

ENEPIG process

Electroless nickel, electroless palladium and semi-autocatalytic gold plating

Umicore's ENEPIG process provides an universal finish to the PCB industry with excellent wire-bonding performance and the highest degree of solder joint reliability (SJR) with lead-free SAC 305 alloy. The palladium slows the diffusion of tin into the nickel resulting in a minimum thickening of the nickel/tin IMC (= intermetallic compound), even following thermal stress of 1000 hours at 150 °C.

The possible use of unique semi-autocatalytic gold electrolyte Gobright® TWX-40 also enables to deposit even thicker gold layers with very uniform thickness distribution depending on customer requirements. The combination of electroless processes (nickel and palladium) and the final gold plating with this special type of electrolyte ensures a corrosion-free final finish system for highend applications and mixed assembly processes on same surface.

Moreover ENEPIG films are less expensive in comparison to electrolytic or electroless bondable gold like ENAG (= Electroless nickel + Autocatalytic gold) and additionally comply with latest RoHs and WEEE regulations.

Advantages

- Universal finish for soldering and wire-bonding applications
- Highly robust solder joints with SAC solder
- Excellent contact surface
- Electroless process
- Less expensive than electrolytical gold finishes
- Dense and homogenous gold protection layer from 0.03 - 0.3 µm

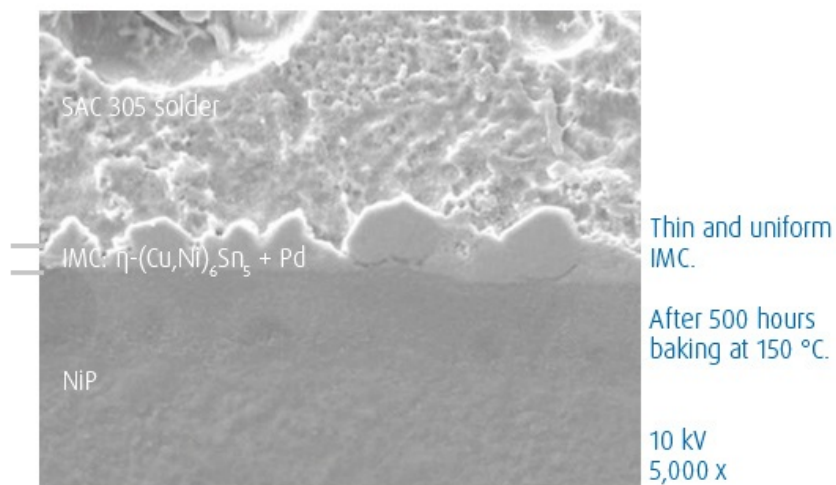
Applications

- IC package PCB substrate
- Multi-functional assembly



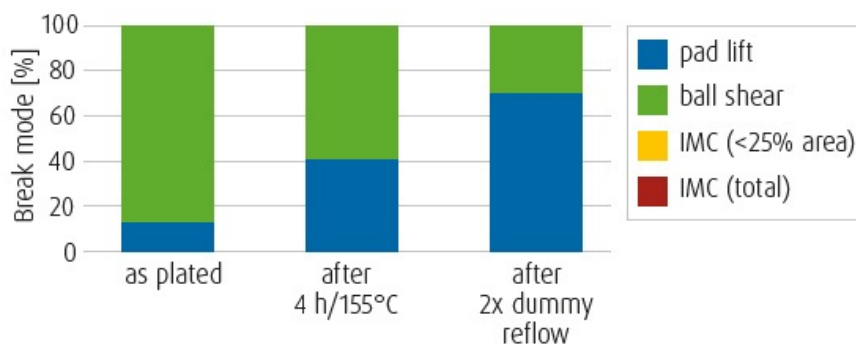
- PCB for harsh environment

Cross-Section Observation by SEM of ENEPIG Solder Joint

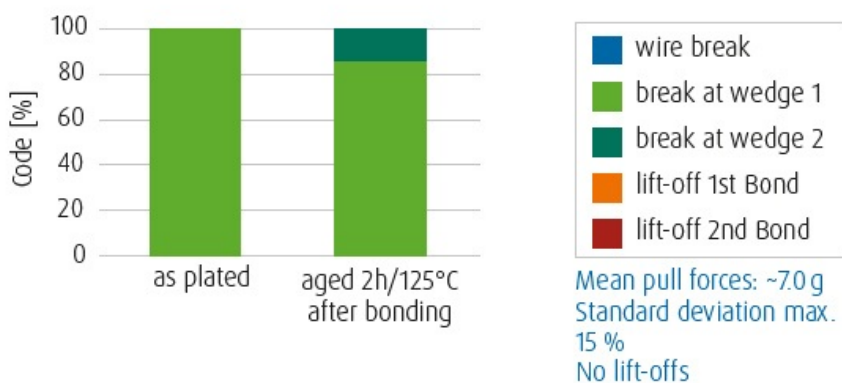


BGA Solder Ball Shear Results

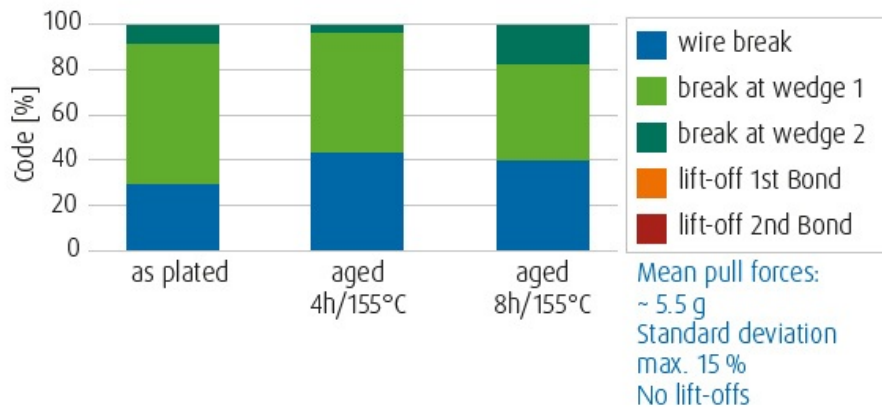
(ball size 0.76 mm, SAC solder, 4.8 μm NiP, 0.15 μm Pd, 0.06 μm Au)



Aluminium Wire Pull Test Results, AlSi1 25 μm



Gold Wire Pull Test Results, Heraeus HD2 25 µm



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