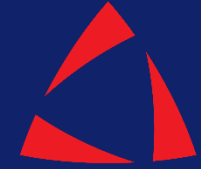


*ENSURE TOTAL SOLUTIONS*



**AUROMEX**

# AUROMEX

Company Profile



A 3D rendering of a compass rose with a red arrow pointing towards the word 'VISION'. The word 'VISION' is written in a large, bold, sans-serif font, arched across the top of the image. The compass rose is partially visible at the bottom, showing its circular scale and the red arrow pointing towards the word. The background is a light, neutral color.

# VISION

Strive to be the number one in surface-finishing industry in Thailand and ASEAN with the aim of providing comprehensive high-performance technology, supported by world-class applications expertise and services, as part of Auromex strategic "Total Solution Initiative"



# Mission

- Offer a comprehensive range of high-performance surface finishing technology and services, focused on automotive, electronics, aerospace, building, and PWB industries in Thailand and ASEAN region and expand industrial & geographic marketing as opportunities arise.
- Provide leading edge products at competitive Cost of Ownership with reliable delivery and post sales services.
- Focus on developing Auromex proprietary technology that meets industry, markets and customers' needs.
- Be perceived by suppliers as a reliable customer with good long-term partnership.
- Establish Auromex total solutions as an industry brand, and attain recognition by customers as a "knowledge-based company."
- Be regarded in the industry as having one of the best work environments, in terms of employment, good career path opportunities, resulting in a low job turnover rate.



# Company History



## Over 50 Years in Surface Finishing & Related Industries



# Facilities



THAILAND

Auromex Co., Ltd.

HQ: Bangna, Samutprakan

Operation: Bangpoo Ind Est., Samutprakarn



VIETNAM

Auromex Vietnam Co., Ltd.

South Branch: Amata Ind. Est., Dong Nai

North Branch: Thanh Trai, Hanoi



INDONESIA

PT Auromex Chemi Indonesia

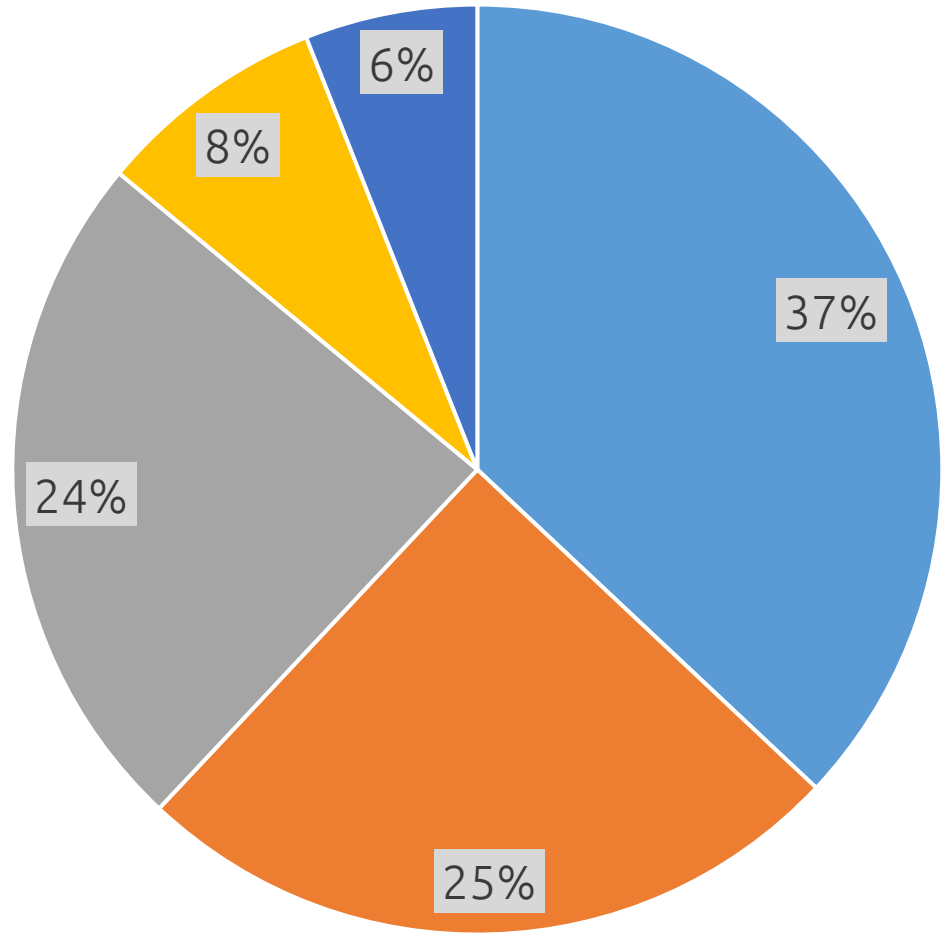
Cakung, Jakarta Timur



# Auromex Manpower



## Manpower Allocation



- Technical Commercial
- Technical Service + R&D
- Manufacturing
- General Affairs
- Others





# OUR PRODUCTS

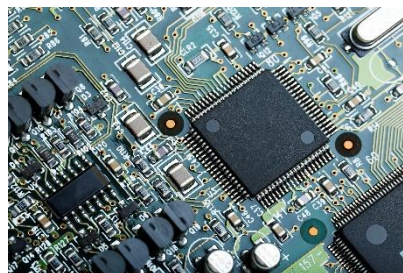


# Products

## Process Design and Chemical Selection for Surface Finishing

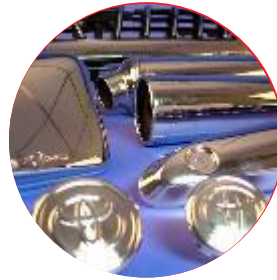
Based on the normal plating, aiming "Beautiful" and "Rust Prevention", our products are not only focusing on giving added-value of multi-function, high performance and high reliability to the plating, but we also look forward to environmental protection.

- Plating on Plastics
- Decorative Based Metal Plating
- Corrosion Resistance Coating
- Electroless Nickel Technology
- Functional Chrome Technology
- Anodizing Process Technology
- Chemicals for Printed Circuit Boards (PCBs)
- Decorative Precious Metal Plating
- Industrial Cleaners Technology
- Glass Color Treatment





# PLATING ON PLASTICS



Plastics play the important roles in automotive industries and Auromex has participated in this field for a long time. We are proud to present a full line of conventional and chemical reduction process or direct process to fulfill automotive and sanitary industries' needs. Both of processes are environmental friendly and economy that meet the worldwide standard including WEEE, RoHS, and ELV..



# DECORATIVE BASED METAL COATING



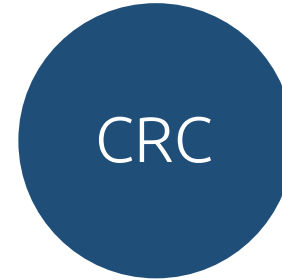
DBM



Our decorative based metal coating process consists of copper, nickel, and chromium Plating on specific metal substrates such as steel, zinc, brass, and aluminum. We provide a full range of high quality products that cover from electroplating to post treatment. Furthermore, we also support premium chemicals to increase superior value for electrophoretic process.



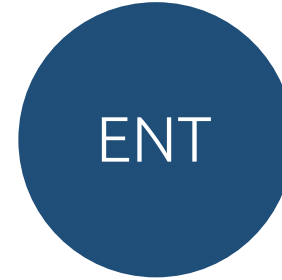
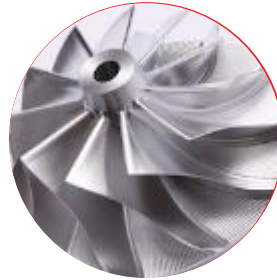
# CORROSION RESISTANCE COATING



We supply different brightener systems for various kinds of zinc plating and zinc alloys plating, e.g. zinc-iron, and zinc-nickel brighteners, along with all post-treatments such as conversion coatings. With over twenty years' experiences in zinc plating process, we can be trusted to implement better quality and environmentally friendly processes.



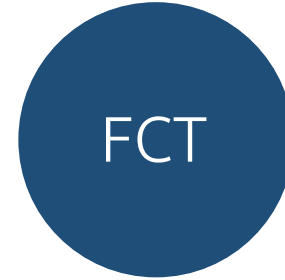
# ELECTROLESS NICKEL TECHNOLOGY



Electroless nickel deposit have properties which enable them to be used for corrosion protection and provide wear resistance for fabricated parts. Auromex's electroless nickel process includes nickel-phosphorous from low phosphorus to high phosphorus, electroless nickel-boron, and composite electroless nickel.



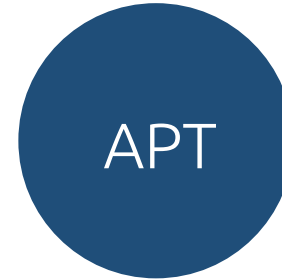
# FUNCTIONAL CHROME TECHNOLOGY



Hard chrome plating is typically used in the automotive sector for shock absorbers, in printing rollers for the rotogravure industry, and for high performance leisure items such as golf clubs among many other applications. Hard chrome is typically thicker than decorative chrome deposits. For hard chrome process, we also serve standard and environmental friendly products, such as lead-free and PFOS-free, products for automotive, rotogravure, and hard wares industries.



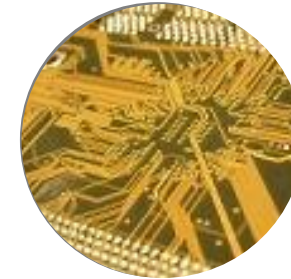
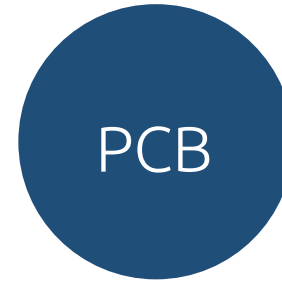
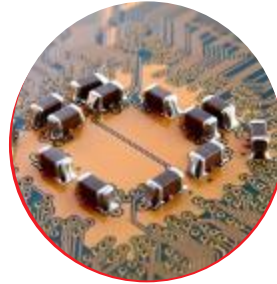
# ANODIZING PROCESS TECHNOLOGY



Anodizing is process intended to increase corrosion resistance, allow dyeing, improve lubrication by building up oxide layers. Auromex's anodizing processes fulfill electronics, automotive, furniture and aerospace industries' needs. We are proud to present different processes for wrought aluminum finishes depending on final appearance and specific full process for cast aluminum and it alloys. Moreover, we also offer a wide range of dyes' shades for a various application.



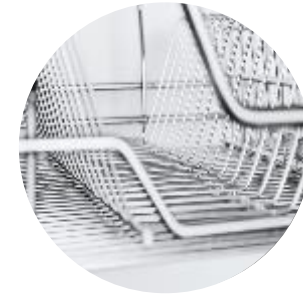
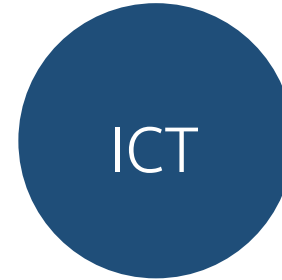
# CHEMICALS FOR PRINTED CIRCUIT BOARD



Auromex offers standard processes for both rigid and flexible circuit boards. Our metallization processes start from desmear process, electroless copper plating to acid copper plating. For final finishing process, we introduce a full line of electroless nickel immersion gold (ENIG) and nickel plating in tab gold process. We also provide premium raw materials, such as, anode's copper balls.

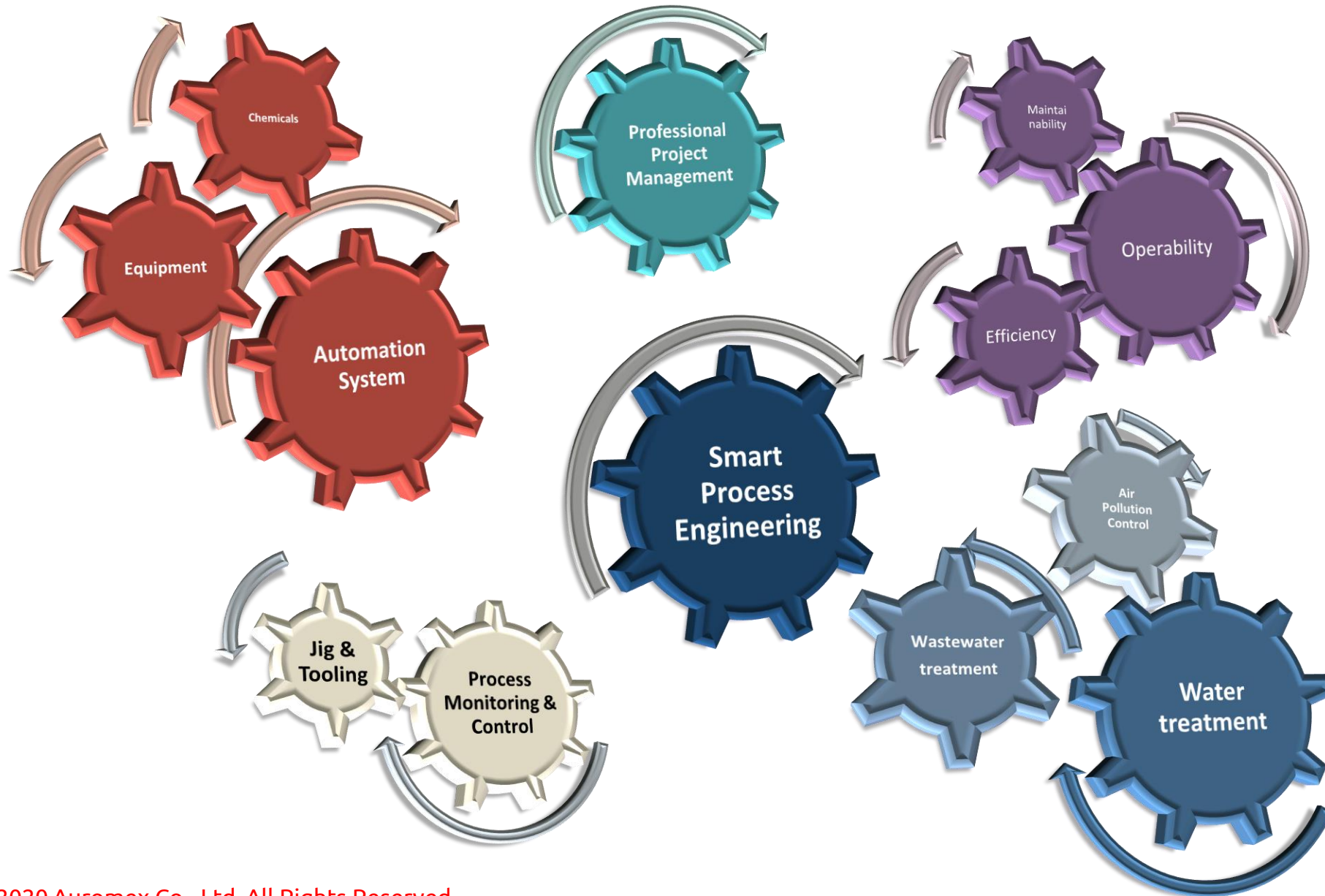


# INDUSTRIAL CLEANER TECHNOLOGY



It is our belief that plating quality starts from excellent surface treatment. Therefore, we provides standard industrial cleaners for different kinds of metals and specific processes for aluminum and plastics, at lower cost with increased flexibility to meet specific and bespoke customer requirements. Our products include spray and soak cleaners, electro cleaners, pickling agents, acid activators and strippers.

# Total Solution Provider







# Total Solution Service

A Systematic Approach to Integrate Design, Installation, Optimization & Maintenance of Surface-Finishing Processes to Ensures The Highest Quality and Yields at the Lowest Cost of Ownership & Time

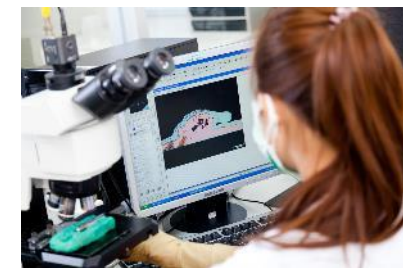


## Preliminary Service

- Requirement and Specification Analysis
- Process Design and Alpha-Site Process Evaluation (Sample Plating)
- Production Line Audit and Improvement Plan Report
- Providing Consultancy on
  - Production Line Design & Equipment
  - Laboratory and Solution Analysis set up.

## After-Sales Services

- Chemical Analysis & Control to Maintain Optimum Performance
- Troubleshooting Support & Root Cause Analysis
- Preventive Maintenance and Periodic Audit Program
- New Technology Launching and Process Improvement
- Training Academy





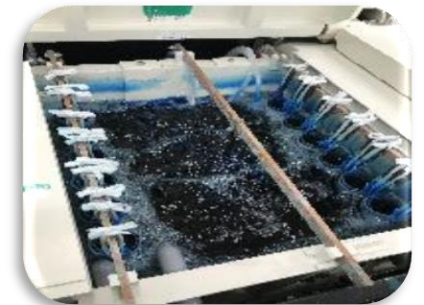
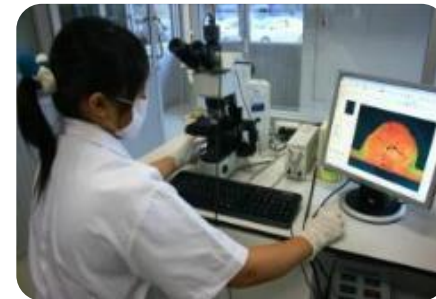
# Laboratories

## Analytical Instrumental & Materials Analysis Capabilities

Over more than 40 years providing solutions services to our clients, we have learnt that one of the key things they require, whenever challenges arise or there is a problem on the production line, is technical support including:

- Rapid answer of what is wrong and why it happened
- Root cause analysis with greater accuracy and insight both in depth and detail
- Troubleshooting and solutions to help solve challenges quickly to get the production lines up and working again and so minimize downtime

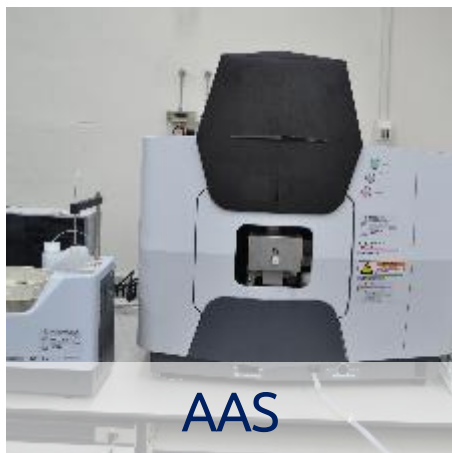
We have made long-term and consistent investments in our analytical instruments, laboratories and material analysis facilities to ensure that we can meet these demands



# Analytical Instrumentation Laboratory



Provides support in terms of chemical, elemental and functional group analysis, applying a broad range of methods.



# Material Analysis Laboratory



Offers expertise in accurately identifying and determining physical and mechanical properties of different kinds of coating as well as surface analysis, utilizing a variety of sophisticated scientific equipment and special techniques



Grinding - Polishing



Laser Microscope



Step test | Thickness



Tensile



Thermocycle



Cutting



XRF



SEM



Salt Spray/CASS Test



X-Ray





# Pilot Line

Area: 200 m<sup>2</sup> Tank Size: 230 L

## Process Capability:

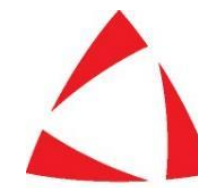
- Plating on Plastic (Conventional and Direct Process)
- Electroless Nickel on Al and Iron
- Anodizing Process and Aluminum Treatment
- Decorative Based Metals (Cu/Ni/Cr) on metal substrates
- Zinc, Zinc Alloy, and Passivation
- PCBs (Electroless Pd and Au)
- Hard Chrome

## Advantages

- Investigation of product and process on intermediate scale
- Improve process development and design
- Minimize risk and failures in full-scale production
- Able to test various shape and size sample part
- Enhance training efficiency
- Alpha-site for New Product Testing
- Improve jig design
- Always available and ready to use.



# Training Academy



**AUROMEX**  
TRAINING ACADEMY

We are committed to sharing knowledge and technology with our clients

- Basic Theoretical Training
- Operating and Maintenance Training
- Basic Troubleshooting Training
- Introduction of New Technologies and Regulations
- Laboratory Analysis Training
- Plating Equipment Training



# Manufacturing Facility & Warehouse



## Highest Quality Manufacturing Standards & Documentation Systems

- Production Area: 2400 m<sup>2</sup>
- Production Capacity
  - Liquid Products: 600,000 L/month
  - Powder Products: 120,000 Kg/month
- Advantages
  - Faster & More Flexible Production
  - Reduced Cycle Times
  - Improved Turn-Around Time
  - Increased Inventory Turns
  - Shorter Delivery Lead Times
  - Accurate Product Tracking
- Less Finished Goods in Inventory
  - FIFO - Reduction in Stale Products
- Enhances Workers Safety
- Compliance to international standard.
  - ISO 9001 ; 14001
  - ELV & RoHS



# Environmental Concern



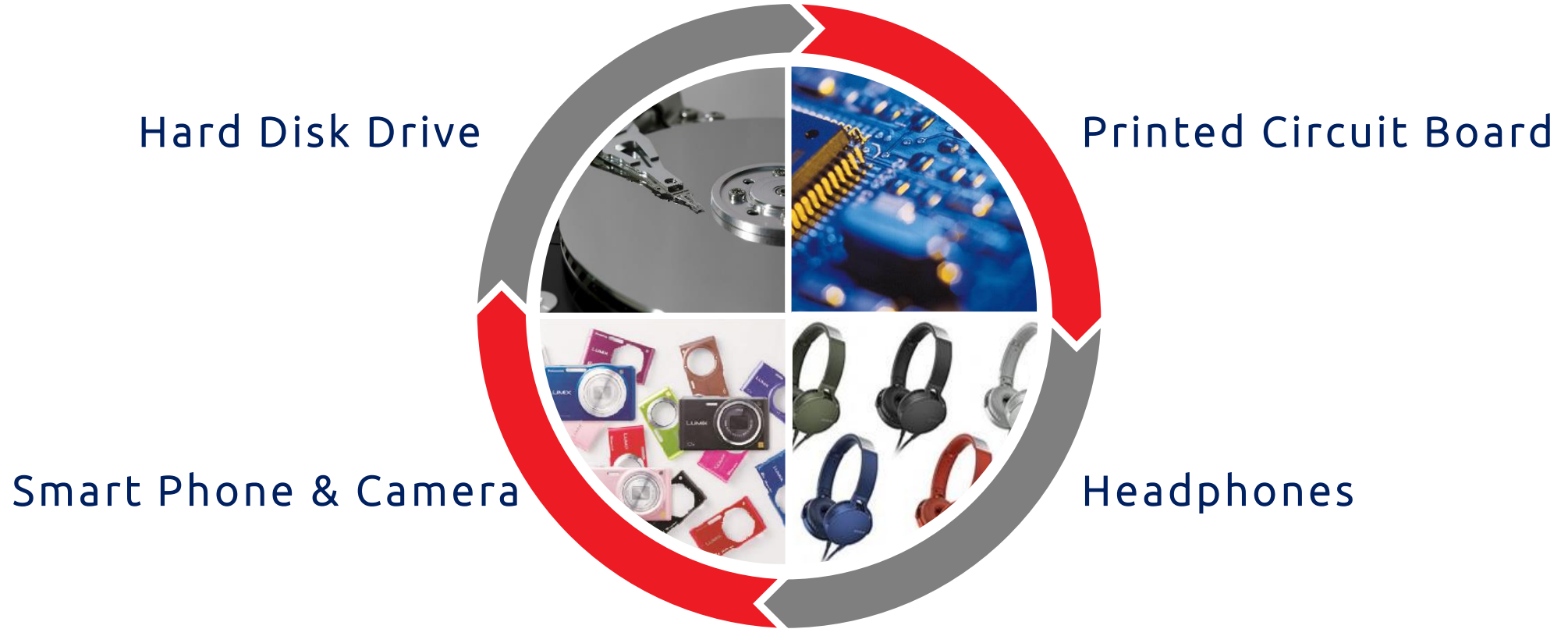
Caring for the environment is a core part of our corporate philosophy. Auromex believes environmentally friendly policies benefit everyone: our customers, our staff, our clients, our location and the wider community as well as the natural world which sustains us.


Through all of our corporate activities, we will try our best to protect the global environment and work in harmony with nature. Our products are developed to meet these environmental regulations and we continuously monitor the implementation of new environmental regulations such as

- RoHS (Restriction of Hazardous Substances)
- WEEE (Waste Electrical and Electronic Equipment)
- ELV (End Life Vehicle).



# AUROMEX Surface Finishing Technology for Electronic Applications





# AUROMEX Surface Finishing Technology for Hard Disk Drive

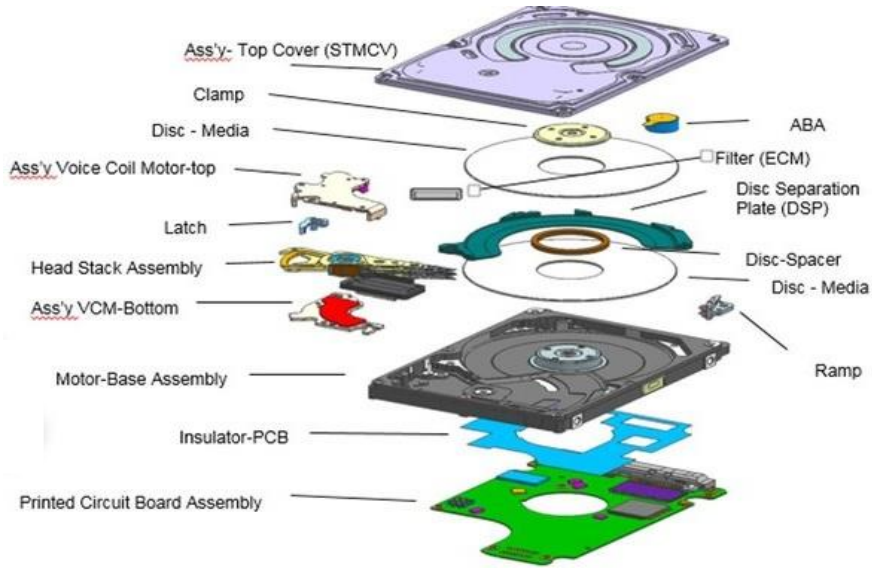
# Hard Disk Drive Manufacturing Process



Component Fabrication

Sub-Assembly

Final Assembly



Ref: [https://www.researchgate.net/figure/Intact-HDD-with-the-cover-removed-left-and-exploded-image-of-a-HDD-showing-individual\\_fig2\\_317472565](https://www.researchgate.net/figure/Intact-HDD-with-the-cover-removed-left-and-exploded-image-of-a-HDD-showing-individual_fig2_317472565)





# General Plating Specs of Hard Disk Drive

Test Items	Test Method	Requirement
Appearance	Visual check	Smooth, uniform, and of even density and color
Thickness	XRF	Depend on customer requirement
Phosphorus content	ICP or XRF	9 – 13 wt% or depend on customer requirement for non-magnetic properties
Hardness	Vickers hardness	500 – 550 Hv
Adhesion	Tape test + Cross cut	Not found nickel peeling on tape
	Bending test	Not found flaking of coating from substrate
	Heat quench (Only steel substrate)	No peeling , flaking of plating
Porosity	Alizarin test (For aluminum)	No red spots remaining indicate pores
	Boiling test (For steel)	No rust spot
	Peroxyl test (For Steel)	No blue spot for porosity
Corrosion Resistance	Humidity test	No corrosion, discoloration, or peel-off
	Nitric acid dipping test	No corrosion
Surface Cleanliness	Liquid Particle Count	Depend on customer requirement





# AUROMEX

## Electroless Nickel Technology

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- Excellent wear, corrosion and chemical resistance
- High phosphorus content in the deposition films: 10 – 11 wt%
- Reduced color-tarnishing effect
- High bath stability
- Stable phosphorus content throughout bath life
- Stable deposition speed throughout bath life
- Long bath life
- Wide operating range
- Lead & cadmium free



# AUROMEX

## Electroless Nickel Technology

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- Free of lead and cadmium
- Long bath life → Less renewal chemical



- Wide operating condition
- High bath stability

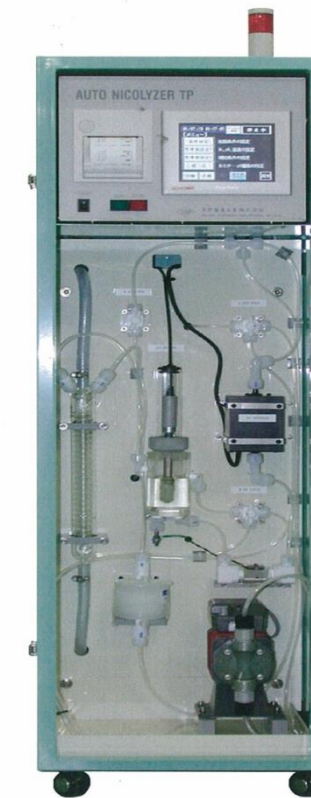


- Excellent wear and corrosion resistance
- Less color-tarnish effect



## Automatic Control Machine

Online analysis and dosing system for EN plating





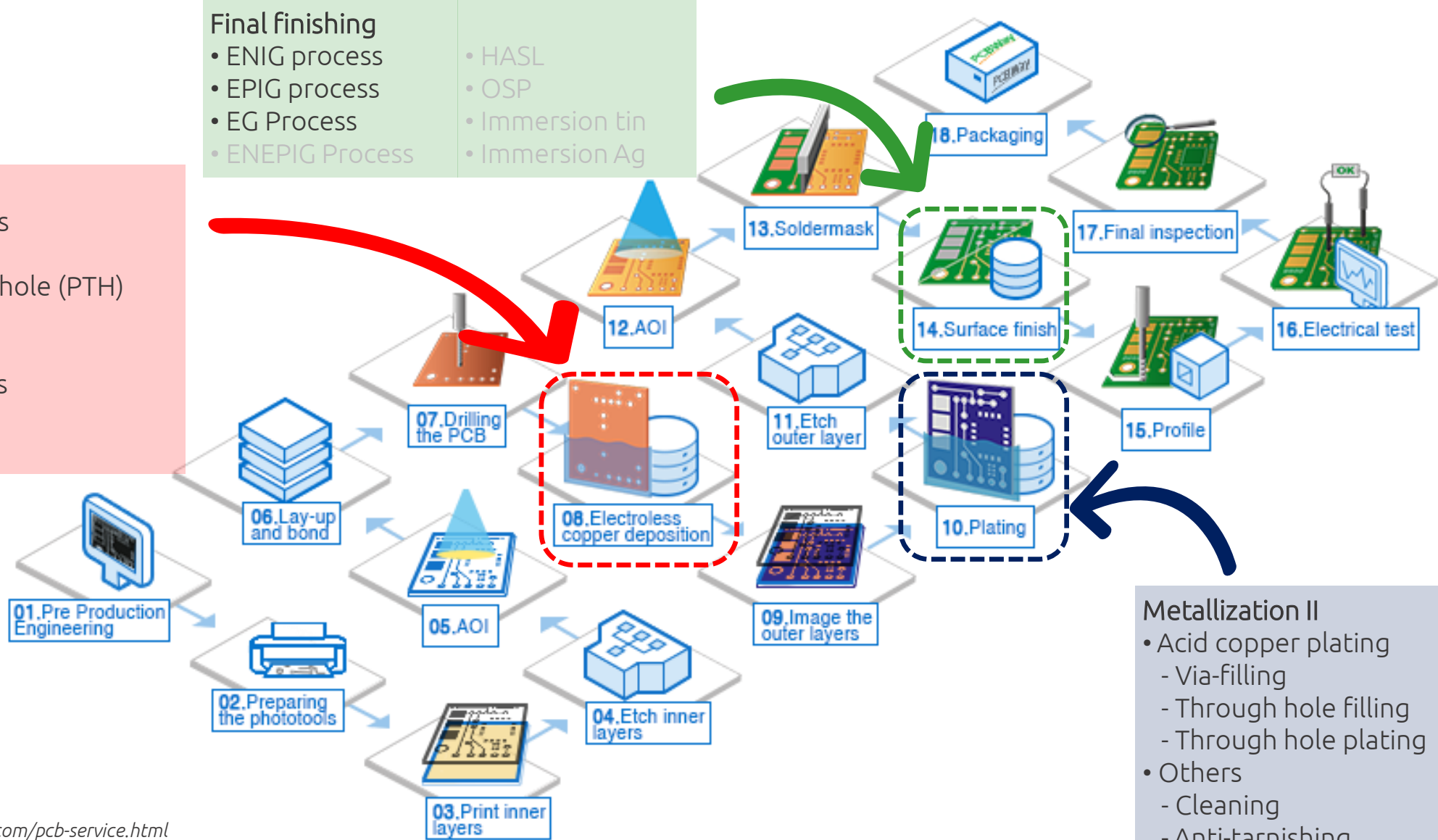
# AUROMEX Surface Finishing Technology for PCBs



# Key Process Supply in PCB Manufacturing

- Final finishing
- ENIG process
  - EPIG process
  - EG Process
  - ENEPIG Process
  - HASL
  - OSP
  - Immersion tin
  - Immersion Ag

- Metallization I
- Desmear process
  - OPC process
  - Plating through hole (PTH)
  - OPC process
  - NACE process
  - SAPINA process
  - Others
  - Cleaning



- Metallization II
- Acid copper plating
  - Via-filling
  - Through hole filling
  - Through hole plating
  - Others
  - Cleaning
  - Anti-tarnishing

<https://www.pcbway.com/pcb-service.html>

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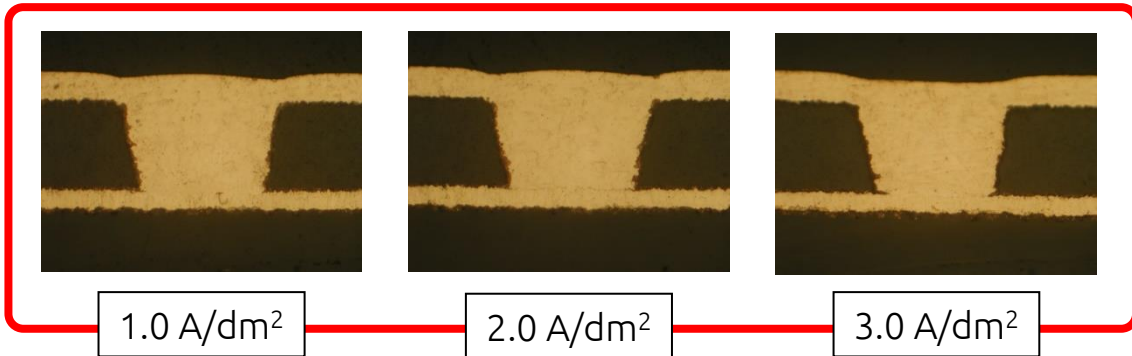
# Auromex Technologies for PCBs



## Acid Copper Process: Via-Filling

### Key features:

- ✓ Provide great via-filling performance
- ✓ Wide current density range can be operated
- ✓ Easy to use and control
- ✓ Available for both flex- and rigid-board



	6 A/dm <sup>2</sup>	8 A/dm <sup>2</sup>	10 A/dm <sup>2</sup>
10 μm	 Filling achieved		
12 μm		 Filling achieved	
14 μm			 Filling achieved

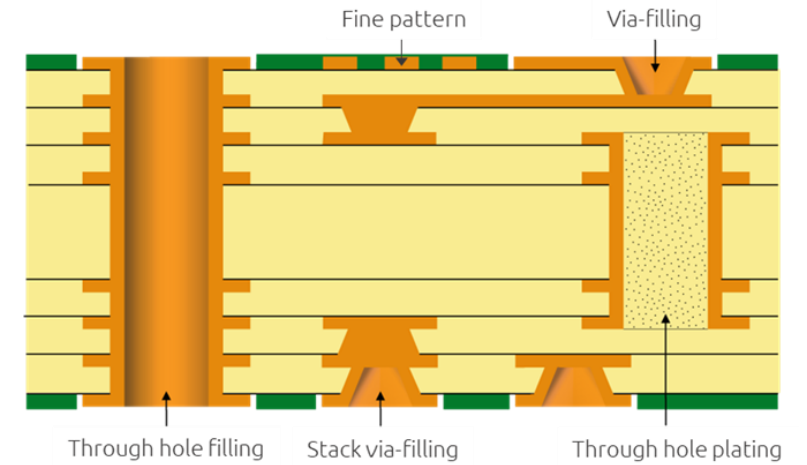
Plating condition: CuSO<sub>4</sub> • 5H<sub>2</sub>O: 220 g/L, H<sub>2</sub>SO<sub>4</sub>: 80 g/L, Cl<sup>-</sup>: 50 mg/L  
Via hole diameter = 75 μm, via hole depth = 50 μm

# Auromex Technologies for PCBs

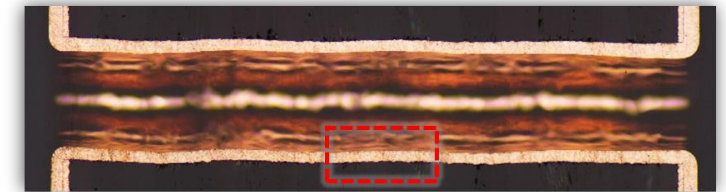


## Acid copper process: **Via-filling Plating and PTH**

- ✓ Provide superior performance in via-filling and through hole plating application
- ✓ Provide uniform copper film thickness
- ✓ High throwing power has been improved
- ✓ Suitable for MSAP applications



Through hole plating

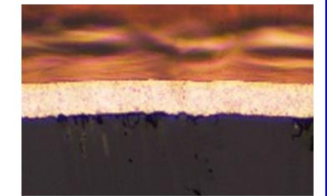


Conventional bath



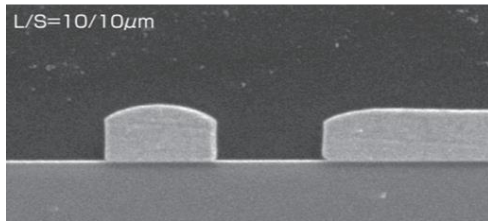
T.P. = 80%

Our process

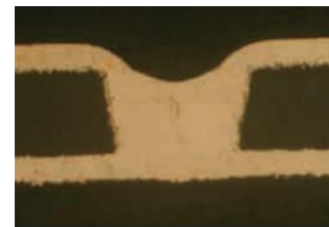


T.P. = 85%

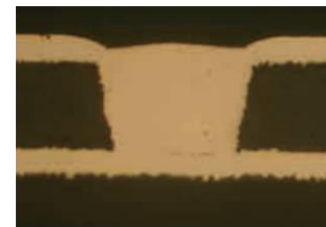
Fine pattern plating



Via-filling Plating



Conventional process



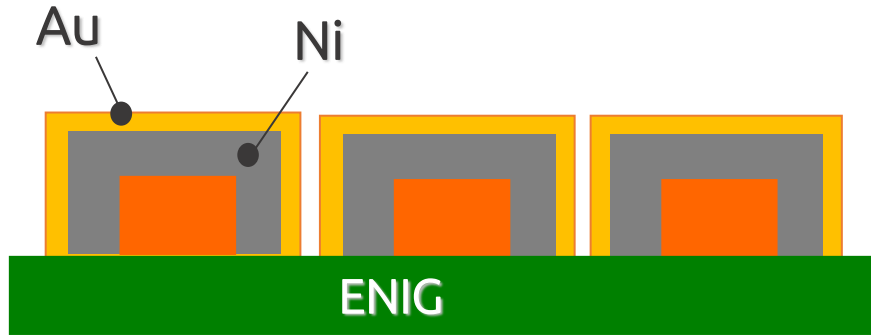
Our process



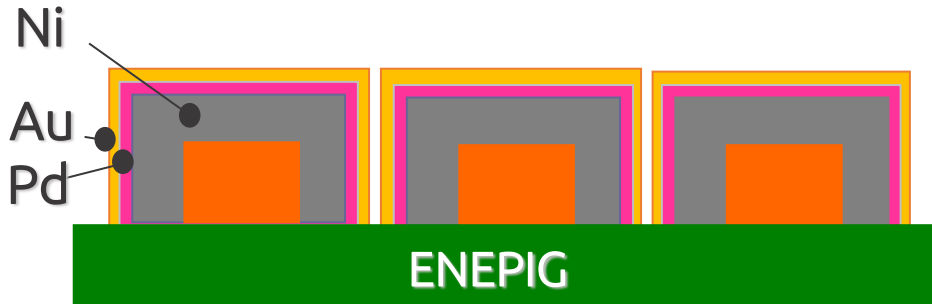


# Auromex Technologies for PCBs

Final Finishing: Development background of electroless Pd/Au plating process



Ni: 5 $\mu$ m  
Au: 0.3 $\mu$ m

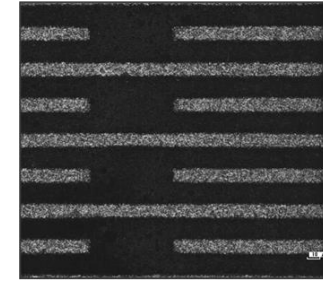


Ni: 5 $\mu$ m  
Pd: 0.1 $\mu$ m  
Au: 0.03 $\mu$ m

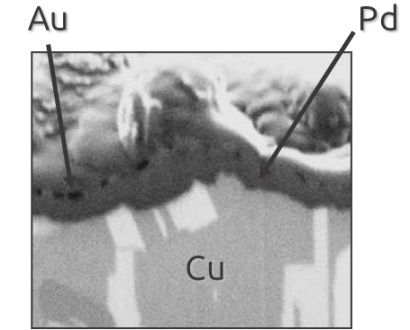


Pd: 0.1 $\mu$ m  
Au: 0.03 $\mu$ m

Appearance

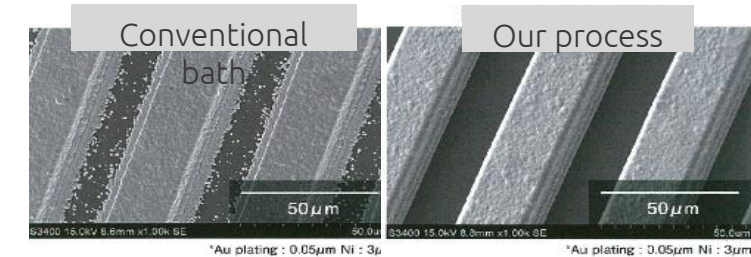


L/S = 10  $\mu$ m/15  $\mu$ m



FIB-SIM image: No void between Cu and electroless Pd plating

Fine line capability: L/S = 25/25  $\mu$ m



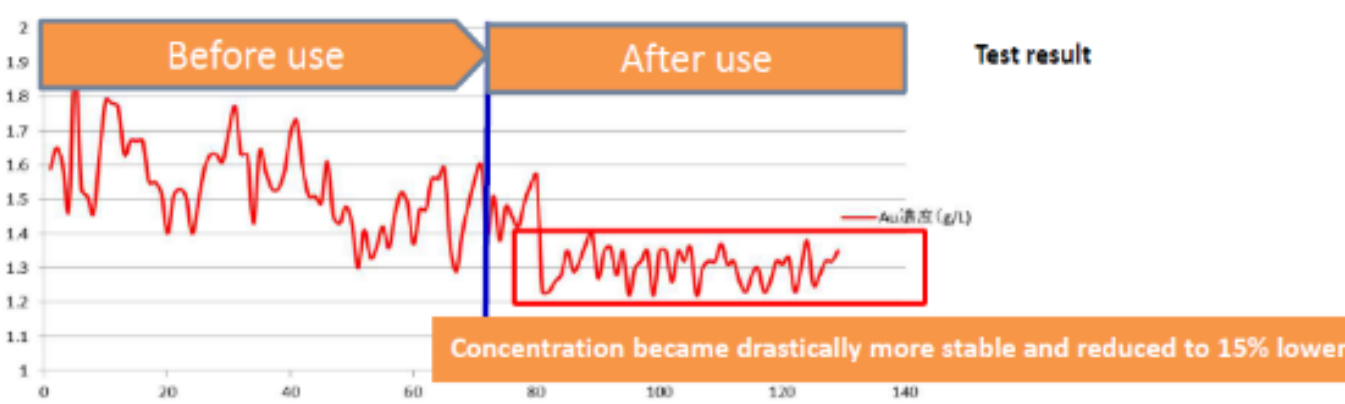
Total thickness of film 0. 13 $\mu$ m  
Fine wiring  
Effective pattern



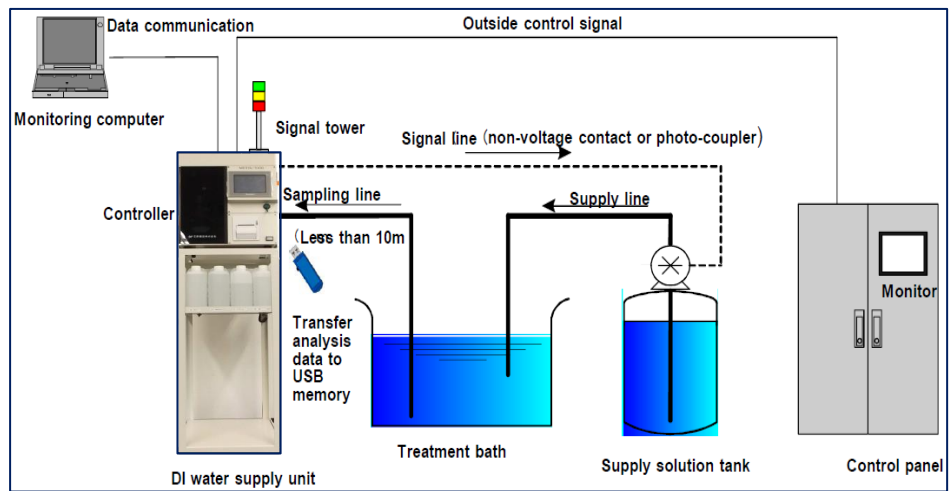
# Automatic Analyzing and Dosing Units: Metis-7000 Controller

- Simple Integration into existing production lines
- High analysis accuracy
- Utilized for optimum control & replenishment of key chemical constituents
- Allow material cost savings through reduced consumption & higher quality reducing scrap rate
- Allow cost savings through reduced off-line analysis

## Test result: Au concentration vs Time



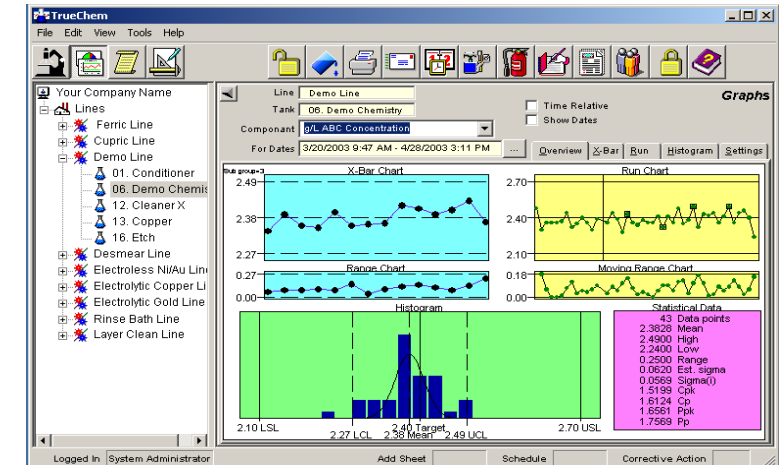
## Metis-7000



# Process Control and Monitoring: TrueChem



- Advanced Statistical Analysis: Cpks, KPIs, & Other Metrics
- Configurable & Easy Integration: Automated Chemical Analysis Controllers
- Scheduler, Test Procedures, Event Tracking
- Simplified ISO & NADCAP Compliance
- System Based on Best Practices Framework
- Available for laptop and mobile phone



## Rules & Conditions

