Au Ni

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umicore Electroplating

ENIG-PROCESS

ELECTROLESS NICKEL - IMMERSION GOLD

Electroless nickel - immersion gold

Electroless nickel – immersion gold (ENIG) is a flat, solderable, metallic finish on printed circuit boards and ceramic substrates. It serves to protect the copper from oxidation and ensures solderability and bondability with aluminium wire.

In this process, the surfaces and vias intended for the finish first have a nickel layer applied to the copper in an electroless process as a diffusion barrier and, in a second step, a thin gold finish is applied. The gold reliably acts to prevent nickel oxidation and significantly determines the very good solderability of the ENIG surface, even after printed circuit boards have been stored for extended periods.

A pretreatment that is outstandingly attuned also allows fine line circuitries to be coated reliably. Of course, the ENIG surface also fulfils current RoHS and WEEE requirements.

Advantages

- Surface finish for printed circuit boards for soldering and bonding with Al-wire
- High solder joint reliability with lead-free and lead-containing solders
- Outstanding contact surface
- Electroless nickel deposition with best edge covering and fine line capability
- More cost-effective than electrolytic gold layers

Applications

- Printed circuit boards and substrates in SMD-, CoB- and HDI-technology
- PCB for soldering and Al-wire bonding applications
- Contact surfaces for keypads

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TECHNICAL SPECIFICATION ELECTROLESS NICKEL

Electrolyte characteristics NIMUDEN® NPR-series	
Electrolyte type	Autocatalytic Ni-deposition
pH value and temperature	4.6 at 80 - 84 °C
Deposition rate	approx. 12 µm / h

Coating characteristics NIMUDEN® NPR-series	
Coating composition	Nickel-Phosphorus
Phosphorous content	6 - 9 %
Recommended thickness	4.0 - 7.0 µm

TECHNICAL SPECIFICATION IMMERSION GOLD

Electrolyte characteristics Gobright® Immersion Gold Electrolytes	
Electrolyte type	Charge exchange
Metal content (depending on electrolyte type)	0.4 - 2.0 g/l Au
pH value	weakly acidic to neutral
Temperature (depending on electrolyte type)	80 - 85 °C

Coating characteristics Gobright® Immersion Gold Electrolytes	
Coating composition	Fine gold
Recommended thickness	0.05 - 0.10 µm

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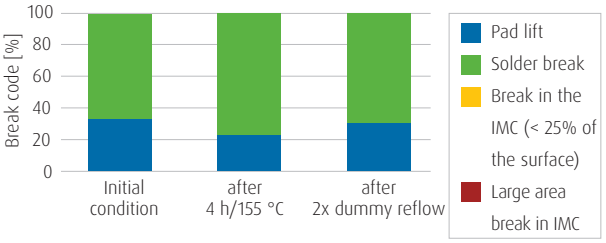
Results from BGA-shear tests
(0.76 mm-balls of SnAg4Cu0,5; 5 µm NiP, 70 nm Au)



SEM image of a cross section through an ENIG layer solder joint

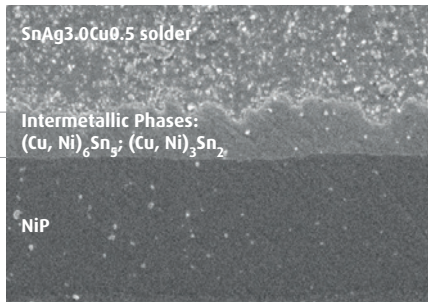
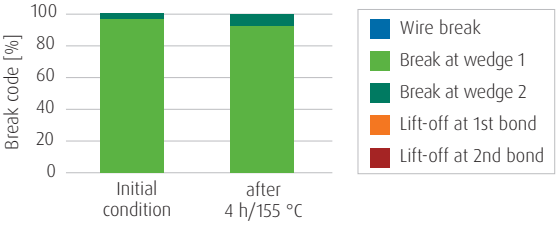


Image after 1,000 hours of aging at 150 °C.

10 kV
5,000 x

Results of pull tests after bonding with AlSi1 wire (25 µm)



Average lift-off force > 7 g
Relative standard deviation max. 15 %
No lift-offs

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

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