



Ni-STAR STRIKE

ALKALINE ELECTROLESS NICKEL PLATING PROCESS

INTRODUCTION

Ni-Star Strike is a modern day alkaline electroless nickel system designed to produce thin nickel coatings on zincated aluminium alloys.

Ni-Star Strike is supplied as a 3-part process: -

Ni-Star Strike Part 1	Make up additive
Ni-Star Strike Part 2	Make up and replenishment additive
Ni-Star Strike Part 3	Replenishment additive

BENEFITS

- By using Ni-Star Strike solution when processing aluminium, the life of the main Ni-Star electroless nickel bath will be considerably extended.
- The Ni-Star Strike solution has good stability and will tolerate high levels of zinc and aluminium with no adverse effects on deposit

SOLUTION MAKE -UP

Ni-Star Strike Part 1	20% v/v
Ni-Star Strike Part 2	8% v/v

OPERATING DATA

Nickel	5.5 – 6.5g/L Optimum 6.0g/L
pH	8.5 – 9.5 Optimum 9.0
Temperature	28 – 36°C
Immersion time	5 – 10 mins
Agitation	Not required
Extraction	Essential

EQUIPMENT

Tanks	High-density polypropylene
Heaters	PTFE immersion heaters or PTFE steam coils
Filtration	2 solution turnovers per hour through 5 micron or smaller filter bags or cartridges. All filter units must be of non metallic parts

It is recommended that the solution tank and filter bodies are cleaned out at the end of every working day. If there is any sign of nickel metal the tank should be cleaned with 50% Nitric Acid.

INSTALLATION

It is essential that the tanks to be used for PMD Ni-Star Strike are thoroughly cleaned and leached before any chemistry is introduced. See equipment maintenance for procedure.

1. Fill tank to half working volume with DI water.
2. Add Ni-Star Strike Part 1 (20% final volume) and mix well.
3. Add Ni-Star Strike Part 2 (8% final volume) and mix well.
4. Top tank up to final volume with DI water.
5. Adjust pH to 9.0 using ammonia (approx 2 ml/L).
6. Install new filter bag or cartridge.
7. The solution is now ready for use.

PROCESS SEQUENCE

See notes on pre-treatment.

MAINTENANCE AND CONTROL

The solution should be analysed on a regular basis and maintained at the optimum concentrations detailed under operating data.

Nickel analysis is used as a basis of maintaining the additions of Ni-Star Strike Part 2 and Ni-Star Strike Part 3.

Ni-Star Strike Part 2 and Ni-Star Strike Part 3 are added on an equal basis.

Analysis			Additions	
Titre	Nickel	Activity	mls / litre Ni-Star Strike Part 2	mls / litre Ni-Star Strike Part 3
5.1	6.0	100%	0	0
5.0	5.9	98%	2.2	2.2
4.9	5.8	96%	4.1	4.1
4.8	5.6	94%	6.1	6.1
4.7	5.5	92%	8.1	8.1
4.6	5.4	90%	10.0	10.0
4.5	5.3	88%	12.0	12.0
4.4	5.2	86%	13.9	13.9
4.3	5.0	84%	15.9	15.9
4.2	4.9	82%	17.9	17.9
4.1	4.8	80%	19.8	19.8
4.0	4.7	78%	21.8	21.8



Note:

Do not pre mix additives prior to addition to tank.

Notes:

1. To provide optimum plating conditions it would be preferable to make frequent additions.
2. A complete solution replenishment is achieved when 100 mls/ltr of Ni-Star Strike Part 2 and Ni-Star Strike Part 3 have been made.
3. It is unwise to operate solution below 90% strength. Should this occur then make several additions to restore bath to optimum operating conditions. Failure to keep bath at optimum can lead to instability and shorten the life of the bath.

ANALYSIS METHOD

Nickel concentration

Reagents

0.1M EDTA (standard volumetric solution)
50% Ammonia solution
Murexide indicator

Method

1. Pipette 5.0mls of bath into a conical flask.
2. Add 50mls of DI water.
3. Add approximately 10mls 50% ammonia solution.
4. Add a small spatula tip of murexide .
5. Titrate against 0.1 M EDTA solution to a purple end point.
6. Record titre = t mls.

Calculation

$t \times 1.174 = \text{g/L nickel.}$

Replenishment

Refer to table in Maintenance and Control for appropriate additions.

EQUIPMENT MAINTENANCE

Good housekeeping in electroless nickel plating is essential. All electroless nickel processes are sensitive to contamination such as metals, sulphur compounds and particulate matter such as dust. Great care should be taken to avoid contamination.



It is good practice to pump the solution out through the filter each day and wash the tank out. Once a week (or more often if required) carry out the full stripping procedure as described below.

When not in use the solution should be covered to reduce evaporation losses and contamination.

STRIPPING PROCEDURE

When preparing brand new equipment fill the tank with fresh 50% v/v nitric acid (SG 1.37) and pump round the system for a minimum of 8 hours. This passivates stainless steel and leaches out soluble organics from plastic equipment. This should be followed by a thorough washing as indicated below.

Used tanks should be stripped regularly as follows:

1. Transfer the solution to spare tank.
2. Remove and clean filter bags.
3. Rinse and pump water round the equipment.
4. Fill the tank with 50% nitric acid.
5. Circulate the acid to ensure that all surfaces are contacted.
6. Leave overnight to strip nickel deposits which may have built up.
7. Pump acid to storage or effluent.
8. Wash out the tank and circulate water round system thoroughly.
9. Drain tank.
10. Fill tank with deionised water and circulate.
11. Drain tank.
12. Fit new filter.
13. Return nickel solution to tank, make up to volume with deionised water and analyse.

NOTES

Pre Treatments

Correct cleaning is vital in electroless nickel plating. Good rinsing is essential when processing aluminium, so you do not drag strong caustic into the Ni-Star Strike solution, which would cause blistering of the deposit.

All materials must be free from oils, grease, organic contamination, oxides and scales. It is very important that the base metal itself is carefully examined for physical damage such as scratches, pits, inclusions, cracks, roll or extrusion marks, all of which may adversely affect the appearance and performance of electroless nickel deposit.

A general pre-treatment for aluminium would be as follows:

1. Hot soak clean – PMD 505 Cleaner.
2. Rinse.
3. Acid etch 500 ml/ltr nitric acid + 50g/l Econovate A.

- 4. Rinse x 2.
- 5. PMD Alzon (Zincate)
- 6. Rinse x 2.
- 7. Zincate strip 500 ml/ltr nitric acid.
- 8. Rinse x 2.
- 9. PMD Alzon (Zincate)
- 10. Rinse x 2.
- 11. Ni-Star Strike.
- 12. Rinse.
- 13. Ni-Star electroless nickel plate.

DISPOSAL

Dispose of in accordance with local authority requirements

PRODUCT FAMILIES

The following products are referred to in this data sheet.

PRODUCT NAME	PRODUCT NUMBER
Cleaner 505	206001
Alzon RFU	228001
Econovate	223004
Ni-Star Strike Part 1 (25L)	551003
Ni-Star Strike Part 1 (200L)	551007
Ni-Star Strike Part 2 (25L)	551004
Ni-Star Strike Part 2 (200L)	551008
Ni-Star Strike Part 3 (25L)	557019
Ni-Star Strike Part 3 (200L)	557039

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