

Make-up of CIRCUTEK C-777 working bath:

CIRCUTEK C-777	2 - 3% by volume
CIRCUTEK PD-776S	2.0 lbs/gal
37% Reagent Grade Hydrochloric Acid:	2 - 5% by volume
Deionized Water:	Balance
Temperature:	80 - 95°F
Immersion Time:	4 - 6 minutes
Agitation:	Work bar agitation
Vibration:	Recommended for small hole processing

Procedure:

1. Fill tank ½ full with deionized water.
2. Add the required amount of **CIRCUTEK PD-776S** and mix until completely dissolved.
3. Slowly add the hydrochloric acid.
4. Add the required amount of **CIRCUTEK C-777** catalyst.
5. Bring the solution up to volume with deionized water. Mix well.

OR fill tank with **CIRCUTEK PD-776** liquid. Add required amount of **CIRCUTEK C-777** catalyst, and mix well.

CONTROL

PARAMETERS:

To achieve optimum results the baths should be maintained at these concentrations.

<u>CIRCUTEK PD-776 Pre-Dip:</u>	OPTIMUM	RANGE
Acid Concentration:	0.4N	0.2 - 0.6N
Chloride Concentration:	4.35N	4.0 - 4.70N
Specific Gravity:	Above 1.14	

To maintain the specific gravity, replenish the bath according to the following schedule using **Circutek PD-776S** salt.

<u>Specific Gravity</u>	<u>PD-776S Addition</u>
1.136	-
1.129	2.7 oz/gal
1.118	5.4 oz/gal

<u>CIRCUTEK C-777:</u>	OPTIMUM	RANGE
CIRCUTEK C-777	2.5% by volume	2-3% by volume
Acid Concentration:	0.4N	0.2 - 0.6N
Chloride Concentration:	4.35N	4.0 - 4.70N
Stannous Chloride (SnCl₂):	13 g/l	10 - 16 g/l

Note: The desmear and electroless copper deposition process is laminate-specific. Parameters specified in RBP supplied operating guides for particular installations always supersede the parameters listed above.

This product should be used only for its intended purpose. The information stated above is based on our laboratory tests and experience, and is accurate to the best of our knowledge. Since actual use is beyond our control, the recommendations or suggestions are made without warranty, expressed or implied.

Photometric Procedure:

1. Pipette 30 ml of *CIRCUTEK C-777* concentrate into a 1000 ml volumetric flask.
2. Add 225 g of *CIRCUTEK PD-776S* and 20 ml of hydrochloric acid. Dilute to a volume of 1 liter and mix well.
3. Pipette 25, 20, 15, 10 and 5 ml samples of the standard solution prepared in step 2 into five 100 ml volumetric flasks. Dilute to the mark with 25% (by volume) reagent grade hydrochloric acid. Mix well. These standards represent 5.0%, 4.0%, 3.0%, 2.0% and 1.0% of the *CIRCUTEK C-777* working bath.
4. Using a variable wavelength colorimeter set at 450 nm, read the absorbances for the different concentration of activator using 25% hydrochloric acid to zero the instrument.
5. Plot the absorbances versus concentrations on standard graph paper.
6. To determine the concentration of the *CIRCUTEK C-777* working solution, pipette 15 ml of the bath into a 100 ml volumetric flask. Dilute to the mark with 25% hydrochloric acid and mix well.
7. Read the absorbance of the sample and determine the percent concentration from the graph.

Determination of Stannous Chloride in C-777

Equipment: 10 ml pipette 500 ml Erlenmeyer flask
50 ml burette 50 ml graduated cylinder
Balance

Reagents: 0.1N Iodine (I₂) – Standard solutions are commercially available from chemical supplier.

25% Hydrochloric Acid – Dilute 250 ml of concentrated hydrochloric acid to a volume of 1 liter with deionized water.

Starch Indicator – Commercially available from chemical supplier.

Procedure:

1. Pipette 10 ml of a working bath into a 500 ml Erlenmeyer flask.
2. Add 75 ml of 25% hydrochloric acid.
3. Add 75 ml of deionized water.
4. Add 0.5 - 1 g of starch indicator.
5. Titrate with 0.1N iodine to a blue-black endpoint.

Calculation: ml of I₂ X N of I₂ X 9.48 = g/l SnCl₂

Maintenance: To raise the stannous chloride concentration by 1g/l, add 3.785 g/gal. Dissolve the required amount of stannous chloride into a 5% hydrochloric acid solution and add the mixture to the working bath.

Note: Do not make stannous chloride adds during production. Make stannous chloride adds at the end of a production day.

Calculation: $\text{ml NaOH} \times N \text{ NaOH} \times 2 = \text{Acid Normality}$

Maintenance: To raise the acid normality by 0.1N, add 30 ml of 37% reagent grade hydrochloric acid per gallon of working solution.

BATH LIFE: *CIRCUTEK C-777* activator should be replaced when the copper concentration exceeds 1.0 g/l, or after 12 months of production.

CIRCUTEK C-776 pre-dip should be replaced when the copper concentration exceeds 0.5 g/l or when 500 SSF/gal. of boards have been processed.

CAUTIONS: *CIRCUTEK PD-776S* is a non-hazardous solid. Normal caution, such as safety glasses, rubber gloves, etc. should be exercised during handling.

CIRCUTEK C-777 catalyst is a strongly acidic concentrate. Avoid skin, oral and eye contact. Avoid breathing vapors. When handling the liquid concentrate wear goggles and protective clothing. In case of contact flush exposed areas immediately with cold water. Consult a physician in case of injury.

WASTE DISPOSAL: *CIRCUTEK PD-776S* should be neutralized to precipitate metals. Dispose of sludge according to state and local regulations.

CIRCUTEK C-777 catalyst should be adjusted to a pH of 8 to 9 with 25% by weight sodium hydroxide. USE EXTREME CAUTION! This reaction generates heat and may become violent if the sodium hydroxide is not added slowly. The precipitate contains palladium which may be reclaimed.