

SECOPLATE®

HIGH QUALITY SURFACE PLATING FOR RF-CONNECTORS, ELECTRICAL and MICROWAVE COMPONENTS

INTRODUCTION

Excellent corrosion resistance, high conductivity, low surface friction, high abrasion resistance and pleasing appearance (similar to fine satin finished steel), make SECOPLATE® a possible substitute to silver plating and commonly used nickel containing surface treatments.

SECOPLATE® does not contain nickel and combines high conductivity with relative permeability of $\mu_r = 1$ (non-magnetic). On the other hand non-magnetic nickel based surfaces usually contain a minimum of 8% phosphor, as a result the conductivity falls to approximately 2% IACS (International annealed Copper Standard). Several metals are simultaneously applied by a critically controlled galvanic process.

The resulting surfaces has physical and chemical characteristics suitable for a wide range of electronic components, electrical parts, RF-Connectors and micro wave components.

CHARACTERISTICS

Corrosion resistance, tarnishing behaviour

The corrosion and tarnishing behaviour is better than that of chromium plating. SECOPLATE® parts keep their pleasing appearance under constant exposure to industrial atmospheres. Unlike silver SECOPLATE® does not discolour under the influence of sulphur and potassium sulphides etc., furthermore there is no build up in oxide layers as is usually the case in nickel and nickel containing surfaces.

SECOPLATE® parts successfully pass all internationally normed salt spray tests (MIL, DEF, CCTU, IEC).

High temperatures and excessive humidity do not create foreign layers which might adversely affect the contact resistance.

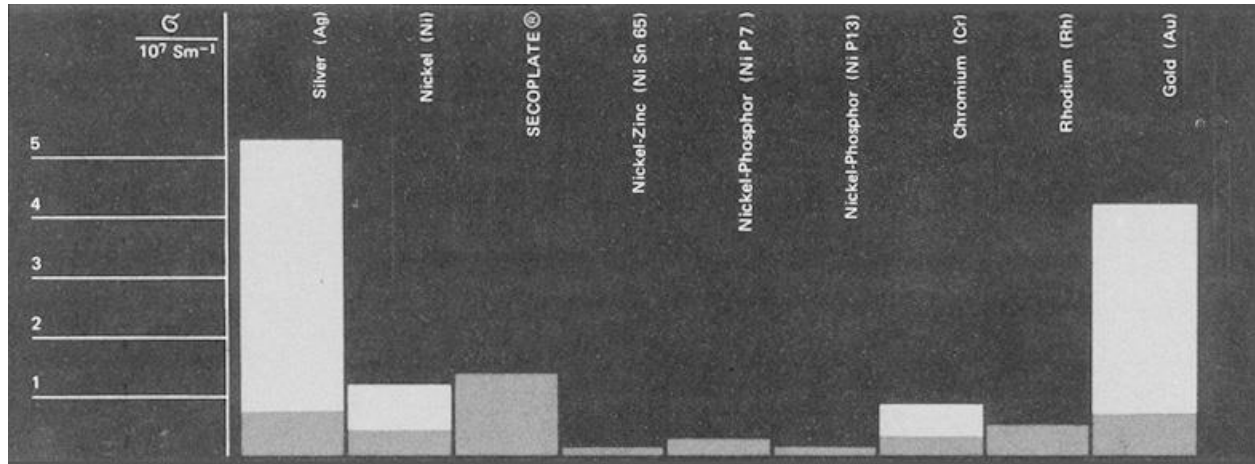
Porosity, reaction to base material

A plating thickness of only 2-3 μ m of SECOPLATE® is sufficient to create a completely non-porous, corrosion resistant surface subject to the condition of the substrate or undercoat.

SECOPLATE® is applied in a thickness of 0.5 - 5 μ m, depending on the application and condition of the substrate. Relative to other types of metallic coatings such as nickel, SECOPLATE® deposits evenly over intricate component shapes, consequently variations in plating thickness (e.g. caused by edge effects) are considerably less. SECOPLATE® does not alloy with brass, the co-efficient of expansion of both SECOPLATE® and brass are practically identical. Rapid temperature shocks (-50°C/200°C) do not cause blistering or cracking of the plating.

Electrolytic potential

The electrolytic potential corresponds approximately to that of brass. SECOPLATE® contacts and RF-Connectors can be brought into contact with stainless steel, silver, nickel or nickel containing surfaces without risk of corrosion.



Conductivity

Direct current conductivity of galvanically applied layers:

SECOPLATE®	Non-magnetic	1.45	10^7 mhos/m	25% IACS
Silver	Non-magnetic	0.7 – 5.5	10^7 mhos/m	12 – 95% IACS
Nickel	Magnetic	0.28 – 1.35	10^7 mhos/m	4.8 – 23% IACS
Nickel-Zinc (65%)	Magnetic	0.07	10^7 mhos/m	1.2% IACS
Nickel-Phosphor (7%)	Non-magnetic	0.13	10^7 mhos/m	2.2% IACS
Nickel-Phosphor (13%)	Non-magnetic	0.08	10^7 hos/m	1.4% IACS
Chromium	Magnetic	0.16 – 0.77	10^7 mhos/m	2.8 – 13.3% IACS

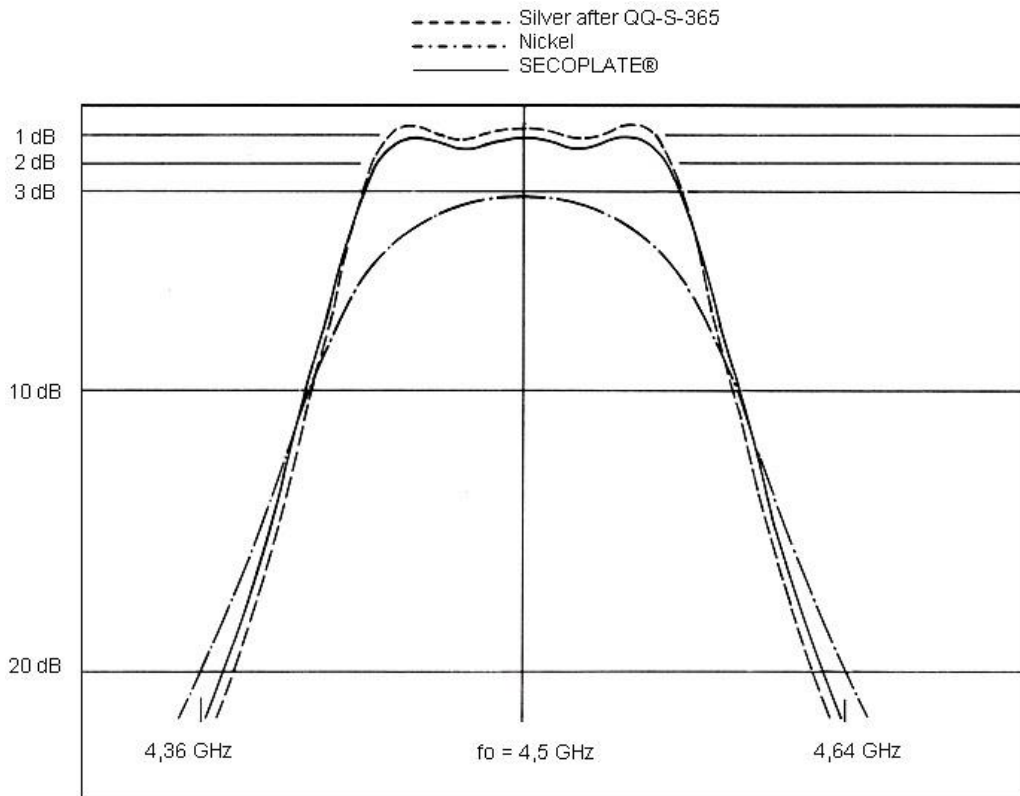
RF-Losses

The relative permeability μ is 1. The losses at high frequencies are therefore very low. Measurements on 3-section band pass filters have resulted in the following comparative Q and conductivity values at 4.5 GHz (relative to silver):

Material	Unloaded Q	Calculated conductivity	Insertion loss at centre frequency
SECOPLATE®	63%	41%	1.2 dB
Silver	100%	100%	0.8 dB
Hard gold	56%	32%	1.3 dB
Nickel	23%	5%	3.2 dB

Measurements were taken with plating thickness of 5 μ m. In practice approximately 10 μ m are required for nickel and containing surfaces. All filter dimensions are identical. Surface roughness is identified on all filters. The filters were turned to $f_0 = 4.5$ GHz; 0.5 dB ripple.

Chebyshev response:



Solderability

SECOPLATE® parts are readily solderable at normal soldering temperatures, using standard Sn/Pb 60/40 material and colophonium (US-Test Method RS 178 EIA).

Wear, Scratch Resistance, Friction Values

The hardness of SECOPLATE® is more than double that of silver, furthermore it is slightly higher than nickel containing platings. Consequently SECOPLATE® parts reach a degree of scratch resistance scarcely previously achieved. The friction co-efficient is 30% less than silver. The most significant of these three factors is the wear behaviour. Silver plated N series connectors already begin to show sign of wear after approximately 150 matings. The same connectors with SECOPLATE® finish only start showing wear damage after approximately 2000 couplings. This increases by more than ten-fold the life expectancy of SECOPLATE® parts.

SUMMARY

SECOPLATE® is an advanced, economical, metallic deposit available through S E C PLATING PTY LTD.

SECOPLATE is available from:-



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