PMD (UK) Ltd, Broad Lane, Coventry, CV5 7AY, England. Telephone 024 7646 6691 Fax 024 7647 3034
Web Site: www.pmdgroup.co.uk Email: sales@pmdgroup.co.uk
NISHG-06/02
ISSUE 5
PREV 4

NI-SHIELD G

ELECTROLESS NICKEL PROCESS FOR PLATING ON MAGNESIUM

INTRODUCTION

Ni-Shield G is an electroless nickel process developed specifically for plating on magnesium die-castings. Ni-Shield G is used at nearly neutral pH and produces deposits containing 4 - 5% phosphorus.

The products used in the make-up and operation of Ni-Shield G are:-

Ni-Shield G MU	Make up additive.
Ni-Shield G RA	Replenishment additive
Ni-Shield G RB25	Replenishment additive
Ni-Shield G RB50	Replenishment additive

SOLUTION MAKE-UP

Ni-Shield G MU	400 ml/L
D.I. Water	to 1 litre

OPERATING CONDITIONS

Nickel	4.5 - 5.5g/L
Sodium hypophosphite	18 - 22g/L
pH	6.0 - 6.5
Temperature	75 - 80 Deg C
Agitation	Solution movement (pumping)
Loading	0.5 - 1.0 sq.dm./litre
Plating Rate	10µm/hour
Extraction	Essential

EQUIPMENT

Tanks	High density polypropylene
Heaters	PTFE immersion heaters with thermostatic control
Filtration	10 bath turnovers per hour through 5 micron or smaller filter bags or cartridges. All filter units must be of non metallic construction.

INSTALLATION

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

1. Half fill the clean empty tank with DI water.
2. Add the required volume of Ni-Shield G MU.
3. Make up to final volume with DI water and mix well.
4. Analyse solution and adjust as necessary.
5. Heat to operating temperature.

PROCESS SEQUENCE

1. Hot soak clean, Econonclense NS, 50g/l, 60°C, 5 - 10 minutes.
2. Rinse
3. Etch. Econovate MG or Econovate C, 18-25°C, 30-90 secs.
4. Rinse
5. Econovate A, 300g/L 30°C, 10 minutes.
6. Rinse
7. Ni Shield G, 75-80°C
8. Rinse
9. Dry

MAINTENANCE AND CONTROL

For every 10 sq.dm. (approximately 1 sq.ft.) plated to 25 microns (0.001") the following additions should be made:-

Ni-Shield G RA	200 ml
Ni-Shield G RB 50 or 25	200 ml

NOTE: A new bath should be replenished with Ni-Shield G RB 50 to maintain pH. As the bath ages (approximately 2 metal turnovers) the pH will become more stable and Ni-Shield G RB 25 should be used for replenishment.

The solution should be maintained at the following chemical composition by regular additions based on work area processed supplemented by chemical analysis and additions.

	Optimum	Range
Nickel	5 g/L	4.5 - 5.5 g/L
Sodium Hypophosphite	20 g/L	18 - 22 g/L

To increase the nickel concentration by 0.5 g/L add 5 ml/l Ni-Shield G RA.

To increase the sodium hypophosphite concentration by 2 g/l add 5 ml/l Ni-Shield G RB 50 or 25.

pH

The replenishment chemistry should maintain the pH within the specified range. If it is necessary to adjust use a 50% (v/v) solution of 0.88 S.G. ammonia or a 10% (v/v) solution of sulphuric acid.

METAL TURNOVERS

If the Ni-Shield G process is operated and replenished as described above it is capable of 4-5 metal turnovers ie. 20-25gm nickel can be plated from each litre of working solution, before the solution should be replaced.

ANALYSIS METHODS

1. Nickel Concentration

Reagents

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

Method

1. Pipette 5.0mls of the cooled bath into a 250ml conical flask.
2. Add 50ml of DI water.
3. Add 10ml of 50% ammonia solution.
4. Add a small spatula tip of murexide indicator.
5. Titrate to a purple end point with 0.1M EDTA.
6. Record titre = t mls.

Calculation

t x 1.174 = g/L nickel

Replenishment

For every 0.5g/L required add 5 ml/L Ni-Shield G RA

2. Sodium hypophosphite concentration

Reagents

0.1N iodine (standard volumetric solution)
Concentrated hydrochloric acid
0.1N sodium thiosulphate (standard volumetric solution)
Iodine indicator solution

Method

1. Pipette 5.0mls of the cooled bath into an iodine flask.
2. Add 5.0mls of concentrated hydrochloric acid.
3. Add 50mls of DI water.
4. Pipette 50.0mls of 0.1N iodine to the flask.
5. Stopper flask, mix well and leave in a dark cupboard for 30 minutes.
6. Titrate to a pale yellow colour with 0.1N sodium thiosulphate.
7. Add a few drops of iodine indicator and continue titration to a colourless end point.
8. Record titre = t mls.

Calculation

(50-t) x 1.08 = g/L sodium hypophosphite

Replenishment

For every 2g/L required add 5ml/L of Ni-Shield G RB 25 or G RB 50.

DISPOSAL

Dispose of in accordance with local authority requirements.

PRODUCT FAMILIES

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

Product Names	Product Number
Ni-Shield G MU	557007
Ni-Shield G RA	557009
Ni-Shield G RB 50	555005
Ni-Shield G RB 25	555006
Econoclense NS	206013
Econovate MG Additive	207001
Econovate A	223004
Econovate C	227006