

Every Day Reduction of Carbonates

Every Day, Asterion works to help our clients become more efficient, more productive and, most importantly, more profitable. As part of our efforts, we work with our clients to help them discover better methods to manage and control their plating baths.

Over time we have learned quite a bit about the struggles our customers have in managing carbonates in alkaline plating baths. Accumulation of carbonates in alkaline plating baths is a continuous problem and can lead to a number of issues affecting quality and plating efficiency. The primary cause of formation of sodium carbonate is a naturally occurring phenomenon when sodium hydroxide is electrolyzed. Another cause is our atmosphere, which contains carbon dioxide. Carbon dioxide combines with water to create a form of carbonic acid, H_2CO_3 . The carbonic acid reacts with the alkaline solution to form carbonates. Air agitation or vigorous mixing will make the problem worse. Finally, a smaller but important cause can be the formation of oxygen at the anode. The oxygen can react with organic materials that may be present in the plating bath as additives, this reaction forms carbonates.

Typically, a new plating bath will have about 8oz./gal of carbonate contamination. But over time carbonates build in plating baths and when carbonate concentrations reach 12 oz./ gal. a number of problems will begin to occur. These problems include but are not limited to slower plating speeds, reduced throwing power, increased brightener consumption, grainy or burned deposits in high current density areas, plating roughness and in extreme cases organics that begin to “oil” out or float. Needless to say no plating professional wants to work with a bath that contains a high concentration of sodium carbonates.

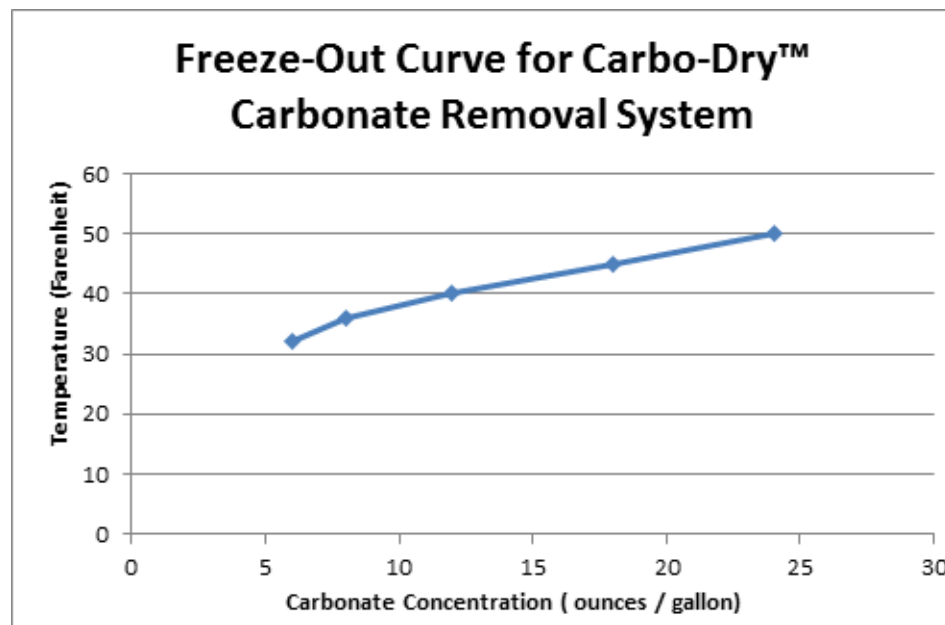
Asterion™ is offering a solution to the problem associated with carbonate build-up in alkaline plating solutions.

Traditional methods for reducing carbonates in alkaline plating baths in solution involved shutting down production, decanting a portion of the working bath and pumping the solution to totes and placing in an environment with temperatures less than 32 °F waiting for crystals to form, which can take up to 48 hours, and then manually removing the sludge. This is a time consuming and costly procedure that is inexact and often results in a substantial loss of the working bath volume.

Asterion’s “Carbo-Dry™” unit offers a unique system for reducing carbonates with the capability to produce almost solid crystals utilizing a simple and relatively maintenance free skid mounted system. The “Carbo-Dry™” automatically treats 50 gallons in a batch process producing roughly 70 pounds of dry crystal residue as a result of a 2 step cycle that includes both a chilling cycle and a centrifuge process. The treated solution is transferred back to the plating line eliminating the need to shut down production or the need to have additional plating solution for an off-line treatment. This reduces time spent by manual labor filtering a slush, it virtually eliminates loss of plating solution and greatly reduces

waste treatment cost. Total cycle time in most cases is three to five hours with a starting plating solution temperature of 80 °F-140 °F.

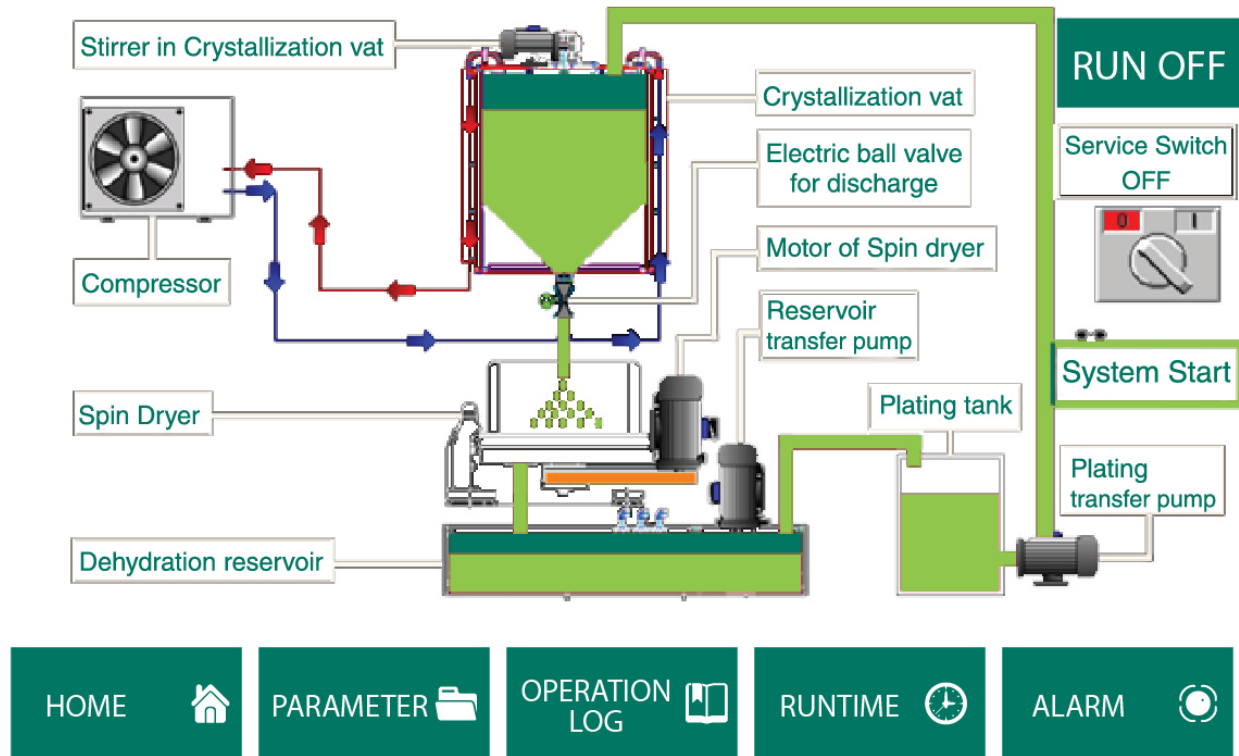
This graph indicates relative solubility vs. temperature of sodium carbonate with equivalent sulfate concentrations for Asterion™ “Technilloy ZN NI 3000” a zinc nickel plating system.



K C Jones Plating Company has been operating the **Carbo-Dry™** unit on a nominal 4000 gallon zinc alloy plating tank to control the buildup of the sodium carbonate and sulfate impurities. Prior to installing the **Carbo-Dry™** unit quality of the plating was becoming an issue due to the impurity increase above the acceptable level. In addition to quality issues the plating efficiency was also being sacrificed due to reduced conductivity of the plating solution. After installation of the **Carbo-Dry™** unit and processing roughly 2 batches per day for a 24/7 operation the carbonate levels have remained within required specifications.

Mark Burger Manager of Business Development with K C Jones **“estimates the unit saves roughly \$45,000 per year in shutdown cost to maintain quality standards. In addition, labor savings and waste treatment cost have been dramatically reduced by concentrating the carbonate / sulfate waste. The unit has operated trouble free and is only utilized on one shift. Because of the overall increase in plating efficiency the number of flights were increased by 20% as an added benefit to the overall process.”**

The **Carbo-Dry™** unit is skid mounted with a foot print roughly 4 ft. x 8 ft. constructed of stainless steel and poly-propylene where plating solutions are processed. There are relatively few moving parts reducing maintenance costs. Shown below is the main operating display indicating the process cycle.



Typically the starting temperature will be 40°F for zinc alloy plating solutions with 12 to 14 oz/gal carbonate. As the carbonate level in the bath drops the temperature can be adjusted on the unit to maintain carbonate level near the optimum range of 8 oz /gal. The carbonate / sulfate crystals are decanted in the spin dryer basin and trapped in a specially designed filter bag. The refined plating solution is then automatically returned to the operating tank with limited loss of volume and zero labor cost.

Every Day, Asterion works to help our clients become more efficient, more productive and, most importantly, more profitable. By continuing to work with our clients to improve plant operations, reduce labor costs and meet quality objectives we provide Every Day Value that our clients have come to rely on over the years.

For more information on the **Carbo-Dry™** unit or any **Asterion™** products please contact us at 800-428-0719 or visit the web www.asterionstc.com