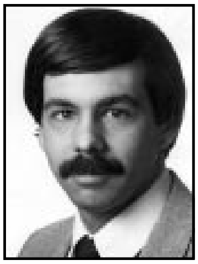

Finishers' Think Tank

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Have a problem on the finishing line? To send your question, use the convenient, postpaid form on our Readers' Service Card, or send a letter to: "Finishers' Think Tank," 12644 Research Parkway, Orlando, FL 32826-3298.

Depositing Gold on Bright Nickel

Q. **We gold-electroplate bright nickel to 8 µm, followed by a gold strike and 1.5 µm of 23-kt gold. The gold is wearing through within three months—what can we do to prevent this?**

A. The easiest answer to your question would be to deposit more gold. If you are already depositing a reasonable thickness of gold on the parts, however, the problem may be either in the quality of the nickel deposit, or the quality and hardness afforded by the gold. In today's market, there are many processes that claim much higher hardness than conventional gold systems, and allow for thinner deposits offering much better wear resistance. As to the quality of the nickel underlayer, if the nickel contains impurities or is a passive surface, it will cause premature wear problems with the final coating. Abrasion and wear tests are available that would establish a standard measure of abrasion (vs. "within three months") for field tests. The following questions should be addressed: How were the original specifications developed? What level of quality is appropriate? What is the percentage of failure in the field? What field conditions are required by the product specifications? What can be done internally to correct the problem without major cost increases?

Inconsistent Tank Performance

Q. **We operate three alkaline zinc tanks—all the same size, concentration, temperature, electric and work load. Two tanks are predictable and keep the proper concentration of metals, but the other one is inconsistent. Why is this happening and how can we correct it?**

A. Obviously, something is different in the problem tank, but the dilemma is: How do you test for it if you don't know what it is? Plating chemistry, in fact, does behave predictably if a sufficient amount of time and money is spent on testing and appraisal. In alkaline zinc solutions, a complex combination and balance of organic materials are essential. These materials are not easily analyzed, and they form different species that will affect the anodic and cathodic reactions. These systems must be controlled independently, and the chemistry must also be controlled to optimize each of the process systems. Although three solutions may look the same, there may be subtle differences that would require an unlimited budget to analyze. Skill and experience, therefore, must suffice, and you will need to focus on the three tanks as individual—rather than identical—process systems.

Electroless Nickel

Q. **What is the difference in the ammonia and non-ammonia versions of electroless nickel, and which is better?**

A. Electroless nickel is primarily a functional coating, so the best electroless coating is one that meets specifications and gives the most dependable, efficient and economical results. Indeed, there are differences in using ammonia-based systems and carbonate-based systems. Functional differences include hardness, stability, speed of deposit and control. Which is "better" depends on what the job requirements are, and how those requirements fit into your system. An overall appraisal of the factors involved—desired properties, variety of products available, functional properties of the coating—should provide the answer for your specific application.

Contaminated Silver Solution

Q. **We barrel-plate silver in an alkaline cyanide solution. Unfortunately, poor practices have contaminated the solutions with copper and zinc from dragged-in acid used in preparing brass and copper components. The now-alloyed silver is demonstrating enough difference in resistance that product performance is affected. How much contamination can be tolerated before performance is affected, and what is the relationship between soluble zinc vs. the codeposited zinc?**

A. Components are plated in silver to achieve a specific functional response from the coating. Customers request silver because they know the properties will fit their needs. By giving them an alloy of silver/copper, silver/zinc or silver/copper/zinc, you are not delivering what was ordered. As the degree of contamination in your silver solution increases, the properties derived from your process will change, which ultimately will affect your customer's requirements. Rather than trying to predict the point at which the bath will become unusable, it would be better to spend the effort to prevent contamination in the first place. Rinse purification techniques, such as reverse osmosis or ion exchange, should keep metals out of the rinsewaters and avoid—or at least limit—contamination. ***P&SF***