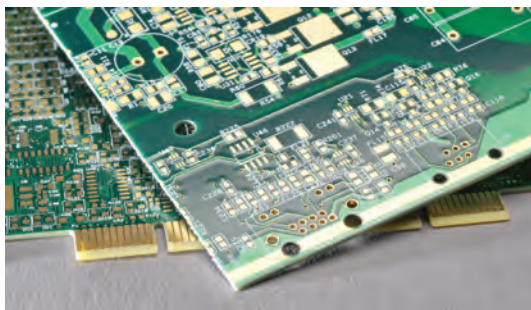




Raytheon Research Confirms ENEPIG Viability for Tin-Lead Soldering



ENEPIG continues to gain acceptance as a “universal” finish. Its attributes have been demonstrated in various applications. Uyemura has published data showing that ENEPIG forms a very robust solder joint with lead-free SAC type alloys, and is a viable gold wire bonding and contacting surface. ENEPIG can virtually eliminate the need for a “selective finish”. The electro-

less palladium is non-corrosive to nickel, eliminating any chance of “black pad”. In addition, unlike pure palladium, phosphorus palladium is amorphous and forms a barrier to the diffusion of nickel to the surface, allowing effective gold wire bonding with minimum gold thickness.

Last fall, at the SMTA meeting in Fort Worth, TX, a paper delivered by Mike Wolverton P.E., Raytheon, added substantial weight to Uyemura's findings. (Raytheon is the world's largest producer of guided missiles.) The paper, titled “Quality, Reliability and Metallurgy of ENEPIG Board Finish and Tin-Lead Solder Joints,” describes the evaluation

More on page 4.

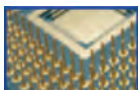
News from the 4-14 Plating Processes Subcommittee

The IPC Plating Committee, after completing its round robin study (using a Phos Pd version of electroless Pd) has proposed the following deposit thicknesses as part of its draft for its IPC-4556 ENEPIG specification:

“The electroless nickel thickness shall be 3 to 6 μm [118.1 to 236.2 μin] at ± 4 sigma (standard deviations) from the process

mean. The electroless palladium thickness shall be 0.05 to 0.15 μm [2 to 6 μin] at ± 4 sigma (standard deviations) from the process mean. The minimum immersion gold thickness shall be 0.025 μm [1.2 μin] at - 4 sigma (standard deviations) below the mean. All measurements should be made on a 1.5 X 1.5 mm (60 mils X 60 mils) pad or equivalent area”.

More on page 4.



Acorns & Crystal Balls...

Predictions?

In a normal year, a mature oak produces 25-30 pounds of acorns. This year, production was at a record low (about a half pound per tree) – which was fortunate for those of us hammered by New England's record October snowfall. Had that storm hit in the fall of 2010, when the yield was a record 250 pounds of acorns per tree, we might *still* be out of power!



by Don Walsh

So, where will acorn production be next year? Scientists have no idea. So far the guess is that nature wants such randomness to keep the number of squirrels, deer and mice under control. (per an article from the NY Times–12/3/11).

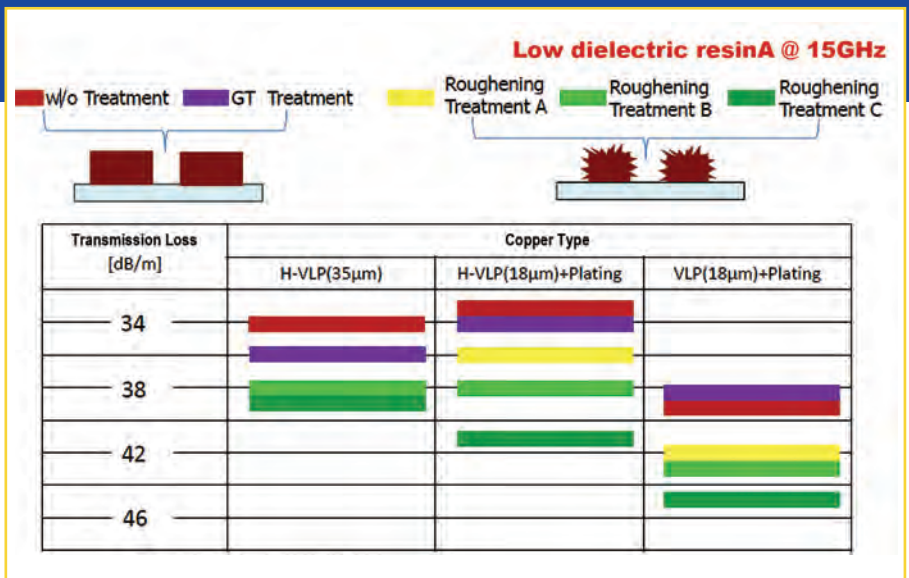
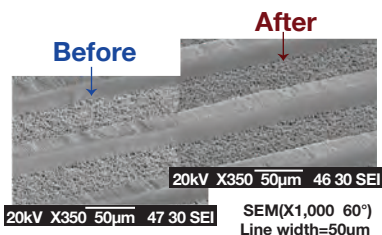
Maybe economists can blame nature for the gold market, too. With all the news about gold records, the year ended with prices just 10.18% above where they started (1/1/12 WS Journal). We entered 2012 just under \$1600 an ounce. If prices don't return to the \$1900 levels that could not be maintained in the third quarter, then a lot of varmints are going to be seriously hurting. A stable market for all metals, however, would be good news for manufacturers. The wild card is the world economy. Nothing that I've seen or heard predicted that the rupee, despite India's dramatic growth, would fall so quickly vs. the US dollar, thus forcing the Indians to dramatically reduce their gold jewelry purchases. Since India is the world's largest gold jewelry market, the rupee has pulled gold down – not the problem for Europe, Thailand or Japan.

Ironically, rhodium – traditionally the most expensive precious metal, fell behind gold at times during 2011. Per an 11/15/11 article in the WS Journal, 114 ounces of gold are mined each year for every ounce of rhodium. The latter metal is used in the jewelry (best reflective setting for diamonds) and automotive industries (catalytic converters). Back in '08, that metal hit \$10,000 an ounce, but three quarters of its volume goes to automotive demand and that has not yet rebounded in all parts of the world. The article predicted that there is enough supply to hold off big price jumps thru '12.

We will see – I trust no one's crystal ball – they are too easily broken by floods, tsunamis, and economic crashes.

New Cu Treatment for High Frequency PCBs

Uyemura, North America's exclusive representative for MEC Company LTD, announces the commercial availability of MEC FlatBOND GT copper surface treatment. It provides a profile-free surface, and high adhesion performance with insulation materials, and can deliver sufficient adhesion for low dielectric resin.



Left chart: shows the copper pattern before and after FlatBOND GT treatment. Above: Because the copper remains unchanged, there is no signal loss.

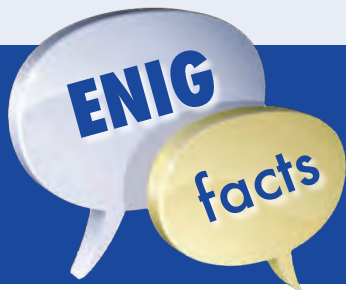
In Memory



Larry Baucom, Uyemura's sales manager for the southeast region prior to a tragic accident in 2009, passed away January 5.

Larry was one of the first sales employees of Uyemura USA, and one of the company's most valuable technical assets. He was widely respected for his extensive knowledge of both the PCB and GMF industries. Larry had years of hands-on production experience prior to joining Uyemura in 1992, having managed the plating department at a high-volume printed circuit shop in Richmond, Virginia. He was highly skilled in working with customers to solve problems and identify solutions.

Larry was an auto restoration hobbyist, and a nationally ranked bass fisherman. He is survived by his wife, Rhonda, and two step-daughters. Larry will be keenly missed by the entire Uyemura family.



Uyemura New Immersion Gold TAW-66 has a neutral pH. The neutral pH eliminates the hydrogen ion, which is partially responsible for electroless nickel corrosion, thus complementing the NPR-4 lateral growth nickel deposit.

EN for Dummies . . . (and time travelers)

A competitor seems to have entered a time warp, with their recent announcement of "the first electroless nickel developed specifically to eliminate black pad" which "provides lateral growth on copper," and "eliminates the use of dummy plating."

Nostalgia aside, (we loved the 90s!) what's truly being communicated here is that they are just a bit behind with EN development.

In 1994, Uyemura introduced NPR-4, an EN providing lateral growth in copper that, like all

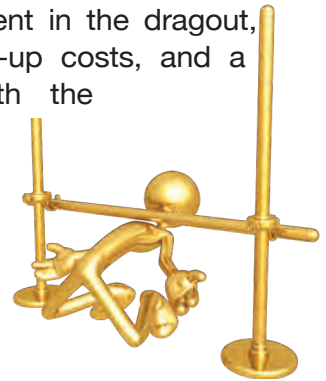
How Low... Can an ENIG Go?



In a world of continued gold price volatility, **lowering gold concentration while maintaining bath performance** is the ultimate cost-saving alchemy.

Uyemura has invested over a decade in the development of ENIG matrices that plate boards at consistently higher efficiencies. Higher immersion gold deposit efficiencies mean less nickel dissolution, thus less nickel corrosion. The result: fewer dollars tied up in solutions, less gold content in the dragout, substantially lower make-up costs, and a robust nickel underneath the immersion gold.

To learn more, or to arrange test processing, contact your Uyemura representative.



Uyemura electroless nickel processes, does not require dummy plating. **Since then, NPR-4 has become the world's most widely specified ENs for circuit boards.**

ALERT!

Is everyone over there ready for Y2K?

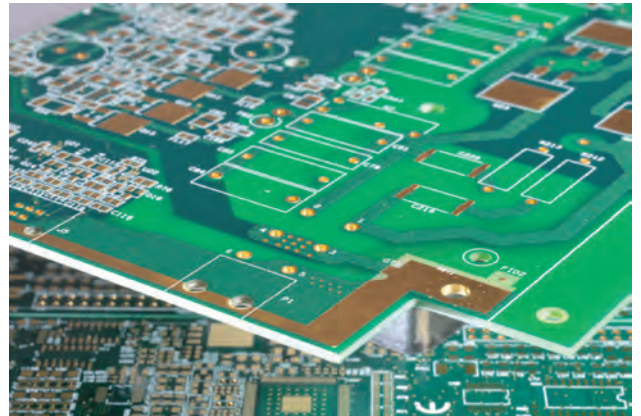


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(continued)

of an ENEPIG board finish for soldering to a ball grid array and chip components using SnPb solder.

Five palladium thicknesses were evaluated. Conditions that were compared included as-soldered, post-solder assembly thermal exposure, reworked, coated and temperature-cycled conditions. Maximum global and local solder joint palladium weight percentages and cross-sectioned intermetallic compound morphology requirements were derived for high quality and reliability in a typical mil-aero application. Visual, electrical continuity, x-ray and shear strength data, plus scanning electron microscopy/energy dispersive spectroscopy (SEM/EDS) compositional and metallurgical data and analysis were included. Wire bond ball shear strength were also given for the palladium thicknesses tested.



The data showed that Sn63 forms a highly reliable solder joint to ENEPIG. The findings are most significant for military and medical applications, which are presently exempt from the requirement to use "lead-free" solder.

News from the 4-14 Plating Processes Subcommittee...

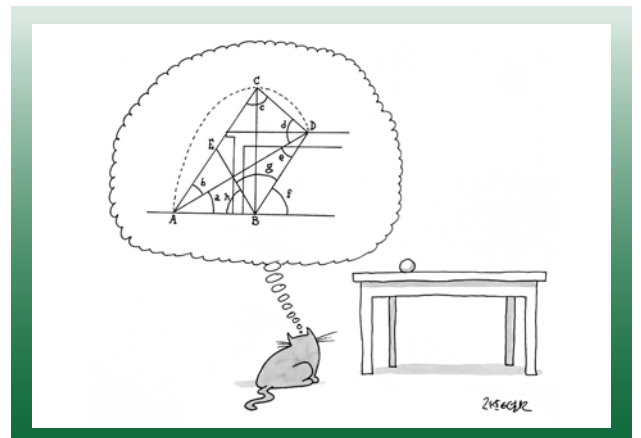
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The IPC Plating Committee is in the process of revising the IPC-4552 Immersion Gold Specification that was issued in 2002. The proposed revision is as follows: "The immersion gold deposit shall be 0.04 microns (1.6 micro inches) at -4 sigma from the process mean as measured on a pad of 1.5 mm X 1.5 mm (60 mils X 60 mils) or equivalent area, The electroless nickel shall range from 3 microns (120 micro inches) to 6 microns (240 micro inches) measured on the same feature size".

The committee is co-chaired by George Milad and Gerard Obrien.



Stay tuned as these proposals are finalized and issued.



EVF-N: Acid Copper Via Filling In Half the Process Time

EVF-N plates through-holes and vias simultaneously, cutting process times by 50%. It delivers exceptional performance for hole diameters smaller than 150 micrometers. Designed for soluble anodes, it is suitable for both pattern and through-hole plating.

For details or test processing, contact your Uyemura representative.

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