

CLEARSignals

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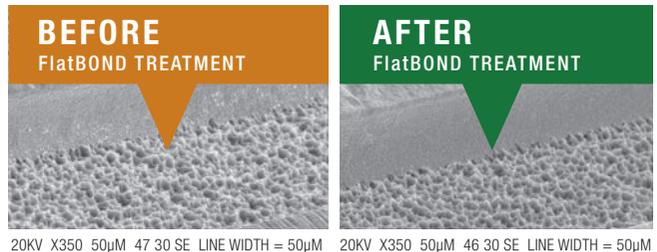
UYEMURA INTERNATIONAL CORPORATION

Line Extensions Solidify Technology Dominance for Uyemura MEC Products

Developments Allow Shops to Pursue New Markets and Improve Margins

FLATBOND GT, MEC's marquis copper surface treatment, is generating intense interest among shops – and, more recently, OEMs, as a solution for servers and other 25 GHz+ applications. FlatBOND provides a profile-free surface, and improves adhesion by 40% on low dielectric resins, although the treated surface is flat.

As speeds and frequencies move higher, conductor surface roughness produces signal loss. So the goal is to balance signal integrity and layer adhesion, a feat FlatBOND manages exceptionally well. FlatBOND produces a chemical bond without topographical change and provides for negligible signal loss and distortion on high-frequency applications. It is an elite alternative for “next-gen” applications – and an effective tool for shops hoping to differentiate and compete in new markets.



Zero Field Failure Enabled by Uyemura Processes, Support

Calumet Electronics is a global leader in the manufacture of high-performance PCBs, serving customers who design and manufacture systems for industrial controls, power grid management, life support, medical diagnostics, avionics, aerospace, and the military.



Calumet (continued)



Stephen Vairo, President/CEO, Calumet Electronics

Founded in 1968, Calumet takes pride in manufacturing every one of its boards in North America.

CE's circuit boards are found in mission-critical applications demanding zero failures and zero downtime; products must display unconditional package integrity. The company is ISO 9001 and AS9100 certified, and Nadcap accredited. Nadcap provides a significant pre-qualification status to attract and retain customers in aerospace, defense and other high-reliability sectors. Nadcap represents an unprecedented cooperative industry effort to improve quality, while simultaneously reducing cost and improving efficiencies. Calumet was audited by Nadcap in 2013 and 2014 with zero findings, earning it Nadcap Merit status.

Calumet Electronics is committed to exceeding customer expectations and to continual quality improvement. One reason it can make such commitments is powerful vendor partnerships such as the one it has with chemistry supplier Uyemura International Corporation (UIC).

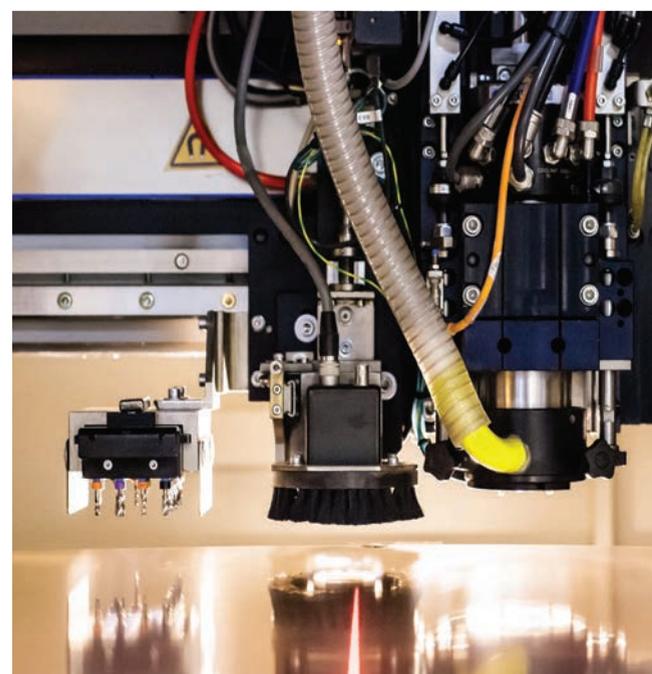
According to Calumet President and CEO Stephen Vairo, "Uyemura has historically delivered on innovations to optimize throughput, yields and costs here at Calumet. In 2004, they specified and implemented a proprietary automated ENIG process system. Success and process predictability resulted in a duplicate system for Uyemura's

RGA-14 silver process. This was followed by the installation of their EPL process and redesign of copper tanks and eductors to enhance copper distribution and aspect ratios."

The products Uyemura supplies to Calumet are ENEPIG, KAT ENIG, Via Filling Coppers, Thru-Cup EPL, RGA-14 Immersion Silver, and MEC copper surface treatments.

Calumet's reputation, according to Vice President and COO Todd Brassard, is producing zero field failure products. "Many of our customers cannot tolerate a single field failure. With multilayer packages that cannot delaminate and must endure the most strenuous conditions over indefinite cycles, Calumet PCBs must perform beyond the lifetime of our customers' products. So we require raw materials and processes that exceed performance expectation when subjected to severe destructive environments, analysis and testing and maintains structural and bond integrity."

For Calumet, the stakes are high. "Our business continues to expand in aerospace, defense and medical



Pluritec Inspecta X-Ray Drill

markets,” explains Brassard, “where package integrity is unconditional.” Calumet is one of just 14 PCB fabricators that have earned Nadcap certification. “Better still,” adds Brassard, “we had zero non-conformances in our last two Nadcap audits.” This has earned Calumet “Accreditation with Merit Status,” an elite Nadcap quality designation. The company has partnered with sales rep firms across the US. “This is our network of field professionals who will translate our capabilities through local business climates and cultures in support of medical, defense and medical companies,” says Brassard.

Calumet’s market research indicates there were about 3000 North America PCB fabricators in the 80’s. “Today,” says Vairo, “there are 230. We’re one of them partly because we choose solid customer and supply partners. Good partners collaborate to master tech support, qualification, training, technology solutions and future challenges and opportunities.”

Additionally, CE is one of the few PCB manufacturers who are committed to producing quality products and American jobs. The company is fiercely loyal to the “made in USA”

“Uyemura has historically delivered on wet process innovation to optimize throughput, yields and costs.”

– Stephen Vairo, President/CEO, Calumet Electronics

ideal and has no offshore partners, brokers or engineering service providers.

At Calumet Electronics the combination of pre-eminent engineering and pre-manufacturing software tools, and contemporary process automation, ensures predictability, and maximizes throughput with enhanced yields. Integrated SMART process automation and state of the art systems gather statistical data, metrics, and real-time process variance/scales to minimize deviation and to mitigate both risk - and surprise.



Hitachi Drill Machines



Calumet's Automated Plating Lines



Uyemura MEC Products (continued)

ETCHBOND CZ-2030 was developed for inner layer preparation prior to dry film or image transfer. This organic acid-type copper treatment delivers performance equal to its predecessor, CT-910, with fewer components.

CZ-2030 has a stable etching rate, and provides maximum soldermask adhesion at a low etch (less than 40 μ inch).

CZ-2030's single-component system, coupled with its high copper capacity (55 g/l) reduces storage needs and minimizes waste.

V-BOND 7710 is an H_2SO_4 - H_2O_2 -type microetchant with substantial cost and maintenance advantages compared with conventional oxide alternatives. It is widely regarded as a higher-performing successor to CZ-2030 for oxide treatment, and provides exceptional inner layer adhesion to all resins, including high Tg, HF (halogen-free), and PTFE.

It has the highest peel strength in the industry, and a high copper capacity (45 g/l) for reduced waste. V-Bond is flood immersion or spray compatible, so there's no capital expense burden. The V-Bond process operates over a broad temperature range and can provide greater stability and bonding at reduced etching amounts. It is engineered to remain sludge-free for up to a year.

ETCHBOND CZ-5480 allows the greatest process flow flexibility, with no equipment issues. Its nitric acid formula is primarily used for copper micro-roughening for dry film and soldermask applications. An alternative to CZ-2030, CZ-5480 still provides dry film adhesion and line resolution that is superior to peroxide, persulfate, and tri-acid microetches.



"I see you brought the pie charts."

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3-day Tech Briefing Details Important New Research

The Annual Technical Meeting was held July 31 through August 1. Its purpose: to share the most significant new developments from the Japan and Taiwan research and applied development facilities.

HIGHLIGHTS INCLUDED:

COPPER PLATING

- New research on via filling copper chemistry for combination through hole and blind via plating.
- New research on via filling and pattern plating using insoluble anodes.
- New technology for vertical continuous copper plating for extremely uniform copper plating thickness distribution.

WAFER PLATING

- New generation zincate (Epithas MCT-37) which reduces intrusions into the aluminum metallization, increases bath life.
- Epithas LEC-40 aluminum etch, which opens the aluminum lattice for uniform zincate formation.
- NPR-24 EN, which was developed specifically for plating ultra-fine pitch patterns, also ball grid arrays.

FINAL FINISHES

- WET-890 EN wetting agent to reduce gas bubble retention in high aspect ratio through holes.
- MEH-6 and WHE-3, which eliminate excess foot growth and plating in non-plated through holes.

ELECTROLESS CHEMISTRIES

- The latest generation electroless palladium, Talon 3, deposits on nickel (ENEPIG) or copper (EPIG). Most significantly, it allows higher thickness gold deposits, thereby enhancing wire bonding reliability.

UYEMURA INTERNATIONAL CORPORATION

Corp HQ: 3990 Concourse, #425 • Ontario, CA 91764 • ph: 909.466.5635

Tech Center: 240 Town Line Road • Southington, CT 06489 • ph: 860.793.4011

www.uyemura.com

