

# Aluminum/Electroless Nickel... a choice finish

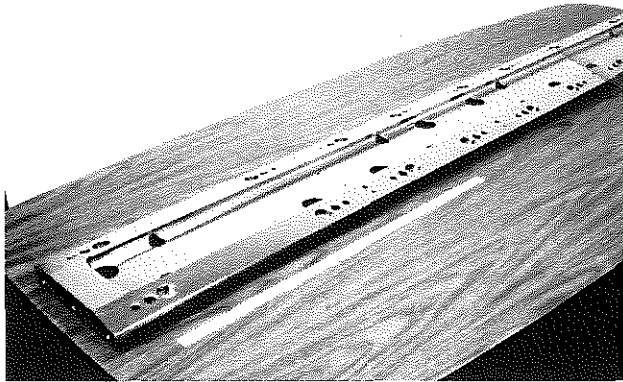
by Tony George and Keith Chadd

The process for electroless nickel plating on aluminum has advanced over the past decade from a

rather complicated technology to a very consistent, easily reproducible procedure. As a consequence of the continuous improvement in processing techniques, electroless nickel is being relied upon more as a finish of choice by design engineers looking for light-weight, high strength materials in the manufacture of their products.

While aluminum has a good strength-to-weight ratio and excellent machinability, electroless nickel can extend the

ability of aluminum to function in applications where it could not be considered otherwise. Applications that require surface properties such as solderability, corrosion protection,



*This aluminum fountain for the printing industry is normally made out of stainless steel because of the corrosive inks and fountain solutions. The hardness and corrosion resistance of high phosphorous electroless nickel enabled the manufacturer to use aluminum, a lighter, easier to machine, and less expensive material.*

ability, wear and appearance are greatly enhanced by applying specific electroless nickel coatings.

For electronics applications, high phosphorous electroless nickel (TM 103) can provide non-magnetic properties, corrosion resistance and extended wear.

In the mold industry electroless nickel plays a big part in extending the life of the mold by supplying the surface with a hardness from 46-48 Rockwell C, and improving release

characteristics. Release characteristics can also be enhanced by impregnating Teflon into the nickel deposit (TM 117P) or applying a coating of teflon nickel co-deposit (TM 117C). For food equipment manufacturers the advantages of a teflon co-deposit (TM 117C) is a light-weight part with corrosion resistance that is easy to clean.

In military applications, electroless nickel has been used for corrosion resistance in the manufacture of light-weight aluminum antennas as well as hydraulic rods.

Other opportunities have presented themselves in the last five years with the introduction of low phosphorous electroless nickel which has an as plated hardness of 57-61 Rockwell C. This deposit can be deposited over high phosphorous nickel for applications where the part cannot be baked after plating to achieve hardness. This double deposit process gives high corrosion resistance to the part along with a high hardness close to that of hard chrome plating. When higher hardness is required, electroless nickel can be plated on aluminum which allows chrome plating to be applied to any critical surface with thicknesses up to .010 thick.

Techmetals provides coatings to the aerospace industry and helps in the developmental stages of new

projects. One case in point is a customer request to replace hard coat anodize on an aluminum brake sleeve.

The specification required that the I.D. of the sleeve had to have a minimum of .0015 per side thickness of hard chrome after final honing,

which would require a heavy build up. The problem with the application was that it is very difficult to plate hard chrome on aluminum without damaging nonplate areas of the part.

Techmetals requested a specification change on the print to allow for Techmetal 103 to be applied to the entire surface of the part which would increase the corrosion resistance of the aluminum, and allow for the hard chrome to be applied with a higher degree of success and repeatability.

Techmetals' commitment to continuous improvement in plating aluminum with electroless nickel have opened a new door in engineering applications. Dedicated plating lines insure the quality of the products produced, and capacities have increased with the demand allowing parts to be plated as small as simple connectors to 10 foot long aluminum printing cylinders. There are going to be more applications for electroless nickel plated aluminum.

If you think you have an application that may need electroless nickel, call today and let Techmetals solve your problems.

