ViaKing®

The superior carbon based PTH process

Electronics | Desmear and metallization | atotech.com

A cost effective metallization process for HDI, flex and exotic dielectric material

Excellent performance and bath life

ViaKing® is Atotechs enhanced graphite-based direct metallization process. Optimized for both high and low volume production needs, ViaKing® operates with an attractive CoO but offers the highest product reliability and capability.

Designed to operate with low etch conditions, in combination with a stable and long life graphite bath, ViaKing® provides excellent stability, conductivity and electrical integrity for market-leading high yield electrolytic plating.

Key benefits

- Compatible with a very wide range of dielectric materials
- Direct Cu to Cu adhesion for maximum reliability
- Low etch depth for minimal copper removal on inner layers - reduced risk of etch back ICD or voids
- Unique Conductivator formulation is highly resistant to bacterial and copper contamination
- Wide operating window and enhanced bath stability
- Outstanding plating propagation
- Suitable for both panel and pattern plate technologies
- Easy to install into existing equipment
- Ideal for both high volume as well as low volume or stop / start production

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ViaKing® is a functioning and technically superior carbon based PTH process

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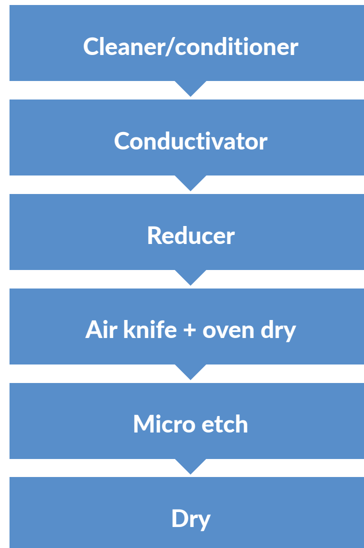


50%

of existing customers are using ViaKing® for the production of flex and exotic dielectric materials

Benefits

- Universal, quick, single or double pass process
- Excellent joint reliability
- Enables mixed or hybrid dielectric builds
- No impact from low volume, or stop/start operations
- Very stable graphite bath with a long solution lifetime and wide operation window

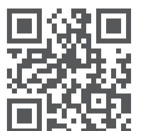
Features

- Exceptional adhesion to a wide range of PCB materials
- Suitable for flex, flex-rigid, multilayer and HDI BMV products
- Direct Cu-Cu adhesion
- Improved conductivity over simple carbon black processes
- Small particle size with high pH ensures bath stability
- Short horizontal process with low water consumption
- Chelator free for simple waste treatment

Environmental and HSE implications

- No cyanide
- No formaldehyde
- No chelators

Atotech Group
+49 30 349850
info@atotech.com



Noviganth® BV

Robust electroless Cu for vertical MLB & HDI

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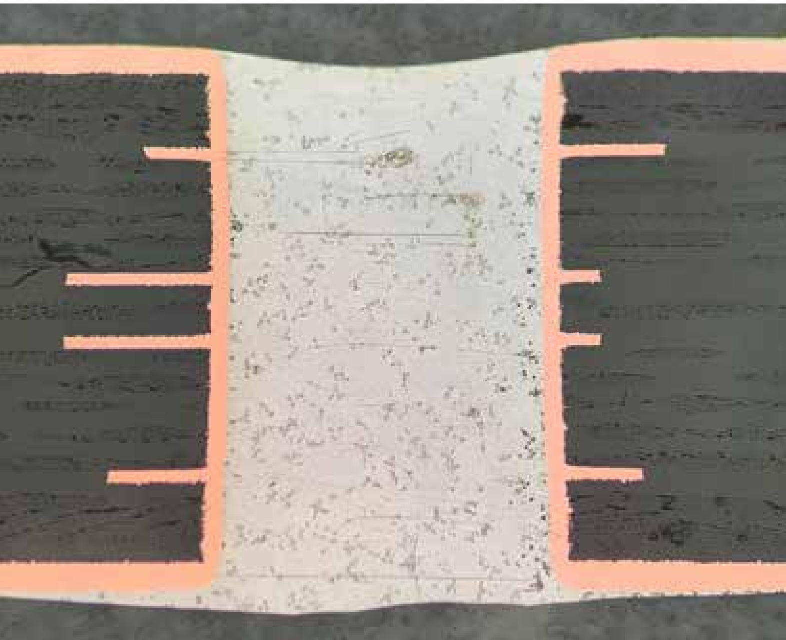

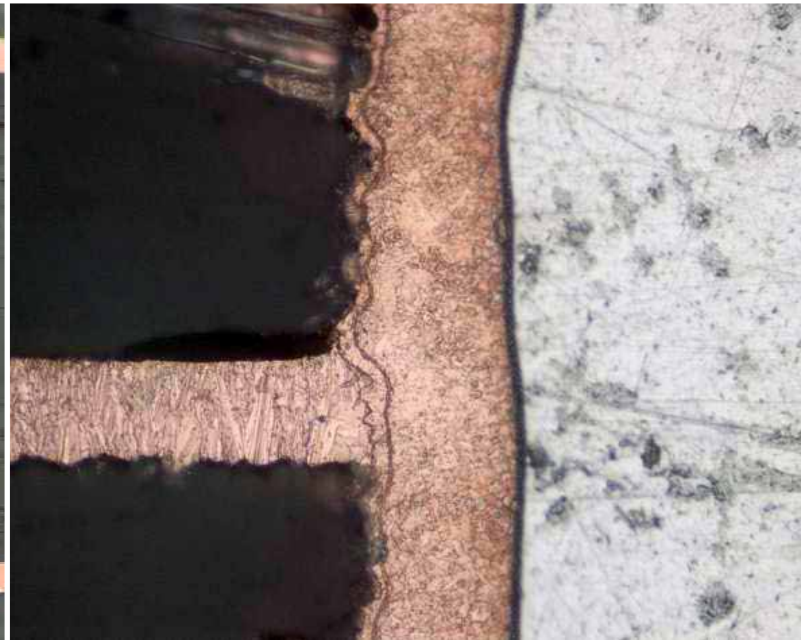

Leading smear removal, activation and electroless copper solutions

Mature technology

With over a decade of HVM production experience, the Pallaganth® activator and Noviganth® BV electroless copper bath offer a stable and robust low build vertical solution for multilayer and HDI PCB production.

Based on the widely adopted Pd/Sn colloidal activator approach, this easy to operate process is compatible with your existing equipment infrastructure and is already in use for challenging and high reliability applications.

Features and benefits

- Very mature technology
- Robust Pd/Sn activator operating at 40 ppm
- Robust EDTA based electroless copper bath
- Low build bath 0.35-0.4µm in 15 min
- Excellent coverage & reliability performance
- Cost-effective process

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Pallaganth® & Noviganth® BV
Robust electroless Cu for vertical MLB & HDI

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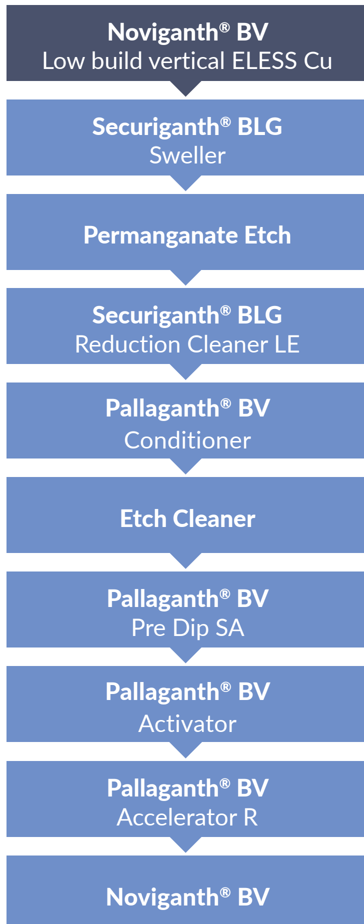


Pallaganth® BV

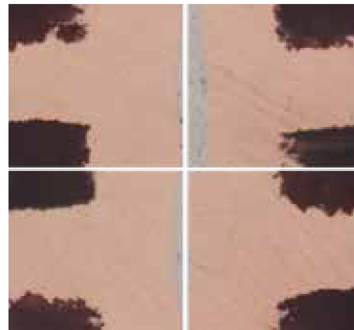
Pallaganth® BV is a high capability activation bath based on the widely used Pd/Sn colloid approach. In combination with the Noviganth® BV electroless copper bath, the complete process offers a stable and robust low build vertical solution for high reliability applications.

Exceptional reliability

Our Pd/Sn based electroless copper processes are used in automotive and other high reliability applications.

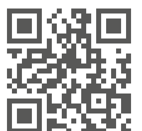
A stable & easy to operate process

Based on EDTA, Noviganth® BV is a robust and stable process solution that has been optimized for coverage and reliability performance.
Operating at a low Pd content, the process as a whole offers low running costs with an ease of operation that is attractive to todays PCB manufacturers.



No ICD after 6 cycles solder dip @ 288 °C

Atotech Group
+49 30 349850
info@atotech.com



Printoganth® PV G2

Universal vertical electroless Cu process

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High throw, high performance

80%

throwing power

High performance

As the challenges of advanced HDI PCBs continue to increase, the demands made on electroless Cu processes also grow. Printoganth® PV G2 is the next generation in the vertical P series of electroless copper solutions that ensures your production capabilities can meet those demands.

Offering market leading throwing power for vertical HDI processes, Printoganth® PV G2 provides excellent BMV coverage in the most challenging of designs while maintaining excellent adhesion and coverage on a wide selection of dielectric materials.

Wide compatibility with via fill electrolytes

Stacked BMVs offer one of the best solutions to maximising density on modern PCBs and the associated manufacturing and assembly operations demand that filled BMVs have minimal surface dimples. Historically, this has been a challenge due to interactions between the electroless copper bath and the via fill electrolyte selection.

With its novel additive package, Printoganth® PV G2 offers a wide compatibility to via fill electrolytes, and has shown that minimal dimple characteristics can be achieved in vertical applications without any loss of performance elsewhere.

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Printoganth® PV G2
Universal vertical electroless Cu process

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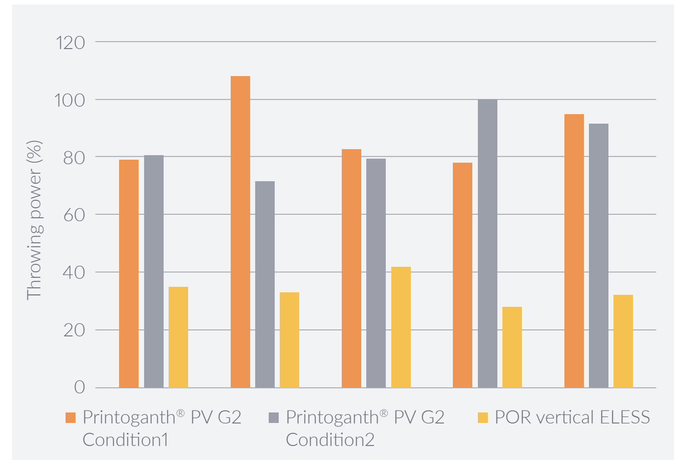
Controlled stress ensures excellent coverage

Printoganth® PV G2 has been optimized to ensure controlled stress within the deposited layer. This is critical in achieving reliable coverage without blistering on a wide range of dielectric materials such as polyimide.

Figure 1: Blister free deposit on PI

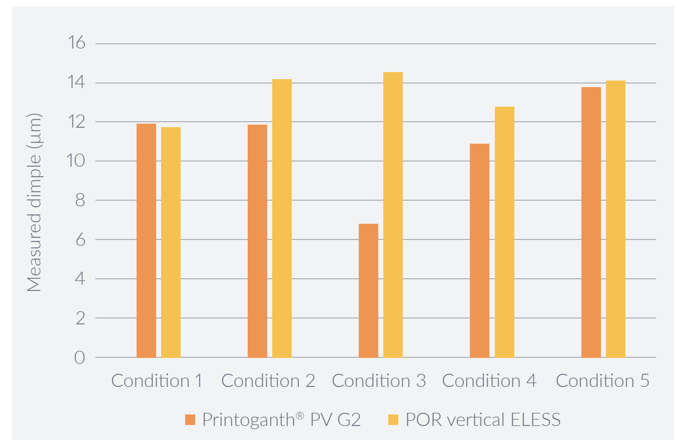
High throwing power

Traditional vertical baths typically have limited throwing power capabilities of less than 50%. Due to a unique additive package, Printoganth® PV G2 readily achieves a significantly higher throwing power of 80%.



Reduced dimple depth

Printoganth® PV G2 has a wide compatibility with electro plating electrolytes which enables smaller dimple depths in filled vias.



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+49 30 349850
info@atotech.com

Printoganth® P2

Universal horizontal electroless Cu

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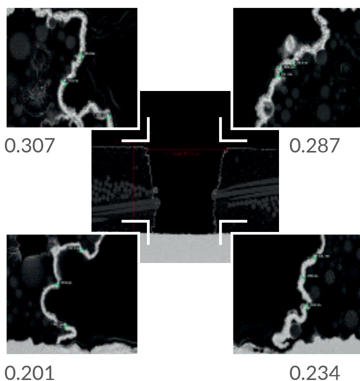
Universal horizontal e'less Cu system for flex, flex-rigid, HDI & MLB base materials



Latest member of the Printoganth® P series

Printoganth® P2 is a new horizontal electroless copper bath which offers outstanding throwing power performance and excellent coverage, even on challenging base materials, such as those used in high speed or 5G applications.

As the successor to Printoganth® P Plus, the new P2 process features a comparable internal stress level which ensures very good adhesion even on PI. In combination with an excellent reliability performance and proven compatibility to various via filling electrolytes.

Printoganth® P2 is truly a universal solution for HDI and flex PCB manufacturers.

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Universal horizontal e'less Cu for flex, flex-rigid and MLB & HDI base materials

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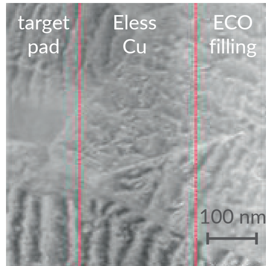

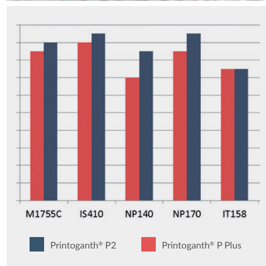

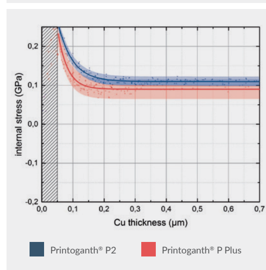

Figure 1: Void free interface
Figure 2: Coverage on relevant base materials
Figure 3: In-situ stress measurement during electroless copper deposition

Enhanced crystal structure, with improved via fill performance

With an industry wide, and increasing concern over stacked BMV reliability, and based on Atotechs market leading investigations into nano voids, Printoganth® P2 targets nano void free interfaces between the target pad and the e'less copper itself.
In combination with unrivalled compatibility with via fill electrolytes, Printoganth® P2 offers a universal electroless copper process that also enables smaller post plate dimples in the via surface.

Excellent coverage

Ideal for high technology applications, Printoganth® P2 exhibits enhanced throwing power over previous Printoganth® P series processes, ensuring good coverage in even the most challenging of via geometries.
Compatible with the Neoganth series of activator processes, Printoganth® P2 maintains the excellent coverage characteristics typical of the P series electroless coppers, and is suitable for use on a wide range of dielectric materials.

Internal Stress

The formulation of Printoganth® P2 has been carefully controlled to ensure that the deposited layers show moderate tensile stress which is comparable to the previous Printoganth® P series.
By further suppressing the formation of blisters in the plated layer, Printoganth® P2 offers excellent adhesion on Upilex and Kapton polyimide foil up to deposit thickness of 0.45 µm absolute or 0.80 µm when measured on FR4 (by XRF / titration).

Features and benefits

- Excellent throwing power into BMVs, outperforming Printoganth® U Plus and P Plus
- Outstanding adhesion and non-blistering performance even on high speed and other challenging substrates such as PI and BT
- Excellent reliability performance, very low to zero defects at the BMV capture pad even at ultra high resolution
- Wide compatibility with industry proven electrolytic via filling processes
- Fully analyzable stabilizer system for best process control

Atotech Group
Erasmusstraße 20
10553 Berlin – Germany
+49 30 349850
info@atotech.com

Neoganth® W Pre Dip

Advanced pre dip for fine line applications

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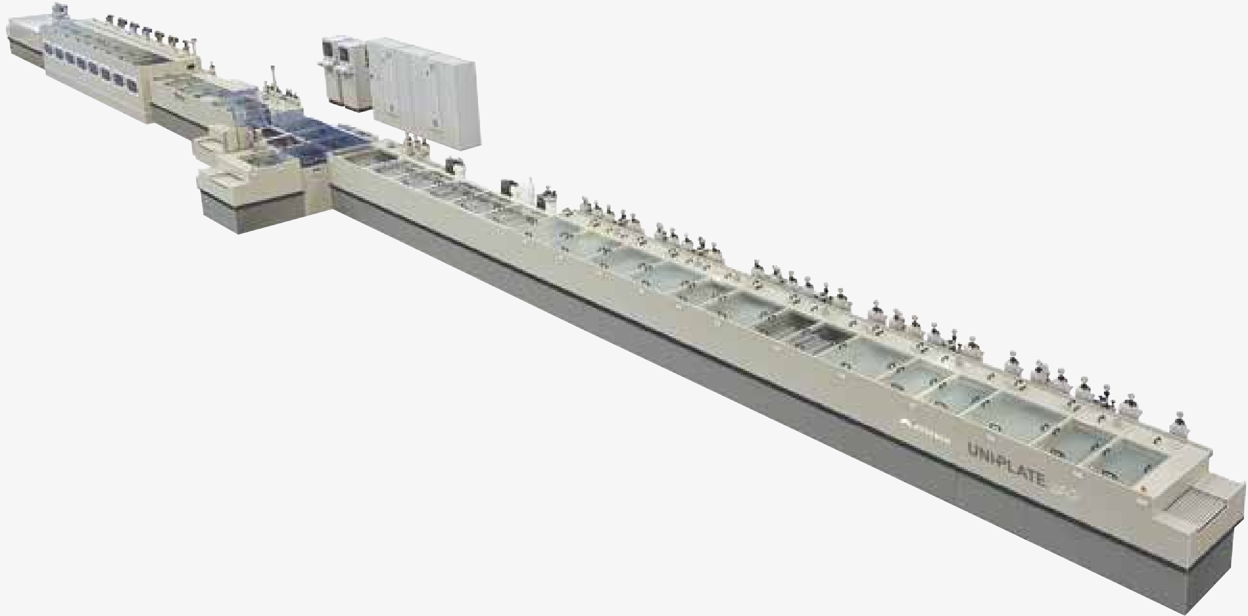

Horizontal activator pre dip for fine line applications

> 40

Global Installations
(Sept 2019)

Best coverage at high yield

The pre dip utilized prior to the PTH activator is multi-functional, It ensures correct wetting and pre-conditioning of the glass fibers while removing any remaining copper oxides after etch cleaning. However, Pd induced etch defects can be attributed to the precipitation of activators due to cross reactions with existing pre dips.

Neoganth® W Pre Dip has been specifically formulated to ensure less precipitation within the activator module, and thus actively minimizes Pd induced etch shorts, increasing product yields. Electroless Copper coverage is not reduced, with Neoganth® W Pre Dip performing comparably to the current POR (Neoganth® B Pre Dip).

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Advanced pre dip for fine line HDI and package substrates applications

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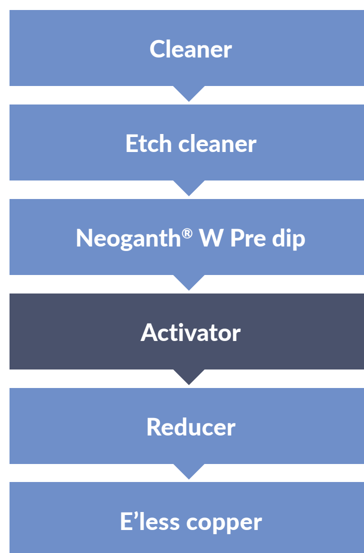
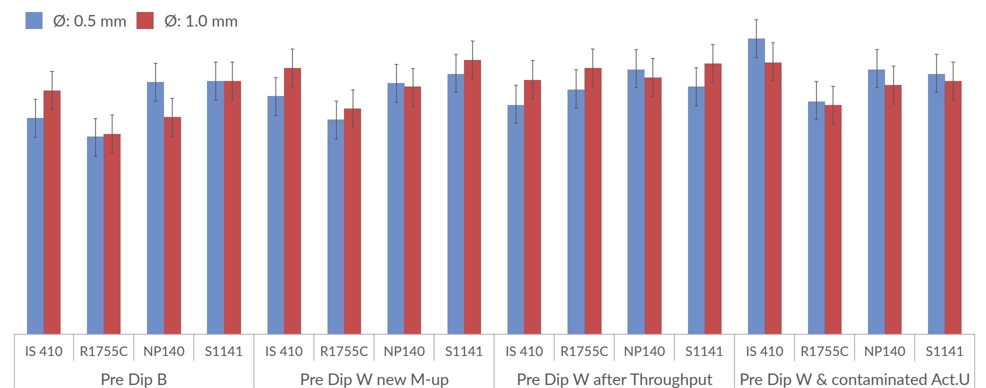
Figure 1:
Neoganth® W Pre Dip processing PCB panels in a Uniplate® LB line – no foaming in the module

Features and benefits

- Horizontal activator pre dip for fine line HDI and package substrates
- Measureable yield improvement through reduced Pd short circuits
- Fully compatible with Neoganth® activator series and maintains the existing robust activation process
- Excellent coverage performance on a wide variety of base materials, (comparable to Neoganth® B Pre Dip)
- Very good reliability performance
- No foaming

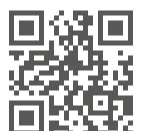


Neoganth® W Pre Dip shows excellent backlight performance, and is comparable with the POR (Neoganth® B Pre Dip)



Backlight performance comparison on 4 different base materials (Isola IS410, Panasonic R1755C, Nanya NP140, Shengyi S1141) with 2 different through hole diameters (0.5 and 1.0 mm) Printoganth® U Plus electroless copper

Atotech Group
Erasmusstraße 20
10553 Berlin – Germany
+49 30 349850
info@atotech.com



Neoganth® E Activator

Economic horizontal activator

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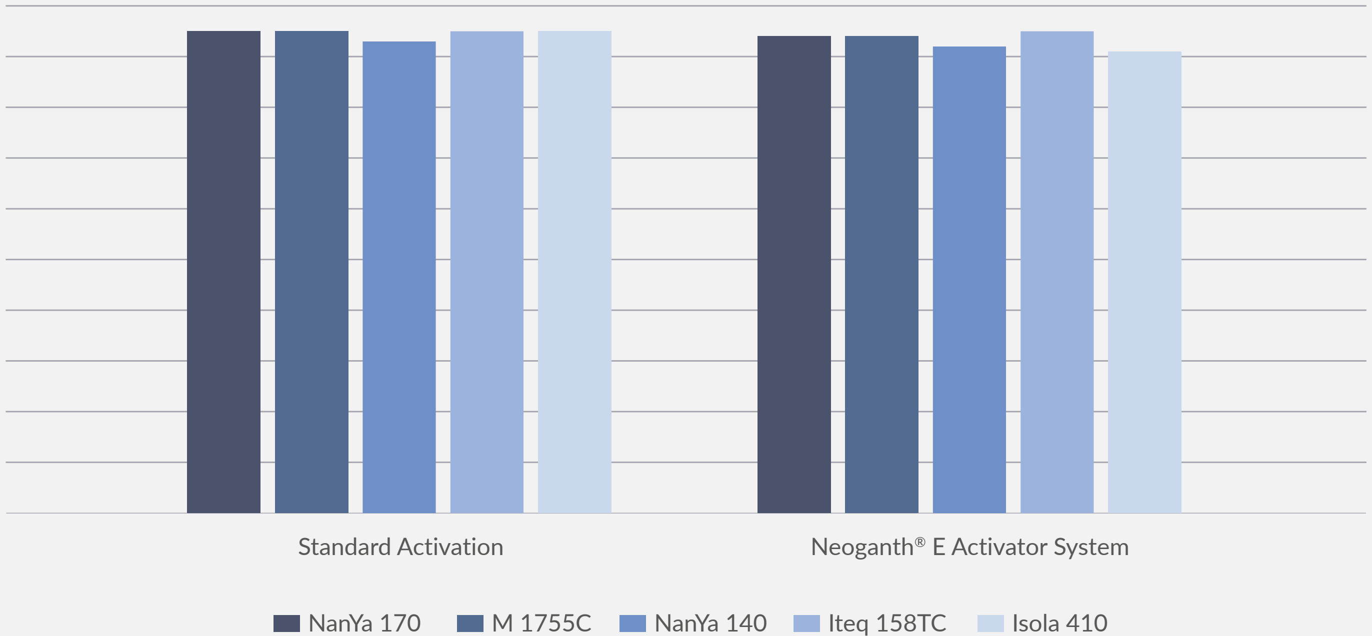

Cost efficient activator for MLB, HDI and rigid-flex production in horizontal equipment

80 ppm

Palladium

Highly efficient and cost effective

Neoganth® E Activator is the next generation of low Palladium activators for electroless Copper processing. It provides a longer life time and reduces consumption due to lower bath precipitation and sludge formation and offers good coverage on a wide range of dielectric materials.

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Easy drop-in solution fully compatible to standard horizontal process sequences

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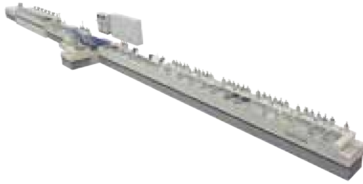

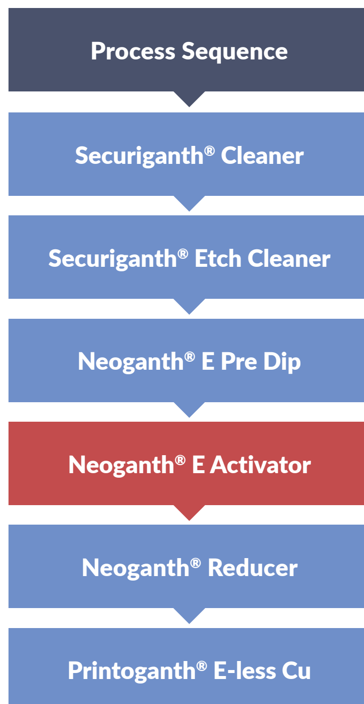

Features and benefits

- Operates at 80 ppm Pd bath concentration
- Excellent bath stability compared to other low Pd activators
- Increased bath lifetime
- Low Pd precipitation and low sludge formation
- Estimated 30% cost reduction
- Comparable performance to high Pd containing activators on standard PCB material
- Compatible with existing Atotech horizontal processes, and drop-in systems

Figure 1: Low Pd precipitation / low sludge formation (11 m^2/L throughput).
Left: Standard activation, right: Neoganth® E Activator System

Atotech Group
Erasmusstraße 20
10553 Berlin – Germany
+49 30 349850
info@atotech.com