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# AUROMEX<sup>®</sup>

TECHNICAL

INSTRUCTIONS

DATA SHEETS

## **STANNOCLAD BNC**

### **TIN- NICKEL- COBALT ALLOY PLATING PROCESS**

#### **INTRODUCTION**

The **AUROMEX STANNOCLAD BNC** is a newly developed alkaline tin-nickel-cobalt alloy plating process that can produce a brilliant black deposit. This process is specially designed to give a reasonable hard, ductile and fine grained deposit both as undercoats or top colouring and deposits of this process are excellent in resistance to tarnishing and oxidation, it is advantageous to many applications in decorative purpose, such as jewellery, spectacle frame and watch manufacturing industries.

The **AUROMEX STANNOCLAD BNC** can be used for both tack and barrel plating.

#### **PROCESS FEATURES**

- \* Mirror Bright, greyish to deep black colour deposit.
- \* Deposits are hard and highly ductile
- \* Non-critical in operation and control
- \* No accumulation of deleterious brightener decomposition products
- \* Reasonable corrosion resistance
- \* Relatively low cost
- \* High plating efficiency

#### **DEPOSIT CHARACTERISTICS**

Appearance	: Mirror bright, greyish to deep black colour deposit
Deposit composition	: 55-65% Tin, 25-30% Nickel, 10-15% Cobalt
Hardness	: 250-300 vickers (depends on ratio of alloying metals)

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**AUROMEX<sup>®</sup>**

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

## EQUIPMENT REQUIRED

Tank	Polypropylene or PVC glass fiber reinforced tanks are suitable.
Heater	Heating is required and temperature regulation is essential. Therefore, thermostatically controlled immersion heater are recommended.
Rectifier	A standard D C power supply should be used with an ampere output capacity sufficient to meet the requirements of the plating operation. The power supply should be equipped with a Voltmeter, ammeter and stepless control for accurate regulation of the current.
Filtration	The solution should be filtered continuously through polypropylene or cotton cartridges to maintain clarity.
Agitation	Moderate to vigorous agitation is necessary to maintain uniform metal distribution. Jet Stream and mechanical agitation at 7-14 m/min may be used.
Anodes	Insoluble anodes should be used, Platinized Titanium anodes or graphite anode with an area sufficient to provide a maximum current density of $0.25\text{A/dm}^2$ are recommended.

## PLATING BATH COMPOSITION

**AUROMEX STANNOCLAD BNC** make up electrolyte is supplied ready to use, containing all necessary chemicals and reagents.

## OPERATING CONDITIONS

	<u>Unit</u>	<u>Range</u>	<u>Optimum</u>
Metallic tin content	g/l	3-6	4
Metallic nickel content	g/l	3-10	5
Metallic cobalt content	g/l	3-10	5
Temperature	°C	30-50	45
Cathode current density	$\text{A/dm}^2$		
	(rack)	0.5-2.0	1.0
	(barrel)	0.3-1.0	0.5
pH value		8.5	7.5-9.5
Agitation		moderate	moderate
Plating rate at $1\text{ A/dm}^2$	min/um	6-8	7

## **BATH MAINTENANCE**

The alloy metal content of the solution should be maintained at the recommended concentration and ratio (ie cobalt at 5 g/l, tin at 4 g/l, nickel at 5 g/l) by periodic additions of replenishment chemicals (BNC-1 tin concentrate, BNC-2 nickel concentrate and BNC-3 cobalt concentrate) and brightener (BNC replenisher brightener), no extra chemicals required in normal routine replenishment.

Replenishment should be based on regular analysis but under optimum operating conditions,

For every 100 Ampere-hour, recommend to replenish the following chemicals:

STANNOCLAD BNC-1 tin conc.	1.0 litre
STANNOCLAD BNC-2 nickel conc	0.3 litre
STANNOCLAD BNC-3 cobalt conc	0.3 litre
STANNOCLAD BNC brightener	25 c.c.

## **RECOMMENDED PLATING SEQUENCES**

Bright Nickel Plated → Clear water rinse → Stannoclad BNC → Clear water rinse  
→ Anti-tranish passivation → Clear water rinse → Hot D.I. water rinse →

Oven dry

## **CONDUCTIVITY**

Specific gravity of the solution should be maintained between 12-25 degree Baume. If for any reason excessive drag out occurs, and the specific gravity of the solution drops below 15 degree Baume, we can replenisher by Stannoclad BNC conducting salt or metallic replenisher concentrates (tin/nickel/cobalt concentrates).

## **PH ADJUSTMENT**

The pH of the solution is recommended to keep between 7.5-9.5 to lower or raise the solution pH by addition of 25% potassium hydroxide or phosphoric acid.

## **PACKING**

When ordering, reference should be made to the following code numbers:

STANNOCLAD BNC Make Up Electrolyte	20 litre / pack
STANNOCLAD BNC-1 Tin Concentrate	5,10 or 20 Litre / pack
STANNOCLAD BNC-2 Nickel Concentrate	5,10 or 20 litre / pack
STANNOCLAD BNC-3 Cobalt Concentrate	5,10 or 20 litre /pack
STANNOCLAD BNC Brightener	1,2 or 5 litre /pack
STANNOCLAD BNC Special Blackener Additive	1,2 or 5 litre /pack
STANNOCLAD BNC Wetting Agent	1,2,5 litre /pack
STANNOCLAD BNC Conducting Salt	20 or 25 Kgs /pack