Getting the most from your Electroless Nickel

Lowest Cost and The Best Performance

Previously in P&SF I wrote about the "Do's & Don'ts" of electroless nickel phosphorus plating solutions. I would like to emphasize these and add additional items. In view of the World competition, and rising and fluctuating nickel and chemical costs it has become extremely important to get the most out of the process of electroless nickel plating.

At a recent EN Conference that I attended, one whole session was devoted to extending the useful life of EN solutions and to the over-all conservation of materials and energy. We must use the best technology available to conserve and be competitive in the world market and in our own local market.

Kurt Weamer reminded us to keep a clean work area, change filters often, keep chemical inventory form aging by using FIFO inventory system. Don't leave containers open. Be accurate with chemical analysis. Make sure all standard solutions are correct and not aged. Follow the procedures carefully. An example from my own experience: The analytical procedure commonly used to determine sodium hypophosphite requires 30 minutes in dark area after adding the reactants. I observed other chemists often opening the cupboard that contained the flask to be kept dark. This results in an incorrect answer. Additions or no additions would be made incorrectly. All instruments should be calibrated often against known standards.

FR.Liu, in the Journal of Applied Surface Finishing, describes cyclic voltammetry method to determine sodium hypophosphite in EN solutions that appears to be more accurate than the present titration method.

Grant Keers and Graham Orgill suggest "Steady State" EN. Using a system that includes electrodialysis combined with nickel recovery, automatic pH control, and automatic water dosing to keep the concentration of sodium sulfate and orthophosphite in the optimum with a bleed stream of 10-20 L/hour. Automatic feed chemical controllers for nickel content and pH and fully automated additions of replenishing chemicals.

The economics of using the automatic operating "Endless Life" and steady state systems provide significant cost savings and good quality repeatable results.

Helmut Horstemke and Stanley Zabrocky Suggest that "Endless Life" may be possible using sulfate free nickel source combined with "bleed and feed held at 10 metal "turn-overs" and automatic chemical feed would lower costs substantially over the "dump and replace after 6-10 "metal turn overs".

Do's

Use clean DI water in the pre-rinse and for the EN plating solution make up. DI water system should have a carbon filter before the resin beds and the system should be sterilized periodically to prevent algae, moulds and bacteria form contamination the plating solutions and rinses. These growing things can cause high stabilizer consumption, rough deposits and/or nodules and poor adhesion.

Be precise with thickness measurements. Additional deposit thickness costly.

Be sure the thickness specification is adequate for the application.

Keep racks stripped, clean and free from crack in the rack coating that can entrap preparation solutions.

Plan production to run all the items continuously then cool the tank soon after the last load.

Filter the solution back into the plating tank when ready for production.

Refer to the August P&SF Do’s and Don’ts. {included here?}

Refer to the 2007 EN Conference papers.
**Don'ts**

Keep the solution hot when not in use. (There are heat exchangers that can heat the EN solution quickly and cool rapidly. Big savings in sodium hypophosphite are the result.)

Don’t use city water or Well water for make up or additions to the EN plating solution.

Don’t over heat the plating solution. Check and calibrate temperature controls.