AUROMEX®

TECHNICAL INSTRUCTIONS

DATA SHEETS

SILVAMEX EF90

HIGH SPEED SILVER ELECTROFORMING PROCESS

INTRODUCTION

The **AUROMEX SILVAMEX EF90** is a high speed semi-bright to mirror bright alkaline cyanide process, specially developed to give a hard bright deposits over a much wider range of current densities. This process is advantageous to many applications either decorative or industrial. Such as wire plating , contacts, semi-conductors, jewellery, gift items and electroforming applications.

FEATURES

- Semi-Bright to Mirror Bright finish deposits.
- Deposits are hard, highty ductile and good wear resistance.
- Wider operating current densities, uniformly deposits from 0.5 to 10 Amp/dm^2
- Non-critical, economical operation and control.
- No accumulation of deleterious brightener decomposition products.
- Exceptional throwing and covering power.
- High electrical conductivity.

DEPOSIT PROPERTIES

Appearance	:	Semi to Mirror Bright Finish (silver colour)
Deposit purity	:	99.9% up
Hardness	:	100 - 160 mHv20g
Deposit Density	:	10.5 g / dm^2
For 1 micron deposit	:	105 mgm / dm^2

PLATING BATH PREPARATION

SILVAMEX EF90 make up agent is supplied in unit form. Each unit contains all the products required to make 10 litres of solution. It does not contain silver.

The following instructions are for the preparation of 10 litres of solution.

AUROMEX ® CHEMICALS CORPORATION
UNIT NO. 2, 4/F., INTERNATIONAL PLAZA, 20 SHEUNG YUET ROAD, KOWLOON BAY, KOWLOON, H.K.
TEL: 2796 7238 FAX: 852-2796 7117

MATERIAL REQUIRED :

SILVER Potassium Cyanide (54%)	1.5 kgs.
SILVAMEX EF90 Make Up Salt (Code 14440)	1.5 kgs.
SILVAMEX EF90 Make Up Brightener A (Code 14441)	250 mls.
SILVAMEX EF90 Make Up Brightener B (Code 14442)	50 mls.

PROCEDURES :

(1) Fill to a clean plating tank 2/3 of the required final volume with distilled or deionised water.
(2) Add in the 1.5 kgs **SILVAMEX EF90** Make Up Salt (Code 14440), stir unit completely mixed.
(3) Dissolve the silver Potassium Cyanide (54%) in a separate quantity of demineralised or distilled water and then add to the above solution.
(4) Add in the **SILVAMEX EF90** Make Up Brightener A & B.
(5) Dilute the solution to 10 litres with demineralised or distilled water, the solution is then ready to use.

OPERATING CONDITION :

	UNIT	RANGE	OPTIMUM
SILVER METAL	g/l	50-100	80
KCN (FREE)	g/l	90-110	100
K2C03	g/l	15-60	20
pH		12-12.5	12.3
TEMPERATURE	℃	25-30	28
CATHODE CURRENT DENSITY	A/dm²	1-2	0.5-5*
DEPOSITION RATE	min/u	5 microns in 7.5 minutes at 1 A/dm²	
ANODE		Fine grained extruded 99.9% Silver	
ANODE : Cathode ratio		2:1 min	
AGITATION		Moderate to Vigorous	
CURRENT EFFICIENCY		100%	

* The cathodic current density depends upon the deposition rate required. Normally, there is a maximum current density at which an article may be plated without "burning" occurring. This figure will depend therefore, on the silver and free cyanide concentrations, the degree of agitation and the physical shape of the part.

EQUIPMENT

TANKS — Steel lined with suitable plastic material such as polyethylene, Tygon, polyvinyl chloride, Koroseal and glass containers are recommended.

HEATERS — Not normally required but a stainless steel immersion heater with thermostat control.

FILTRATION — Preferably continuous using filter paper stacks or woven nylon or polypropylene cartridges.(capacity of approx. 1-2 times tank volume per hour.)

AGITATION — The most suitable method of providing agitation is by means of a moving cathode bar arrangement. In additions, particularly in cases of continuous operation, moderate circulation of the solution by means of a pump is most desirable.

ANODES — High quality anodes should be used. Fine silver electrolytic grades (99.7% up) is recommended.

SOLUTION MAINTENANCE

SILVER METAL :

The silver content should not be allowed to drop below 50 gram per litre. Below this figure, because of lack of sufficient silver ions the tendency for dullness at the high current density areas will increase. During the operation, the silver anodes normally maintain the silver content. Sufficient anodes should be used in the tanks so that the anode current density does not at any time exceed about 12 amperes per square foot. A ratio of cathode to anode area of 1 to 2 is highly desirable.

POTASSIUM CYANIDE :

To obtain optimum brightness, it is important to maintain the free cyanide at a minimum of 95 g/l. Below this value, there is a tendency for dullness to develop in regions of low current density.

POTASSIUM CARBONATE :

As in all cyanide baths, carbonates build up. The carbonate content may reach a value of 80 g/l without adverse effect.

SILVAMEX EF90 REPLENISHER BRIGHTENER :

This is the active additive for maintaining bright deposits. Additions are made on the basis of the number of ampere hours passed through the solution. For each 6000 ampere-minutes add 300 mls. **SILVAMEX EF90** Replenisher Brightener A and 30 mls. **SILVAMEX EF90** Replenisher Brightener B.

STRIKE SOLUTION

A silver strike should be used prior to silver plating. A typical formula is as follows :

AgCN	1.5 - 3.5 g/l
KCN	100 - 115 g/l

TYPICAL DEPOSITION RATE

The process is 100% cathode effeciency, thus the following figures may be used as a guide to deposition rate.

Current Density A/dm²	Deposition time (seconds) 1 micron (40 micro-inches)
1.0	90.0
5.0	18.0
10.0	9.0
15.0	6.0

ORDERS & PACKING

When ordering, reference should be made to the following code and packing.

SILVAMEX EF90 Make Up Salt (Code 14440)	1.5 kg/unit
SILVAMEX EF90 Make Up Brightener A (Code 14441)	250 mls/unit
SILVAMEX EF90 Make Up Brightener B (Code 14442)	50 mls/unit
SILVAMEX EF90 Replenisher Brightener A (code 14443)	300 mls/unit
SILVAMEX EF90 Replenisher Brightener B (Code 14444)	30 mls/unit