Advice & Counsel



Frank Altmayer, MSF, AESF Fellow AESF Technical Director Scientific Control Labs, Inc. 3158 Kolin Ave. Chicago, IL 60623-4889 E-mail: faltmayer@sclweb.com

Got Nickel? The Trend is to Restrict Its Use

Dear Advice and Counsel,

My company is a small jewelry manufacturer and we do a lot of gold plating. Of course we typically plate the gold over nickel.

I have heard a lot of rumors that nickel plating is an environmental "target," but I'm not sure I understand what is going on. Is this happening here in the USA, in Europe or where? Please clarify. What, if any, substitutes are there for nickel?

Signed, Tiffany Zale Winston,

Dear Ms. Winston,

I'm not totally sure myself about what is going on, but I'll give it a try. It seems that several European countries—notably Sweden, Denmark, and Germany—started this trend by passing regulations that limited the use of nickel in jewelry back around 1993, according to United Metal Refining, Inc. (see www.unitedpmr.com/ nickel_allergies.htm),

Sweden limited the nickel in any alloy used for ear piercing or ear jewelry to 0.05%. If you ship to that country, they will test samples, and if one fails, the whole lot is sent back. In Denmark, any jewelry that releases more than 0.5 μ g/cm²/week when the jewelry is exposed to artificial perspiration is banned. Jewelry that is included in the regulation is earrings, bracelets, necklaces, chains, finger rings, wristwatches, eyeglass frames, hair clips, anklets, watch straps and buckles, and garments that have buttons or other hardware that contacts the skin. Germany bans all jewelry that comes into contact with the skin and releases more than 0.5 μ g/cm²/week.

The differing regulations caused problems within the EU (because all countries are supposed to have the same regulations). The Council of the European Communities adopted Council Regulation

European Regulations That May Be Affected By the Nickel Risk Assessment Conclusion:

- 1. Directive 76/769/EEC Restrictions on marketing/use of dangerous substances
- 2. Euro Coinage
- 3. Consumer protection
- 4. Directive 98/83/EC water quality standards
- 5. Food contact materials, additives, and supplements
- 6. Directive 90/385/EEC implantable medical devices
- 7. Directive 88/378/EEC toy safety
- 8. Directive 89/106/EEC construction products
- 9. Emissions to water
- 10. Directive 96/61/EC pollution prevention & control
- 11. Directive 76/464/EEC pollution of aquatic environments
- 12. Directive 2000/60/EC water policy
- 13. Directive 80/68/EEC groundwater protection
- 14. Emissions to air
- 15. Directive 98/24/EC protection of workers
- 16. Directive 2000/76/EC incineration of waste
- 17. Waste management
- 18. Directive 91/689/EEC and Regulation EEC No. 259/93 hazardous waste

(EEC) 793/93, also known as the Existing Substances Regulation (ESR). The regulation requires that a four step process be used to evaluate and control existing chemical substances:

- 1. Data collection
- 2. Priority setting
- 3. Risk assessment
- 4. Risk reduction

One of the EU countries acts as a "rapporteur" (facilitator). For nickel and certain nickel compounds (nickel sulfate was listed on the third priority list in 1996, nickel chloride, nitrate and carbonate were on the fourth priority list in 2000) the rapporteur is Denmark, one of the original three countries that decided to go on their own.

As of this writing, steps 1, 2, and 3 have been completed. Denmark has submitted a "draft effects assessment for the environment." The Danish have recommended safe levels of nickel that are so low that in many cases they are below the average background concentration in the environment (claimed by the Nickel Forum website). We have not yet seen this report.

The methods for carrying out such an assessment were originally designed for organics, and there is disagreement over whether this methodology is suitable for metals. The results of this risk assessment can be one of the following:

(Continued on page 28)

Rapids, MI, with 22 members and guests attending.

Andrew W. Peterson, sales manager for KLM Water Treatment, Inc., Grand Rapids, explained the care and feeding of steam boilers. The feed water must be treated with a combination of water softeners and chemical feeders to eliminate calcium, magnesium, iron and free oxygen. The carbon dioxide gas and sludge that results from boiler operation must be removed. The maximum amount of dissolved solids for this area is 10 times the original water. The proper operation of a boiler demands that contaminants be controlled.

Peterson also said that cooling towers can use hard water until the hardness reaches three times the original water. If this is exceeded, scaling may occur. Automatic water bleeders help to prevent scaling. He also addressed bacteria and biocides.

Chuck DeMinck

Midwest Florida

The AESF Midwest Florida Branch met October 15, 2003, at Pappas' Mediterranean Restaurant, Largo, FL. Business discussed included an upcoming Christmas

Kansas City



AESF President Doug Lay, CEF-2 (seated at far left), was the featured speaker at a recent meeting of the AESF Kansas City Branch. Also seated are (l-r): Jon Carter, Praxair Surface Technologies; Branch President Ira Donovan, MSF, Burns and McDonnell; and Angela Vawter, CEF-2, Burns and McDonnell. Standing are (l-r): Brad Welles, Infinitech Finishing; Chris Boese, Weld Racing; Bob Eschman, Electroplating Consultants; Greg Gorman, Burns and McDonnell; Steven Smithers, Praxair Surface Technologies; Paul Skelton, Mid America Alloys; Cliff Slater, Chematall-Oakite-TASKEM; Bob Hoisington, Burns and McDonnell; and Charlie Hayes, Spec Plating Corp.

Party and the future of the Society. Strong viewpoints were voiced on ways to support rebuilding the organization.

Speaker for the evening was Frank Borza of MAFCO, a past president of the branch, who presented an overview of aluminum coatings. He covered conversion coatings, anodizing, spray coatings, powder coatings and electroplating.

Rob Mason, CEF

Advice & Counsel

(Continued from page 26)

- a. Need for more testing and evaluation
- b. No risks identified

c. Risk identified, risk reduction/ management measures required

If the conclusion from the risk assessment is that there is a requirement for management and reduction of risk, numerous European regulations will be affected (see accompanying table), and many of these will impact metal finishers in Europe and in the U.S. The issue is important in the U.S., because multi-national companies want one manufacturing process for the world community. If nickel plating is affected in Europe, it won't be long before it is affected in the U.S.

As for jewelry, on January 26, 1994 another Directive was issued that had the following provisions:

"Nickel is banned from use in post assemblies (ear piercing, ear rings, and other body piercing), except for alloys containing less than 0.05% nickel.

"Nickel is banned from earrings, necklaces, bracelets, chains, anklets, finger rings, wrist watch cases, watch straps tighteners, and clothing "hardware", unless the release of nickel is less than 0.5 μ g/cm²/week for at least two years of normal wear."

Closer to home, in a paper presented at AESF SUR/FIN[®] 2002, Bill Saas of Taskem, Inc., noted that Scandinavian countries have a "Nordic Swan" program (similar to EPA's Energy Star labeling program, except it is for Environmental friendliness), and that nickel-plated products of any kind do not qualify for the program.

The driver for all of this concern is that some professionals in Europe, the U.S. and Australia are of the opinion that nickel and nickel compounds should be regulated and controlled because they yield allergic sensitivity and because both IARC (International Agency for Research on Cancer) and the NTP (National Toxicology Program) have linked some nickel compounds to cancer. On the other hand, TERA (Toxicology Excellence for Risk Assessment (TERA) published a study titled "Toxicological Review of Soluble Nickel Salts." They concluded that there was insufficient data to make a final decision on whether soluble nickel salts are carcinogenic.

California declared all soluble nickel compounds to be carcinogenic back in 1999, requiring all new nickel plating installations to install very sophisticated emission control systems.

Stay tuned. As for substitutes for nickel, they all are inferior to nickel in one way or another. Back during WWII, automotive companies tried white brass. Some European companies have gone to an alloy of copper, zinc, and tin. If any of our readers have potential substitutes, please let me know, and I'll pass it along. *Pass*

> Got a Question For a *P&SF* Columnist?

Here's how to send it: E-mail it to: editor@aesf.org FAX it to: 407-281-6446 Mail it to: P&SF 12644 Research Parkway Orlando, FL 32826