CAL 94

An antiquing solution for Brass

CAL 94 is an immersion process that is used as an activating solution prior to CAL-Pac's CAL 87. This combination of products will form a uniform, jet-black finish on brass and other alloys containing between 65 and 90% copper. Depending upon the desired finish, the CAL 94 may provide adequate color on its own to produce a pleasing antiqued finish. For more detailed information, please refer to the CAL 87 data sheet.

Operating Conditions:

Concentration:	1 lb/gal
Temperature:	190˚ to 210˚ F.
Immersion Time:	1 to 5 minutes

Typical Process Cycle:

A.	Mechanically polish surface (for bright finishes)
B.	Clean in Cal-Pac's NS-200 or AP-500 Soak cleaner
C.	Cold water rinse
D.	Activate in Cal-Pac's 101 or 170 Acid Salts
E.	Cold water rinse
F.	Chemically etch surface (for satin finishes)
G.	Cold water rinse
H.	Activate alloys of less than 90% copper in CAL 94
I.	Cold water rinse
J.	Blacken in CAL 87 (opt.)
K.	Cold water rinse
L.	Dry

Make-up:

To make up a new CAL 94 solution, fill the tank one-half full with cold water and stir in the required amount of CAL 94 salts. Use care when dissolving salts since considerable heat will be evolved. Continue agitation until all salts have dissolved, making sure there are no lumps at the

bottom of the tank. Fill up the tank up to within 6 to 8 inches of the top of the tank and begin heating the solution to operating level.

Operation:

Preparation, activation and chemical etching are all done the same way as when working with the CAL 87 solution. Once again, for more detailed information please refer to the CAL 87 technical data sheet.

The CAL 94 solution is only necessary if the copper content of the alloy isles than 90%. Otherwise, the work can be processed directly through the CAL 87 solution. The immersion time in the CAL 94 solution is dependent upon the age of the solution, the temperature and the concentration. Increases in the latter two parameters tend to darken the film and shorten the processing time. Adequate rinsing should be used prior to and after the CAL 94 to prevent contamination of the solutions.

Solution Control:

The concentration of the CAL 94 salts is not overly critical and can be adequately controlled by observing the work. If the temperature is within range and the coatings are not as dark as desired, the salts should be added in increment of 3 oz/gal. If after two or three of such adds, the desired finish is still not obtained, it is an indication that the bath is contaminated with dissolved metals and must be discarded.

Equipment:

The CAL 94 solution should ideally be contained within a stainless steel tank. None of the seams or connections which come in contact with the solution can be soldered or brazed. All related equipment should be stainless; other metals will be attacked by the solution. The tank should be designed to allow between 6 to 10 inches free-board to accommodate the evaporation losses. Heat should be by gas flame tubes or by high-pressure steam. Ventilation is recommended to remove the large volumes of water vapor.

Caution:

The CAL 94 salts contain both alkali and strong oxidizing agents. The solution operates at very high temperatures. Use extreme caution when working around this solution. Avoid contact with skin, eyes or clothing. Operators should wear the proper protective clothing and eye protection. If contact occurs, flush with plenty of water and call a physician. Do not allow the salts to come into contact with combustible materials