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.

Chromium Fume Suppressants **When used to comply with** air emissions standards, do chromium fume suppressants cause deposit problems, such as pitting?

Chromium fume suppressants A. are basically fluorocarbonbased surface-active agents that work to reduce the fumes and aerosols from chromium plating solutions. They reduce the surface tension by forming a foam blanket on the surface of the chromium, thereby reducing the evolution. The foam consists of bubbles created by the evolution of hydrogen from the plating process. Because hydrogen is highly explosive, the bubbles need to break easily to avoid a heavy buildup of hydrogen on the surface of the tank.

When considering a fume suppressant, you must also consider how it will change the characteristics of the plating solution (e.g., the surface activity and the wetting of some of the materials in the solution, such as insoluble particulates). The size and effect of the specific gravity of the solution may cause the particles to float or be stirred up, which may result in problems associated with the fume suppressant. The effect is actually caused by the solution condition itself. There is also a change in how the hydrogen is dispersed as it is formed in solution. It will form bigger bubbles than those expected without the suppressant, which may affect the percolation activity of the process and cause materials to be lifted from the bottom of the tank.

It has been reported that fume suppressants cause pitting or cracking of chromium deposits, especially those that are heavy and thick. The effect seems to be more pronounced when fume suppressants are added to an old solution that is already contaminated, so it is best to add the suppressant to a new solution, rather than an old one.

Problems can be predicted if you realize how the fume suppressant affects the parts as they are plated. Tracks and trails may form because of the transit of the bubbles up the parts as they leave the solution. The bubbles that cover the surface may preclude the plating activity and cause areas of thinner plating, or areas that demonstrate different characteristics from the rest of the deposit. In decorative plating, the problems are not as noticeable because the deposits are usually very thin, so fume suppressants are quite common in decorative solutions.

Finishing Aluminum Parts

Q. Our current method of finishing aluminum parts is to grind with 120, 180, 240 and 320 grit, and finally with a Scotch Brite[™] pad. After buffing, we still see lines in the parts. How can we achieve a true mirror finish?

Your sequence of grinding and A. buffing seems to be fine, but you should probably end up with at least a 400 finish before color-buffing the parts. Although there could be some technical reason for your problem, the most likely cause is that you are continually grinding in the same direction, which reinforces the grind lines rather than cutting through and eliminating them. Although the part will look good prior to processing, when etching and deoxidizing in the aluminum preplate, the surface will be attacked preferentially and

open up the hidden grind lines. When this happens, the parts look like they were never taken beyond the 180-grit stage, and never color-buffed.

The reason for using smaller and smaller grit sizes is to reduce surface imperfections to a finer condition. If the grind lines go in the same direction, the earlier, deeper lines will not be removed-only reinforced. Although color buffing will spread the aluminum and hide the lines, it will not remove them, and they will open up and become more apparent during the preparation cycle. That is why you should emphasize the early stages of the grinding operation, because the lines cannot be removed later. Polishing and buffing, however, are not specialties of mine, so please consult your suppliers for further advice.

Performing a P2 Audit

Is there an available program for performing a P2 audit?

A The New York Branch of the AESF, together with the State of New York, commissioned, wrote and delivered a program to do just that. It emphasizes the economics and techniques to arrive at a program for implementation in a plating shop, and explains the methodology to do a self-appraisal, allowing for the best method of investment. As far as I know, the Branch can release that program to others.

There are other programs available from the U.S. EPA, as well as from other state, local and federal agencies. I am currently reviewing an EPA program called "P2 Progress," the intent of which is to predict the true value of a P2 project. Sometimes, changes in manufacturing techniques only transfer waste from one form to another—this is not always obvious and can be misleading. The EPA program helps you make that decision. When changing from solvent paints to either powder- or waterbased paints, for example, there is an additional need for a high-temperature bake-to-cure. The question is: Am I really reducing VOCs, or am I just going from solvent VOCs to an increase in emissions from the oven or from the generator stations that create the oven's electricity? Although electric ovens are thought to be clean, the conception may change when the full effects of emissions from power stations are considered.

Other contacts for P2 information include the American Institute for Pollution Prevention, the Pollution Prevention Roundtable and, especially, the AESF. There is an entire infrastructure surrounding pollution prevention that has developed, with many case histories available.

The Benefits of DI Water **We are in the aerospace industry and use DI water in all of our processes. We know DI** water is used widely in the metal finishing industry—what are the appropriate areas of use? A DI (deionized) water is indeed used frequently in the metal finishing industry, and is becoming more a part of our processing every day. DI water is used to control the quality of the water when processing parts. DI water is water that is passed through ion exchange resins to remove cations, anions or both, producing high-quality water with very low concentrations of dissolved materials and ions.

The greatest benefit of DI water is that it has no contaminants, is very soft, and doesn't create the problems associated with hard water-cleaners and process systems do not require materials to soften the water before use. Water softeners are basically complexors that tend to interfere with waste systems, and generate more sludge when treated. This causes the system to consume more chemistry and time for treatment. Without the need for water softeners, the systems can work better, create less sludge and operate at a higher efficiency without affecting the environment.

Using DI water also aids process recovery systems by avoiding contamination and purification problems. Rinses can be returned to process tanks without danger of buildup of errant materials. DI water also promotes spot-free drying when the quality of the water is maintained at very high values.

DI water is very aggressive, and is a more efficient rinse media because it removes more of the rinse films than is possible with city or tap water. This same aggressive nature, however, may cause surface passivation, or attack an unprotected, reactive surface (*e.g.*, nickel or iron). Nickel tends to become passive in DI water and iron tends to flash-rust quickly in DI water rinse systems. The flashrusting may not be immediately visible, but can result in adhesion problems, surface imperfections and roughness.

DI water does have its place in a metal finishing shop, and its use should be encouraged. Although it is an expensive material to produce, it can be used and reused for a significant length of time, so can become very cost-effective if you capitalize on its benefits. *P&SF*