Electroless Nickel Plating

Common Names: EN, Electroless Nickel

Applicable Specifications: Mil-C-26074; AMS –C-26074; AMS-2404

Description: Electroless Nickel refers to the autocatalytic (or chemical) reduction of the aqueous nickel and phosphorous ions onto a base substrate. The process differs from electrolytic plating in that no electrical current is required. The electroless nickel process provides a deposit that follows the contours of the substrate exactly. There is no build-up on edges or corners. A sharp edge receives the same thickness of deposit as a blind hole. There are limitations to this uniformity. The surface must be exposed to a continuous fresh supply of the plating solution. For example, internal cavities in a part may require special pumping of the solution.

Function & Physical Finish: Electroless nickel is hard, uniform, and corrosion resistant. Typically, in order to provide corrosion protection, the deposit thickness must be greater than 0.0005." The normal practical upper limit of thickness is 0.002"

Electroless nickel, because of the presence of Phosphorous in the deposit, is very hard. As deposited, the hardness is about 60 Rc. The deposit has excellent wear resistance, lubricity, and anti-galling properties.

The deposit is a lustrous gray metallic color and may be brush finished to match stainless steel. Deposits greater than 0.0005" are non-porous.

Examples of Use: Food, pharmaceutical, and medical equipment; machine tools, textile machinery parts, packaging machinery parts.

Considerations & Limitations:

- Base Material: Steel, Tool Steel, Brass, Copper, Aluminum
- Shape of parts: Unlimited except that blind cavities or holes may require supplemental pumping to ensure adequate solution flow. Special fixturing may be required for to control gas pocketing.
- Size: Parts up to 30 inches by 30 inches. Maximum weight is 500 lbs.
- Quantity: Although quantity affects price, quantity is not a limiting factor. Price is determined by how many parts can be process in an hour.
- Thickness of Finish: Varies from 0.0003" to 0.002". The nominal plating rate is 0.001" per hour.
- Masking: Can be used to protect critical machined dimensions.
- Heat Treatment: Parts which are Rockwell 40c or above must be stress relieved before and after hard chromium plating.
- Method of Processing: Parts must be racked or barrel plated. They can be "loose racked" to prevent rack marks.
- Pre-Treatment: Parts must be clean and free from oil, grease and tape residue. Parts must be "chemically" clean prior to plating and may require specific activation, chemical etch or activation prior to plating. Parts may require Stress Relief before and after plating. Sometimes abrasive blasting or mechanical finishing is required for better adhesion or to achieve a required surface finish.
- Packaging: ***Parts are repacked as received***. It is often necessary to wrap parts with paper to prevent scratching. This will be done at the customer's request.

Quality Control Process solutions are checked and analyzed following an established schedule and monitored using SPC techniques. Thickness testing can be done at the customer's request. Salt Spray testing can be done by submitting samples to an outside laboratory. This is done for an extra charge at the customer's request.