

Ni-STAR STRIKE AF

ALKALINE ELECTROLESS NICKEL PLATING PROCESS

INTRODUCTION

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

Ni-Star Strike AF is supplied as a 2-part process: -

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

BENEFITS

By using Ni-Star Strike AF solution when processing aluminium, the life of the main Ni-Star electroless nickel bath will be considerably extended.

The Ni-Star Strike AF solution has good stability and will tolerate high levels of zinc and aluminium with no adverse effects on deposit.

User friendly two part process containing no ammonia.

SOLUTION MAKE UP

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

OPERATING DATA

Nickel	5.5 - 6.5 g/L	(optimum 6.0g/L)
pH	8.5 – 9.5	(optimum 9.0)
Temperature	28 - 36°C	(optimum 34°C)
Immersion time	5 – 10 minutes	
Agitation	Not required	

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.

Extraction - Essential.

INSTALLATION

It is essential that the tanks to be used for PMD Ni-Star Strike AF 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 AF 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 Ni-Star pH Adjuster (if required).
6. Install new filter bag or cartridge.
7. The solution is now ready for use.

PROCESS SEQUENCE

See notes on pre-treatment.

MAINTENANCE 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 AF Part 1 and Ni-Star Strike Part 2.

Ni-Star Strike AF Part 1 and Ni-Star Strike Part 2 are added on a 2:1 basis.

To increase pH, add small increments of Ni-Star pH Adjuster until desired pH is attained.

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Analysis			Additions	
Titre	Nickel	Activity	Mls / litre Ni-Star Strike AF Part 1	Mls / litre Ni-Star Strike Part 2
5.1	6.0	100%	0	0
5.0	5.9	98%	4.3	2.2
4.9	5.8	96%	8.2	4.1
4.8	5.6	94%	12.1	6.1
4.7	5.5	92%	16.1	8.0
4.6	5.4	90%	20.0	10.0
4.5	5.3	88%	23.9	11.9
4.4	5.2	86%	27.8	13.9
4.3	5.0	84%	31.7	15.8
4.2	4.9	82%	35.6	17.8
4.1	4.8	80%	39.5	19.8
4.0	4.7	78%	43.4	21.7

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 200 mls/ltr of Ni-Star Strike AF Part 1 and 100mls of Ni-Star Strike Part 2 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

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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.

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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 AF 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 AF.
12. Rinse.
13. Ni-Star electroless nickel plate.

DISPOSAL

Dispose of in accordance with local authority requirements.

PRODUCT FAMILIES

The following product or product families are referred to in this data sheet.

<u>Product Name</u>	<u>Product Number</u>
PMD Cleaner 505	206001
PMD Alzon RFU	228001
Econovate A	223004
Ni-Star Strike AF Part 1	555014
Ni-Star Strike Part 2 (25L)	551004
Ni-Star Strike Part 2 (200L)	551008
Ni-Star pH Adjuster	555012

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