

CATALOG & Technical Bulletin

General Catalog of WORLD METAL CO.,LTD. Index

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Development of IT relating field and surface treatment technology

Surface treatment technology is essential item in electronics components relating field.

We, WORLD METAL CO., LTD., have hitherto been specialized in such industrial field.

While the products development cycles gets shorter and shorter, there is new demand for development capability with smoother response.



Our specialties

Technical R&D oriented company in surface treatment industrial field

Products quality management system based on ISO9001

Products development coordinated with customers needs

Always we relate to most advanced technology needs, we have established achievement in semi-conductors and electronic components field

Development for plating processes suited to materials and applications

Chemicals cost down by our own developed WMF process

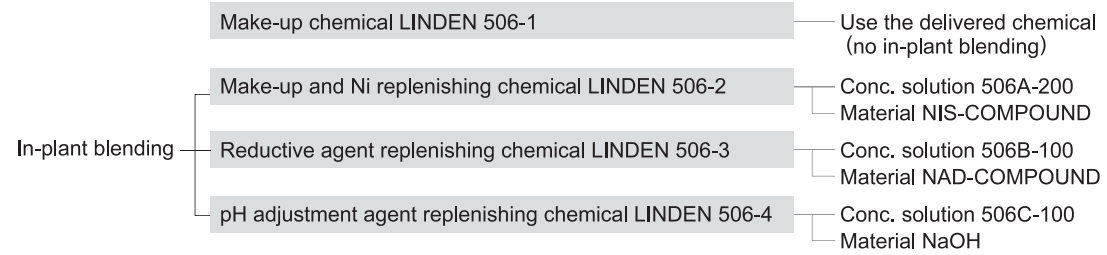
1. Cost down for general-purpose plating chemicals
 - WMF process;30~50% cost down
 - In-plant plating chemical blending by using concentrated form of the chemical solution and major chemical material
2. Plating process on glass ceramic substrates (LTCC)
 - Applicable to independent and extremely micro wiring patterns and lines and space (30 μ m and under)
 - Electroless Nickel / substitution Gold / thick Gold plating
 - Applicable to the RoHS directive
3. Selective partial plating on thin films
 - CAT-92 and CAT-99 process:plating on vacuum deposition films and sputtering films of Al, Cr-Cu and Cu
 - Ceramic IC packages (HTCC):plating on pastes of W, Mo-Mn, Ag, Ag-Cu, Cu-W, Mo, Mo-Cu, Cu, Ag-Pd, Al and Cr-Cu
4. Plating processes on PCB
 - Applicable to independent and extremely micro wiring patterns and applicable to such lines and spaces (30 μ m and under)
 - Electroless Nickel / substitution Gold / thick Gold plating
 - Electroless Nickel / Palladium / substitution Gold plating
 - CAT 2000-1 process and applicable to the RoHS directive
5. Plating process for semi-conductors
 - Plating on LSI and electrodes;bumps and damascene (special electrolytic and electroless plating)
Cu, Ni, Ni-Fe, Au, Sn, Sn-Pb, In and Pb
 - BGA, flip chips, MCM, TAB, CSP and SMD
6. Plating on heat sinks:Cu-W, Cu-Mo, OFC, Al, AlSiC, ceramic series complex materials, etc.
7. Plating chemicals for providing heat resistance and mould releasing property; moulds for cathode-ray tubes and glass bottles / NIBOFRAM and NIBOFRAM E
 - Moulds for PET plastics (NIBOFRAM)
8. Plating on textiles and for EMI / LINDEN TX, LINDEN NZ and MCU-500
9. Plating chemicals for providing lubricant property and abrasion resistance / LINDEN 809 and COMPO-NF
 - Composite plating with PTFE, diamond, Al₂O₃, SiO₂, SiC, WC, CBN, NB, etc.
10. Plating on micro powders of mica, diamond, Al₂O₃, SiO₂ and Cu ball
11. Plating on ABS resins and engineering plastics
12. Plating on sintered alloy, Neodymium, Samarium-Cobalt, and electrode formation on dielectric filters, PZT and ceramic capacitors
- Plating on glass discs
13. (non magnetic plating on glass substrate of hard disc and high adhesion power without etching glass surfaces)
 - Electroless Nickel alloy plating / LINDEN (Ni-P and Ni-P-W), NIBORON (Ni-B), NIBOFRAM (Ni-B-W), NIBOLIN (Ni-B-P) and NIBOTALIN (Ni-B-W-P)
14. Electroless Cobalt alloy plating / COMBATH (Co-P and Co-B) and CONIP (Co-Ni-P and Co-Ni-B)
15. Electroless Copper plating
16. ● Low temp. and low speed bath:MC-U and MCU-25
 - Middle speed bath (1~5 μ m/h):MCU-MS and MCU-500
 - High speed bath (5~8 μ m/h):MCU-HS and MCU-700
- Electroless Gold plating
17. ● Substitution Gold type:MN-AUA, MN-AUB, MN-AUC, MN-AUE, MN-AUI and MN-AUG
 - Self-catalyst type:GOLD 8, GOLD 8L, GOLD 9, GOLD 9L, GOLD 10 and GOLD 10L
 - Non-cyanide type:MN-AUN
- Brighteners for electrolytic plating, additives (for racks, barrels and hoops), brighteners for electrolytic Nickel plating (LIEBELIGHT)
18. and brighteners for Copper sulfate plating, Copper pyrophosphate plating and solder plating
- Pre-treatment chemicals for semi-conductors and special materials
19. (conditioners, etching chemicals, Pd activators, blackening chemicals, improving chemicals for solderability, etc.)
- Commission development and trial plating test (fare-pay services)
20. Recovering Gold and precious metals;recycling business
21. Total coordination for plating plants
22. (common use ~ clean room specifications and data management system by computer on-line system)
- Arrangement for human-resources supplying service
23. (assigning to work in domestic and overseas destinations for professional surface treatment technical staff, technical guidance, granting technical license and entering into license agreement)

WMF process is the special process by which, the customers can conduct their in-plant chemical blending for our electroless plating chemicals for using in their factory with the back-up of our manufacturing know-how. When the chemical consumption reaches to a certain level, WMF process is so effective for the customers cost down, and more than several-ten of our customers have been enjoying the advantage of our WMF process.

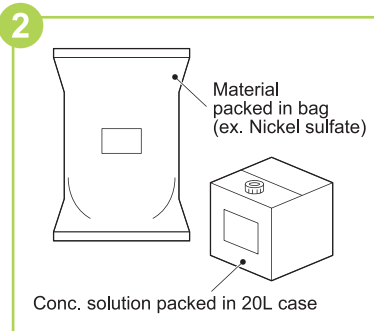
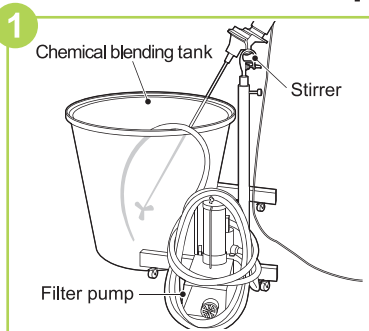
- Cost down of the plating chemicals (30~60% off)
 - It enable for the customers to upgrade their own technical capability and can develop their own special technology
 - Can supply the plating chemicals to other companies of their group member which can contribute a stable quality standard among them
 - Can contribute to the reduction of the environmental load specified by ISO-14001
 - Can establish appropriate counter-measure against complaint for their products
 - Can overcome the problem caused by material cost increase
 - Can arrange the export of the plating chemicals to their overseas factories
 - Can reduce cost for packing materials
- We assure our technical guidance shall be in perfect condition

*Available catalogs, manual and MSDS for respective products

In-plant chemical blending of electroless Nickel plating chemicals (example)



Details about WMF process ~ Initial equipment, chemicals and WMF process ~



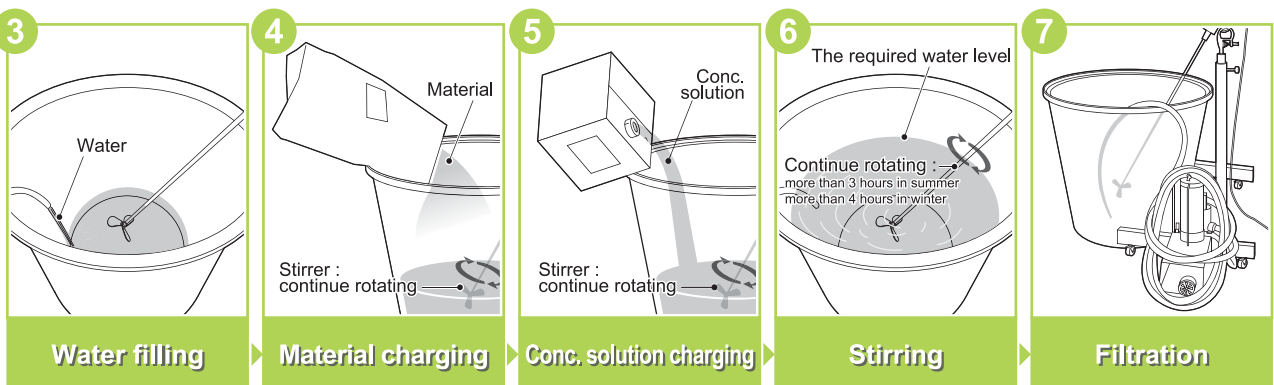
Initial equipment and chemicals

1. The required equipments for practicing WMF process are detailed as per left illustration marked as 1: "chemical blending tank", "stirrer" and "filter pump".
* These equipments are desirable to be prepared with 3 sets for rationalization of work.
But "the stirrer" and "the filter pump" are capable to use as the common equipment severally.
2. The using chemicals will be delivered to customers in such manner of "the material packed in bag" and "the conc. solution packed in 20L case".
Practice in-plant blending with these chemicals.

The details of WMF process

3. **Water filling**
Fill the chemical blending tank with water up to about 50% of the volume.
*We suggest to heat water with the electrical heater for helping the material to dissolve.
4. **Material charging**
Charge the required quantity of the material after water level have reached to about 50% of the volume.
Start to stir at this time.
5. **Conc. solution charging**
Charge the required quantity of the conc. solution after having charged the material.
Stir with stirrer continuously.
6. **Stirring (agitation)**
Fill water up to the required water level after having charged the material and the conc. solution completely.
Stir more than 3 hours in summer and more than 4 hours in winter with stirrer continuously until the charged material has dissolved completely.
7. **Filtration**
Stop stirring after the material has dissolved completely.
Filtrate the chemical with the filter and transfer to the storage tank of the replenishing chemical.

The above described process is the approx. explanation about WMF process.
WMF process is not difficult process although in-plant chemical blending.
Everybody can produce the plating chemicals as same as our products by checking the volumes of the charged material and conc. solution.





Electroless Nickel plating chemicals (Ni-P)

Electroless Nickel plating chemicals (Ni-P) for wiring patterns on electronic parts, PCB and ceramics

Lead free electroless Nickel plating chemicals (Ni-P)

Lead free electroless Nickel plating chemicals (Ni-P) for wiring patterns on electronic parts, PCB and ceramics

Hazardous heavy metal free and heavy metal free electroless Nickel plating chemicals (Ni-P)

Electroless Nickel plating chemicals for special applications (Ni-P)

Electroless Nickel-Boron plating chemicals (Ni-B) for electronic parts, wiring pattern and common use

Lead free and heavy metal free electroless Nickel-Boron plating chemicals (Ni-B)

Electroless plating chemicals for special applications (Tungsteners containing film plating and Cobalt alloy plating)

Electroless Nickel plating chemicals (Ni-P)				
Name	Specialties	Composition	Packing	Application
Materials for WMF process	<input type="checkbox"/> Cost down <input checked="" type="checkbox"/> Economical cost lower than market price	NIS—COMPOUND NAD—COMPOUND	20kg 25kg	<input type="checkbox"/> High purity and for blending electroless Nickel plating chemicals
LINDEN 506 506N 506T (high function plating)	<input checked="" type="checkbox"/> Superior solderability <input checked="" type="checkbox"/> Common use and continuous operation <input checked="" type="checkbox"/> Superior corrosion resistance <input checked="" type="checkbox"/> Superior plating film property <input checked="" type="checkbox"/> Superior brightness <input checked="" type="checkbox"/> Easy replenishing and no milky contamination <input checked="" type="checkbox"/> Sulfur free <input type="checkbox"/> Chemicals for WMF process <input checked="" type="checkbox"/> Cost down:30%off	506-1 <input type="checkbox"/> Make-up 506-2 <input type="checkbox"/> Replenishing 506-3 <input type="checkbox"/> 506-4 <input type="checkbox"/>	20L 200L 1000L	<input type="checkbox"/> Specially for outside and planting film property <input checked="" type="checkbox"/> Electronic parts <input checked="" type="checkbox"/> Mechanical parts <input checked="" type="checkbox"/> Automobile parts <input checked="" type="checkbox"/> Hardness after heat treatment:900Hv <input checked="" type="checkbox"/> Plating on big works <input checked="" type="checkbox"/> Lead frames <input checked="" type="checkbox"/> Shafts <input checked="" type="checkbox"/> Maintaining solderability
LINDEN 409 409E 880	<input checked="" type="checkbox"/> Common use and continuous operation <input checked="" type="checkbox"/> Superior plating film property <input checked="" type="checkbox"/> Easy replenishing and no milky contamination <input checked="" type="checkbox"/> Available two make-up solution type (409E) <input type="checkbox"/> Chemicals for WMF process <input checked="" type="checkbox"/> Cost down:30%off	409-0 <input type="checkbox"/> Make-up 409-1 <input type="checkbox"/> 409-2 <input type="checkbox"/> Replenishing 409-3 <input type="checkbox"/>	20L 200L 1000L	<input type="checkbox"/> Specially for plating film property <input checked="" type="checkbox"/> Electronic parts <input checked="" type="checkbox"/> Mechanical parts <input checked="" type="checkbox"/> Automobile parts <input checked="" type="checkbox"/> Hardness after heat treatment:900Hv <input checked="" type="checkbox"/> Shafts <input checked="" type="checkbox"/> Nuts
LINDEN 507T 507S	<input checked="" type="checkbox"/> Common use and continuous operation <input checked="" type="checkbox"/> Specially for brightness <input checked="" type="checkbox"/> Easy replenishing and no milky contamination <input checked="" type="checkbox"/> Available two make-up solution type (507S)	507-0T <input type="checkbox"/> Make-up 507-1 <input type="checkbox"/> 507-2 <input type="checkbox"/> Replenishing 507-3T <input type="checkbox"/>	20L 200L 1000L	<input type="checkbox"/> Specially for outside <input checked="" type="checkbox"/> Electronic parts <input checked="" type="checkbox"/> Mechanical parts <input checked="" type="checkbox"/> Automobile parts
LINDEN 406K 406KT	<input checked="" type="checkbox"/> Function plating, common use and continuous operation <input checked="" type="checkbox"/> Superior corrosion resistance <input checked="" type="checkbox"/> Superior plating film property <input checked="" type="checkbox"/> Superior malleability <input checked="" type="checkbox"/> Superior solderability <input checked="" type="checkbox"/> Easy replenishing and no milky contamination (406KT) <input type="checkbox"/> Chemicals for WMF proces <input checked="" type="checkbox"/> Cost down:30%off	406K-1 <input type="checkbox"/> Make-up 406K-2 <input type="checkbox"/> 406KT-3 <input type="checkbox"/> Replenishing 406KT-4 <input type="checkbox"/>	20L 200L	<input type="checkbox"/> Specially for plating film property <input checked="" type="checkbox"/> Hermetic seal parts <input checked="" type="checkbox"/> Specially for outside <input checked="" type="checkbox"/> OA equipment <input checked="" type="checkbox"/> Electronic parts <input checked="" type="checkbox"/> Automobile parts <input checked="" type="checkbox"/> Hardness after heat treatment : 900Hv <input checked="" type="checkbox"/> Maintaining solderability <input checked="" type="checkbox"/> Specially for bending property <input checked="" type="checkbox"/> Non-magnetism <input checked="" type="checkbox"/> Aluminum alloys
LINDEN 5MK	<input checked="" type="checkbox"/> High corrosion resistance and function plating and continuous operation <input checked="" type="checkbox"/> Superior plating film property <input checked="" type="checkbox"/> Superior malleability and low inner stress <input checked="" type="checkbox"/> For thick plating (30~100μm) <input checked="" type="checkbox"/> For Aluminum	5MK <input type="checkbox"/> Make-up AK <input type="checkbox"/> BK <input type="checkbox"/> Replenishing CK <input type="checkbox"/>	20L 200L	<input type="checkbox"/> Plating on big works <input checked="" type="checkbox"/> Aluminum, Copper, brass and castings <input checked="" type="checkbox"/> Moulds <input checked="" type="checkbox"/> Components using in coast and sea <input checked="" type="checkbox"/> Nuclear power parts
LINDEN 512	<input checked="" type="checkbox"/> High corrosion resistance and function plating and continuous operation <input checked="" type="checkbox"/> For thick plating (30~100μm) <input checked="" type="checkbox"/> No rough deposit and no pit	512-1 <input type="checkbox"/> Make-up 512-2 <input type="checkbox"/> 512-3 <input type="checkbox"/> Replenishing Ammonia water <input type="checkbox"/>	20L	<input type="checkbox"/> Plating on big works <input checked="" type="checkbox"/> Moulds <input checked="" type="checkbox"/> Nuclear power parts
LINDEN MNB	<input checked="" type="checkbox"/> Common use and for batch use <input checked="" type="checkbox"/> Excellent plating film property in all respects <input checked="" type="checkbox"/> No rough deposit and no pit <input checked="" type="checkbox"/> Available two make-up solution type	MNB <input type="checkbox"/> Make-up or MNB-1 <input type="checkbox"/> Make-up MNB-2 <input type="checkbox"/>	20L	<input type="checkbox"/> OA equipment <input checked="" type="checkbox"/> Automobile parts <input checked="" type="checkbox"/> Aluminum alloys <input checked="" type="checkbox"/> Electronic parts <input checked="" type="checkbox"/> Solderability

Electroless Nickel plating chemicals (Ni-P) for wiring patterns on electronic parts, PCB and ceramics				
Name	Specialties	Composition	Packing	Application
LINDEN SA	<input checked="" type="checkbox"/> Specially for semi-conductor parts and electronic parts and for batch use <input checked="" type="checkbox"/> Neutral type bath and low contents of Phosphorus <input checked="" type="checkbox"/> Deposit dense plating film <input checked="" type="checkbox"/> No bridge in micro patterns <input checked="" type="checkbox"/> Low inner stress <input checked="" type="checkbox"/> Superior bonding property and solderability	LINDEN SA <input type="checkbox"/> Make-up or LINDEN SA-1 <input type="checkbox"/> Make-up LINDEN SA-2 <input type="checkbox"/>	20L	<input type="checkbox"/> Specially for plating film property <input checked="" type="checkbox"/> All vacuum deposition patterns <input checked="" type="checkbox"/> Thin film patterns <input checked="" type="checkbox"/> Ceramics <input checked="" type="checkbox"/> Cr-Cu and Cr-Ni patterns

Name	Specialties	Composition	Packing	Application
LINDEN 100	<ul style="list-style-type: none"> Plating bath at low temp. and neutral bath Low inner stress and superior plating film property For bonding and soldering Superior plating reactivity 	LINDEN 100-1 Make-up LINDEN 100-2 Replenishing 30~80°C	20L	<ul style="list-style-type: none"> Electronic parts Ceramic condensers PZT
LINDEN 200	<ul style="list-style-type: none"> Plating bath at low temp. neutral bath and low contents of Phosphorus Plating speed:12~13μm/h (70°C) Superior plating film property Superior plating reactivity Can start plating before bath temp. reaches to 90°C 	LINDEN 200-1 Make-up LINDEN 200-2 Replenishing 30~80°C	20L	<ul style="list-style-type: none"> Plating on big works Ceramics Plastics Electronic parts
LINDEN 202	<ul style="list-style-type: none"> Neutral bath, low contents of Phosphorus and common use Low inner stress Superior plating reactivity High hardness without any heat treatment (700Hv) 	202-0 Make-up 202-1 Replenishing 202-2 Replenishing 202-3 Replenishing	20L	<ul style="list-style-type: none"> Ceramic capacitors PZT Ag and Ag-Pd paste Electronic parts
LINDEN 203H 203K	<ul style="list-style-type: none"> Selective partial plating for electronic circuits No bridge in micro patterns Superior plating film property 	203H-0 Make-up 203H-1 Replenishing 203H-2 Replenishing 203H-3 Replenishing	20L 200L	<ul style="list-style-type: none"> Electronic parts Mechanical parts Thin film patterns
LINDEN 204 (neutral bath)	<ul style="list-style-type: none"> Selective partial plating for electronic circuits No bridge in micro patterns Superior plating film property Inner stress is almost zero 	204-0 Make-up 204-1 Replenishing 204-2 Replenishing 204-3 Replenishing	20L 200L	<ul style="list-style-type: none"> LTCC boards Electronic parts Mechanical parts Thin film patterns
LINDEN 303H 303HK	<ul style="list-style-type: none"> Selective partial plating for electronic circuits No bridge in micro patterns Superior plating film property Superior corrosion resistance Prove high performance with the combination of substitution Gold plating (MN-AUA) 	303H-1 Make-up 303H-2 Replenishing 303H-3 Replenishing 303H-4 Replenishing	20L 200L	<ul style="list-style-type: none"> Electronic parts Mechanical parts Thin film patterns
LINDEN 52	<ul style="list-style-type: none"> Selective partial plating for PCB No bridge in micro patterns Superior plating film property Prove high performance with the combination of substitution Gold plating (MN-AUE) 	52-1 Make-up 52-2 Make-up 52-5 Replenishing 52-3 Replenishing 52-4 Replenishing	20L 200L 1000L	<ul style="list-style-type: none"> PCB and FPC Substrate for substitution Gold plating

Lead free electroless Nickel plating chemicals (Ni-P)

Name	Specialties	Composition	Packing	Application
LINDEN 5MK-LL 5MK-L 5MK-LN	<ul style="list-style-type: none"> Common use and continuous operation Superior corrosion resistance Easy replenishing and no milky contamination Sulfur free Less smells of acetic acid (5MK-LN) 	5MK-L Make-up AK-LL Replenishing BK-L Replenishing CK-L Replenishing	20L 200L 1000L	<ul style="list-style-type: none"> Applicable to the RoHS directive Electronic parts Mechanical parts Automobile parts Hardness after heat treatment:900Hv Plating on big works Shafts
	<ul style="list-style-type: none"> Chemicals for WMF process Cost down:30%off 	AKLL-100 BKL-100 CKL-300	20L 200L 1000L	
LINDEN 409L	<ul style="list-style-type: none"> Common use and continuous operation Superior plating film property Superior corrosion resistance Easy replenishing and no milky contamination Superior brightness 	409-1L Make-up 409-2L Make-up 409-3L Replenishing 409-4L Replenishing	20L 200L 1000L	<ul style="list-style-type: none"> Applicable to the RoHS directive Electronic parts Mechanical parts Automobile parts Plating on big works Shafts Saw blades
	<ul style="list-style-type: none"> Chemicals for WMF process Cost down:30%off 	9AL-200 9BL-100 9CL-100	20L 200L 1000L	
LINDEN 513	<ul style="list-style-type: none"> High corrosion resistance and function plating and continuous operation For thick plating (30~100μm) No rough deposit and no pit 	513-1 Make-up 513-2M Make-up 513-2S Replenishing 513-3 Replenishing Ammonia water Replenishing	20L 200L	<ul style="list-style-type: none"> Applicable to the RoHS directive Plating on big works Moulds Nuclear components

Name	Specialties	Composition	Packing	Application
LINDEN 701	<ul style="list-style-type: none"> Common use and continuous operation Specially for brightness Superior plating film property 	701-1 } 701-2 } Make-up 701-3 } 701-4 } Replenishing	20L 200L	<ul style="list-style-type: none"> Applicable to the RoHS directive Specially for outside Electronic parts Mechanical parts
LINDEN 711L	<ul style="list-style-type: none"> Common use and continuous operation Specially for brightness and superior leveling property Superior plating film property Easy replenishing and no milky contamination 	711-1L } 711-2L } Make-up 711-3L } 711-4L } Replenishing	20L 200L	<ul style="list-style-type: none"> Applicable to the RoHS directive Specially for outside Electronic parts Mechanical parts
LINDEN MNB-L	<ul style="list-style-type: none"> Common use and for batch use Superior plating film property 	MNB-L Make-up 200mℓ/ℓ	20L	<ul style="list-style-type: none"> Applicable to the RoHS directive Electronic parts Mechanical parts
LINDEN MNB-LC (Nickel chloride bath)	<ul style="list-style-type: none"> Common use and for batch use Superior plating film property Less crystallization in winter 	MNB-LC Make-up 200mℓ/ℓ	20L	<ul style="list-style-type: none"> Applicable to the RoHS directive Electronic parts Mechanical parts

Lead free electroless Nickel plating chemicals (Ni-P) for wiring patterns on electronic parts, PCB and ceramics

Name	Specialties	Composition	Packing	Application
LINDEN 203HL	<ul style="list-style-type: none"> Selective partial plating for electronic circuits No bridge in micro patterns Superior plating film property 	203H-0L } 203H-1L } Make-up 203H-2L } 203H-3L } Replenishing	20L 200L	<ul style="list-style-type: none"> Applicable to the RoHS directive Electronic parts Thin film patterns
LINDEN 204L (neutral bath)	<ul style="list-style-type: none"> Selective partial plating for electronic circuits No bridge in micro patterns Superior plating film property Inner stress is almost zero 	204-0L } 204-2L } Make-up 204-1L } 204-3L } Replenishing	20L 200L	<ul style="list-style-type: none"> Applicable to the RoHS directive Electronic parts Thin film patterns LTCC substrates
LINDEN 234L	<ul style="list-style-type: none"> Selective partial plating for LTCC Less influence on basis materials Suited best for Ag and Ag-Pd paste Superior plating film property Low inner stress 	234-1L } 234-2L } Make-up 234-3L } 234-4L } 234-5L } Replenishing	20L	<ul style="list-style-type: none"> Applicable to the RoHS directive Electronic parts Ni plating on pastes of Ag, Ag-Pd and Cu LTCC substrates
LINDEN 303HKL	<ul style="list-style-type: none"> Selective partial plating for electronic circuits No bridge in micro patterns Superior plating film property Superior corrosion resistance Prove high performance with the combination of substitution Gold plating (MN-AUA) 	303H-1KL } 303H-2KL } Make-up 303H-3KL } 303H-4KL } Replenishing	20L 200L	<ul style="list-style-type: none"> Applicable to the RoHS directive Electronic parts Thin film patterns
LINDEN 52L	<ul style="list-style-type: none"> Selective partial plating for PCB No bridge in micro patterns Superior plating film property Prove high performance with the combination of substitution Gold plating (MN-AUE) 	52-1L } 52-2L } Make-up 52-5L } 52-3L } 52-4L } Replenishing	20L 200L	<ul style="list-style-type: none"> Applicable to the RoHS directive PCB and FPC Substrate for substitution Gold plating

Hazardous heavy metal free and heavy metal free electroless Nickel plating chemicals (Ni-P)

Name	Specialties	Composition	Packing	Application
LINDEN 5MK-F	<ul style="list-style-type: none"> Common use and continuous operation Superior corrosion resistance Easy replenishing and no milky contamination Sulfur free 	5MK-F } AK } Make-up AK-F } BK-F } CK-F } Replenishing	20L 200L	<ul style="list-style-type: none"> Applicable to the RoHS directive Electronic parts Mechanical parts Automobile parts Hardness after heat treatment:900Hv
LINDEN 204F (neutral bath)	<ul style="list-style-type: none"> Selective partial plating for electronic circuits No bridge in micro patterns Superior plating film property Inner stress is almost zero 	204-0F } 204-2F } Make-up 204-1F } 204-3F } Replenishing	20L 200L	<ul style="list-style-type: none"> Applicable to the RoHS directive Electronic parts Thin film patterns LTCC substrates

Name	Specialties	Composition	Packing	Application
LINDEN 52F	<ul style="list-style-type: none"> ■ Selective partial plating for PCB ● No bridge in micro patterns ● Superior plating film property ● Prove high performance with the combination of substitution Gold plating (MN-AUG) 	52-1F } 52-2F } Make-up 52-3F } 52-4F } Replenishing	20L 200L	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive ● PCB and FPC ● Substrate for substitution Gold plating

Electroless Nickel plating chemicals for special applications (Ni-P)

Name	Specialties	Composition	Packing	Application
LINDEN NZ	<ul style="list-style-type: none"> ■ Electroless Nickel plating chemical on textiles ● Can plate white and even film ● Superior bath stability ● Continuous operation ● Alkaline type and low temp. bath 	NZ-M } NZ-A } Make-up NX-B } Replenishing 30~50°C	20L	<ul style="list-style-type: none"> ○ EMI electromagnetic wave shields ● Electrode of electrical cell and urethane ● ABS resins ● Silicon wafers
LINDEN TX	<ul style="list-style-type: none"> ■ Electroless Nickel plating on ABS resins, textiles and ferrite ● Can plate white and even film ● Easy to use ● Continuous operation ● Alkaline type and low temp. bath 	TX-M } TX-A } Make-up TX-B } Replenishing 30~40°C	20L	<ul style="list-style-type: none"> ○ ABS resins ● Electrode of electrical cell and urethane ● Acryl ● Ferrites and ceramics ● Plastics
LINDEN 809 (ruggedness)	<ul style="list-style-type: none"> ■ Substrate plating for PTFE coating ● Can form uniform vase-shaped rough film ● Treat PTFE coating after LINDEN 809 plating and fix coating firmly with vacuum heat treatment ● Can maintain PTFE fixing 	809-A } 809-B } Make-up 809-C } Replenishing ◎Available PTFE coating agents	20L	<ul style="list-style-type: none"> ○ Specially for plating film property ● Forming film with abrasion resistance and lubricant property ● Moulds ● Valves ◎ Applying PTFE, MoS₂ and graphite
COMPO-NF (PTFE) COMPO-NFL (lead free)	<ul style="list-style-type: none"> ■ PTFE composite electroless Nickel plating ● Excellent lubricant property, abrasion resistance, water-repellent property and mould releasing property ● PTFE contents:10~26vol% ● Hardness:300Hv (as plated) ● Excellent bath stability and easy maintenance ● Can maintain bath with auto analysis replenishment equipment ● No contents of PFOS, PFOA and PFAS 	COMPO-NF-M } COMPO-NF-A } Make-up COMPO-NF-FB(FW) } COMPO-NF-B } Replenishing COMPO-NF-C }	20L 500g	<ul style="list-style-type: none"> ○ Specially for plating film property ● Forming film with abrasion resistance and lubricant property ● Moulds ● Valves ◎ Available composite plating with SiC, etc.
LINDEN BLACK 469L (black color)	<ul style="list-style-type: none"> ■ Black colored electroless Nickel plating chemical ● Lead free plating ● Dip into black coloring chemical after electroless Nickel plating 	469-1L } 469-2L } Make-up 469-3L } 469-4L } Replenishing 469-5L } Black coloring	20L	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive ● Replacement for black Zinc plating ● Mechanical parts ● Automobile parts ● Optical components
LINDEN SD-609	<ul style="list-style-type: none"> ■ Electroless Nickel plating for glass disks ● Dense plating film ● Can obtain adhesion power without etching glass ● Even covering power ● Non-magnetism ● Can plate 2μm on mirror-like surface (roughness about 10 Å) 	SD-609-M } SD-609-A } Make-up SD-609-B } SD-609-C } Replenishing	20L 200L	<ul style="list-style-type: none"> ○ Hard disks ● Glass ● Ceramics ● ITO
LINDEN PH-200	<ul style="list-style-type: none"> ■ High contents of Phosporus type electroless Nickel plating chemical ● Continuous operation:3~4 turns ● Superior plating film property and post-processing property ● P contents:12~13% ● High degree of amorphous property (non-crystallinity) ● High degree of anti-magnetic property at high temp. ● Low inner stress ● High corrosion resistance 	PH-200-M } PH-200-A } Make-up PH-200-B } PH-200-C } Replenishing	20L 100L	<ul style="list-style-type: none"> ○ Functional parts of high value added type ● Moulds ● Non magnetic plating on A0 substrate for hard disks ● Marine components ● Sliding parts ● Electronic parts
LINDEN T	<ul style="list-style-type: none"> ■ Strike electroless plating chemical ● Plate with LINDEN T after etching with T-22, and can be available for various sorts of plating on Titanium and stainless steels ● Superior adhesion power 	Treatment with T-22 ↓ Plating with LINDEN T (undiluted solution)	20L	<ul style="list-style-type: none"> ○ Various sorts of plating on Titanium ● Various sorts of plating on SUS

Name	Specialties	Composition	Packing	Application
AP-555	<ul style="list-style-type: none"> ■ Pit prevention agent for electroless Nickel plating ● Can use both LINDEN (Ni-P) and NIBORON (Ni-B) 	10~20mℓ/ℓ	20L	● For electroless Nickel plating bath

Electroless Nickel-Boron plating chemicals (Ni-B) for electronic parts, wiring patterns and common use

Name	Specialties	Composition	Packing	Application
NIBORON M	<ul style="list-style-type: none"> ■ Ni-B and continuous operation ● Superior heat resistance and discoloration resistance ● Low electric resistance ● Suited best for soldering and Ag-Cu soldering ● Superior plating film property after sintering ◎ Prove excellent performance with the combination of Pd activators (AT-90 series) ◎ No contents of Na 	NIBORON M Undiluted solution NIBORON A } Replenishing NIBORON B } 60°C	20L 200L	<ul style="list-style-type: none"> ○ CPU ceramic IC packages ● Semi-conductor parts ● Micro patterns smaller than 50μm ● Wire bonding ● Forming electrodes ● Heat sinks (Cu-W) ● Optical connector packages ● HTCC substrates (W paste) ☆ Best seller
NIBORON 5	<ul style="list-style-type: none"> ■ Ni-B and continuous operation ● Nickel contents:100% ● Same crystal structure with electrolytic Nickel plating film ● Best solderability and Ag-Cu solderability ● Excellent heat resistance and discoloration resistance ● Most active plating chemical and can plate on any materials ● Low plating temp. (35°C~) ● Strike electroless plating ● Void free 	NIBORON 5M } Make-up NIBORON 5B } Replenishing NIBORON 5A } 35~60°C	20L	<ul style="list-style-type: none"> ○ Electronic parts ● Hermetic seal parts ● Plating on various sorts of pastes ● Plating on textiles ● Plating on micro powders ● Thermistor ● Lead terminals ● Heat sinks (Cu alloy)
NIBORON 70	<ul style="list-style-type: none"> ■ Ni-B and continuous operation ● Superior heat resistance ● Superior solderability after heat treatment (650°C) in air ● Suited best for soldering and Ag-Cu soldering ● Low electric resistance ● Economical cost by replenishing type 	NIBORON 70S } NIBORON 70M } Make-up Replenishing NIBORON 70R } 60°C	20L 100L	<ul style="list-style-type: none"> ○ Ceramic packages ● Semi-conductor parts and electronic parts ● Micro patterns ● Wire bonding ● Forming electrodes ● Heat sinks (OFC and Al SiC) ● Automobile parts
NIBORON 80	<ul style="list-style-type: none"> ■ Ni-B and continuous operation ● Superior heat resistance and discoloration resistance ● Low electric resistance ● Suited best for soldering and Ag-Cu soldering ● Economical cost by replenishing type 	NIBORON 80S } NIBORON 80M } Make-up Replenishing NIBORON 80R } 60°C	20L 100L	<ul style="list-style-type: none"> ○ Ceramic packages ● Semi-conductor parts and electronic parts ● Micro patterns ● Wire bonding ● Automobile parts
NIBORON 946	<ul style="list-style-type: none"> ■ High contents of Boron ● For film with heat resistance and anti-oxidation ● Boron contents:4%~ 	Undiluted solution	20L	● Heat resistance parts

Lead free and heavy metal free electroless Nickel-Boron plating chemicals (Ni-B)

Name	Specialties	Composition	Packing	Application
NIBORON 70L	<ul style="list-style-type: none"> ■ Lead free type electroless Nickel plating chemical ● Superior solderability ● No bridge in micro patterns ● Superior plating film property 	70-SL } 70-ML } Make-up 70-RL } Replenishing 70-BL } 60°C	20L 200L	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive ● Electronic parts ● Mechanical parts
NIBORON 75	<ul style="list-style-type: none"> ■ Heavy metal free type electroless Nickel plating chemical ● Excellent heat resistance ● Excellent solderability ● No bridge in micro patterns ● Superior plating film property 	75-S } 75-M } Make-up Replenishing 75-R } 60°C	20L 200L	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive ● Electronic parts ● Mechanical parts

Name	Specialties	Composition	Packing	Application
NIBORON MF	<ul style="list-style-type: none"> ■ Heavy metal free type electroless Nickel plating chemical ● Superior solderability ● Superior plating film property 	Undiluted solution 50°C~60°C	20L 200L	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive ● Electronic parts ● Mechanical parts

Electroless plating chemicals for special applications (Tungstener containing film plating and Cobalt alloy plating)

Name	Specialties	Composition	Packing	Application
NIBOFRAM	<ul style="list-style-type: none"> ■ Electroless Ni-B-W plating chemical ● Superior mould releasing property with glass ● Excellent heat resistance ● Low thermal expansion coef. ● Superior abrasion resistance 	Undiluted solution 50°C~70°C	20L	<ul style="list-style-type: none"> ○ Parts required abrasion resistance at high temp. ● Glass moulds ● Plastic moulds (PET) ● Continuous casting moulds ● Engine parts ● Thermistor
LINDEN NPW	<ul style="list-style-type: none"> ■ Electroless Ni-P-W plating chemical ● Superior mould releasing property ● Excellent abrasion resistance and lubricant property ● Superior brightness ● Superior heat resistance ○ High hardness compared with PTFE composite plating 	NPW-1 } Make-up NPW-2 } 90°C	20L	<ul style="list-style-type: none"> ○ Glass moulds ● Plastic moulds (PET) ● Rolls ● Sliding parts ● Optical parts (auto focus)
NIBOLIN	<ul style="list-style-type: none"> ■ Electroless Ni-B-P plating chemical ● Superior plating film property due to its low contents of Phosphorus and Boron ● Superior heat resistance and mould releasing property ● Excellent abrasion resistance and lubricant property ● Superior solderability 	NIBOLIN BP-1 } NIBOLIN BP-2 } Make-up NIBOLIN BP-3 } Replenishing NIBOLIN BP-4 Stabilizing agent	20L	<ul style="list-style-type: none"> ○ Glass moulds ● Plastic moulds ● Rolls ● Sliding parts ● Gears
NIBOTALIN	<ul style="list-style-type: none"> ■ Electroless Ni-B-W-P plating chemical ● Superior heat resistance and mould releasing property ● Excellent abrasion resistance and lubricant property ● Superior solderability ● Economical cost compared with traditional chemicals (NIBOFRAM) 	BTP-1 } Make-up BTP-2 } BTP-3 } Replenishing BTP-4 } BTP-5 Stabilizing agent	20L	<ul style="list-style-type: none"> ○ Glass moulds ● Plastic moulds ● Rolls ● Sliding parts
COMBATH P	<ul style="list-style-type: none"> ■ Electroless Co-P plating chemical ● Excellent abrasion resistance ● Beautiful brightness with white gray color ● Prevent skip plating and burning for SUS materials 	Undiluted solution or Combas P-1 } Make-up Combas P-2 } Combas P-3 pH adjustment	20L	<ul style="list-style-type: none"> ○ Prevent skip plating and burning for SUS materials ● Printer parts ● Prove both magnetism and abrasion resistance ● Valves
COMBATH M	<ul style="list-style-type: none"> ■ Electroless Co-B plating chemical ● Can obtain high pure Cobalt film ● Superior heat resistance and anti-skip plating property 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ Magnetic film ● Valves ● Sliding parts
COMBATH CPW	<ul style="list-style-type: none"> ■ Electroless Co-P-W plating chemical ● W : ~3%, P : ~5% ● Excellent heat resistance and lubricant property 	CPW-1 } Make-up CPW-2 }	20L	<ul style="list-style-type: none"> ○ Parts required abrasion resistance at high temp. ● Parts for steel manufacture
COMBATH CBW	<ul style="list-style-type: none"> ■ Electroless Co-B-W plating chemical ● W:~3%, B:~0.5% ● Excellent heat resistance and abrasion resistance 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ Parts required abrasion resistance at high temp. ● Parts for steel manufacture
COMBATH 964	<ul style="list-style-type: none"> ■ Electroless Co-B plating chemical ● High contents of Boron 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ Magnetic film ● Prevent Si dispersion
CONIP 8020	<ul style="list-style-type: none"> ■ Electroless Co-Ni-P plating chemical ● Co:78%, Ni:18%, P:4% ● Barrier for preventing Au-Si dispersion 	8020-A } Make-up 8020-B }	20L	<ul style="list-style-type: none"> ○ Magnetic mediums ● Heat resistance plating ● IC packages
NCP-9010	<ul style="list-style-type: none"> ■ Electroless Ni-Co-P plating chemical ● Ni:82%, Co:10%, P:8% 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ Magnetic plating ● Form barrier layers
NCP-8020	<ul style="list-style-type: none"> ■ Electroless Ni-Co-P plating chemical ● Ni:72%, Co:20%, P:8% 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ Magnetic plating ● Form barrier layers
NCB-9010	<ul style="list-style-type: none"> ■ Electroless Ni-Co-B plating chemical ● Ni:90%, Co:10%, B:0.5% 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ Magnetic mediums ● Heat resistance plating
NCB-8020	<ul style="list-style-type: none"> ■ Electroless Ni-Co-B plating chemical ● Ni:80%, Co:20%, B:0.5% 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ Magnetic films ● Form barrier layers



Brighteners for electrolytic Nickel plating

Special electrolytic Nickel plating chemicals

Brighteners for electrolytic Nickel plating

Name	Specialties	Composition	Packing	Application
LIEBELIGHT L-0	<ul style="list-style-type: none"> ■ Primary brightener for bright Nickel plating ● Easy bath maintenance ● Ductile film ● Can plate thick film (thickness:several cm) 	L-0 5~20ml/l	20L	<ul style="list-style-type: none"> ○ Electronic parts ● Common use ● Steel manufacture use
LIEBELIGHT L-1	<ul style="list-style-type: none"> ■ Primary brightener for bright Nickel plating ● Standard brightener 	L-1 15~25ml/l	20L	<ul style="list-style-type: none"> ○ Electronic parts ● Common use
LIEBELIGHT L-1A	<ul style="list-style-type: none"> ■ Primary brightener for bright Nickel plating ● Improve leveling 	L-1A 15~25ml/l	20L	<ul style="list-style-type: none"> ○ Common use ● Can use for any applications ● Display items ● Automobile parts ● High class decorative items ☆ Best seller
LIEBELIGHT L-2AX	<ul style="list-style-type: none"> ■ Secondary brightener for bright Nickel plating ● Superior brightness 	L-2AX 0.1~3.0ml/l	20L	<ul style="list-style-type: none"> ○ High class items ● Display items
LIEBELIGHT BLACK L-BK	<ul style="list-style-type: none"> ■ Additive for secondary brightener for bright Nickel plating ● Brightness with black tone 	L-1A 20ml/l L-2AX 0.3ml/l L-BK 0.2~1.0ml/l	20L	<ul style="list-style-type: none"> ○ Can use for any applications ● Bookmarks and Gold buttons ● Substrate for Gold plating ● High class decorative items
LIEBELIGHT L-2GH	<ul style="list-style-type: none"> ■ Secondary brightener for bright Nickel plating ● Brightness with slightly white color ● Improve color tone of Gold plating 	L-1A 20ml/l L-2GH 0.3~1.8ml/l	20L	<ul style="list-style-type: none"> ○ Automobile parts ● Wheel nuts ● Decorative items
LIEBELIGHT RS LEVELER	<ul style="list-style-type: none"> ■ Additive for secondary brightener for bright Nickel plating ● Additive for improving leveling 	L-1 0.3~0.4ml/l RS LEVELER 0.2~0.4ml/l	20L	<ul style="list-style-type: none"> ○ Specially for barrel plating ● Electronic parts ● Neodymium
LIEBELIGHT L-2B	<ul style="list-style-type: none"> ■ Secondary brightener for barrel Nickel plating 	L-1 20ml/l L-2B 0.2~0.8ml/l	20L	<ul style="list-style-type: none"> ○ Specially for barrel plating ● Can use for any applications ● Coins ☆ Best seller
LIEBELIGHT BR-500	<ul style="list-style-type: none"> ■ Brightener for barrel Nickel plating ● One solution type ● Superior covering power in low current density area ● Easy bath maintenance 	L-1A 20ml/l (Make-up only) BR-500 0.2~1.0ml/l	20L	<ul style="list-style-type: none"> ○ High class automobile parts ● Bumpers ● Mufflers of motorbike ● High class hotel items
LIEBELIGHT L-200A	<ul style="list-style-type: none"> ■ Brightener for rack Nickel plating ● One solution type ● Can obtain mirror like brightness with high degree of leveling and mild tone in high current density area ● Superior covering power in Chromium plating 	L-1 20ml/l (Make-up only) L-200A 0.6ml/l	20L	<ul style="list-style-type: none"> ○ Watt's bath ● Bright plating bath
TBT-40	<ul style="list-style-type: none"> ■ Covering power improving agent for bright Nickel plating ● Extend bright area 	TBT-40 5ml/l	20L	<ul style="list-style-type: none"> ○ Plated steel sheets ● Automobile parts ● Plating on hoops ● Cell cases ● Office equipment ● Electronic parts ☆ Best seller
LIEBELIGHT SB-71 SB-72	<ul style="list-style-type: none"> ■ Brightener for semi-bright Nickel plating ● Ductile film with low inner stress ● Can plate in high current density area (40A/dm²) ● Even bright film over wide current density area ● Superior corrosion resistance ● For bending and deep drawing ● Superior leveling property ● Superior solderability 	SB-71 1~2ml/l SB-72 1~2ml/l	20L	<ul style="list-style-type: none"> ○ Automobile parts ● Electrical home appliance ● Decorative items ● High class hotel items
LIEBELIGHT SB-922	<ul style="list-style-type: none"> ■ Brightener for semi-bright Nickel plating ● One solution type ● Easy bath maintenance 	SB-72 2ml/l (Make-up only) SB-922 0.2~1.0ml/l	20L	<ul style="list-style-type: none"> ○ Watt's bath ● Bright plating bath ● Semi-bright plating bath
NS-AP	<ul style="list-style-type: none"> ■ Pit prevention agent for Nickel plating ● Best product of pit prevention 	10~20ml/l	20L	

Special electrolytic Nickel plating chemicals

Name	Specialties	Composition	Packing	Application
NIBOFRAM E	<ul style="list-style-type: none"> ■ Ni-W and electrolytic plating chemical ● W = 30% ● Excellent abrasion resistance ● Hardness:600~1200Hv ● Economical cost ● Can plate Cr on the plating film ● Less crack occurrence ● Can plate thick film (20~50μm) 	NIBOFRAM Make-up NIBOFRAM EN NIBOFRAM HEW } Replenishing NIBOFRAM EK	20L 200L	<ul style="list-style-type: none"> ○ Glass moulds ● Engine parts ● Plastic moulds ● Conductor rolls ● Continuous casting moulds ● Carbon rolls ● Steel manufacture ● Long life
LINDEN EPN	<ul style="list-style-type: none"> ■ Ni-P and electrolytic plating chemical with super excellent corrosion resistance ● Superior oxidization resistance and corrosion resistance ● For substrate and superior combination property with other sorts of plating ● P = 15% ● Superior brightness 	EPN-M Make-up EPN-S } Replenishing EPN-P	20L	<ul style="list-style-type: none"> ○ Various sorts of moulds ● Sintered alloys ● Electronic parts ● Abrasion resistance parts ● Lead frames
ZEROOLL	<ul style="list-style-type: none"> ■ Inner stress reducing agent ● Reduce inner stress of sulfamate bath and Watt's bath to zero ● Beautiful outside 	20~100ml/ℓ	20L	<ul style="list-style-type: none"> ○ For sulfamate bath ● For Watt's bath ● Bump plating
NS-AP-S	<ul style="list-style-type: none"> ■ Pit prevention agent ● For Nickel sulfamate plating bath 	2~15ml/ℓ	20L	○ Specially for sulfamate bath
LIEBELIGHT SF-1 SF-2	<ul style="list-style-type: none"> ■ Brightener for Nickel sulfamate plating bath ● Can obtain mirror like brightness ● Wide bright range 	SF-1 10~50ml/ℓ SF-2 1~ 5ml/ℓ	20L	<ul style="list-style-type: none"> ○ Provide brightness ● Substrate for Gold plating ● Plating on electrical terminals
NI-STK	<ul style="list-style-type: none"> ■ Special blending strike Nickel plating chemical ● Improve adhesion power 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ Stainless steels ● KOVAR ● SKD-62
NIFLOY 802T (permalloy)	<ul style="list-style-type: none"> ■ Ni-Fe and electrolytic alloy plating chemical ● Ni = 80%, Fe = 20% ● Superior magnetic property ● Easy bath maintenance ● Superior brightness ○ Low thermal expansion coef. 	802-TM Make-up 802-TN 802-TF } Replenishing 802-TS 802-TA	20L 200L	<ul style="list-style-type: none"> ○ Magnetic plating ● Magnetic heads ● Torque sensors ● Watch parts
NIBORON EB EB-10	<ul style="list-style-type: none"> ■ Ni-B and electrolytic plating chemical ● Can use easily by adding to Watt's bath, sulfamate bath, etc. ● High hardness:800Hv ● Improve heat resistance and abrasion resistance ● Can protect against radioactivity 	NIBORON EB-M 50~150ml/ℓ NIBORON EBL-1 0~50ml/ℓ	20L	<ul style="list-style-type: none"> ○ Metal pattern ● Moulds ● Atomic parts
BMP-FW (for semi-conductors)	<ul style="list-style-type: none"> ■ Electrolytic Nickel plating chemical for forming bumps ● Low inner stress and high purity ● Superior covering power ● Superior adhesion power to barrier layers ● Ni on Ti-Cr-Cu, etc. ● Less skip plating 	Undiluted solution	5L 20L	<ul style="list-style-type: none"> ○ Substrate plating for solders and Au bumps ● Semi-conductor elements
BMP-SN (for semi-conductors) NW-2	<ul style="list-style-type: none"> ■ Sulfamate bath type electrolytic Nickel plating chemical ● Low inner stress, high purity and non-brightness ● Superior covering power ● Superior adhesion power to barrier layers 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ Substrate plating for solders and Au bumps ● Semi-conductor elements



Electroless and electrolytic Copper plating chemicals

Electroless and electrolytic Gold plating chemicals

Electroless and electrolytic Silver plating chemicals

Other sorts of electroless and electrolytic plating chemicals

Electroless Gold plating equipment

Electroless and electrolytic Copper plating chemicals				
Name	Specialties	Composition	Packing	Application
MC-U	<ul style="list-style-type: none"> Electroless Copper plating chemical for using at low temp. Fast plating speed Superior plating film density Can plate dense film Superior plating reactivity 	MCU-A] Make-up, MCU-B] Replenishing 18~30°C ~0.4 μm/h	20L	<ul style="list-style-type: none"> Primary chemical Copper plating Through holes Ceramics
MCU-25	<ul style="list-style-type: none"> Electroless Copper plating chemical for using at low temp. Can plate dense film Superior bath stability 	MCU-25A] Make-up MCU-25B] Replenishing MCU-25C]	20L 200L	<ul style="list-style-type: none"> Plating on plastics ABS resins Ceramics
MCU-500 MCU-MS	<ul style="list-style-type: none"> Electroless Copper plating chemical for thick plating at middle speed Superior bath stability Superior plating film property Can use for long-term and continuous operation 	MCU-500-A] Make-up MCU-500-B] Replenishing MCU-500-C] MCU-500-D] MCU-500-H]	20L 200L	<ul style="list-style-type: none"> Plating on plastics ABS resins Ceramics Textiles
MCU-HS MCU-700	<ul style="list-style-type: none"> Electroless Copper plating chemical for thick plating at high speed Fast plating speed Superior plating film property and adhesion power Can use for long-term and continuous operation Superior color tone Superior bath stability 	MCU-AHS] Make-up MCU-BHS] MCU-CHS pH Adjustment 60~80°C 5~8 μm/h	20L 200L	<ul style="list-style-type: none"> Omit primary Copper plating Semi additive process and full additive process Plating on ceramics SLC Build-up process
ACB-900	<ul style="list-style-type: none"> Brightener for Copper sulfate plating Superior macrothrowing power and covering power 	ACB-900M] Make-up ACB-900S] Replenishing	20L	<ul style="list-style-type: none"> Plating on through holes PCB
ACB-90 ACB-40	<ul style="list-style-type: none"> Brightener for bright Copper sulfate plating Excellent brightness and leveling property Can obtain ductile film Less decomposition of brightener's ingredients Wide current density area For high temp. bath (40°C) (ACB-40) 	ACB-90M] Make-up ACB-90A] Replenishing ACB-90B]	20L	<ul style="list-style-type: none"> Bright plating Plating on plastics
CP-60	<ul style="list-style-type: none"> Additive for Copper pyrophosphate plating Most many achievements for through holes 	0.5~1.5mℓ/ℓ	20L	<ul style="list-style-type: none"> Plating on thorough holes Plating on pastes Plating on sintered materials For prevention carburizing
BMP-CUS (for semi-conductors)	<ul style="list-style-type: none"> Electrolytic Copper plating chemical for forming bumps Low inner stress Superior covering power High purity 	Undiluted solution	20L	<ul style="list-style-type: none"> For forming Cu bumps Semi-conductor elements
DAM-CUS	<ul style="list-style-type: none"> Copper sulfate plating chemical for damascene Superior hole filling property Less voids Superior adhesion power to barrier layers 	Undiluted solution	20L	<ul style="list-style-type: none"> Semi-conductors
C-20 C-20STK	<ul style="list-style-type: none"> Copper cyanide plating chemical for special use Can plate substrate surely on materials which become problem at weak adhesion power Suited best for substrate plating of Copper sulfate and Nickel plating 	Undiluted solution	20L	<ul style="list-style-type: none"> Plating on Beryllium-Copper, Phosphorus bronze and Silver Plating on 42-alloy, KOVAR, castings and Zinc die-castings For prevention carburizing

Electroless and electrolytic Gold plating chemicals				
Name	Specialties	Composition	Packing	Application
MN-AUA	<ul style="list-style-type: none"> Substitution Gold plating chemical Superior adhesion power Substrate for thick Gold plating Superior color tone (lemon yellow) Suited for sulfur free for Ni substrate 	MN-AUA 250~500mℓ/ℓ KAu(CN) ₂ 2g/ℓ	20L	<ul style="list-style-type: none"> Applicable to the RoHS directive Electronic parts Mechanical parts
MN-AUB	<ul style="list-style-type: none"> Substitution Gold plating chemical High adhesion power to Nickel and Gold Superior color tone (lemon yellow) For Ni-B 	MN-AUB 200~500mℓ/ℓ KAu(CN) ₂ 2g/ℓ	20L	<ul style="list-style-type: none"> Electronic parts Flip chips PCB

Name	Specialties	Composition	Packing	Application
MN-AUC	<ul style="list-style-type: none"> ■ Substitution Gold plating chemical for ceramics and PCB ● Stable ball share strength 	MN-AUC 250~500ml/ℓ KAu(CN) ₂ 1.5g/ℓ	20L	<ul style="list-style-type: none"> ○ CAT-2000 process ● PCB and FPC
MN-AUE	<ul style="list-style-type: none"> ■ Substitution Gold plating chemical for PCB ● Stable ball share strength ● Use LINDNE 52 for Nickel substrate 	MN-AUE 50~250ml/ℓ 1%KCN 1~5ml/ℓ KAu(CN) ₂ 1~4g/ℓ	20L	<ul style="list-style-type: none"> ○ CAT-2000-1 process ● PCB and FPC
MN-AUG	<ul style="list-style-type: none"> ■ Substitution Gold plating chemical for electronic parts ● Stable ball share strength ● Stable plating bath ● Suited for substrate for thick electroless Gold plating 	MN-AUG 100~500ml/ℓ 1%KCN 2~10ml/ℓ KAu(CN) ₂ 1~4g/ℓ	20L	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive ● Electronic parts ● Mechanical parts
MN-AUI MN-AUIP	<ul style="list-style-type: none"> ■ Substitution Gold plating chemical ● Superior adhesion power ● Stable ball share strength ● Available powder type (MN-AUIP) 	MN-AUI Undiluted solution ~200ml/ℓ KAu(CN) ₂ 1.5g/ℓ	20L 20kg	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive ● Electronic parts ● LTCC boards ● PCB and FPC
MN-AUN (neutral type, non-cyanide type)	<ul style="list-style-type: none"> ■ Electroless Gold plating chemical (substitution/reduction type) ● Gold sulfite bath ● Thicknes:0.03~1.0μm ● Superior bath stability 	Undiluted solution Au containing solution 2g/ℓ	20L	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive ● Electronic parts ● For thick plating on semi-conductors ● PCB
GOLD 8 GOLD 8L (self-catalyst type)	<ul style="list-style-type: none"> ■ Electroless Gold plating chemical for thick plating at high plating speed ● Stable plating bath ● Fast plating speed:1~3μm/h (75°C) ● Continuous operation (5~10 days) ● Excellent bonding property ● Au contents:99.99% (S.G. 19.3) ● Alkaline type ● Applicable to the RoHS directive (GOLD 8L) 	GOLD 8-M (GOLD 8L-M) 250~500ml/ℓ GOLD 8-A (GOLD 8L-A) 5g/ℓ KAu(CN) ₂ 2~4g/ℓ	20L 1kg	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive (GOLD 8L) ● Bonding Gold ● IC packages ● Chip carriers ● Electronic parts ● Mechanical parts ● PCB
GOLD 9 GOLD 9L (self-catalyst type)	<ul style="list-style-type: none"> ■ Electroless Gold plating chemical for thick plating at high plating speed ● Very stable plating bath ● Fast plating speed at low temp. compared with traditional type:1~3μm/h (65°C) ● Continuous operation (5~10 days) ● Excellent bonding property ● Applicable to fine patterns ● Excellent plating film property ● Alkaline type ● Applicable to the RoHS directive (GOLD 9L) 	GOLD 9-M (GOLD 9L-M) 250~500ml/ℓ GOLD 9-A (GOLD 9L-A) 5~7.5g/ℓ KAu(CN) ₂ 2~4g/ℓ	20L 1kg	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive (GOLD 9L) ● Bonding Gold ● IC packages ● Chip carriers ● Electronic parts ● Mechanical parts ● PCB
GOLD 10 GOLD 10L (self-catalyst type)	<ul style="list-style-type: none"> ■ Electroless Gold plating chemical for thick plating at high plating speed ● Stable plating bath ● Fast plating speed:1~3μm/h (75°C) ● Continuous operation (5~10 days) ● High heat resistance ● Excellent bonding property ● Applicable to fine patterns ● Alkaline type ● Applicable to the RoHS directive (GOLD 10L) 	GOLD 10-M (GOLD 10L-M) 250~500ml/ℓ GOLD 10-A (GOLD 10L-A) 5~7.5g/ℓ KAu(CN) ₂ 2~4g/ℓ	20L 1kg	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive (GOLD 10L) ● Bonding Gold ● IC packages ● Chip carriers ● Electronic parts ● Mechanical parts ● PCB
GOLD 8C-2 (direct plating on Copper)	<ul style="list-style-type: none"> ■ Electroless Gold plating chemical for thick plating on Copper materials ● Can plate thick Gold directly on Cu ● Can plate thick Gold on Ni ● Superior bath stability and no decomposition ● Beautiful color tone and superior bonding property ● Alkaline type 	After treatment by GOLD 8C-1 ↓ GOLD 8C-2 500ml/ℓ KAu(CN) ₂ 5~8g/ℓ	20L 20L	<ul style="list-style-type: none"> ○ Plating on Cu ● Plating on small works
GOLD ESTA	<ul style="list-style-type: none"> ■ Strike electrolytic Gold plating chemical ● Superior covering power ● Superior adhesion power 	Undiluted solution KAu(CN) ₂ 1.5g/ℓ	20L	<ul style="list-style-type: none"> ○ For strike Gold plating

Name	Specialties	Composition	Packing	Application
GOLD EPU	<ul style="list-style-type: none"> ■ High purity electrolytic Gold plating chemical ● Purity:99.99% ● Hardness:50 ~ 70Hv ● Superior bonding property 	Undiluted solution KAu(CN) ₂ 5~17g/ℓ	20L	○ For wire bonding
GOLD EC-10 EC-10H	<ul style="list-style-type: none"> ■ Hard electrolytic Gold plating chemical for common use ● Excellent throwing power and dense film and corrosion resistance ● Economical cost and superior brightness 	Undiluted solution KAu(CN) ₂ 5~17g/ℓ	20L	○ Connectors and PCB ● Connecting terminals ● Semi-conductor industry ● Precision machinery industry
AU-505	<ul style="list-style-type: none"> ■ Adhesion power improving agent for Gold plating ● Improve adhesion power between Ni/Au plating 	Undiluted solution	20L	○ PCB ● Hermetic seal parts

Electroless and electrolytic Silver plating chemicals

Name	Specialties	Composition	Packing	Application
SILVER 7	<ul style="list-style-type: none"> ■ Self-catalyst type electroless Silver plating chemical ● Can plate on Ni (NIBORON film) ● Flash Ag plating bath ● Even brightness ● Substitution Silver plating on Cu 	SILVER 7 200mℓ/ℓ Potassium Silver cyanide 2~6g/ℓ	20L	○ Solderability ● Prevent color change ● Capacitors ● Ceramic substrates ● PCB
AG-1 AG-2 (bright Silver plating)	<ul style="list-style-type: none"> ■ Additive for bright Silver plating (electrolytic cyanide plating bath) ● Can obtain hard and bright film ● 180~210Hv ● Excellent abrasion resistance 	AG-1 Hardening agent AG-2 Brightener	5L 5L	○ Decorative items ● Tableware ● Electronic parts
AG-10 AG-100 AG-200	<ul style="list-style-type: none"> ■ Color change prevention agent for Silver ● Strong resistance to sulfurate gas atmosphere ● Superior solderability 	500mℓ/ℓ	18L	○ Prevent color change for Silver materials ● Jewelry ● Electronic parts and wave guides
AG-50	<ul style="list-style-type: none"> ■ Pre-treatment agent for Ag and Ag paste ● Pre-treatment agent for plating on Ag and Ag paste ● Brightening agent ● Ag paste → AG-50 → Ni plating → solder plating ● Remove color change 	50~300mℓ/ℓ	20L	○ Brightening agent for Silver materials ● Pre-treatment agent for plating ● Chip resistors ● Capacitors ● Improve bonding property
ASM-200	<ul style="list-style-type: none"> ■ Adhesion power improving agent for plating on Ag, KOVAR and 42-alloy ● Use at various sorts of plating on Ag ● Deposition prevention agent on glass seals for Ni-P plating on hermetic seals 	500mℓ/ℓ ~ Undiluted solution 40°C	20L	○ For decorative use ● Hermetic seal parts ● Electronic parts

Other sorts of electroless and electrolytic plating chemicals

Name	Specialties	Composition	Packing	Application
SN-402	<ul style="list-style-type: none"> ■ Substitution Tin plating chemical ● Fast plating speed ● Easy bath maintenance 	Undiluted solution	20L	○ TAB ● Electrode bars of electrical cell
SN-7P	<ul style="list-style-type: none"> ■ Neutral type electrolytic Tin plating chemical 	Undiluted solution	20L	○ Electronic parts
SEW	<ul style="list-style-type: none"> ■ Pure electrolytic Tin plating chemical for special use ● Brightness with white color and semi-bright ● Suited best for thin film on ceramics with less Pb-Bi, Ag paste with less Pb and glass with less Pb-Bi 	SEW-M Make-up SEW-SN } SEW-KS } Replenishing SEW-AD }	20L 200L	○ Materials with weak resistance to chemicals ● Thin films, vacuum deposition films and pastes ● Electronic parts
SN-AP	<ul style="list-style-type: none"> ■ Lead free electrolytic Tin plating chemical ● Pure Tin plating bath 	Undiluted solution	20L	○ Applicable to the RoHS directive ● Electronic parts

Name	Specialties	Composition	Packing	Application
LINDEN RS-11	<ul style="list-style-type: none"> ■ Electroless Sn-Ni alloy plating chemical (Sn:50%-Ni:50%) ● Superior corrosion resistance ● Superior solderability ● Alkaline type 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ PZT ● Ceramics
PD-1 (Pd-P)	<ul style="list-style-type: none"> ■ Electroless Palladium plating chemical ● Superior heat resistance ● Superior sliding property ● Superior bath stability 	Undiluted solution or two solution type PD-1A } Replenishing PD-1B }	20L	<ul style="list-style-type: none"> ○ Connectors ● Substrate for Gold plating ● Heat resistance plating
PD-100 (Pd ≒ 100%)	<ul style="list-style-type: none"> ■ Electroless Palladium plating chemical ● Superior heat resistance ● Superior sliding property ● Superior bath stability 	Undiluted solution or two solution type PD-100A } Replenishing PD-100B }	20L	<ul style="list-style-type: none"> ○ Connectors ● Substrate for Gold plating ● Heat resistance plating
INS-200	<ul style="list-style-type: none"> ■ Electrolytic Indium plating chemical ● Suited for plating on micro area ● Superior covering power and throwing power ● Stable plating bath ● Lower melting point 	Undiluted solution	5L 20L	<ul style="list-style-type: none"> ○ For forming bumps ● Plating on precision parts ● MCM

Electroless Gold plating equipment

Name	Specialties	Composition	Application
Plating tank specially for GOLD 8	<ul style="list-style-type: none"> ■ PTFE tank with automatic replenishment equipment for GOLD 8A ● 10L, 15L, 20L, 50L, 100L, etc. 	Thermostat, air agitation, cathode rocking and replenishment equipment	<ul style="list-style-type: none"> ○ Delivery: 1 ~ 2 months ● For GOLD 9, 9L, 10 and 10L



Conditioners, cleaning chemicals and degreasing chemicals (for electronic parts)

Degreasing chemicals, cleaning chemicals and supplementary agents (for common use)

Etching chemicals (on vacuum deposition films, pastes, ceramics and semi-conductor chips)

Etching chemicals (for Copper series, steel series, SUS series and Titanium series materials)

Sensitizers, activators / Pd activating and catalysts

Conditioners, cleaning chemicals and degreasing chemicals (for electronic parts)

Name	Specialties	Composition	Packing	Application
PT-0	<ul style="list-style-type: none"> ■ Acid degreasing chemical for ceramics ● Provide hydrophilic property ● Make etching uniform 	100~200ml/ℓ	20L	<ul style="list-style-type: none"> ○ Ceramics ● PCB
PT-100 PT-100K	<ul style="list-style-type: none"> ■ Acid degreasing chemical for PCB ● Strong cleaning ability ● Clean uniformly 	PT-100 50~200ml/ℓ PT-100K 75~125ml/ℓ	20L	<ul style="list-style-type: none"> ○ PCB ● Fine patterns ● CAT-2000 process
PT-200	<ul style="list-style-type: none"> ■ For PCB ● Strong type acid degreasing chemical 	50~200ml/ℓ	20L	<ul style="list-style-type: none"> ○ PCB and FPC ● CAT-2000-1 process
PN-1	<ul style="list-style-type: none"> ■ Conditioner, neutral degreasing chemical ● Conditioner on ABS resins for plating ● Provide hydrophilic property ● Adjust orientation ● Make etching uniform 	PN-1 30~50ml/ℓ Na ₃ PO ₄ 10~40g/ℓ	20L	<ul style="list-style-type: none"> ○ Plating on ABS resins ● Ceramics
800-SD	<ul style="list-style-type: none"> ■ Auxiliary additive for degreasing and etching (liquid type) ● Auxiliary additive for degreasing and etching W and Mo-Mn ● Use for ultrasonic cleaning 	100~200ml/ℓ	20L	<ul style="list-style-type: none"> ○ Ceramic IC packages
800-S	<ul style="list-style-type: none"> ■ Degreasing chemical specially for ceramics (liquid type) ● Neutral soak degreasing chemical ● Degreasing chemical for electronic parts 	100~300ml/ℓ	20L	<ul style="list-style-type: none"> ○ Degreasing chemical for various sorts of pastes on ceramics
TFC-CDS	<ul style="list-style-type: none"> ■ Conditioner for thin films ● For vacuum deposition films and Cr/Cu sputtering films ● For thin films of Al and other sorts of metals 	100ml/ℓ	20L	<ul style="list-style-type: none"> ○ Thin film boards ● ITO substrates ● Thin film IC packages
TFC-CM	<ul style="list-style-type: none"> ■ Conditioner for thick films ● For Ag pastes and Ag-Pd pastes ● For pastes of other sorts of metals 	20~100ml/ℓ	20L	<ul style="list-style-type: none"> ○ Thick film boards ● Glass ceramic substrates (LTCC) ● IC packages
CD-103	<ul style="list-style-type: none"> ■ Cleaner conditioner ● For use cleaning and conditioning ● Remove oxidized film on Cu surface and stains at inside of through holes at same time 	50ml/ℓ	20L	<ul style="list-style-type: none"> ○ Through hole substrates
L-505B	<ul style="list-style-type: none"> ■ Degreasing and rust removing chemical for PCB ● Acid degreasing ● Acid etching after resist printing ● Degrease and etch Cu 	200~500ml/ℓ 50~60°C	20L	<ul style="list-style-type: none"> ○ For selective partial plating on PCB ● CAT-2000 process
PD-MIT PD-MIT2	<ul style="list-style-type: none"> ■ Bridge prevention agent ● Remove absorbed Pd selectively on glass and ceramics and prevent bridges 	100~300ml/ℓ	20L	<ul style="list-style-type: none"> ● CAT-2000 process
NS-500	<ul style="list-style-type: none"> ■ Prevention agent for short circuits, leaks and bridges at Ni/Au plating on PCB ● Prevent short circuits between patterns ● Prevent deposition on resist ● Remove Cu etching residue 	200ml/ℓ	20L	<ul style="list-style-type: none"> ○ PCB ● Ni/Au plating ● CAT-2000 process ● SLC ● Build up ● PLP
Z-200	<ul style="list-style-type: none"> ■ Acid degreasing chemical with etching ability ● Degrease and remove rust for Cu and Cu alloys ● Prevention agent for oxidization and color change of Cu at high temp. ● Remove oxide of KOVAR and 42-alloy 	100~200ml/ℓ	20L	<ul style="list-style-type: none"> ○ Lead frames ● PCB ● Cu pastes ● Cu materials

Degreasing chemicals, cleaning chemicals and supplementary agents (for common use)

Name	Specialties	Composition	Packing	Application
EARTHMOCLEAN D (measures against earth environmental problem)	<ul style="list-style-type: none"> ■ Aqueous degreasing chemical replaced for organic solvents (Freon, methylene chloride, ethane, etc.) ● Measures against BOD and COD 	50~200ml/ℓ	20L	<ul style="list-style-type: none"> ○ Precision parts ● Specially for quality ● Zinc die-castings
GLARINSE G	<ul style="list-style-type: none"> ■ Cleaning chemical with excellent draining ● Aqueous degreasing chemical replaced for organic solvents (Freon, methylene chloride, etc.) ● Suited best for cleaning glass series materials 	25~70ml/ℓ	20L	<ul style="list-style-type: none"> ○ LCD boards ● Glass disks ● Silicon wafers
SA-100	<ul style="list-style-type: none"> ■ Soak degreasing chemical (powder type) ● All-purpose type ● Economical cost 	30~80g/ℓ 50°C	20kg	<ul style="list-style-type: none"> ○ Common use ● Steel materials ● Copper alloys
SA-400	<ul style="list-style-type: none"> ■ Degreasing chemical for Copper series materials (powder type) ● No Phosphorus type with low bubbling ● Excellent effect for degreasing rolling oil and burned oil at punching ● Less tarnishing by alkaline dip to materials 	50~80g/ℓ 60°C	20kg	<ul style="list-style-type: none"> ○ Copper alloys, brass and Phosphorus bronze ● Lead frames ● OFC materials
SA-800	<ul style="list-style-type: none"> ■ Soak degreasing chemical (powder type) ● Alkaline soak degreasing chemical ● Suited best for electroless Nickel plating ● Easy bath maintenance and superior working efficiency ◎ High performance and solve various sorts of problem caused by insufficient degreasing 	30~50g/ℓ	20kg	<ul style="list-style-type: none"> ○ Electrolytic plating for common use ● Electroless plating for common use
ELC-400	<ul style="list-style-type: none"> ■ All-purpose type electrolytic degreasing chemical (powder type) ● Can degrease in short time and excellent water rinsing ability ● Less tarnishing by alkaline dip to materials 	60~90g/ℓ 50°C 5A/dm ²	20kg	<ul style="list-style-type: none"> ○ Ferrous series ● Copper alloys and brass ● Nickel series
ELC-4000S	<ul style="list-style-type: none"> ■ Soak and electrolytic degreasing chemical ● Alkaline degreasing chemical ● Very high degreasing performance ● Suited best for degreasing Ag-Cu solders by adding CN ● Suited best for degreasing Copper and Copper alloys 	100~300ml/ℓ	20L	<ul style="list-style-type: none"> ○ From common use to precision parts ● Steel materials ● Copper alloys
ELC-4000SN	<ul style="list-style-type: none"> ■ Soak degreasing chemical for Copper (OFC) ● Alkaline degreasing chemical ● Very high degreasing performance ● Superior effect for degreasing with ultrasonic 	100~300ml/ℓ	20L	<ul style="list-style-type: none"> ○ Special Copper alloys ● OFC materials
ZD-10 ZD-20	<ul style="list-style-type: none"> ■ Electrolytic degreasing chemical for Zinc die-castings ● No etching to basis materials ● Can plate film with high adhesion power and no pinholes 	ZD-10 40g/ℓ ZD-20 20g/ℓ 40°C	20kg 20L	<ul style="list-style-type: none"> ○ Zinc die-castings
ELC-5000S	<ul style="list-style-type: none"> ■ Carbon removing chemical ● Alkaline degreasing chemical ● Remove oils containing carbon ● Remove carbon burned strongly 	Undiluted solution RT~100°C	20L	<ul style="list-style-type: none"> ○ Glass moulds ● Rubber moulds ● Quartz oscillators
CE-200	<ul style="list-style-type: none"> ■ Electrolytic degreasing chemical for removing smuts ● No contents of surfactant ● Suited best for degreasing Ag-Cu solders by adding CN ● High performance of removing smuts 	CE-200 100~300ml/ℓ NaCN 50~100g/ℓ	20L	<ul style="list-style-type: none"> ○ Electrolytic degreasing ● Remove smuts ● IC packages
SAL-70L SAL-80L SAL-70L2 SAL-1000	<ul style="list-style-type: none"> ■ Degreasing chemical specially for Aluminum ● Replacement for organic solvents ● Can degrease with both soak and electrolytic use 	SAL-70L 200ml/ℓ	20L	<ul style="list-style-type: none"> ○ Specially for Aluminum ● Replacement for organic solvents
ED	<ul style="list-style-type: none"> ■ Auxiliary additive for electrolytic degreasing ● Remove smuts 	NaOH 50~70g/ℓ ED 50~70g/ℓ	20kg	<ul style="list-style-type: none"> ○ Remove smuts ● For electrolytic plating
SGA	<ul style="list-style-type: none"> ■ Auxiliary additive for electrolytic degreasing ● Improve smut removing ability ● Improve rust removing ability by degreasing 	Electrolytic degreasing chemical 50~70g/ℓ SGA 10~30g/ℓ	25kg	<ul style="list-style-type: none"> ○ Remove smuts ● For electrolytic plating

Etching chemicals (on vacuum deposition films, pastes, ceramics and semi-conductor chips)

Name	Specialties	Composition	Packing	Application
CR-11	<ul style="list-style-type: none"> Remove Cr in Cr-Cu thin films Remove Cr only by etching and without etching Cu Provide hydrophilic property Remove Cr in forming bumps 	500ml/l~ Undiluted solution 50~70°C	20L	<ul style="list-style-type: none"> Thin film patterns Provide hydrophilic property to silicon wafers Flexible boards Bumps
MC-WM	<ul style="list-style-type: none"> Etching chemical for W and Mo-Mn alloy pastes, Cu-W, W, Mo and Mo-Cu Improve adhesion power and short circuits For pattern W, Mo and vacuum deposition films Remove Cr thin films Etch Cr-Mo steels and improve adhesion power 	100~500ml/l RT~50°C	20L	<ul style="list-style-type: none"> Ceramics IC packages PGA and MPU Heat sinks Thin films Bumps
ETW (non-cyanide type)	<ul style="list-style-type: none"> Etching chemical for W and Mo-Mn alloy paste, Cu-W, W, Mo and Mo-Cu Improve adhesion power and short circuits For pattern W, Mo and vacuum deposition films Remove Cr thin films Etch Cr-Mo steels 	ETW-1 50g/l ETW-2 500ml/l	16kg 20L	<ul style="list-style-type: none"> Ceramics IC packages PGA and MPU Heat sinks Thin films Bumps
MC-E	<ul style="list-style-type: none"> Fluoride type auxiliary additive for etching Use together with HCl or H₂SO₄ Improve adhesion power by removing oxidized film Suited best specially for removing glass materials Superior effect for improving adhesion power and preventing short circuits on W and Mo-Mn paste 	MC-E 100ml/l~ Undiluted solution HCl or H ₂ SO ₄ 200ml/l	20L	<ul style="list-style-type: none"> Castings SUS 42-alloy KOVAR Semi-conductor ceramics Hermetic seal parts
MC-E5 (non-cyanide type)	<ul style="list-style-type: none"> Etching W and Mo-Mn pastes Etching W and Mo-Mn pastes on AlN Etching Ag pastes Cu-W alloy pastes 	MC-E5 100~300ml/l H ₂ O ₂ 200~800ml/l	20L	<ul style="list-style-type: none"> Ceramics IC packages PGA Ag and Ag-Pd paste
MC-EC	<ul style="list-style-type: none"> Etching chemical for ceramics (Barium titanate) Improve adhesion power by etching ceramics 	100ml/l~ Undiluted solution 50~60°C	20L	<ul style="list-style-type: none"> Barium titanate series
MC-ET	<ul style="list-style-type: none"> Remove SiO₂ films Pre-treatment for plating Replacement for hydrofluoric acid (for safety) 	Undiluted solution	20L	<ul style="list-style-type: none"> Pre-treatment for plating on silicon wafers
ET-13	<ul style="list-style-type: none"> Etching chemical for silicon wafers and Si Pre-treatment for plating Improve adhesion power 	Undiluted solution	20L	<ul style="list-style-type: none"> Transistors Solar cells Thyristors
ET-70	<ul style="list-style-type: none"> Etching chemical for Cu₂O and CuO Remove cuprous oxide of Cu pins Etching clad Cu No etching to glass 	Undiluted solution 90~100°C	20L	<ul style="list-style-type: none"> Pins of thermal sensor Pins of capacitor Pins of resistor Pins of lead
ET-70K	<ul style="list-style-type: none"> Additive for chemical polishing Add to hydrogen peroxide Economical cost compared with traditional chemicals Deburring chemical 	ET-70K 300ml/l H ₂ O ₂ 270ml/l	20L	<ul style="list-style-type: none"> KOVAR 42-alloy Hermetic parts Ferrous series
ET-022F	<ul style="list-style-type: none"> Special etching chemical for ceramics Improve adhesion power to chemical Copper and Nickel plating 	100~500ml/l	20L	<ul style="list-style-type: none"> Barium titanate series
PT-1	<ul style="list-style-type: none"> Primary etching chemical for PZT Improve adhesion power by using PT-2 together 	Undiluted solution	20L	<ul style="list-style-type: none"> PZT
PT-2	<ul style="list-style-type: none"> Secondary etching chemical for PZT Improve adhesion power 	Undiluted solution	20L	<ul style="list-style-type: none"> PZT

Name	Specialties	Composition	Packing	Application
ET-AGB	<ul style="list-style-type: none"> ■ Etching chemical for Ag-Cu solders ● Alkaline cyanide type ● Etch KOVAR, Ag-Cu solders and Ni at the same time ● Improve adhesion power 	ET-AGB 10~50g/ℓ KCN 10~30g/ℓ	8kg	<ul style="list-style-type: none"> ○ Etching hetero-metals in PGA ● LPC (laser power caps) ● OSC caps
HN-25	<ul style="list-style-type: none"> ■ Etching chemical for Ag and Ag-Pd paste ● Improve adhesion power and prevent leaks ● Remove metallic oxide 	50~500ml/ℓ	20L	<ul style="list-style-type: none"> ○ Ceramic boards ● Chip capacitors ● CR ● Lead frames
HC-55	<ul style="list-style-type: none"> ■ Adhesion power improving agent ● Superior effect for ferrous series and SUS series 	100~700ml/ℓ	20L	<ul style="list-style-type: none"> ○ KOVAR ● 42-alloy ● Lead frames
HS-55	<ul style="list-style-type: none"> ■ Adhesion power improving agent ● Mild etching ● Superior effect for Cu-W alloys 	100~500ml/ℓ	20L	<ul style="list-style-type: none"> ○ PCB ● Cu series lead frames

Etching chemicals (for Copper series, steel series, SUS series and Titanium series materials)

Name	Specialties	Composition	Packing	Application
ET-50 ET-50AMS ET-50TN ET-60	<ul style="list-style-type: none"> ■ Oxidizing type etching chemical for Copper ● Roughen substrate before plating ● Mild etching ● Improve adhesion power 	ET-50A 60ml/ℓ ET-50B 200g/ℓ ET-50AMS 60ml/ℓ ET-50BN 200g/ℓ ET-50A 60ml/ℓ ET-50BN 200g/ℓ	20L 20kg	<ul style="list-style-type: none"> ○ Copper alloys ● OFC materials ● Lead frames ● PCB and FPC
ET-50FN	<ul style="list-style-type: none"> ■ Oxidizing type etching chemical for steel and Copper materials ● Remove Cu (diffused Cu) 	500ml/ℓ ~ Undiluted solution	20L	<ul style="list-style-type: none"> ○ DBC ● Sintered materials ● Cu materials
ET-50F2	<ul style="list-style-type: none"> ■ Etching chemical for stainless steels ● Different system from HNO₃ system ● No emission of NO₂ gas ● Remove metallic oxide 	ET-50F2 250ml/ℓ ~ Undiluted solution HCl 0~100ml/ℓ	20L	<ul style="list-style-type: none"> ○ SUS materials ● Lead frames ● Remove mill scales
MC-E	<ul style="list-style-type: none"> ■ Fluoride type auxiliary additive for etching ● Use together with HCl or H₂SO₄ ● Improve adhesion power by removing oxidized film ● Remove glass materials ● Remove Si, SiO₂ and other sorts of oxide ● Improve adhesion power at plating on stainless steels 	MC-E 100ml/ℓ ~ Undiluted solution HCl or H ₂ SO ₄ 200ml/ℓ	20L	<ul style="list-style-type: none"> ○ Castings ● SUS ● 42-alloy ● KOVAR ● Semi-conductor ceramics ● Free cutting steels
ASM-200	<ul style="list-style-type: none"> ■ Etching chemical and prevention agent for deposition on glass at Ni plating ● Etching chemical for Ag materials 	200~300ml/ℓ	20L	<ul style="list-style-type: none"> ○ Hermetic seals ● Quartz oscillators ● Semi-conductor laser caps
HM-100	<ul style="list-style-type: none"> ■ Acid etching chemical ● Remove mill scales ● Remove carbon and diffusion layers of Ag-Cu and KOVAR 	200ml/ℓ ~ Undiluted solution	20L	<ul style="list-style-type: none"> ○ Etching pins of KOVAR and 42-alloy ● Quartz oscillators

Name	Specialties	Composition	Packing	Application
MC-EP	<ul style="list-style-type: none"> ■ Fluoride type auxiliary additive for etching and solid acid (powder type) ● Use together with HCl or H₂SO₄ ● Improve adhesion power by removing oxidized film ● Remove glass materials ● Remove Si, SiO₂ and other sorts of oxide ● Improve adhesion power at plating on SUS materials 	MC-EP 50~300g/l H ₂ SO ₄ or HCl 50~200ml/l	20kg	<ul style="list-style-type: none"> ○ Castings ● SUS ● 42-alloy ● KOVAR ● Semi-conductor ceramics ● Free cutting steels
T-22 T-44	<ul style="list-style-type: none"> ■ Etching chemical for Titanium (activating chemical) ● Use for plating on Titanium T-22 → LINDEN T (strike plating) ● Remove TiO₂ films 	T-22 Undiluted solution ↓ 80~90°C LINDEN T	20L	○ Various sorts of plating on Ti
Z-100 (acid emulsion)	<ul style="list-style-type: none"> ■ Reinforcing agent for acid cleaning ● Remove mill scales, oils and welding scales ● No excessive etching by inhibitor 	Z-100 50~100ml/l HCl 300~500ml/l	20L	<ul style="list-style-type: none"> ○ Remove mill scales of steel materials ● Clean spot welding points ● Quartz oscillators

Sensitizers, activators / Pd activating and catalysts

Name	Specialties	Composition	Packing	Application
MC-S	<ul style="list-style-type: none"> ■ Strong acid type sensitizer ● Long life ● For common use 	50~300ml/l	20L	<ul style="list-style-type: none"> ○ For copper plating ● Ceramics ● Textiles
PT-3	<ul style="list-style-type: none"> ■ Special type sensitizer ● For PZT and Barium titanate ● Superior adhesion power 	100~300ml/l	20L	<ul style="list-style-type: none"> ○ PZT ● Barium titanate
MC-A MC-A2	<ul style="list-style-type: none"> ■ Weak acid type activator (Pd) ● For plating on whole surface 	200ml/l	20L	<ul style="list-style-type: none"> ○ On ceramics ● Plating on textiles ● Plating on micro powders
AT-PD	<ul style="list-style-type: none"> ■ Acid type activator (Pd) ● For plating on whole surface 	200ml/l	20L	○ For plating on whole surface of Copper and Copper alloy
AT-120	<ul style="list-style-type: none"> ■ Acid type activator for selective partial plating (Pd) ● Low Pd concentration bath ● For fine patterns 	AT-120 90~110ml/l Use together with H ₂ SO ₄	20L	<ul style="list-style-type: none"> ○ Activate Cu on PCB ● No bridge and no skip plating ● CAT-2000 process
AT-PD-22	<ul style="list-style-type: none"> ■ Weak acid type activator specially for Ag paste (Pd) ● For selective partial plating ● Ag pastes 	Undiluted solution	20L	○ Ag and Ag-Pd pastes
AT-100	<ul style="list-style-type: none"> ■ Weak acid type activator (Pd) ● For selective partial plating (for thin films) ● Activator of CAT-92 process ● Ni plating on Ni-Cr pastes 	200~500ml/l	20L	<ul style="list-style-type: none"> ○ Ni plating on Al vacuum deposition patterns ● ITO and LSI ● Cu and Cu pastes
AT-110 AT-110L	<ul style="list-style-type: none"> ■ Acid type activator (Pd) ● For selective partial plating ● Applicable to the RoHS directive (AT-110L) 	AT-110 50~200ml/l AT-110L 30~200ml/l	20L	<ul style="list-style-type: none"> ○ Ni plating on Al vacuum deposition patterns ● ITO, LSI and PCB ● Cu and Cu pastes
AT-80	<ul style="list-style-type: none"> ■ Alkaline type activator for selective partial plating (Pd) ● Activate Mo-Mn and W pastes ● Less bridges ● Pd plating 	500ml/l	20L	<ul style="list-style-type: none"> ○ IC packages ● Cu substrates ● Cu plating
AT-90 AT-90L-2	<ul style="list-style-type: none"> ■ Neutral type activator for selective partial plating (Pd) ● Activate Mo-Mn, W and Ag pastes on AlN ● Activate Cu-W ● Activate Cu thin films ● Easy to use ● Applicable to the RoHS directive (AT-90L-2) 	AT-90 Undiluted solution ~200ml/l AT-90NS Replenishing (for AT-90) AT-90L-2 Undiluted solution ~200ml/l	20L 200L	<ul style="list-style-type: none"> ○ AlN substrates ● Fine patterns ● W and Ag pastes ● PCB ● Mo-Mn pastes ☆ Best seller

Name	Specialties	Composition	Packing	Application
AT-905	<ul style="list-style-type: none"> ■ Weak acid type activator for selective partial plating (Pd) ● Pd activator specially for Mo-Mn and W pastes ● Can plate selectively and partially by easy Pd substitution ● Easy to use ● Economical cost and high Pd concentration 	Undiluted solution 40~70°C	20L	<ul style="list-style-type: none"> ○ Activate Mo-Mn and W pastes on Al₂O₃ and Al ● IC packages ● PCB
AT-907 AT-907L	<ul style="list-style-type: none"> ■ Neutral type activator (Pd) ● Improve no plating and skip plating caused by bipolar phenomenon ● For micro patterns (L&S 30μm and under) and improving bridges ● Applicable to the RoHS directive (AT-907L) 	Undiluted solution 50~70°C	20L	<ul style="list-style-type: none"> ○ PCB and FPC ● CAT-2000-1 process ● Activating Mo-Mn and W pastes on ceramics
PT-4	<ul style="list-style-type: none"> ■ Weak acid type activator (Pd) ● Plating on whole surface of ceramics ● Superior adhesion power ● For PZT and Barium titanate 	100~300ml/ℓ	20L	<ul style="list-style-type: none"> ○ Barium titanate ● PZT ● Al₂O₃ ● AlN
PN-105	<ul style="list-style-type: none"> ■ Catalyst with no contents of HCl ● Less haloing phenomenon at Cu plating on PCB ● Small size of colloid particles ● For small size of through holes 	PN-105 25~35ml/ℓ PN-104 250~290g/ℓ	5L 20L 20kg	<ul style="list-style-type: none"> ○ Chemical Cu plating on multi-layer PCB
PN-PS	<ul style="list-style-type: none"> ■ Acid type catalyst ● ABS resins ● Long life ● Economical cost 	PN-PS 150ml/ℓ HCl 150ml/ℓ 20~30°C	20L	<ul style="list-style-type: none"> ○ For plating on ABS resins ● Engineering plastics ● EMI



Stripping chemicals for plating films (Ni, Au, Sn and solder)

Rust prevention chemicals, post-treatment chemicals and anti-tarnishing chemicals

Chemicals for electronic parts

Additives for special applications

Plating resist ink and masking chemicals

Chemicals for Aluminum

Pre-treatment process chemicals for LTCC

Chemicals for PCB and CAT-2000-1 process

Stripping chemicals for plating films (Ni, Au, Sn and solder)

Name	Specialties	Composition	Packing	Application
LIPSTAR NC-1 NC-2	<ul style="list-style-type: none"> ■ Non-cyanide type Nickel stripping chemical ● No residue of smut of ferrous substrate ● No etching to basis materials ● Suited best for Nickel stripping on free cutting steels 	NC-1 160g/ℓ NC-2 270mℓ/ℓ NaOH 0~30g/ℓ or NC-1 80g/ℓ NC-2 180mℓ/ℓ	16kg 18L	<ul style="list-style-type: none"> ○ Electroless Nickel plating ● Electrolytic Nickel plating ● Moulds ● Neodymium magnets ● Mechanical parts ● Shafts
LIPSTAR NC-11 NC-22	<ul style="list-style-type: none"> ■ Non-cyanide type Nickel stripping chemical ● Suited best for Nickel stripping after heat treatment ● Can strip electrolytic Nickel well ● No etching to basis materials 	NC-11 60g/ℓ NC-22 200mℓ/ℓ 70°C	12kg 20L	<ul style="list-style-type: none"> ○ Electrolytic Nickel plating ● Electroless Nickel plating ● Mechanical parts
LIPSTAR NC-100 NC-200	<ul style="list-style-type: none"> ■ Non-cyanide type Nickel stripping chemical ● Can strip after heat treatment ● Large stripping capacity ● Can strip both electrolytic and electroless Nickel 	NC-100 160g/ℓ NC-200 280mℓ/ℓ or NC-100 80g/ℓ NC-200 180mℓ/ℓ	16kg 20L	<ul style="list-style-type: none"> ○ Electroless Nickel plating ● Electrolytic Nickel plating ● Mechanical parts
LIPSTAR NC-10 NC-20 NC-30	<ul style="list-style-type: none"> ■ Non-cyanide type Nickel stripping chemical on Copper and brass substrate ○ Less etching to basis materials 	NC-10 30g/ℓ NC-20 30g/ℓ NC-30 500mℓ/ℓ NaOH 50g/ℓ	3kg 3kg 20L	<ul style="list-style-type: none"> ○ Electroless Nickel plating ● Copper and brass parts
LIPSTAR S	<ul style="list-style-type: none"> ■ Cyanide type Nickel stripping chemical ● Economical cost ● No etching to basis materials ● Fast stripping speed ● No residue of smut ● Beautiful stripped surface 	LIPSTAR S 60~100g/ℓ NaCN 100g/ℓ	24kg (8kg×3)	<ul style="list-style-type: none"> ○ Electrolytic Nickel plating ● Electroless Nickel plating
LIPSTAR EV	<ul style="list-style-type: none"> ■ Electrolytic stripping chemical for Copper, Nickel and Chromium for jigs ● Can operate only by replenishing ● Can remove deposited metals by filtering ● No emission of hazardous gas ● Fast stripping speed 	LIPSTAR EV 33%	20L	<ul style="list-style-type: none"> ○ Plating jigs ● Jig branches in SUS material ● Jigs for electrolytic Ni plating ● Jigs for plating on plastics
LIPSTAR GOLD LG-7DL	<ul style="list-style-type: none"> ■ Very fast stripping speed for Gold plating ● Economical cost ● Available powder type (LG-7DP) 	LG-7DL 200mℓ/ℓ KCN 50g/ℓ	20L	<ul style="list-style-type: none"> ○ Gold films, spattering films and vacuum deposition films on various sorts of materials
LIPSTAR GOLD LG-8L	<ul style="list-style-type: none"> ■ Can strip Gold plating without etching substrate of Copper and Nickel ● Can re-plate Gold beautifully after stripping Gold plating 	LG-8L 200mℓ/ℓ KCN 50g/ℓ	20L	<ul style="list-style-type: none"> ○ Gold plating on Copper ● Ni/Au plating on Copper ● Lead frames
LIPSTAR E-400	<ul style="list-style-type: none"> ■ Electrolytic stripping chemical for solder and Tin ● Can strip Tin alloy ● No contents of fluoride 	LIPSTAR E-400 250mℓ/ℓ 20μm/h (7A/dm ² 9:1Tin-lead)	20L	<ul style="list-style-type: none"> ○ Strip jigs
LIPSTAR NC-101	<ul style="list-style-type: none"> ■ Stripping chemical for solder and Lead ● No contents of nitric acid, hydrogen peroxide and fluoride ● Less etching to Copper materials ● No emission of gas and mist ● Fast stripping speed and can strip Lead 	NC-101-A 500mℓ/ℓ NC-101-B 500mℓ/ℓ	20L	<ul style="list-style-type: none"> ○ PCB ● Lead frames ● Connectors

Rust prevention chemicals, post-treatment chemicals and anti-tarnishing chemicals

Name	Specialties	Composition	Packing	Application
NR-301	<ul style="list-style-type: none"> ■ Water-soluble type primary rust prevention chemical ● Primary rust prevention chemical which can replace with cyan ● Prevent rusts for vase-shaped holes at acid Zinc plating ● Primary rust prevention for materials after plating 	10~100mℓ/ℓ	20L	<ul style="list-style-type: none"> ○ Brake parts ● Electronic parts ● Common ferrous materials
NR-303	<ul style="list-style-type: none"> ■ Water-soluble type rust prevention chemical for water cutting ● Fill pinholes ● Extend 1~2 cycles in salt spray test ● Improve corrosion resistance further by using after chromate treatment at Zinc plating 	5~15mℓ/ℓ 20~50°C	16kg	<ul style="list-style-type: none"> ○ Electroless Nickel plating ● Electrolytic Nickel plating ● Zinc plating

Name	Specialties	Composition	Packing	Application
NR-330	<ul style="list-style-type: none"> ■ Water-soluble type rust prevention chemical for water cutting (emulsion type) ● For electrolytic and electroless plating ● Fill pinholes ● Extend 1~2 cycles in salt spray test 	20~50ml/ℓ 20~50°C	18L	<ul style="list-style-type: none"> ○ Electroless Nickel plating ● Electrolytic Nickel plating ● Zinc plating
NRG-50	<ul style="list-style-type: none"> ■ Water-soluble type rust prevention chemical for water cutting ● For treatment chemical which can replace with chromate treatment ● Form passive film on the surface of Nickel film 	NRG-50 50~200ml/ℓ Oxalic acid 50~200g/ℓ	16kg	<ul style="list-style-type: none"> ○ Electroless Nickel plating ● Electrolytic Nickel plating ● Plated castings
HM-200NC	<ul style="list-style-type: none"> ■ Treatment agent which can replace with chromate treatment ● Form very thin passive film on Ni plating 	Undiluted solution 60°C	20L	<ul style="list-style-type: none"> ○ Electroless Nickel plating ● Shafts
Z-200S	<ul style="list-style-type: none"> ■ Chemical for both soft etching and anti-tarnishing ● Treatment chemical for both rust prevention and rust removing for Copper and Copper alloys ● 42-alloy, rust prevention and rust removing 	100~300ml/ℓ	20L	<ul style="list-style-type: none"> ○ Copper and Copper alloys ● 42-alloy ● Be-Cu
CB-9	<ul style="list-style-type: none"> ■ Anti-tarnishing agent for Copper ● Primary rust prevention for Cu surface ● Not influence plating and solderability afterward 	50~100g/ℓ 60°C	18L	<ul style="list-style-type: none"> ○ Cu materials ● PCB
CB-90	<ul style="list-style-type: none"> ■ Anti-tarnishing agent for Copper (for heat resistance) ● Superior effect at high temp. (about 150°C) ● Not influence electric resistance and adhesion power 	50~100g/ℓ	18L	<ul style="list-style-type: none"> ○ Cu materials ● PCB
CB-99	<ul style="list-style-type: none"> ■ Anti-tarnishing agent for Copper ● New type anti-tarnishing chemical with no contents of BTA (benzotriazol) 	50ml/ℓ	18kg	<ul style="list-style-type: none"> ○ Cu materials ● PCB

Chemicals for electronic parts

Name	Specialties	Composition	Packing	Application
ET-140	<ul style="list-style-type: none"> ■ Improving and recovering agent for solderability ● Activate the surface of Cu and Ni plating ● Recover solderability ● Anti-tarnishing 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ Electronic parts required soldering ● Nickel plating
ET-140H	<ul style="list-style-type: none"> ■ Removing agent for oxide of solder and Tin ● Recover solderability of solder and Tin ● Remove oxide only 	500ml/ℓ ~ Undiluted solution	20L	<ul style="list-style-type: none"> ○ Solder plating and Tin plating ● Clean solder balls
ET-150	<ul style="list-style-type: none"> ■ Improving and recovering agent for solderability ● Activate the surface of Ni plating ● Recover solderability ● Alkaline type 	200ml/ℓ	20kg	<ul style="list-style-type: none"> ○ Electronic parts required soldering ● Nickel plating
PCB-1N	<ul style="list-style-type: none"> ■ Blackening agent for Cu surface ● Form even ruggedness ● Superior adhesion power to plastics and resist ● Improve adhesion power between Cu surface and resist 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ Copper inner layers of multi-layer PCB ● Copper surface of through holes ● Build-up boards ● OFC
PCB-1R	<ul style="list-style-type: none"> ■ Bleaching agent for blackening treatment ● Reducing agent to Copper color 	Undiluted solution	20L	<ul style="list-style-type: none"> ○ OFC
PC BROWN	<ul style="list-style-type: none"> ■ Roughening agent for Copper surface ● Form brown oxide films ● Can obtain high adhesion power for multi-layer (1.8kg/cm²) ● High adhesion power to plastics 	PC BROWN BR-1 PC BROWN BR-2 } Make-up 55~65°C	20L	<ul style="list-style-type: none"> ○ PCB ● Roughen the surface of inner layer of multi-layer printed circuit boards

Additives for special applications				
Name	Specialties	Composition	Packing	Application
55-A	<ul style="list-style-type: none"> ■ Inhibitor (restraining agent for acid cleaning) ● Inhibit excessive etching to ferrous materials by adding to acid cleaning bath ● Improve outside 	55-A 20~50ml/ℓ HCl, H ₂ SO ₄	20L	<ul style="list-style-type: none"> ○ Acid cleaning for steels and Copper ● Remove mill scales
CR-AMP	<ul style="list-style-type: none"> ■ Mist inhibiting agent for acid electrolysis (powder type) ● Mist inhibiting agent for Chromium plating ● Mist inhibiting agent for ALMITE 	0.3~1.0g/ℓ	1kg	<ul style="list-style-type: none"> ○ Chromium plating ● ALMITE ● Acid electrolysis
ED-3	<ul style="list-style-type: none"> ■ Forming agent for trivalent Chromium in Chromium plating bath ● Can form easily by dummy plating 	As required	25kg	<ul style="list-style-type: none"> ○ Chromium plating
NBF-150	<ul style="list-style-type: none"> ■ Pre-treatment agent for Nd-B-Fe ● Stabilize surface layers 	200ml/ℓ	20L	<ul style="list-style-type: none"> ○ Plating on Nd-B-Fe
NBF-220	<ul style="list-style-type: none"> ■ Pre-treatment agent for Nd-B-Fe ● Make surface layers uniform 	NBF-220 200ml/ℓ HN-25 200ml/ℓ	20L	<ul style="list-style-type: none"> ○ Plating on Nd-B-Fe
WSK-2500 (waste water treatment)	<ul style="list-style-type: none"> ■ Treatment agent for heavy metals ● Can remove various sorts of heavy metallic ions at the same time by strong reaction to chelated metallic complex salts which have been difficult to treat with traditional neutralization and sedimentation process 	WSK-2500 Add as required according to metallic ion concentration	20kg 220kg	<ul style="list-style-type: none"> ○ Waste water treatment ● Make such heavy metallic ions as Cu, Ni, Zn, Pb, etc. in waste water insoluble

Plating resist ink and masking chemicals				
Name	Specialties	Composition	Packing	Application
SEAL-PEAL #8008	<ul style="list-style-type: none"> ■ Masking chemical for plating (seal-peal):light red brown color ● For brushing and dipping ● Can prove acid and alkali resistance and heat resistance ● Economical cost 	RT~120°C	16kg	<ul style="list-style-type: none"> ○ Masking for electrolytic and electroless plating ● Electronic parts
PLATING-REGIST A	<ul style="list-style-type: none"> ■ Masking chemical for plating (high quality):green color ● For brushing and dipping ● Can prove acid and alkali resistance and heat resistance 	RT~120°C	3kg 5kg	<ul style="list-style-type: none"> ○ Masking for electroless plating ● Electronic parts
WMF537	<ul style="list-style-type: none"> ■ Masking chemical for plating (high quality) :green color ● For brushing and dipping ● Can prove acid and alkali resistance and heat resistance 	RT~120°C	28kg	<ul style="list-style-type: none"> ○ Masking for electroless plating ● Electronic parts

Chemicals for Aluminum				
Name	Specialties	Composition	Packing	Application
SAL-70L SAL-70L2	<ul style="list-style-type: none"> ■ Soak and electrolytic degreasing chemical specially for Aluminum ● Replacement for organic solvents ● Can use for soak and electrolytic degreasing ● Degreasing ability reinforced type (SAL-70L2) 	SAL-70L 200ml/ℓ	20L	<ul style="list-style-type: none"> ○ Specially for Aluminum ● Replacement for organic solvents
SAL-80L	<ul style="list-style-type: none"> ■ Soak and electrolytic degreasing chemical specially for Aluminum ● Can use for soak and electrolytic degreasing 	200ml/ℓ	20L	<ul style="list-style-type: none"> ○ Specially for Aluminum ● Replacement for organic solvents
AL-20	<ul style="list-style-type: none"> ■ Alkaline etching chemical ● Etching in alkaline side 	100~200ml/ℓ	20L	<ul style="list-style-type: none"> ○ Improve adhesion power
HL-20	<ul style="list-style-type: none"> ■ Acid etching chemical ● Use between primary and secondary Zincate treatment ● Improve adhesion power 	200ml/ℓ	20L	<ul style="list-style-type: none"> ○ Improve adhesion power
AL-50	<ul style="list-style-type: none"> ■ Etching chemical for Aluminum ● Make etching uniform and improve adhesion power by adding to nitric acid 	100ml/ℓ+HNO ₃ RT	20L	<ul style="list-style-type: none"> ○ Improve adhesion power

Name	Specialties	Composition	Packing	Application
MC-EP	<ul style="list-style-type: none"> ■ Replacement for hydrofluoric acid and solid acid (powder type) ● HNO₃ + MC-EP ● Easy to use 	MC-EP 100g/ℓ	20kg	○ Improve adhesion power
SGA	<ul style="list-style-type: none"> ■ Auxiliary additive for removing smuts ● NaOH + SGA 	SGA 20~50g/ℓ	25kg	○ Improve adhesion power
ALBOND 100	<ul style="list-style-type: none"> ■ Cyanide type Zincate treatment chemical ● Excellent adhesion power ● Long life ● Easy to use 	Undiluted solution 20~50°C	20L	○ Aℓ and Aℓ alloys
ALBOND 250	<ul style="list-style-type: none"> ■ Non-cyanide type Zincate treatment chemical ● Excellent adhesion power ● Long life 	250ml/ℓ 20~25°C	25kg	○ Aℓ and Aℓ alloys ● Double substitution
ALBOND 500	<ul style="list-style-type: none"> ■ Non-cyanide type Zincate treatment chemical ● Non-cyanide type and excellent adhesion power ● Long life ● Alloy bath 	500ml/ℓ 20~25°C	25kg	○ Aℓ and Aℓ alloys ● Double substitution
ALBOND AM	<ul style="list-style-type: none"> ■ Acid type Zincate treatment chemical ● Excellent adhesion power ● Long life 	500ml/ℓ ~ Undiluted solution	20L	○ For Ni plating on Aℓ vacuum deposition films and Aℓ sputtering films

Pre-treatment process chemicals for LTCC

Name	Specialties	Composition	Packing	Application
LT-2000C	<ul style="list-style-type: none"> ■ Alkaline degreasing chemical ● Less influence on basis materials ● Superior effect for Ag and Cu pastes 	200ml/ℓ	20L	○ LTCC substrates ● Ceramic substrates ● Ag, Ag-Pd and Cu pastes
AT-808	<ul style="list-style-type: none"> ■ Auxiliary additive for accelerating activation ● Induce even Pd activation ● Can prove excellent effect for activation of selective area of wiring patterns 	Undiluted solution	20L	○ LTCC substrates ● Ceramic substrates ● Ag, Ag-Pd and Cu pastes
AT-909	<ul style="list-style-type: none"> ■ Neutral type Pd activator ● Can plate without leaks, skip plating, etc. at plating on micro and independent patterns 	Undiluted solution ~500ml/ℓ	20L	○ LTCC substrates ● Ceramic substrates ● Ag, Ag-Pd and Cu pastes
AFP-500	<ul style="list-style-type: none"> ■ Removing agent for Pd residue ● No attacking to printed pattern resist ● Remove Pd penetrated into dicing lines 	500ml/ℓ	20L	○ LTCC substrates ● Ceramic substrates ● Ag, Ag-Pd and Cu pastes
PD-SET2	<ul style="list-style-type: none"> ■ Leak inhibiting agent ● Inhibit leaks, skip plating, etc. at plating on micro and independent patterns 	200ml/ℓ	20L	○ LTCC substrates ● Ceramic substrates ● Ag, Ag-Pd and Cu pastes

Chemicals for PCB and CAT-2000-1 process

Name	Specialties	Composition	Packing	Application
PT-100 PT-200 PT-200K	<ul style="list-style-type: none"> ■ Acid degreasing chemical for PCB ● Strong cleaning ability ● Make cleaning uniform ● Cleaning ability reinforced type (PT-200) 	PT-100 50~200ml/ℓ	20L	○ Fine patterns ● PCB
ET-50 ET-50AMS	<ul style="list-style-type: none"> ■ Oxidizing type acid degreasing chemical for Copper ● Roughen substrate before plating ● Mild etching ● Improve adhesion power 	ET-50A 60ml/ℓ ET-50B 200g/ℓ	20L 20kg	○ Copper alloys and OFC materials ● PCB ● Cu series lead frames

Name	Specialties	Composition	Packing	Application
NS-500	<ul style="list-style-type: none"> ■ Prevention chemical for short circuits, leaks and bridges at Ni/Au plating on PCB ● Prevent short circuits by plating between patterns ● Prevent deposition on resist ● Remove Cu etching residue 	200mℓ/ℓ	20L	<ul style="list-style-type: none"> ○ PCB ● Ni/Au plating ● CAT-2000 process ● SLC ● Build-up ● PLP
AT-120	<ul style="list-style-type: none"> ■ Acid type activator for selective partial plating (Pd) ● No bridge and no skip plating 	AT-120 90~110mℓ/ℓ Use together with H ₂ SO ₄	20L	<ul style="list-style-type: none"> ○ Fine patterns ● PCB ● Applicable to the RoHS directive
AT-905	<ul style="list-style-type: none"> ■ Weak acid type activator for selective partial plating (Pd) ● Pd activator specially for Mo-Mn and W pastes ● Can plate selectively and partially by easy Pd substitution ● Easy to use ● Economical cost and high Pd concentration 	Undiluted solution 40~70°C	20L	<ul style="list-style-type: none"> ○ Activate Mo-Mn and W pastes on Al₂O₃ and Al ● IC packages ● PCB
AT-907 AT-907L	<ul style="list-style-type: none"> ■ Neutral type activator (Pd) ● Improve no plating and skip plating by bipolar phenomenon ● For micro patterns (L&S 30μm and under) and improving bridges ● For the RoHS directive (AT-907L) 	Undiluted solution 50~70°C	20L	<ul style="list-style-type: none"> ○ PCB and FPC ● CAT-2000-1 process ● Activate Mo-Mn and W paste on ceramics
LINDEN 52 LINDEN 52L LINDEN 52F	<ul style="list-style-type: none"> ■ Electroless Nickel plating chemical for PCB and electronic circuits ● Superior selective partial plating ability on micro patterns ● Superior plating film property ● Superior plating reactivity ● Superior adhesion power to F-Au ● Applicable to the RoHS directive (52L and 52F) 	LINDEN 52-1 LINDEN 52-2 LINDEN 52-5 LINDEN 52-3 LINDEN 52-4	20L 200L	<ul style="list-style-type: none"> ○ Specially for plating film property ● PCB and FPC ● CSP ● Micro patterns (50μm and under) ● Ni substrate for Gold plating
	<ul style="list-style-type: none"> □ WMF process chemical ● Cost down ● 30~60%off 	52A-100 52B-200 52C-100	20L 200L	
MN-AUE	<ul style="list-style-type: none"> ■ Substitution Gold plating chemical for PCB ● Stable ball share strength ● Use LINDNE 52 for Nickel substrate 	MN-AUE 50~250mℓ/ℓ 1% KCN 1~5mℓ/ℓ KAu(CN) ₂ 1~4g/ℓ	20L	<ul style="list-style-type: none"> ○ CAT-2000-1 process ● PCB and FPC
MN-AUI MN-AUIP	<ul style="list-style-type: none"> ■ Substitution Gold plating chemical ● Superior adhesion power ● Stable ball share strength ● Available powder type (MN-AUIP) 	MN-AUI Undiluted solution ~200mℓ/ℓ KAu(CN) ₂ 1.5g/ℓ	20L 20kg	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive ● Electronic parts ● LTCC substrates ● PCB and FPC
MN-AUN (neutral type, non-cyanide type)	<ul style="list-style-type: none"> ■ Electroless Gold plating chemical (substitution/reduction type) ● Gold sulfite bath ● Plating thickness:0.03~1.0μm ● Superior bath stability 	Undiluted solution Au contents 2g/ℓ	20L	<ul style="list-style-type: none"> ○ Applicable to the RoHS directive ● Electronic parts ● For thick plating on semi-conductors ● PCB

Plating process

So far, we have devoted ourselves into development of a new plating process beside of such development of plating chemicals for long while. During such period, there have appeared so many new materials into our field and such new materials have provided us some special properties as their requirements. We are very happy if the following our newly developed plating process would be of some help to such customers who are going to emerge into a new technical field or who desire to develop such new customers.

1. Electroless Ni/Au plating process (electrode formation) on silicon wafers (semi-conductors)
2. Nickel plating process on Neodymium-Boron-Iron (Nd-B-Fe)
3. Ni/Cu/Ni plating process on Neodymium-Boron-Iron (Nd-B-Fe)
4. Electroless plating process on Neodymium-Boron-Iron (Nd-B-Fe)
5. High corrosion resistance electrolytic plating process on Neodymium-Boron-Iron (Nd-B-Fe)
6. Electrode formation process by plating on high frequency dielectric filters
7. Electrode formation process by plating on PZT
8. Plating process on Cu-W (by all electroless Nickel process)
9. Electroless Ni/Au plating process on hermetic seals (air-tight terminals and quartz oscillators)
10. Ni/Au plating process on W pastes on Al_2O_3 and AlN substrates (ceramic IC packages)
11. Selective partial Ni/Au plating process on Ag, Ag-Pd and Cu pastes printed patterns (LTCC substrates)
12. Electrolytic Ni/Sn plating process on Ag and Ag-Pd paste electrodes (CR and chip capacitors)
13. Electroless plating process on Ag-Cu solders (KOVAR/Ag-Cu solders)
14. Ni/F-Au/Au plating process on dissimilar metals (PGA) (ceramic IC packages and W/B-Au)
15. Plating process for Ni/solder bumps on semi-conductor electrodes
16. Selective partial Ni/Au plating process on Al thin films on ceramics and glass (CAT-92)
17. Thin bump UBM process on semi-conductor chips (CAT-920)
18. Electroless Nickel plating process on lead frames of Cu alloys (heat sinks)
19. Selective partial Ni/Au plating process on PCB and Cu wiring patterns (CAT-2000)
20. CAT-2500 and 2500-P (PCB) (Ni/Pd/F-Au and Ni/Pd-P/F-Au)
21. CAT-2500 and 2500-P (LTCC) (Ni/Pd/F-Au and Ni/Pd-P/F-Au)
22. Selective partial Ni/Au plating process on fine patterns of Cr-Cu thin films (CAT-99)
23. Selective partial Ni/Au plating process on SLC and build-up boards, applicable to BGA (CAT-900)
24. Double Nickel plating process (dual Nickel plating with high corrosion resistance)
25. Electrolytic plating process on hoops (strips and flat rolled steel sheets)
26. Plating process on stainless steels, super hard steels (SKD), etc.
27. Electroless plating process on fabrics, textiles and foamy plastics
28. Plating process on plastics
29. Electroless plating process on micro powders (Al_2O_3 , SiO_2 , mica, diamond, Cu powder and plastic powder)
30. Plating process on glass moulds
31. Substrate plating process on Ti and Ti alloys
32. Diamond composite plating process (dicing saws for semi-conductors, drills and dressers for CMP)
33. PTFE composite plating process
34. Lubricant plating process (different to composite plating)
35. Plating process on Al materials (representative materials as ADC-12)
36. WPC process (plating process on through-holes)
37. TICOMAC process (Cu wiring patterns on ceramics)
38. Electrode formation process by plating on ceramic capacitors
39. ACF process (micro precision electroforming and micro photo electroforming)
40. High adhesion power plating process on Inconel (for Inconel 18)
41. High corrosion resistance electroless Nickel plating process on free-cutting steels (all alkaline pre-treatment and non-Chromate type)
42. Electrolytic plating process on Zinc die-castings (pinhole free, high corrosion resistance and high adhesion power)
43. Plating process on Peltier elements
44. Plating process on Be-Cu (Beryllium-Copper)
45. WMF process (customer's in-plant blending for electroless plating chemicals)

Plating equipment, waste water treatment plant, automated plating chemical controller and plating equipment for PCB

- We have installed so many numbers of plating lines to our customers which can not be copied by other competitors as we have included our own plating process into such plating lines

Joint reserch, assigned reserch and process development

- We have been assigned by our prospective customers under chargeable contract

Trial work for plating (chargeable)

- We have been assigned by our customers for so many varieties of plating job but for small quantities under chargeable contract

Recovery and recycling for Gold and precious metals

- Au, Pt, Ag, Pd & Rh

*For further details, please contact our sales representative

WORLD METAL CO.,LTD. <http://www.worldmetal.co.jp>

OSAKA

2-1-29, Imagome, Higashiosaka City, Osaka, 578-0903, Japan TEL. +81-72-967-2732 FAX. +81-72-967-2809

KANTO

2-8-28-202A, Okata, Atsugi City, Kanagawa, 243-0021, Japan TEL. +81-46-229-4884 FAX. +81-46-229-5123

TOKAI

2-15-2, Kachigawacho, Kasugai City, Aichi, 486-0945, Japan TEL. +81-568-33-5600 FAX. +81-568-33-5636

TOKYO [Recycle Division]

3-29-11-101, Hikawadai, Nerima-ku, Tokyo, 179-0084, Japan TEL. +81-3-6906-4811 FAX. +81-3-6906-4812