

## RE/Gen CC-40

### A Sodium Chlorate Based Regeneration Method for Cupric Chloride Final Etching

#### Product Description

RE/Gen CC-40 is a concentrated, stabilized, and buffered sodium chlorate solution designed to economically and safely regenerate cupric chloride etching systems utilizing the VIS-U-ETCH system and a secondary specific gravity control. The specific gravity controller utilizes water from the cupric etchant post rinse, thereby reducing rinse water volume requiring waste treatment. The use of sodium chlorate versus chlorine gas as the “regenerative” oxidizer, provides several safety advantages; most important of which is the elimination of chlorine gas storage and reduced potential for chlorine gas generation during replenishment.

#### Performance Features

- RE/Gen CC-40 can be used in conjunction with standard ORP control systems, or with the VIS-U-ETCH combined with a specific gravity controller.
- RE/Gen CC-40, when used as directed with the VIS-U-ETCH system, yields a working bath that operates at low acid (less than 0.04 N) improving edge factor, and a copper concentration of 230 g/L (30 opg), which reduces the volume of “bleed”.
- RE/Gen CC-40 eliminates the need for chlorine gas storage, and when operated properly, significantly reduces the risk of generating chlorine gas.
- In most processes, RE/Gen CC-40 is a drop-in replacement for chlorine gas systems.

#### Physical Specifications

Physical state	Liquid
Appearance	Transparent Solution
Odor	None
Stability	Stable as a Liquid <sup>1</sup>
Freeze/Thaw Stability	Keep from Freezing
Specific Gravity	1.32
pH	5-6 (neat)

<sup>1</sup>Sodium chlorate, once sublimed (water evaporated to form a dry salt) is VERY FLAMMABLE.

## Technical Data Sheet

### Equipment Requirements

Tanks: Constructed Of Polypropylene, PVC Or CPVC.

Heaters: Quartz, Titanium, Teflon Or Teflon/Plastisol Encased Steel.

Racks: Constructed of Polypropylene, Titanium Or Plastisol Coated Steel.

Cooling Coils: Constructed Of Polypropylene, Teflon Or Teflon/Plastisol Coated Steel.

Ventilation: Required

Agitation: Conveyorized Spray Only.

Filtration: Depending On The Acid Normality Of Operation, Continuous Carbon Filtration Is Recommended.

### Product Make-Up

Cupric chloride final etching processes are typically operated within the following specifications.

Parameter	Range	Recommended
Copper as metal (g/L)	220 - 235	225
Hydrochloric acid (N)	0.03 - 0.04	0.035
(pH)	(1.40 - 2.10)	(1.60)
Specific gravity	1.368 - 1.394	1.381
(Baume')	(39 - 41)	(40)

The following procedure is for a 100-gallon bath (378.5 liters) prepared at the recommended concentrations. Should you desire to operate at concentrations other than those recommended, you will be required to make volume adjustments accordingly.

#### *Procedure*

1. Thoroughly rinse the tank and inspect for cleanliness paying special attention to the heaters and heater sheathings, and cooling coils.
2. Fill the tank to 75 gallons with electroless grade cupric chloride, 25 opg.
3. Add 10.3 Gallons of hydrochloric acid, 37%.
4. Dilute to volume with electroless grade cupric chloride, 25 opg.
5. Connect the VIS-U-ETCH Controller and add RE/Gen CC-40 and hydrochloric acid until the ORP is (-520) - (-600) mV.

NOTE: Alternatively, you may use the "overflow" cupric chloride from an existing operation.

# Technical Data Sheet

## Operating Parameters

RE/Gen CC-40 was designed to be operated in a conveyORIZED spray system. Additions of RE/Gen CC-40, Hydrochloric acid, 31% w/w, and water, are made utilizing the VIS-U-ETCH automated replenishment system. The VIS-U-ETCH replenishment system measures the copper concentration spectrophotometrically, and doses RE/Gen CC-40 and hydrochloric acid into the etching bath automatically.

Typical operating parameters for RE/Gen CC-40 etchant are as follows:

Temperature	120 - 140°F
Spray Pressure	30 - 35 psi
Etch Rate <sup>1</sup>	1.3 mil/minute

<sup>1</sup>The actual etch rate of copper is very dependent upon the mechanical variables of the conveyORIZED spray equipment. In order to maximize the etch rate, the spray pressure and rate of solution flow must be optimized by varying the nozzle aperture opening. Additionally, the spray pattern (nozzle configuration) must be optimized. Often times, trial and error observation is required to determine optimum settings.

## Control and Replenishment

It is necessary to periodically measure the copper concentration (as metal), hydrochloric acid normality, and specific gravity to assure the feed rates of RE/Gen CC-40, hydrochloric acid, and water are correct. Once the ORP controller settings have been established, it is recommended that frequency of testing be maintained to assure safe operation of the etchant. Contact Seacole for further information regarding testing procedures and calculations.

## Safety and Handling

Read and understand this product's MSDS before handling.

## Waste Treatment

Individual users should verify the nature of spent solutions to assure compliance with local, state, and federal regulations. Contact Seacole for specific details and/or further waste treatment recommendations.

## Ordering Information

RE/Gen CC-40 is available in 55-gallon drums and 275-gallon totes.

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