Dow Electronic Materials

Interconnect Technologies

Product Selection Guide

Europe, Middle East, and Africa

Interconnect Product Selection Guide

What Our Technology Does

- Versatile plating technology used for metallizing a wide variety of boards from very high aspect ratio through holes to embedded microvias for the manufacture of the most complex end-use printed circuit boards
- Imaging technologies that help to define the finest of lines for dense circuitry

What is Unique

- Innovations that facilitate advanced circuitry design delivering reliability, improved yield, and improved cost of ownership for a large variety of printed circuit board applications

End-use Markets

- Computing
- Communication
- Consumer
- Automotive
- Industrial & Medical
- Military & Aerospace

Applicatios

- MLB (Multi Layer Board)
- HDI (High Density Interconnection)
- IC Substrate
- FPC (Flexible Printed Circuit)
- Optical Waveguide

Processes

- Inner Layer Bonding
- Image Transfer
- Metallization
- Making Holes Conductive
- Electrolytic Plating
- Final Finishes
- Optical Waveguide

Dow Electronic Materials, a global supplier of materials and technologies to the electronics industry, brings innovative leadership to the semiconductor, interconnect, finishing, display, photovoltaic, LED and optics markets. From advanced technology centers worldwide, teams of talented Dow research scientists and application experts work closely with customers, providing solutions, products and technical service necessary for next-generation electronics. These partnerships energize Dow's power to invent.

Dow's portfolio includes: CMP, lithography, metallization and ceramic materials for semiconductor applications; surface preparation, metallization and imaging materials for interconnect, electronic and industrial finishing, and photovoltaic applications; precursor materials for LED, solar and semiconductor manufacturing; OLED materials, display films, and display chemicals for LCD and plasma display fabrication; and zinc-based materials for optics.

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PWB Metallization – Making Holes Conductive

DESMEAR	
CIRCUPOSIT™ Hole Prep 3304	• Prepares resin surfaces for efficient and complete treatment in CIRCUPOSIT™ Promoter 4130 • Enhances resin removal for desmear, long life, easy to control
CIRCUPOSIT™ Hole Prep 4120	• Cleans and conditions hole wall surfaces prior to treatment in alkaline permanganate • Ensures excellent removal of drill smear and good adhesion and coverage of electroless copper
CIRCUPOSIT™ Hole Prep 4126 Sweller	• Enhanced resin removal for high Tg materials • Suitable for both traditional FR-4 laminates and high Tg materials
CIRCUPOSIT™ 4130 Promoter	• Alkaline permanganate solution that effectively removes resin smear from inner layer junctions • Cleans and texturizes the hole wall to improve adhesion of plated copper
CIRCUPOSIT™ 3314 Neutralizer	• CIRCUPOSIT™ Neutralizer 3314 is an integral portion of the patented CIRCUPOSIT™ 3000-1 Electroless Copper Plating Solution. It is a non-chelated neutralizer that removes manganese residues formed at the previous step.
CIRCUPOSIT™ Neutralizer 3319/MLB Glass Etch	• Amine-based neutralizers to remove manganese residues while simultaneously etching exposed glass fibers • Glass Etch controllable from frost to etch back
ELECTROLESS COPPERS (PRE-PLATE)	
CIRCUPOSIT™ 3320 A Conditioner	• Contains a novel conditioning agent, which promotes the adsorption of a thin layer of catalyst, thus producing total electroless copper coverage while avoiding problems associated with over catalyzation • Designed to provide the optimum palladium adsorption for all laminate and dielectric materials
CIRCUPOSIT™ 3323 A Conditioner	• Alkaline conditioner containing a powerful catalyst promoter that ensures total copper coverage of all epoxy and glass fibre surfaces
CIRCUPOSIT™ 3325 Conditioner	• Conditioner designed to facilitate coverage on a wide variety of laminate materials
CIRCUPOSIT™ 3327 Conditioner	• Mildly acidic conditioner that is free of strong complexing agents • Prepares hole wall surfaces for optimal catalyst adsorption, ensuring complete electroless copper coverage in the PTH process
CIRCUPOSIT™ 3328 Conditioner	• APE-free, acidic conditioner designed for controlled surface adsorption on laminates
CIRCUPOSIT™ Etch 3330	• Persulfate- and sulfuric/peroxide-based microetch systems for reliable copper to copper bonds • Dow Electronic Materials steady state control systems available
CIRCUPOSIT™ Catalyst 3344/4444	• Industry standard system consisting of a low acid colloidal tin-palladium catalyst, liquid or solid CATAPREP™ Pre-dip Components, catalyst salt additives, and control additive

ELECTROLESS COPPERS (VERTICAL)	
CIRCUPOSIT™ 3350-1	• Self accelerating copper; EDTA-based • Fine grained deposit ideal for high performance multilayers • Deposits 1.2-1.3 um (47-51 millionths of an inch) in 30 min
NEW! CIRCUPOSIT™ 8500 for Semi Additive Process Substrate Applications	• EDTA-free, tartrate based electroless Cu system • CIRCUPOSIT™ 8510, 8512, or 8515 Conditioners → Microetch → Acid Dip → CIRCUPOSIT™ ADV 8530 Alkaline Ionic Catalyst → CIRCUPOSIT™ 8540 Reducer → CIRCUPOSIT™ ADV 8550 Electroless Cu
CUPOSIT™ 328 L Copper Mix	• High-yield, "thin" electroless copper, tartrate-based • Very stable and simple to operate • Excellent copper-to-copper bonds achieved with all electroplate coppers • Deposits 0.4–0.6 µm (15–25 millionths of an inch) in 20 minutes • Suitable for FPC application
NEW! CIRCUPOSIT™ 328 QI	• Stable tartrate based system • No heavy metal ions added • Thin deposit eless copper process
ELECTROLESS COPPER BATHS (HORIZONTAL)	
CIRCUPOSIT™ 3350-1	• Advanced self-accelerating copper, EDTA-based, suitable for horizontal applications • Fine-grained deposit ideal for high performance multilayers and HDI (High Density Interconnection)applications • Deposits 0.3–0.5 µm (12–20 millionths of an inch) in 4–5 minutes
NEW! CIRCUPOSIT™ 6500	• Ionic catalyst designed for EDTA-free, tartrate based electroless Cu system • CIRCUPOSIT™ 3325 Conditioner → Microetch → CIRCUPOSIT™ 6520 Pre-Dip → CIRCUPOSIT™ 6530 Ionic Catalyst → CIRCUPOSIT™ 6540 Reducer → CIRCUPOSIT™ P-6550 Electroless Cu
DIRECT PLATE	
CONDUCTRON™	• Distinct palladium-based system that offers one of the most conductive direct plate coatings on the market • Does not require a post-coating microetch • May be used in vertical or horizontal applications • **Process Sequence:** Conditioner > Microetch > Glass Conditioner > Pre-Dip > Conductron Activator > Activator
GRAPHITE 2000™	• Graphite-based direct plate system for making holes conductive • Stable colloidal system • **Process Sequence:** Hole Prep > Promoter > Neutralizer > Graphite > Micro-Etch

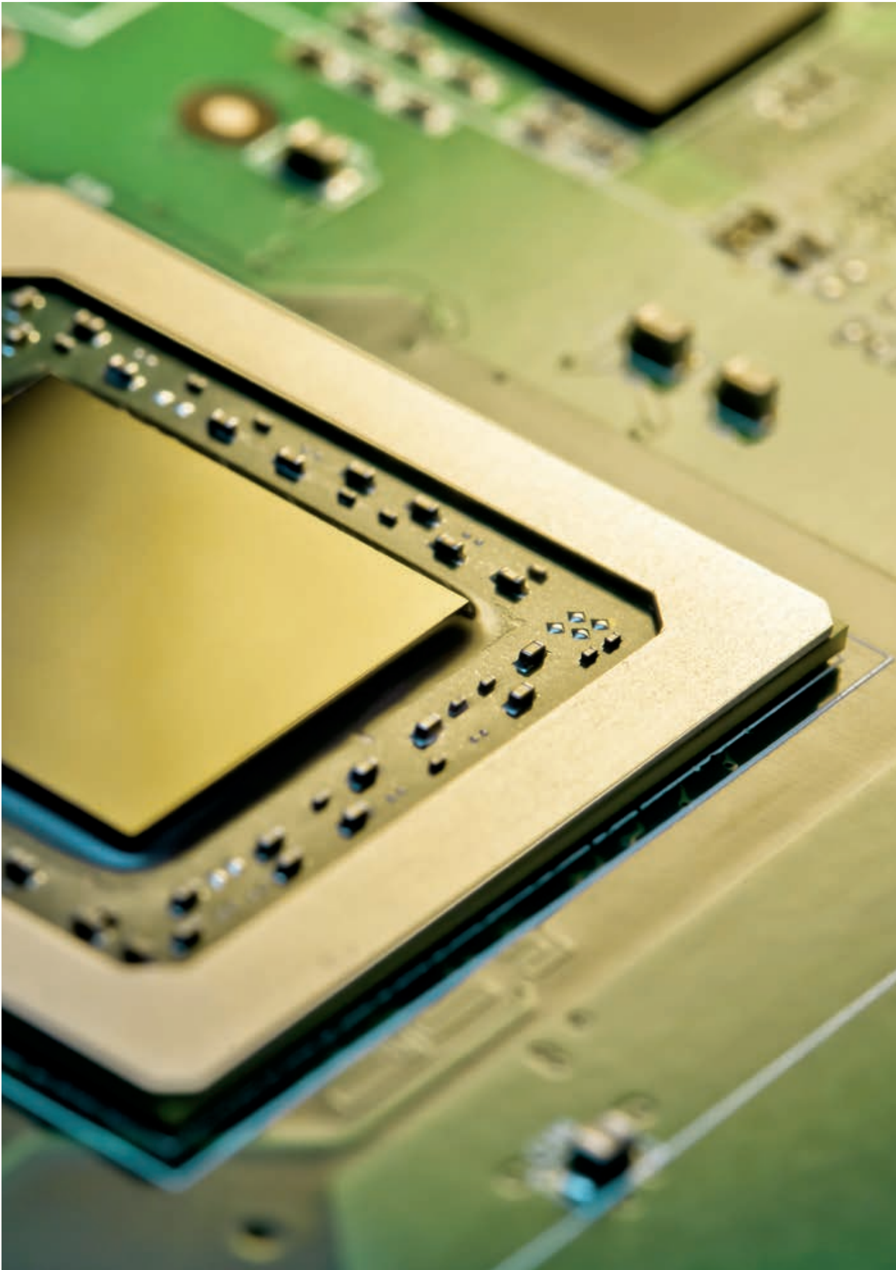
PWB Metallization Electrolytic Plating

ACID CLEANERS	
RONACLEAN™ 960	• Non-chelated acid cleaner
RONACLEAN™ EVP-209	• Non-chelated acid cleaner • NPE (APE) free
RONACLEAN™ EVP-210S	• Sprayable, low-foaming cleaner • NPE (APE) free
MICRO-ETCHANTS	
CIRCUPOSIT™ ETCH 3330	• Peroxysulfate-based • Automatic feed and bleed control
ACID COPPERS (VERTICAL)	
COPPER GLEAM™ 2001-1	• Operating current density from 1-3 ASD (10-30 ASF) • Excellent microlevelling characteristics in narrow diameter holes • Excellent metal distribution even at aspect ratios higher than 10:1 • Bright, ductile copper deposits with high throwing power
ELECTROPOSIT™ 1000	• Exceptional throwing power, surface distribution and levelling at low current densities (0.5-1.5 ASD, 5-15 asf) • Utilizes conventional equipment
COPPER GLEAM™ 1300	• Reliable through hole plating of multilayer and double sided printed circuit boards. • Results are achievable with either electroless copper or the latest direct plate processing • Current density range 1.5-4 ASD (15-40 ASF)
COPPER GLEAM™ CUPULSE™ Plus	• Periodic Pulse Reverse plating for improved performance in throwing power and bathstability for HLC applications
ACID COPPERS (HORIZONTAL)	
COPPER GLEAM™ HS-200	• Two component DC additive system designed to operate at high current densities (5–10 ASD, 50–100 ASF) • Bright, uniform deposit • Fully compatible with insoluble anodes
COPPER GLEAM™ PPR-H	• Distinct two-component additive system that utilizes periodic pulse reverse rectification • Engineered to deliver dramatic improvements in throwing power and surface distribution • Operates at current densities between 5–10 ASD (50–100 ASF) • Fully compatible with insoluble anodes

ACID COPPERS FOR FLEX SUBSTRATE PLATING	
COPPER GLEAM™ CLX	• Operates at current densities between 0.5–2.0 ASD (5–20 ASF) • Excellent physical properties for FPC requirements • Bright, uniform deposit • Compatible with soluble anodes
COPPER GLEAM™ HGX	• Operates at current densities between 0.5–2.0 ASD (5–20 ASF) • Excellent physical properties for FPC requirements • Bright, uniform deposit • Special designed pre-dip process to improve plating appearance • Compatible with soluble anodes
ACID COPPERS FOR VIA AND THROUGH HOLE FILL PLATING	
MICROFILL™ LVF-3	• Exceptional microvia filling performance • Operates at medium current densities between 1–2 ASD (10–20 ASF) • Bright, leveled, uniform deposit • Designed for use with soluble anodes
MICROFILL™ EVF	• Exceptional microvia filling performance • Operates at current densities between 1–3 ASD (10–30 ASF) • Bright, leveled, uniform deposit • Designed for use with insoluble anodes
MICROFILL™ THF-100	• Exceptional through hole filling performance • Operates at current densities between 1–2.5 ASD (10–25 ASF) • Bright, leveled, uniform deposit • Designed for use with insoluble anodes
TIN PLATING (SULFURIC ACID BASED)	
RONASTAN™ EC-1	• Matte tin for etch resist applications • Exceptional throwing power • APE/NPE-free
TIN PLATING (METHANESULFONIC ACID BASED)	
SOLDERON™ PC-T	• Pure tin for etch resist applications • Designed for medium to high technology applications

PWB Final Finish

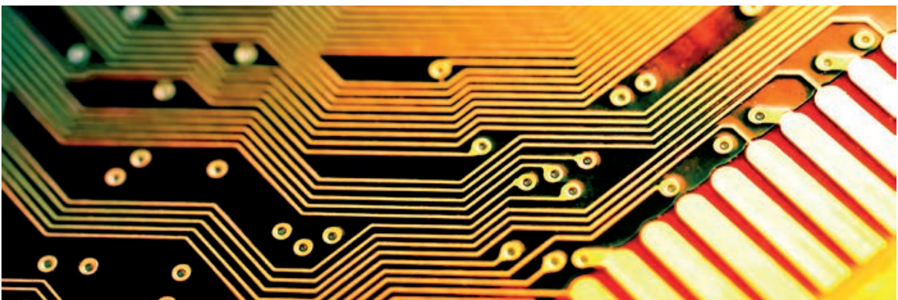
ACID CLEANERS	
RONACLEAN™ 960, EVP-209	• Acidic cleaners, specially designed for removing residues after development aqueous, alkali-strippable dry films
MICRO-ETCHANTS	
CIRCUPOSIT™ Etch 3330	• Peroxy-sulfate based • Mildly-acidic micro-etch providing excellent copper adhesion • Stable and active for longer periods of time while maintaining consistent etch rate
RONAMERSE™ CATALYSTS	
SMT Catalyst	• Chloride based palladium catalyst system
SMT Catalyst CF	• Palladium sulphate-based
ELECTROLESS NICKEL	
DURAPOSIT™ SMT 88	• 8-10% P content by weight electroless nickel with excellent corrosion resistance and solderability • Low skip plating risk
RONAMAX™ SMT	• Consistent deposition rate for SMT applications • 7–10% Phosphorous by weight • High tolerance to metallic contamination
PALLAMERSE™ ELECTROLESS PALLADIUM	
SMT 2000	• Electroless palladium-phosphorous • Used as part of ENEPIG finish for gold wire bonding and excellent solder joint reliability
IMMERSION GOLDS	
AUROLECTROLESS™ SMT 250-1	• Uniform, fine-grained deposit of soft, pure gold • Solderable and aluminum wire bondable
AUROLECTROLESS™ SMT-520	• Designed to produce a uniform fine-grained electroless deposit of pure gold on metallic substrates including electroless nickel and electroless palladium • Lower gold content notably reduces operating costs • Applied as part of ENIG process • The AUROLECTROLESS™ SMT 520 Immersion Gold bath is easy to control and has a high tolerance to contaminants
IMMERSION TIN	
TINPOSIT™ LT34	• Advanced immersion tin for lead-free assembly • Smooth dendrite-free deposits • Fine-grained deposit offering excellent solderability and reliability • Notably reduces galvanic corrosion and solder mask attack • Deposits 1.0–1.2 µm (40–50 millions of an inch) tin in 10–13 minutes



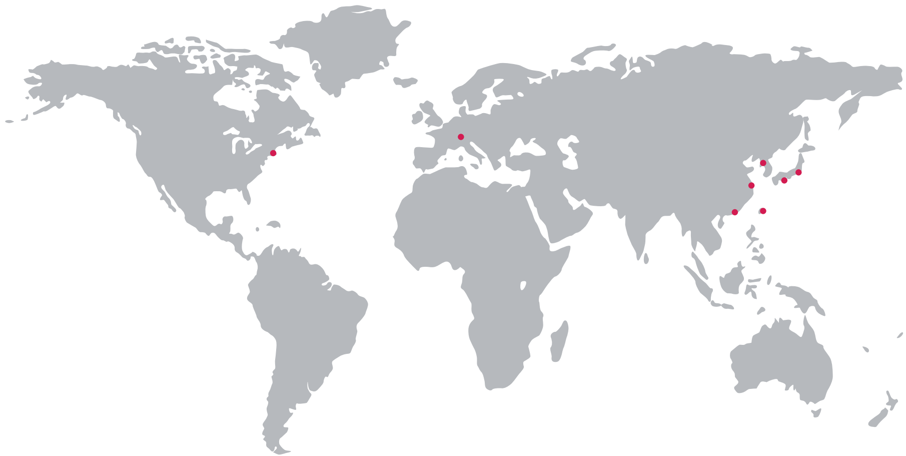
PWB Imaging Materials – Inner Layer

ACID CLEANERS	
RONACLEAN™ EVP-210S	• Sprayable, low foaming cleaner • NPE (APE) free
MICRO-ETCHANTS	
CIRCUPOSIT™ Etch 3330	• Peroxy-sulfate based • Mildly acidic micro-etch offering excellent copper adhesion • Stable and active for longer periods of time while maintaining consistent etch rate
INKJET PHOTO RESIST	
LITHOJET™ 210	• UV-curable acrylic hybrid ink used for etching applications on copper, stainless steel and other metals • Compatible with most PZT drop-on-demand inkjet systems
LITHOJET™ 223	• Etching and plating resist for Printed Circuit Board applications • Very high chemical resistance to acid and alkaline solutions • UV curable • Alkaline strippable
LITHOJET™ 240	• Compatible with acid or alkali etching • High chemical resistance • UV curable
LITHOJET™ 250	• Plating resist compatible with plating chemistries • Designed for high resolution plating • Very high chemical resistance to acid and alkaline solutions • UV curable • Alkaline strippable • Used in selective plating of connectors, electrolytic gold, nickel, copper, and electroless nickel
LIQUID PHOTORESIST	
PHOTOPOSIT™ SN68 H-3	• Negative working photoresist designed for inner layer fabrication and photochemical machining • Stackable – in excess of 24 hrs. • Fast exposure speeds • Extremely low-foaming during developing • Suitable for acid etching applications
PHOTOPOSIT™ SP24D	• Positive working photoresist designed for inner layer fabrication and photochemical machining • Can be used on virtually all metals and alloys including copper, stainless steel, aluminum, and on glass, ceramic and many other substrates • Dried film is extremely hard and stackable

DEVELOPERS	
DEVELOPER 9033	• Aqueous developer for photoresist • 600+ g/L potassium carbonate solution with proprietary equipment cleaner
ANTI-FOAM	
DOWFAX™ DF-146	• Highly effective foam suppressant designed for use with developing and stripping solutions used with aqueous dry films
PHOTORESIST STRIPPING	
SURFACESTRIP™ 419, 715	• Highly concentrated, alkaline liquid designed to be used to fully strip aqueous dry film • Leaves underlayer of copper free of spots and oxidation for easy AOI inspection
CIRCUBOND™ OXIDE REPLACEMENT	
CIRCUBOND™ Cleaner 140	• Low-foaming alkaline-spray cleaner • Minimal attack on copper surfaces
CIRCUBOND™ PreDip 2217	• Designed to provide a surface compatible with either CIRCUBOND™ 2200 or CIRCUBOND™ 2200 Plus Treatment Bath
CIRCUBOND™ 2200 Plus	• Extremely consistent and high peel strength • High copper loading of above 45 g/L • Excellent peel strength on full range of lead-free and high Tg prepeg • Compatible with most halogen-free high-Tg and mid-Tg prepregs with high peel strength
SUPPLEMENTARY PRODUCTS	
ENVIROSTRIP™ 785 Tin Stripper	• High loading tin and tin/lead stripper



A Worldwide Presence



Interconnect Techonlogies Locations:

DongGuan, Hong Kong, Shanghai and Suzhou, China
Sasakami, Japan
Tokyo, Japan
Seoul, South Korea
Taoyuan Hsien, Taiwan
Lucerne, Switzerland
Malborough, Massachusetts

Dow Electronic Materials **dowelectronicmaterials.com**

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