CAL #833

A Nickel Stripper from Copper Alloys

Cal #833 Stripper is an additive which when combined with sulfuric acid will rapidly strip nickel without attacking a copper or copper-alloy substrate. The stripping is done by simple immersion and no current is necessary. Since there is no appreciable attack on the substrate, there is no dimensional change and no need to re-polish the work.

Operating Conditions:

Concentration:	Cal #833	8 to 16/oz gal
	Sulfuric Acid	3 to 10% b.v.
Temperature:	160° to 190° F	
Stripping Rate:	At 160° F:	.004" per hour
	At 180° F:	.007" per hour

Operation:

The stripping rate is dependent upon the temperature of the solution, the concentration of sulfuric acid, the concentration of Cal #833 and the age of the stripping solution. Increases in any of the first three parameters will generally increase the stripping rate. Agitation of either the work or solution will also increase stripping rate. If the substrate is brass or nickel-silver, you are limited in how high of a temperature is allowed before some attack will occur (do not exceed 180° F). As the bath ages, the stripping rate decreases almost linearly with the concentration of dissolved nickel. Eventually, additions of sulfuric acid or Cal #833 will not restore the stripping rate and the solution will have to be discarded.

Preparation of the work:

Parts to be stripped should be free of any greasy or oily soils which would prevent the Cal #833 solution from evenly wetting the surface. An appropriate alkaline soak cleaner will remove such soils. The Cal #833 solution will not remove chromium plating; therefore, chrome-plated work should be stripped in preferably a muriatic acid solution prior to immersion in the Cal #833. Once the work has been prepared, the work then simply immersed in the solution until all the nickel has been dissolved. Occasionally, due to impurities in the nickel deposit, a thin, black film will form and inhibit the stripping rate. This film can be removed by rinsing the work and

immersing in a solution of muriatic acid (50% solution) with agitation. The stripping rate will also be inhibited by a passive nickel surface, that is, one which has been exposed to the atmosphere for any length of time or where the chrome was removed in a reverse-current alkaline stripper. This can be overcome by either activating the nickel in an acid salt or muriatic acid or by additions of ½ oz./gal of sodium meta bisulfate or ammonium thiocyanate.

Makeup:

Cal #833 solution can be made simply and quickly; but since the handling of concentrated acid is required, care and protective clothing should be utilized. Fill the tank two-thirds full with cool water and slowly stir in the required amount of sulfuric acid. Use caution, for a great deal of heat will be evolved and if the acid is added too rapidly, the solution could boil and splash acid. Next, add the required amount of Cal #833 salts and continue agitation until all solids have dissolved. Dilute to operating level and heat to operating temperature and the solution is ready to use.

Equipment:

All the associated equipment must be acid-resistant. Mild steel lined by a flexible PVC such as Koroseal, polyethylene, rubber or lead is preferred. The tank must be equipped with temperature controls and the heating coils should be lead, tantalum, or carbon. Quarts immersion heaters are satisfactory.

Solution Control:

When the stripping rate slows appreciably, additions in increments of 4 oz./gal of Cal #833 salts will usually restore the activity. For best results, the concentration of the sulfuric acid may also be determined analytically by the following procedure:

A. Pipette a 5-ml. sample into a 250 ml. Erlenmeyer flask.
B. Dilute to about 100 m., with distilled water.
C. Add 2 to 4 drops of phenolphthalein indicator solution.
D. Titrate with 1.0 N sodium hydroxide until the solution changes from clear to a stable pink.
E. The calculation is: mls NaOH x N NaOH x Factor = %b.v. H_2SO_4

The concentration of the Cal #833 cannot be readily determined, therefore, additions should be made based on the amount of sulfuric acid consumed (10 lbs Cal #139 per gallon of sulfuric).

Caution:

The Cal #833 salts are highly alkaline and can cause burns. Therefore, contact with skin or eyes should be avoided. Operators should wear the appropriate protective clothing, dust masks and eye protection. In case of contact, flush with large amounts of cool water. If contact with the eyes occurs, flush with water and contact a physician.