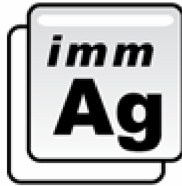
Microcirtec
Micro Circuit Technology GmbH

German Manufacturer of Circuit Boards

MICRO CIRTEC

Chemical Silver (Immersion Silver = Imm Ag)
Lead-Free PCB´s -The Surface of the Future !



Since July 1st, lead soldering is no longer permitted, and the use of alternative surface refinements for pcb´s has so far provided unsatisfactory results, meaning that the lead-free problem has yet to be resolved. The chemical nickel-gold procedure (Imm NiAu) was unsuccessful due to high costs, as was chemical tin. Both procedures have proven to be very complicated and sensitive in the further course of processing management. Lead-free solderings also have serious disadvantages, as hot air tin surfacing exposes the multi-layers to higher processing temperatures and copper leaching effects. We would briefly like to explain why we believe chemical silver is the lead-free procedure of the future, and why it will be the focus of our future investments in the field of surface refinement:

Unproblematic Waste Water Processing

Similarly to chemical tin surfacing, it is a non-electrical, auto-catalytic procedure based on the contrasting electronegativity of copper and the more "precious" silver. The advantages of this processing manner compared with chemical tin are fewer processing steps and lower rinsing temperatures (30 – 50 C°).

From the printed circuit board manufacturer's viewpoint, one strong point in favour of the silver procedure is the fact that waste water processing is unproblematic, whereas Imm Ag has had problems with toxic gold chemistry and chemical tin due to the use of thiourea.

But what advantages are there for you as the user?

Not only is the chemical silver refinement uncomplicated and reliable, but once the manufacturing parameters have been set they can be dependably utilised for further processing and continued use.

Due to the thin surface layer – a thickness of 0.15 – 0.3 mµ is recommended – the surface of the pad is smoother and therefore **there are, even in fine pitch areas, no restrictions when assembling.** The silver functions merely as a protection against oxidation, and the actual solder point is between the copper and chemical tin, therefore **the solder point is absolutely stable. It fulfills all UL requirements (UL796 specif.) and meets the usual requirements of automobile manufacturers:**

Test results

Test	AlphaSTAR		Result	Requirement
SIR 85°C/85%RH IPC-TM-650 2.6.3.5	2.46+9 3.15E+9	24h 96h	Passed Passed	>1E+8; IPC-4553
SIR 35°C/85%RH 100VDC IPC-TM-650 2.6.3.5	3.56E+11 4.62E+11	24h 96h	Passed passed	>1E+10; IPC-4553 and GR 78 (Bellcore)
EM 10V bias, 100V Test 85°C/85%RH IPC-TM-650 2.6.14.1	2.46E+9 1.18E+10 Dendrites not Identified	24h initial 504h (21days)	 Passed Passed	Resistance no higher than the Power of 10 Dendrites not Identified IPC-4553 and J-STD-004
Ianic (static method) IPC-TM-650 2.3.25.1	Typically 0.07-0.48 µg/cm² of Equivalent NaCl		Passed	<1.56 µg/cm² Equivalent NaCL IPC-4553 and J-STD-001 Part 8.3.6

The soldering effectiveness is excellent, allowing multi-fittings with wave soldering and re-flow procedures because silver is an effective diffusion barrier to the copper below. **The procedure is also suitable for pressing techniques**. Due to the "soft" processing methods, there is no need for any subsequent solder stop degradation, thereby avoiding unpleasant surprises when fitting.

Manufacturers give a 12 month (minimum) storage guarantee but the conditions for perfect storage should be noted (< 35 C° and < 85% humidity). Under these conditions **a longer storage period is also possible**. In case of any subsequent soldering difficulties, it is possible to repeat the silver processing.

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