Aurotech® G-Bond 2

Corrosion free ENIG, ENEPIG and EPAG

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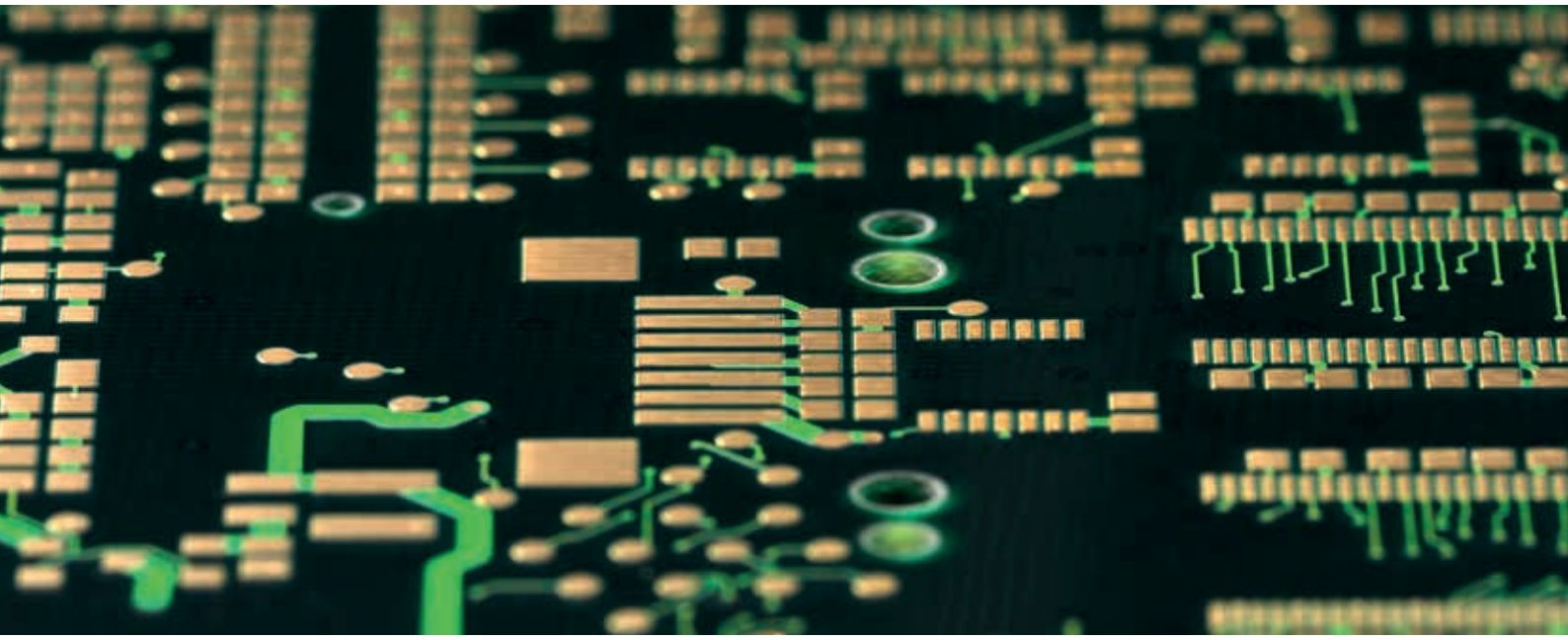

Aurotech® G-Bond 2 is the next generation mixed reaction gold for ENIG, ENEPIG and EPAG

The corrosion free solution for ENIG and ENEPIG

Aurotech® G-Bond 2 is the new gold electrolyte to fulfill all standards for ENIG, ENEPIG and EPAG with highest reliability. The process offers the benefits of a low gold content while achieving excellent thickness distribution at the same time. Both contribute to significant cost savings by reduced drag out losses and tightened thickness ranges. The production proven automated dosing system, which is complementary to Aurotech® G-Bond 2, ensures easy handling and consistent process conditions in work and idle times.

Features and benefits

- Low gold content of 0.5 g/l
- High bath stability, no risk for plate out
- 100% fulfillment of IPC 4552 corrosion requirements
- Excellent thickness distribution of CoV 5% and lower
- Reduced process cost by low gold content and thickness distribution
- Automated dosing system available

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The corrosion free solution for ENIG, ENEPIG and EPAG

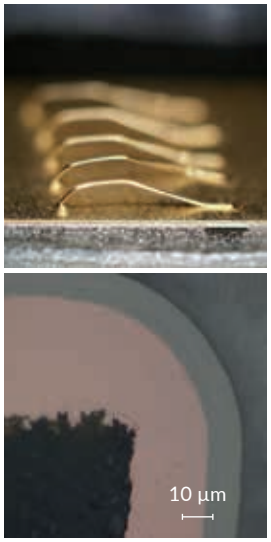

Figure 1-2:
Gold wire bondable finish with ENEPIG
No corrosion with ENIG and ENEPIG

Aurotech® G-Bond 2 fulfills IPC 4552 requirements

Atotech's latest gold bath development operates with a low gold content. At the same time it can achieve excellent thickness distribution. These major benefits lead to significant cost reduction. The new gold bath also fulfills all IPC 4552 requirements.

Building on the experience with the mass production proven predecessor Aurotech® G-Bond for ENEPIG, this new electrolyte offers exceptional bath stability for ENIG, ENEPIG and EPAG processing.

Complementary dosing unit for easy process control

In order to ease the handling and maintenance of the process, Atotech offers complementary dosing equipment which allows a continuous replenishment and ensures constant bath and plating conditions in production environment.

Operating parameters

- Gold content: 0.5 g/l (0.3 – 0.7)
- Plating temperature: 78 – 83 °C
- pH of the electrolyte: 7.8 – 8.2
- Plating rate: ENIG: 80 nm/10 min, ENEPIG 50 nm/10 min

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PD-Core®

The next generation Pd-electrolyte

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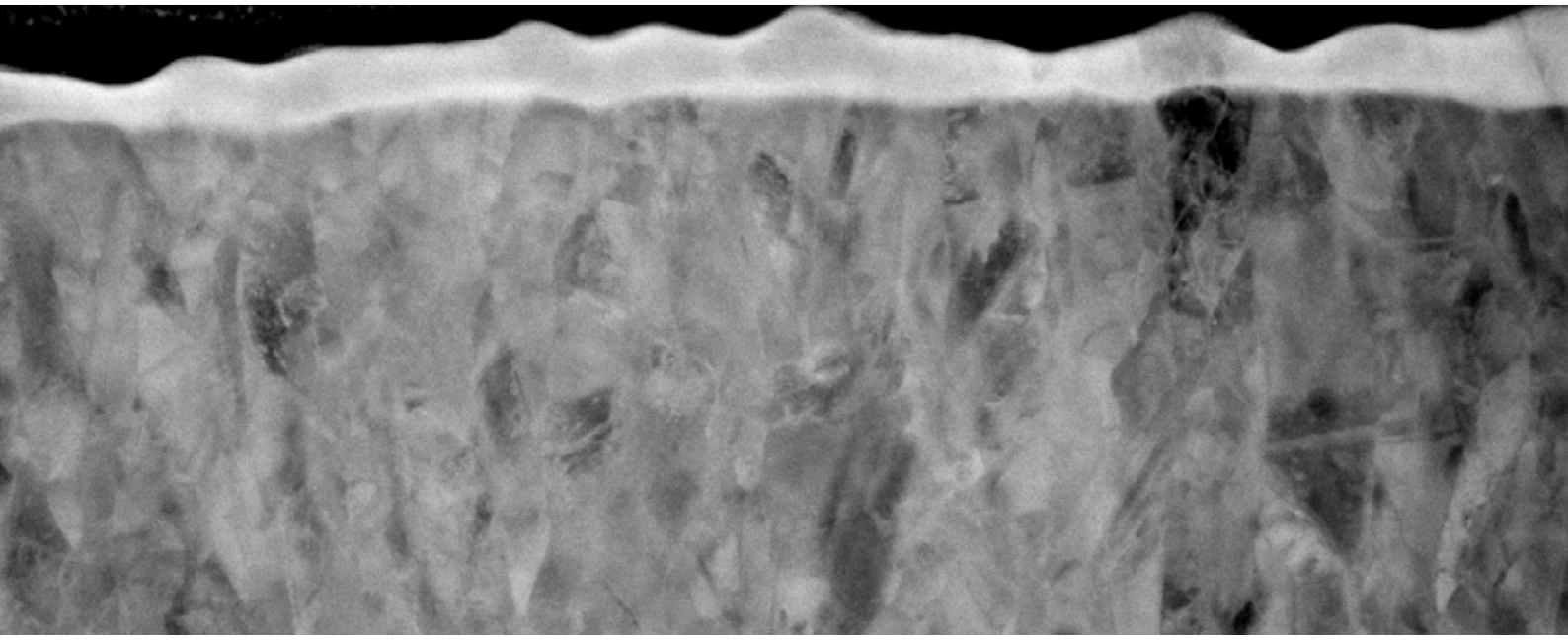

The Pd-electrolyte with low Pd-content and highest stability

0.5

g/l Pd content in the electrolyte leads to lower drag out losses

Best performance for lower cost

The PD-Core® palladium bath deposits pure palladium layers for the highest quality ENEPIG finishes. With the low Pd-content of 0.5 g/l palladium the process is highly cost-efficient as it significantly reduces the precious metal loss due to drag out. The bath offers excellent stability and provides the best performance for more than 10 MTO. Pd layers of up to 400 nm and more are possible if a high Pd-thickness is required.
The Pd-process can be combined with the existing Atotech mid-P Nickel electrolytes Aurotech® NIC, Aurotech® SIT Plus and Aurotech® CNN as well as the latest gold electrolytes such as Aurotech® DC CH, Aurotech® AU Plus CH, Aurotech® G-Bond and Aurotech® G-Bond 2.

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Highest robustness and stability with low Pd-content

Low Pd-content

- Pd-content in the bath of 0.5 g/l
- Reduced drag out losses
- Excellent thickness distribution
- Reduced precious metal consumption
- Cost savings due to reduced precious metal loss

Stable performance

- Stable bath life up to 10 MTO and more
- Constant performance in solder joint reliability and wire bonding over full bath life
- No plate out or precipitation
- High thickness of 400 nm and more is possible

High process robustness

- High process robustness
- Low sensitivity to contamination
- High tolerance to Ni and Cu ions in the solution
- Reduced maintenance due to high bath stability

Process compatibility

- Can be combined with Atotech's mid-P Nickel bathes Aurotech® NIC, Aurotech® SIT Plus and Aurotech® CNN
- Compatible with all actual Atotech's mixed reaction gold bathes such as Aurotech® DC (CH), Aurotech® AU Plus (CH), Aurotech® G-Bond and Aurotech® G-Bond 2

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Aurotech® Activator RE

Low palladium activator for ENIG and ENEPIG

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Excellent palladium seeding with reduced precious metal content

20

mg/L palladium content

Lower precious metal loss with constant process performance

Aurotech® Activator RE is the new Pd-Activator for ENIG and ENEPIG plating. It was developed based on the long-time experience of the market-leading Aurotech® ENIG process. The new activator offers the known reliability and performance of the existing Aurotech® Activators, but with a reduced precious metal content.

A dedicated additive ensures a surface enhanced activity to facilitate uniform palladium seeding even with a reduced Pd-content of 20 mg/L. The activator is applicable for mid- and high-P nickel processes and mitigates the risk for nickel footing.

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Aurotech® Activator RE – reliable performance with low Pd content

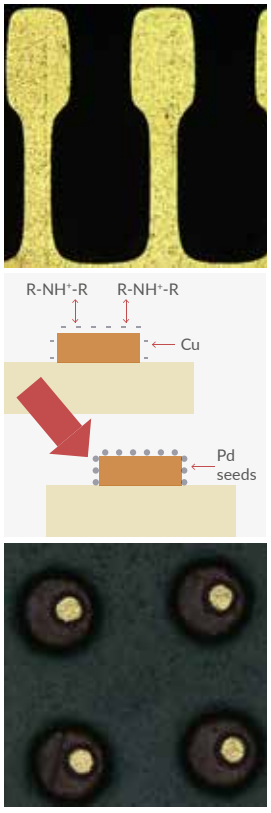

Figure 1-3:
No nickel footing;
Seeding mechanism;
Excellent coverage on
small pads

Pd-Activation for electroless nickel plating

The activation step is one of the key process steps for electroless nickel plating. The uniform and well spread seeding of palladium on the copper surface ensures that the growth of the nickel layer starts homogeneously and even right from the beginning. Activation plays an important role, as it is the basis for a defect free coating – preventing excessive plating, skip plating or even ENIG corrosion.

Aurotech® Activator RE

The intention for the development of the Aurotech® RE Activator was to combine the opportunity of a reduced precious metal content with the known reliable performance of the existing Aurotech® Activators. In this new product this was achieved by implementing additives to enhance the attraction of palladium to the copper surface. This makes it possible to achieve an excellent and homogeneous palladium coverage in the activator step with less than 50% of the original palladium content.

Aurotech® PEP Process flow

- Low precious metal content
- Reduced process costs
- Uniform Pd-seeding
- Reduced risk for Ni-footing
- No skip plating even with low Pd-content
- Applicable for mid- and high-P nickel

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CopperTreat

Copper-polishing microetch for final finish applications

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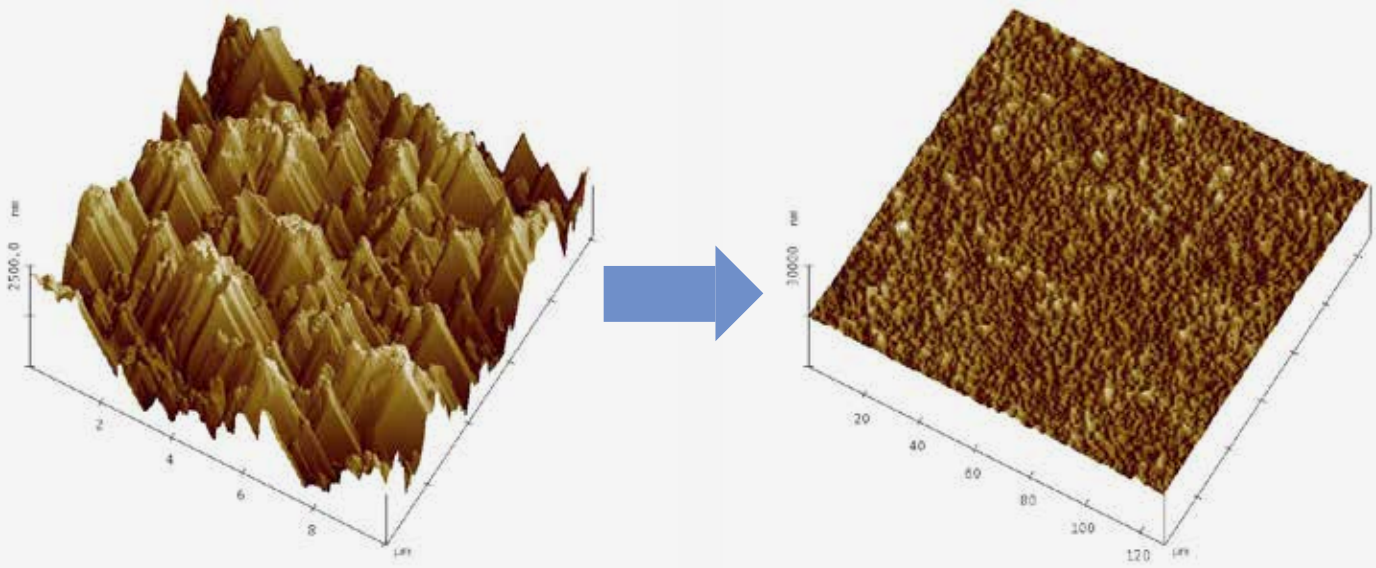

Surface preparation as key for final finish performance

CopperTreat 550 and 800

The major role of the copper micro etches which are used prior to final finishing processes is to clean and smoothen the surface in order to provide best conditions for the plating application.

Coppertreat microetch systems such as CopperTreat 550 and CopperTreat 800 offer outstanding polishing qualities to ensure a homogeneous levelling and smoothening of the incoming copper quality. At the same time, they provide surface protection to prevent the copper from re-oxidation.

Features and benefits

- Mild etch rate of 0.5 to 1 µm/min
- Smooth copper surface, levelling incoming qualities
- Oxidation prevention
- Applicable in horizontal and vertical applications
- Suitable in dip, flood or spray applications
- Fully analyzable, drop-in solution

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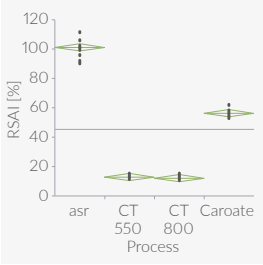
Two polishing etches with dedicated properties



CopperTreat 550

CopperTreat 550 is a peroxide based microetch with excellent levelling properties which can be applied for any ENIG, ENEPIG or I-Sn finish but was specifically designed for OSP pretreatment. With its low etch rate it enables a proper and even microetching of only 0.5 µm per minute to provide a smooth and homogeneous base for the OSP processing.

CopperTreat 800

CopperTreat 800 is a peroxide based microetch with excellent levelling properties which can be applied for any ENIG, ENEPIG or I-Sn finish. It exhibits a very high copper holding capability of 30 g/l which allows a long bath life and a reduced chemical consumption. Like all CopperTreat etch systems it exhibits levelling capabilites to ensure constant copper properties even with varying incoming qualities.

CopperTreat 550

Etch system	**Hydrogen peroxide/phosphoric acid**
Processing	Can be applied in horizontal and vertical
Key properties	pH < 1, working temperature 25 – 40 °C, 0.5 µm etch depth in 1 minute, Cu-loading 30 g/l

CopperTreat 800

Etch system	**Hydrogen peroxide/sulfuric acid**
Processing	Can be applied in horizontal and vertical
Key properties	pH < 1, working temperature 25 – 40 °C, 0.7 – 1.5 µm etch depth in 1 minute, Cu-loading 30 g/l

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OS-Tech® SIT

OSP finish for SIT applications

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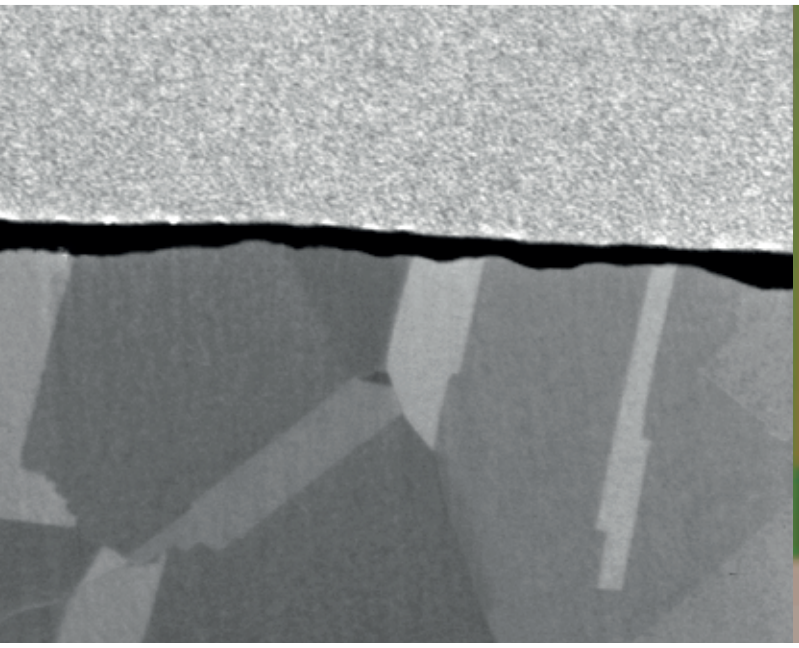

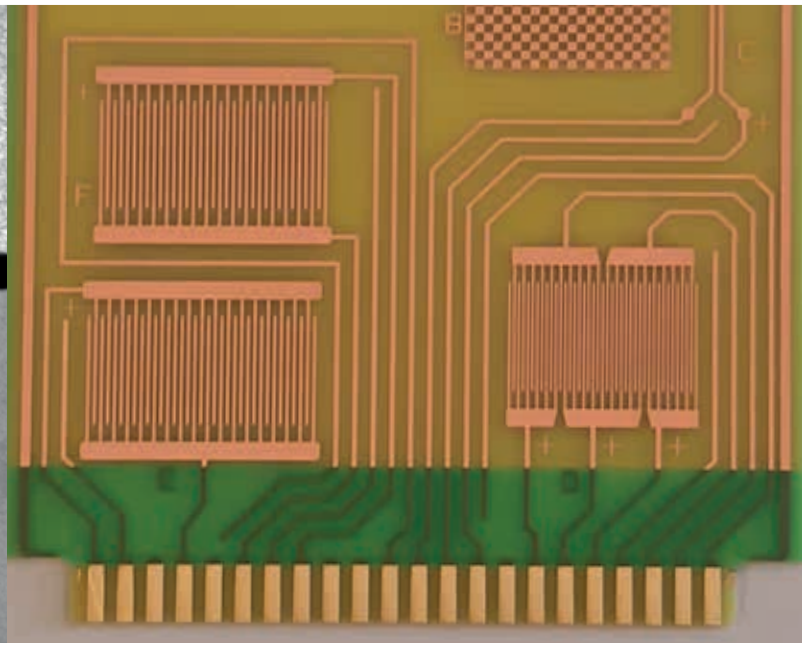

An easy, single step OSP-process combinable with ENIG

Development by design

Organic surface finishes provide a solderable environmentally friendly finish for fabricators in the electronics industry. The key to the potency of the process is the number of reflow cycles the finish can endure. Additionally, the thickness of the coating is a key quality indicator or process control tool as it is a measure of the potential for solder joint quality implications.

Like its sister process OS-Tech® the new OS-Tech® SIT can guarantee multiple solder reflow cycles and is applicable to work in combination with Atotech's production-proven ENIG processes.

Features and benefits

- A 3 step low temperature process
- Drop in for existing lines
- Application of Atotech equipment possible
- Short processing times
- Stable organic coating proven over 5x reflow

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OS-Tech® SIT – the next generation organic preservative coating

Figure 1:
Excellent solder wetting on edge dip coupons after 1 x reflow aging

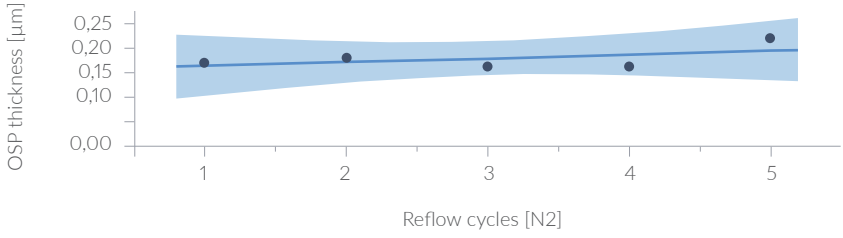
Vertical and horizontal processing

	vertical	horizontal
Cleaner	ProSelect SF (SF/CT/UC*) 1 – 2 min. @ 45 °C	ProSelect H (H/CT/UC) 45 – 80 s @ 45 °C
Rinse	2 min. @ RT	60s @ RT
Microetch CopperTreat 550	1 min @ 30°C Etch depth 0.6 µm	1 min @ 30°C Etch depth 0.6 µm
Rinse	1 min. @ RT	1 min @ RT
Acid dip	1 min. @ RT	1 min @ RT
Rinse	1 min. @ RT	1 min @ RT
Dry	air knife	air knife
OS-Tech® SIT	60 s @ 40 °C 0.2 – 0.45 µm (FIB)	60 s @ 40 °C 0.2 – 0.45 µm (FIB)
Rinse	2 min. @ RT	60 s @ RT
Dry	15 min. @ 60 °C	60 s @ 65 °C

* depends on machine design

A heat resistant organic surface finish

Based on the chemical formulation of OS-Tech® SIT, the deposited organic layer exhibits exceptional heat resistance and was proven to survive five lead-free reflow cycles without any reduction of the coating thickness.



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Stannatech® SF 8

New immersion tin

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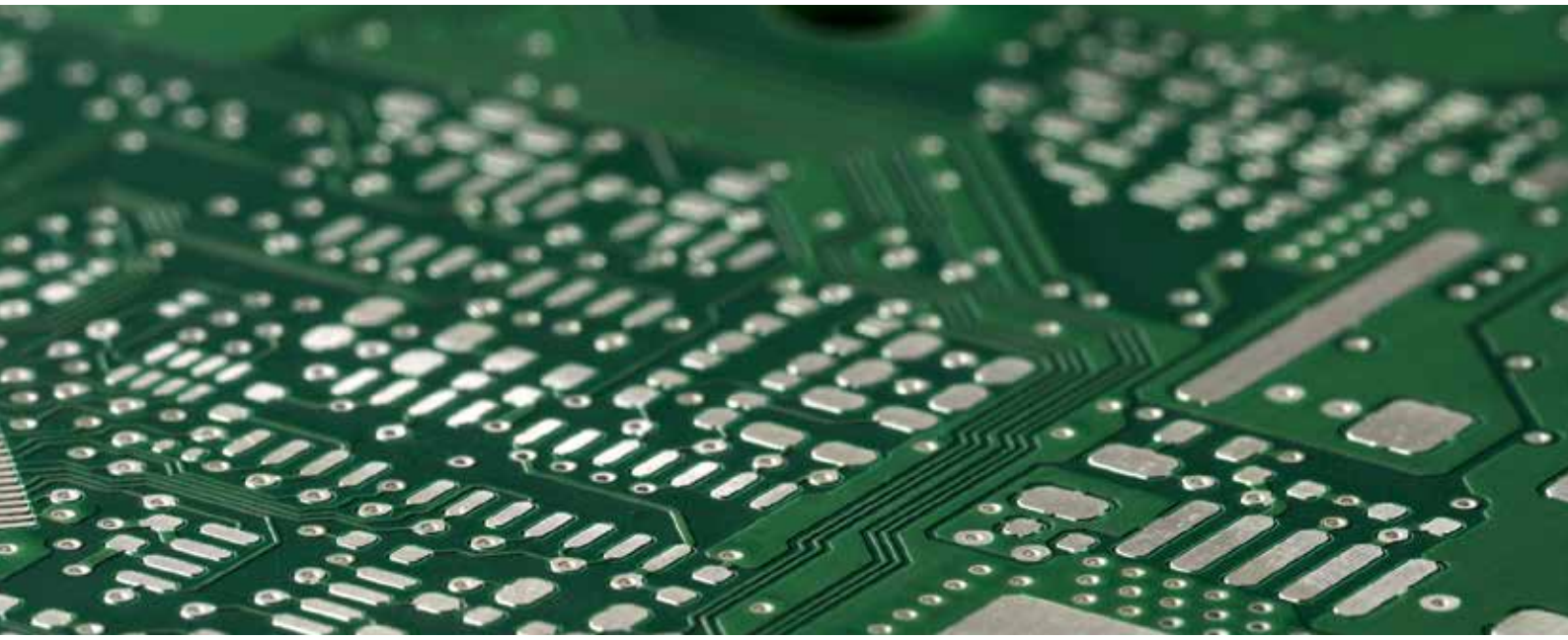

A Stannatech® evolution for vertical processing

New optimized immersion tin process

Based on the experience of the market leading Stannatech® 2000, Stannatech® SF 8 has been specifically developed to improve the process for vertical processing. By reducing the solution viscosity, the rinsing of the plating chemistry can be eased significantly and the solution exchange in small features is clearly improved.

Thanks to this the process can achieve an improved performance in terms of copper dissolution, solder mask attack and rinsability in particular when processed in vertical mode.
Stannatech® SF 8 maintains the market leading speed and quality expected from Atotech's highly versatile immersion tin finishes.

Features and benefits

- Low viscosity for improved rinsing
- Better solution exchange in small features
- Improved solder mask compatibility
- Easy and reliable process
- Stable bath performance and long bath life
- Designed to work with Atotech's Crystallizer® tailored for vertical but also applicable in horizontal

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Stannatech® SF 8 – Designed for vertical processing

Reduced copper dissolution

- Better solution exchange by low viscosity
- Lower copper dissolution in small structures
- Less sensitive to bath convection
- More robust in vertical processing

Improved rinsability

- Improved rinsability by low viscosity
- Lower rinse water consumption
- Improved cleanliness of processed panels
- Lower ion contamination values

Improved solder mask compatibility

- Mild process solution
- Reduced solder mask attack
- Improved compatibility with different types of soldermasks
- Less sensitive to soldermask application

Crystallizer concept

- Designed to work with Crystallizer concept
- Extended bath life
- Low chemistry consumption
- Cost saving by chemistry
- Stable performance over bath life

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