
AUROMEX®

TECHNICAL

INSTRUCTIONS

DATA SHEETS

PALLMEX PN80

PALLADIUM NICKEL ALLOY ELECTROPLATING PROCESS

INTRODUCTION

AUROMEX PALLMEX PN80 is a mildly alkaline bright, palladium nickel alloy plating process, whose unique corrosion resistance is the result of the brightener system which ensures a true alloy with low stress, high ductility and extreme white and mirror bright finish for both electronic and decorative plating applications. **PALLMEX PN80** is particularly suitable for use as substitutes or partial substitutes for several of the other precious metals, most notably gold. A palladium nickel undercoat for gold or rhodium as a substitute for bright nickel improves the corrosion resistance of the coating.

PROCESS CHARACTERISTICS

- * Substitute for gold/rhodium
- * High hardness
- * Low internal stress
- * High ductility (6-8% elongation)
- * Extreme white and mirror bright finish
- * Extremely economic
- * Excellent deposit distribution
- * Non toxic electrolyte
- * Ease of control

DEPOSIT CHARACTERISTICS

Appearance : Extreme white, mirror bright (follow substrate)
Purity : 75-80% Pd, 20-25% Ni
Density : 11.0 – 12.0 g / cc
Hardness : 550-600HV_{20g}

P-1

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CHEMICALS CORPORATION

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EQUIPMENT REQUIRED

Tanks	Polypropylene or PVC glass fibre reinforced tanks are suitable.
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, platinised titanium anodes with an Area sufficient to provide a maximum current density of 0.25 A/dm^2 are recommended.

MAKE UP INSTRUCTION

Palladium Complex :

For the preparation and maintenance of the solution, palladium is added in the form of Diammino-palladium complex (50% pd metal) or Tetra-palladium complex (40% pd metal)

Preparation of the solution :

PALLMEX PN80 make up is supplied as a ready for use electrolyte, it contains all the necessary agents to make up the bath, but does not contain Palladium.

Material required : For 10 litres of electrolyte

Palladium 'P' complex (100 g/l Pd metal)	600 mls
Palladium PN80 Make Up Electrolytes	10 litres
Palladium PN80 Brightener	as required
Palladium PN80 Wetting Agent	as required
Palladium PN80 Acid Adjustment Solution	as required
Ammonium Hydroxide	

OPERATING CONDITIONS

	<u>Unit</u>	<u>Optimum</u>	<u>Range</u>
Metallic Palladium Content	g / l	6	6.0 – 8.0
Metallic Nickel Content	g / l	8	7.0 – 10.0
Temperature	°C	30	25 – 35
Density	°Be	12	8 – 16
pH		8.5	8 – 9
Cathode Current Density	A / dm ²	1 (Vat) 0.4 (barrel)	0.5 – 1.5 (Vat) (barrel)
Anode – to – Cathode Ratio		4 : 1	3 – 5
Agitation	m / min	4	3 – 5
Plating Rate	mgm / Amp - min	23	23 – 25
Time to deposit 1u at 1 A/dm ²	min	4.5	4.5 – 5.0

BATH MAINTENANCE

The Palladium metal content should be maintained at the recommended concentration (6.0 – 8.0 g/l) by periodic additions of Palladium Complex (recommended to replenish in a pre-made solution form of palladium concentrate). **Pallmex PN80** replenisher brightener is supplied as a liquid in units of 300 mls. One unit contains all the necessary agents to be added with the appropriate quantity of palladium complex corresponding to 100 grams of palladium metal.

Replenishment should be based on regular analysis but under optimum operating conditions. Pallmex PN80 process deposit metal at the following rates.

<u>Amp – min</u>	<u>Palladium Consumed</u>	<u>Replenishment</u>
5400	100 grams metal	1 unit of Pallmex PN80 Repl.Br.

As drag out losses cannot be accounted for accurately, analytical checks should be performed periodically.

ANALYTICAL METHODS FOR PALLMEX

Nickel Content

Pipette 10 mls of the bath into a conical flask and add about 100mls of water. Titrate with 0.1M EDTA using Murexide as the indicator to a faint pink end point, T₁.

$$T_1 \times 0.587 = \text{g/l Ni}$$

Palladium Content

Pipette 2 mls of the bath into a conical flask and dilute to about 100mls. Add 1 g of potassium silver cyanide and shake. Leave for about 10 minutes then add a few drops of 100g/l potassium iodide solution. Add 40 mls of 0.1M potassium cyanide from a burette. Titrate with 0.1M silver nitrate to a turbid end – point, T₂.

Pipette 20 mls of 0.1M potassium cyanide into a conical flask and dilute to 100mls. Add a few drops of 100g/l potassium iodide and titrate with 0.1M silver nitrate, T₃.

$$\text{g/l pd} = (40 - 2T_2) - (T_1 \times 0.8) \times 13.3 / T_3$$

PACKING

When ordering, reference should be made to the following Code Numbers :

PALLMEX PN80 Make Up Electrolyte	20 litres / drum
PALLMEX PN80 Replenisher Brightener	300 mls / unit / bottle
PALLMEX PN80 Stabiliser Salts	0.5 or 1 kgs / bottle
PALLMEX PN80 Complexer Salts	0.5 or 1 kgs / bottle
PALLMEX PN80 Brightener	1 or 2 litres / bottle
PALLMEX PN80 Wetting Agent	1 or 2 litres / bottle
PALLMEX PN80 Acid Adjustment Solution	1 or 2 litres / bottle
PALLMEX PN80 Conducting Salt	1,2,5 kgs / pack