

NISTAN

TIN/NICKEL PROCESS

INTRODUCTION

Nistan tin/nickel alloy plating has exceptional corrosion resistance and a superb finish. The deposit contains 65% tin: 35% nickel, a composition which is exceptionally consistent within the operating parameters. The solution is only slightly acidic in pH so surrounding equipment does not corrode. It produces a ductile deposit and is easy to make-up and control with its single maintenance additive. The process will operate over a wide range of current densities and solution compositions in both rack and barrel installations.

Nistan deposits have an attractive, bright chrome-like finish. The hardness and tarnish resistance make it a very acceptable alternative to chromium in decorative nickel/chromium finishing, especially for barrel plating small components.

Nistan can be used in electronics as a more corrosion resistance alternative to tin/lead plating.

Nistan can be used instead of nickel as an undercoat to hard gold in electronic connectors, thereby allowing a reduction in gold thickness.

Other uses are in costume jewellery, instrument controls, kitchen ware, heavy duty switchgear, pistons in hydraulic system, food and drink processing equipment and laboratory equipment.

DEPOSIT CHARACTERISTICS

Alloy Composition	65% tin: 35% nickel.
Appearance	Bright metallic finish with a faint pink tint.
Tarnish resistance	Excellent.
Hardness	700 – 800 DPN as plated.
Throwing Power	Good.
Covering Power	Excellent.
Solderability	Excellent (mildly active flux)
Coefficient of sliding friction	Low.

SOLUTION MAKE-UP

Nistan RTU 100%

It is essential that the tanks to be used for Nistan are thoroughly cleaned and leached before any chemistry is introduced. If in any doubt as to the cleaning procedure please contact PMD Chemicals Technical Department.

1. Add Nistan solution into tank.
2. Place anodes in tank.
3. Plate out for 4 hours at 0.5 A/dm² onto copper or brass corrugated sheet.



OPERATING DATA

Nickel	40 – 55g/L
Tin	15 – 25g/L
Ammonium bifluoride	38 – 45g/L
pH	4.0 – 5.0
Temperature	68 – 75°C
Current density Rack	0.5 – 2.5 asd
Barrel	0.25 – 0.5asd
Deposition rate Rack	0.5 µm/min at 1.5 asd
Barrel	0.125 µm/min at 0.5 asd
Agitation	Solution movement via a circulating pump with sparge pipe under the cathode; or work movement. NB air agitation should not be used

EQUIPMENT

Tanks	Rubber or plastic lined steel
Heaters	PTFE electric immersion heaters or nickel steam coils
Pumps	Pumps and filters should be of all plastic construction
Filtration	Continuous filtration required through 5µm filter
Anodes	Electrolytic nickel strip or pure nickel depolarised anodes must be used. NB titanium anode basket must not be used.

MAINTENANCE AND CONTROL

The nickel content is replenished by dissolution of the anodes but should be regularly analysed and any deficiency made up by additions of nickel chloride – for every 1g/L nickel required add 4g/L nickel chloride.

The concentration of stannous tin decreases gradually, not only because of removal by plating but also because of oxidation to the stannate state. Analyse for tin regularly and for every 1g/L tin required add 10ml/L Nistan Tin Concentrate.

It is important that the concentration of ammonium bifluoride is maintained to give a ratio of ammonium bifluoride: tin of 1.9 - 2.2: 1. As the Nistan Tin Concentrate contains ammonium bifluoride the routine additions of this product will help to maintain the bifluoride level but supplementary additions of ammonium bifluoride may be required. A deficiency of bifluoride will cause dullness at high current density and deposits with excessive tensile stress.

After additions of Nistan Tin Concentrate or ammonium bifluoride the pH should be checked and adjusted with ammonia if necessary. The organic stress reducers and brighteners are maintained by the addition of Nistan Replenisher at the rate of approximately 500ml/1000 ampere hours. The pH should be regularly checked and adjusted by means of dilute hydrochloric acid or ammonia as appropriate.

Analysis methods for stannous tin and nickel are included in this data sheet.

ANALYSIS METHODS

1. Stannous tin

Reagents

Concentrated hydrochloric acid.
0.05M potassium iodate (standard volumetric solution)
Iodine indicator

Method

1. Pipette 5.0mls of Nistan solution into a 250ml conical flask.
2. Add 5ml of conc hydrochloric acid and 25ml of DI water; mix thoroughly.
3. Titrate with 0.05M potassium iodate standard solution using iodine indicator to the first permanent blue colour.
4. Record titre = t mls.

Calculation

$t \times 3.56 = \text{g/L stannous tin.}$

Replenishment

For every 1g/L of tin required add 10ml/L Nistan Tin Concentrate.

2. Nickel

Reagents

Hydrogen peroxide 100 volume.
Tartaric acid.
Ammonia.
Buffer solution (dissolve 54gm of ammonium chloride in water, add 350ml of ammonia solution and add deionised water to make up to 1 litre)
Murexide indicator.
0.1M EDTA (standard volumetric solution)

Method

1. Pipette 2.0mls of Nistan solution into a 500ml conical flask.
2. Add 25ml of water.
3. Add 10ml of 100 vol hydrogen peroxide and boil for 10 minutes.
4. Cool.
5. Add 1.5g of tartaric acid.
6. Add 5ml of ammonia
7. Add 15ml of buffer solution.
8. Add 50ml DI water.
9. Add Murexide Indicator and titrate with 0.1M EDTA solution to a magenta end point.
10. Record titre = t mls.

Calculation

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

Replenishment

For every 1g/L nickel required add 4g/L nickel chloride.

DISPOSAL

Dispose of in accordance with local authority requirements

Tin/Nickel plating solutions can be treated as simple nickel solutions and rinse water or more concentrated waste, can be treated by pH adjustment to 8.0 (Approximately) and settling of the precipitate hydroxides.

Alternatively, store in suitable containers for disposal or reclamation through an authorised contractor who must be securely contained and clearly labelled.

PRODUCT FAMILIES

The following products are referred to in this data sheet.

PRODUCT NAME	PRODUCT NUMBER
Nistan Plating Solution RTU	581001
Nistan Replenisher	581002
Nistan Tin Concentrate	581003

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