



SERFILCO®

FILTRATION OF ACID COPPER SOLUTIONS

TECHNICAL
BULLETIN
TF-154

Acid copper solutions are commonly used in gravure process, automotive underplate for nickel / chrome on decorative parts and on printed wiring boards and other electronic components. "High throw" copper sulfate baths are used for through hole plating. Due to air agitation, the acid copper bath requires continuous filtration to obtain smooth deposits. Periodic carbon treatment is also necessary to remove organic impurities which can cause deposit irregularities.

RECOMMENDED FILTER CARTRIDGE / FLOW RATE

Filtration with 15 micron all polypropylene cartridges at flow rates providing at least twice per hour tank turnover is recommended. This can usually be accomplished with a filtration system sized at the rate of one 2½" x 10" cartridge for each 50 gallons. Denser cartridges at higher flow rates up to 10 times per hour should be considered where the highest possible clarity and quality are required. Each cartridge will have the dirt holding capacity of approximately 3½ square feet. The high dirt holding capacity provided by the depth type cartridges have made it possible to operate filters unattended for 8 weeks or longer.

FILTER SYSTEM RECOMMENDATIONS

Systems consisting of a pump and filter combination are recommended with separate carbon chamber for continuous purification when necessary. Slurry tank related piping and valves are useful for making up the bath before the brightener is added as well as for batch carbon treating the bath. The slurry tank makes pump priming and the addition of chemicals easier. A carbon canister purification chamber can be adapted to any filter with bypass valve and piping to control the flow through the carbon.

Plastics such as polypropylene, PVC or CPVC are the most suitable materials for pump and filter construction.

FILTRATION OF COPPER PYROPHOSPHATE

Air agitated copper pyrophosphate baths require continuous filtration with 2 - 3 turnovers per hour to remove all particles which can cause nodular plating. Continuous carbon treatment to remove organic contaminants is also recommended. The carbon must be changed regularly. About one pound of carbon per 100 gallons should be used to prevent excessive build-up of organics, which cause a brittle copper condition. From

time to time, batch carbon treatment with the addition of filter aid may be necessary to remove all organic decomposition products. Also, occasional permanganate or peroxide treatment will extend the life of the bath.

FILTRATION OF PHOTORESIST

Improves product quality, prevents rejects and extends the life of resist solutions

Liquid photoresists are used in the manufacture of printed circuits, photoengraving, nameplates, and chemically milled parts. Photoresists are applied to the surface and processed to achieve a resist pattern that withstands etching or plating. In dip coating operations, contamination of the photoresist occurs by drag-in of foreign particles. The particles produce pinholes and often faulty resist images. Some particles will eventually dissolve or disintegrate in the photoresist, causing resist failure or discoloration. Since some printed circuit work has extremely fine line separation, cleanliness of the liquid is critical and requires filter media capable of removing particles in the 1 to 5 micron range and even submicron.

Photoresists are usually polymers dissolved in an organic solvent that either cross-link (negative) or degrade (positive) when exposed to ultraviolet light. Material selection for construction of components of any filtration system is important to pump life and photoresist cleanliness. Generally speaking, 300 series stainless steel is the overall best material. TFE coated metal may also be used in seals, impellers, gaskets, etc. Nylon can be used in some instances. Cotton is a suitable filter media fiber.

Users of photoresists usually work with tanks of a few gallons up to 50 or 100 gallons. Filtration is often required on a constant recirculation basis, but the batch basis is most common. Filtration on a continuous basis must be done in such a way as to prevent aeration of the liquid; or bubbles causing misses on the surface of the circuit board will result. High RPM pumps sometimes generate heat if operated for too long a period, also causing deterioration of the photoresist. A system using a low RPM self-priming pump is most desirable.

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