FILTRATION OF PRECIOUS METAL SOLUTIONS

Electroplating of precious metals, such as gold, rhodium and platinum, is done either for decorative finish or for electrical contact applications. Therefore, quality of finish and functional characteristics of the deposit will vary and the level of clarification and purification chosen will be dependent upon the requirements of the application. Size will vary from relatively small tanks in jewelry manufacturing shops, to tanks holding several hundreds of gallons in large electronics plants manufacturing printed circuit boards.

PURIFY WITHOUT SOLUTION LOSS

Precious metal electroplating solutions are high in cost; therefore, any means of clarification and purification selected must be done in such a way as to assure the operator that no solution will be lost due to carelessness or malfunction of the equipment.

OUT-OF-TANK FILTERS CAN BE USED

In-tank type filters are considered to be the safest to operate on precious metal solutions because any leaks are totally contained within the plating tank. However, out-of-tank filters can be as safe if the filtration system is mounted in a plastic tray or tank to assure that no solution will be lost, even if a leak should occur. Siphon breakers on the pump suction and filter return lines should be installed as an additional measure to limit the amount of liquid lost by back siphoning. Magnetic coupled pumps provide complete containment of the liquid without leakage, adding to the safety of out-of-tank filtration systems in which they are used.

The selection of an in-tank or out-of-tank pump and filter will depend upon space limitation of the work area in the tank, and the ability of the unit to meet the flow and pressure requirements.

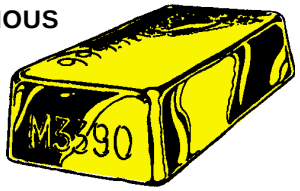
Many precious metal solutions plate better when good agitation is provided in the plating tank. The more uniform coverage obtained with high flow rates results in substantial cost savings.

A pump used with a filter can provide the pressure needed to achieve filtration and can also have sufficient pressure to provide for agitation of the solution. (Utilization of a mixing eductor on the filter discharge can improve agitation many times.) However, if the pump is undersized for both jobs, the agitation serves as a bypass for the filter reducing particle pickup by the filter media. This, in turn, leads to progressive contamination of the plating solution. High flow rates through the filter, plus periodic bypass purification through carbon as necessary, can minimize the need for carbon batch treatment of these solutions. This makes it possible to keep the precious metal in the plating tank with less chance of solution loss.

AUTOMATIC ADDITION SYSTEM IMPROVES CONTROL AND COST

Ampere-Time controllers connected to a shunt on the rectifier provide automatic chemical additions to the bath. Not only do they allow more precise control and improve quality, but they are a valuable cost control for expensive chemicals.

RECLAMATION OF PRECIOUS METALS



With the high cost of precious metals, the use of dragout rinses, electrolytic recovery and ion exchange also have a rapid payback.

ELECTROLYTIC RECOVERY

An electrolytic recovery unit installed in the dragout rinse tank can recover the bulk of precious metals dragged out. Even a small, 20 amp system will recover up to 1.5 oz. per hour.

ION EXCHANGE SYSTEMS

Ion exchange systems can be utilized for recovery of gold and other precious metals. A recirculatory ion exchange system on a still rinse tank can recover 50 to 100 troy ounces of gold per cubic foot of resin.

While the still rinse may recover the bulk of the gold dragout, substantial savings also can be realized by the use of an ion exchange system to recapture metal from the flowing rinse.

Past experience has shown that if there is no recovery on the dragout tank at all, even with little or no recesses in the parts plated, gold loss is 5%!! For barrel plating, the gold loss is 10%!! These figures are "rule of thumb" only, but will cover at least 75% of all gold plating operations.

Payback on the use of a filtration system, along with some of the other equipment suggested above, could occur in a matter of weeks and result in tremendous savings, depending upon the size of the installation.