

NICKEL 2000

INTRODUCTION

Nickel 2000 is a versatile low stress process specifically formulated for use as an undercoat for gold (or other precious metals such as palladium or palladium/nickel).

The process can be used for rack plating e.g. printed circuit board edge connectors, and barrel plating.

Deposits are fine grained, semi-bright, ductile and with low internal stress.

SOLUTION MAKE-UP

Nickel sulphate	264 g/L
Nickel chloride	55 g/L
Boric acid	40 g/L
Nickel 2000 Additive (Powder)	30 g/L

OPERATING DATA

Temperature	40 – 60°C.
Cathode CD	Barrel 0.2 – 1.0A/dm ² Rack 2.0 – 4.0 A/dm ²
Anode CD	1 - 4 A/dm ² .
Agitation	Air or cathode movement.
Anodes	Depolarised or carbon containing nickel. Alternatively, 'S' Nickel in titanium baskets. Polypropylene woven anode bags which have been thoroughly leached in hot water should be used.
Deposition Rate	1 micron/minute at 5 A/dm ² .
Nickel	70 - 75 g/l
Nickel Chloride	50 - 60 g/l
Boric Acid	35 - 45 g/l
pH	3.5 - 4.2.

EQUIPMENT

Tanks	Polythene, polypropylene or PVC.
Tanks	Steel or GRP lined with PVC, polypropylene or hard rubber.
Heating	PTFE or titanium clad electric immersion heaters with thermostatic controls.
Filtration	Continuous filtration recommended.
Extraction	Recommended.

INSTALLATION

It is essential that the tanks to be used for Nickel 2000 are thoroughly cleaned and leached before any product is introduced.

If in any doubt as to the cleaning procedure please contact PMD (UK) Limited Technical Department.

1. Leach the plating tank with 5% v/v sulphuric acid at 60°C, overnight. Pump out and rinse the tank thoroughly.
2. In a separate tank heat deionised water to 65 – 70°C and dissolve the salts.
3. Raise the pH to 5.0 - 5.5 with nickel carbonate.
4. Add 1 ml/l hydrogen peroxide (100 vol) and maintain at 65 – 70°C for 1 hour with agitation.
5. Add 2 g/l activated carbon and agitate at 65 – 70°C for 1 hour. Allow to settle, preferably overnight.
6. Filter the solution into the plating tank, adjust to the correct volume with deionised water and adjust the pH to 3.5 with sulphuric acid.
7. Add the Nickel 2000 Additive (Powder).
8. Plate out the solution overnight at 0.3 - 0.5 A/dm². Sufficient corrugated steel sheet cathode should be used to give a current of 0.1 amperes/litre of solution.
9. Adjust the pH to 3.5 - 4.2 if necessary.

MAINTENANCE AND CONTROL

The Nickel Additive 2000 (liquid) should be maintained on an ampere hour basis - 10 ml/100 ampere hours.

The pH should be maintained within the recommended limits by adding nickel carbonate (to increase) or 10% w/v sulphuric acid (to decrease). During normal operation the pH tends to increase.

ANALYSIS METHODS

1. Chloride

Reagents

0.1N silver nitrate (standard volumetric solution)

Sodium hydrogen carbonate

20% w/v potassium chromate solution

Method

1. Cool a sample of the solution to room temp.
2. Pipette a 5.0ml aliquot into a 250ml conical flask.
3. Add 100ml DI water.
4. Add 2gm sodium hydrogen carbonate and stir until dissolved.
5. Add 2-3 drops 20% potassium chromate solution.
6. Titrate with 0.1N silver nitrate to an orange end point.
7. Record titre = t mls.

Calculation

$t \times 2.378 = \text{g/L nickel chloride}$

Replenishment

For every 1g/L required add 1g/L nickel chloride.

2. Nickel

This analysis method should be carried out after any additions of nickel chloride have been made.

Reagents

0.2N EDTA (Standard volumetric solution)

Ammonia solution

Murexide indicator

ANALYSIS METHODS (CONT).

Method

1. Cool a sample of the solution to room temperature.
2. Pipette a 2.0ml aliquot into a 250ml conical flask.
3. Add 100ml DI water.
4. Add 10ml ammonia solution.
5. Add a pinch of murexide indicator.
6. Titrate to a purple end point with 0.2N EDTA.
7. Record titre = t mls.

Calculation

$$t \times 2.935 = \text{g/L Nickel}$$

Replenishment

For every 1g/L nickel required add 4.48g/L of nickel sulphate 6H₂O.

3. Boric acid

Reagents

0.1N sodium hydroxide (standard volumetric solution)

Buffer solution (Dissolve 60g/L sodium citrate in 100ml DI water. Add 600ml glycerol. Dissolve 2gm phenolphthalein in 10ml methanol and add to the mix. Make up to 1 litre with DI water).

Method

1. Cool a sample of the solution to room temperature.
2. Pipette a 1.0ml aliquot into a 250ml conical flask.
3. Add 25ml of buffer solution.
4. Titrate slowly with 0.1N sodium hydroxide to the first permanent pink end point.
5. Record titre = t mls.

Calculation

$$t \times 6.184 = \text{g/L boric acid}$$

Replenishment

For every 1g/L low add 1g/L boric acid.

**N 2000-01/05
ISSUE 6**

DISPOSAL

Dispose of in accordance with local authority requirements.

PRODUCT FAMILIES

The following products are referred to in this data sheet:-

<u>Product Name</u>	<u>Product Number</u>
Nickel Additive 2000 (Liquid) (25L)	544002
Nickel Additive 2000 (Liquid) (5L)	544032
Nickel Additive 2000 (Powder)	542002

Whilst every endeavour has been made to ensure that the information given in this data sheet is correct, PMD (UK) Limited gives no warranty, express or implied, relating to the use or performance of this product