Cu Sn Zn

Version: 2 May 2019

umicore Electroplating

MIRALLOY®

NICKEL FREE

No Nickel Allergies by Copper-Tin-(Zinc) Electrolytes

Nickel is the world's main contact allergen. In Europe, around 15 to 20 percent of women and around five percent of men are sensitive to nickel - in women under 30, this figure rises to around 40 percent. Once someone has developed a sensitivity, constant or repeated contact with the allergen causes the skin or mucus membrane to react with inflammation (e.g. skin rash). The use of nickel is restricted by Annex XVII to Entry 27 of REACH. The definition of 'prolonged skin contact' (ECHA Q&A No 935) has resulted in many consumer objects that previously were not affected by the nickel limit now being covered by the 0.5µg/cm²/week maximum.

In contrast to nickel, MIRALLOY® platings do not cause any allergic reactions in accordance with current scientific knowledge, meaning they provide a great alternative. In combination with nickel-free substrate materials and other nickel-free processes, the MIRALLOY® process facilitates the manufacture of skin-friendly products. Its skin tolerance has even been proven in trials with sensitive test subjects. MIRALLOY® has been successfully used as a nickel-free coating on objects all around the world.

Advantages

- Copper-tin-(zinc) alloy coatings of white or yellow colour
- Nickel-free (§27 of REACH, Ann. XVII, Reg. (EC) No 1907/2006, Standard 100 by OEKO-Tex®)
- Free of heavy metals such as Cr, Pb, Co, Th, etc.
- Can be combined with precious metals
- Diamagnetic
- Resistant to tarnishing and corrosion
- Excellent layer thickness distribution
- Can be lacquered
- The coatings are RoHS compliant
- Does not cause allergic reactions in the way that nickel does

Applications

- Fashion jewellery
- Clothing accessories
- High-frequency technology
- Craft tools
- Writing tools
- Glasses frames
- Work tools
- Buckles
- Handles and steering wheels
- Personal hygiene devices
- Mouthpieces of all kinds
- Kitchen appliances
- Electronic devices

MIRALLOY®

NICKEL FREE

TECHNICAL SPECIFICATIONS MIRALLOY® 2850

Electrolyte characteristics	
Electrolyte type	Alkaline-cyanide
Metal content	8.5 g/l Cu 34.0 g/l Sn 1.0 g/l Zn
pH value	> 13
Operating temperature	60 °C
Current density range	2.0 A/dm²
Plating speed	Approx. 0.28 µm/ min at 2.0 A/dm²
Anode material	MMO (type PLATINODE® 167)

Coating characteristics	
Coating	Copper-tin-zinc
Alloy composition	50 wt. % Cu 40 wt. % Sn 10 wt. % Zn
Colour of deposit	White
Brightness	Bright
Hardness of deposit HV 0.015 (Vickers) approx. values	550 HV
Max. coating thickness	10 µm
Density of the coating	8.2 g/cm³

MIRALLOY®

NICKEL FREE

MIRALLOY® Copper-Tin-(Zinc) Electrolytes - Nickel Free

- MIRALLOY® 2841 (white) for rack and barrel operation
- MIRALLOY® 2844 (white) for barrel and rack operation
- MIRALLOY® 2844 LC (white) for barrel operation
- MIRALLOY® 2844 E (white) for barrel and rack operation
- MIRALLOY® 2850 (white) for rack and barrel operation
- MIRALLOY® 2851 (white) for rack operation
- MIRALLOY® 2852 (white) for barrel operation

European Nickel Regulation

In Europe 15 to 20 per cent of all women and about five percent of all men are allergic to nickel. For this reason, legislators issued the 7th change to the Consumer Goods Act; the European Nickel Act (§27, Ann. XVII, Reg. (EC) No 1907/2006): Earrings and comparable objects remaining in a wound during the healing process may not contain more than 0.5 % by weight of nickel.

Objects intended to come into direct and prolonged contact with the skin (e. g. earrings, necklaces, rings, watches, buttons etc.) were not permitted if the part of the product that would come into prolonged contact with the skin released more than 0.5 µg/cm²/week of nickel.

When using nickel-free plating, it must be guaranteed that the part of the product that will be in direct and prolonged contact with the skin does not release more than 0.5 µg/cm²/week of nickel in two years under normal circumstances.

Definition of Prolonged Skin Contact (ECHA Q&A no935)

The ECHA (European Chemical Agency) developed a scientifically supported interpretation of 'prolonged skin contact':

Prolonged contact with the skin is defined as potential content between the skin and items containing nickel for more than

- 10 minutes for three or more occasions within two weeks, or
- 30 minutes for one or more occasions within two weeks.

This regulation affects a number of consumer goods such as costume jewellery, clothing accessories, craft tools, writing utensils, kitchen appliances and electronic devices.

YOUR CONTACT

Do you have a specific question or would you like a no-obligation quote calculation?
Our specialist will be happy to help you with any technical questions you might have.

Markus Legeler
Manager Sales International

Mail: markus.legeler@eu.umicore.com
Phone: +49 (0) 7171 607 - 204

umicore Electroplating