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Metal Deposition Solutions

NIPHOS® 964 / 964 HS Nickel Phosphorus Electrolyte

Lowest internal stresses reduce the tendency to crack

NIPHOS® 964 is an acidic electrolyte for the deposition of nickel-phosphorus alloy coatings in rack or barrel operation. By modifying the makeup and operating conditions, the electrolyte is also suitable for high-performance systems (NIPHOS® 964 HS).

NIPHOS® 964 / HS can be used for the electrolytic deposition of bright nickel-phosphorus alloy coatings with extremely low tensile stresses up to slight compressive stresses. As a result, the coatings are extremely low-crack and therefore offer excellent corrosion protection.
NIPHOS® 964 / HS is free of chloride, boric acid and ammonium. Apart from nickel, it contains no other heavy metals such as lead or cadmium (RoHS compliant). The phosphorus content of the coatings can vary from 6 - 13 % phosphorus. By adjusting the operating conditions, the phosphorus content can be adjusted in the range >10.5 % phosphorus. The hardness of the coatings is 550 HV 0.05 in the condition as deposited.

By using a combination of NIPHOS® and hard chrome, the thickness of the chrome layer and thus the amount of Cr6+ used can be reduced - while at the same time improving the properties of the whole layer.
Furthermore, layers of NIPHOS® 964 / HS can be used as a substitute for highly phosphorus-containing layers of electroless nickel electrolytes. Disadvantages of electroless nickel-phosphorus processes can be avoided by using NIPHOS® electrolytes without loss of properties.

A targeted combination of NIPHOS® with hard gold enables

gold savings to be achieved in the coating of contact surfaces.

Electrolyte characteristics

Electrolyte type	Acidic
Metal content	Rack and barrel: 40 (30 - 50) g/l Ni, 20 (15 - 25) g/l P, High-performance systems: 60 (55 - 75) g/l Ni, 20 / 30 / 40 g/l P
pH value	2.3 (2.0 - 2.4)
Operating temperature	Rack and barrel: 50 (40 - 50) °C, High-performance systems: 60 (55 - 65) °C
Current density range	High-performance systems: 10 - 45 A/dm²
Current density range: Rack operation	4 A/dm²
Current density range: Barrel operation	1,5 A/dm²
Plating speed	Rack: 0,33 µm/min at 4 A/dm², Barrel: 0,06 µm/min at 1,5 A/dm², High-performance systems: depending on plant and operating parameters

Coating characteristics

Coating	Nickel Phosphorus
Alloy composition	87 - 94% Ni, 13 - 6% P
Colour of deposit	stainless steel colored
Brightness	slightly bright
Hardness	550 - 600 HV 0,05 as plated, up to 1,200 HV 0,05 after heat treatment (400 °C, 1 h)
Max. coating thickness	> 50 µm
Density of the coating	7.8 - 8.5 g/cm³

Advantages

- Coatings with extremely low tensile stress up to slight compressive stress
- Coatings are extremely crack resistant
- Excellent corrosion protection
- RoHS compliant
- Thinner hard chrome coatings in combination with NIPHOS® reduce the amount of Cr6+
- Replacement of highly phosphorus containing layers of electroless nickel electrolytes
- NIPHOS® in combination with hard gold to save gold on contact surfaces
- Increased electrolyte life compared to electroless nickel processes
- Suitable for barrel and rack applications, as well as high-performance systems

Applications

- Connectors
- Smartcards
- Leadframes
- Hydraulic parts

Your contact person

Markus Legeler

Manager Sales International

T: +49 7171 607 204

F: +49 7171 607 316

markus.legeler@eu.umicore.com