydroxide to a purple endpoint.

#### **5. CALCULATIONS:**

Normality = (mls of base) x (Normality of base) x 0.1

The acid normality of a **CT-160** solution should be maintained between of 0.35 and 0.75. An addition 8 ml per liter of 35% hydrochloric acid will raise the normality 0.1 units.

### **Determination of Stannous Chloride**

#### Reagents and Equipment

25 ml buret  
10 ml pipet  
250 ml Erlenmeyer Flasks  
100 ml graduated cylinder  
0.1 N Iodine Solution  
Fresh Starch Indicator Solution  
50% Hydrochloric Acid solution

### Procedure

1. Pipet 10 mls of working solution into the 250 ml Erlenmeyer flask.
2. Add 25 mls of a 50% hydrochloric acid solution and 75 mls of de ionized water.
3. Add 5 mls of starch indicator solution.
4. Titrate the solution with 0.1 Normal Potassium Iodate-Iodide solution to a dark blue/black endpoint.

### 5. **CALCULATIONS:**

Stannous chloride (g/L) = (mls of Iodine Solution) x (Normality of Iodine Solution) x 9.8

Maintain Stannous Chloride between 18 and 24 grams per liter through **CT-160** additions. Alternately, if circumstances permit, **CA-1000** Catalyst Tin adder can be used to increase stannous chloride concentration. An addition of 1 g/L **CA-1000** will increase the stannous chloride concentration by 1 g/L.

### **pH Control**

Maintain the pH of the working solution below 0.6 with additions of hydrochloric acid.

### **CT-160 Concentration by Test Kit (Color Standard) Method**

The activity of **CT-160** working solution can be determined by comparing the color of a dilute working solution to that of color standard samples.

### Reagents and Equipment

**PD-155** Solution

**CT-160** Standards

5 ml pipet

Clear glass test bottles (any size, but all must be the same size) Procedure:

1. Pipet 5 ml of the working solution into the test bottle.
2. Add **PD-155** solution to fill bottle.
3. Compare the color of the test solution with that of the standards.
4. Determine the amount of **CT-160** needed for replenishment, and make adjustments.

Maintain concentration of the **CT160** working bath at 5% through CT160 additions.

### Color Standard Preparation

Color standards help to visually control the concentration of **CT-160**. To make color standards use the following procedure.

1. Pipet 5 mls of **CT-160** concentrate into a 100 ml volumetric flask.
2. Dilute this solution using **PD-155** and mix.
3. Pipet 3 ml, 4 ml, 5 ml, and 6 ml of this dilute solution into each of 4 test bottles.

Note: you may use test bottles of any size, but all bottles must be the same size.

4. Fill each of the test bottles using **PD-155**.
5. These will represent 3%, 4%, 5%, and 6% working solution concentration of **CT-160**.

Over a period of time the color standard solutions will form a black precipitate. Fresh color standards should be made at that time. Do not attempt to make only one color standard at time. The color will vary. Make the entire kit over again. You can use your first diluted stock solution from part one for three months before discarding it.

## SAFETY AND STORAGE

**CT-160** is a corrosive, acidic solution containing inorganic and organic acids. Avoid breathing vapors. **CONTAINS HYDROCHLORIC ACID.** Use in a well-ventilated area. When handling concentrate or working solution, wear protective clothing, gloves and chemical safety goggles. In case of skin contact, remove contaminated clothing and flush affected area with plenty of cold water. In case of eye contact, flush immediately with plenty of cold water and seek medical attention immediately.

Store **CT-160** in its original container. Keep away from direct sunlight and temperature extremes. Protect from freezing.

## WASTE TREATMENT

**CT-160** contains organic and inorganic acids, palladium and tin metal salts. In the process of activating copper clad material, some copper may be removed and dissolved in solution. The spent working solution of **CT-160** may be treated by pH adjusting the solution to a pH above 10 with dilute caustic soda. Allow the precipitate to settle. Filter the solution and make a final pH adjustment of the solution to between 6 and 8 with dilute sulfuric acid before sending the spent solution to the sewer. Consult with local officials for further waste disposal regulations.

## MISCELLANEOUS

Available in 1 gallon and 5 gallon pails.