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388
ALKALINE ELCTROLESS NICKEL PROCESS

The **Accu-Labs 388** electroless nickel system is specifically formulated to deposit a thin, uniform nickel/phosphorus coating onto properly prepared plastics for EMI/RFI shielding as well as zincated aluminum substrates and zinc die cast prior to plating in an acid electroless nickel bath for brighter, thicker, decorative and functional applications.

The use of **Accu-Labs 388** allows the EN plater to utilize the full life of an acid electroless nickel bath without the worry of blistering or poor adhesion as the bath ages.

The **Accu-Labs 388** system has a high tolerance for zinc metal and deposits such thin coatings that it has a very long operating life. At elevated temperatures, the **Accu-Labs 388** system can be used to plate directly onto zinc die cast. Contact Accu-Labs for more information on this process.

BATH COMPONENT PROPERTIES & OPERATING GUIDELINES

Solution Make-up

Accu-Labs 388-M	40% by volume
Accu-Labs 388-N	5% by volume
Deionized water	To operating volume

1.) Add half tank capacity of DI water to a properly cleaned and passivated tank.

2.) Add required amount of **388-M** and **388-N**.

3.) Fill to working volume with deionized water.

4.) Mix thoroughly with solution and/or air agitation.

5.) Analyze nickel content and adjust to 6.0 g/l if necessary.

6.) Check pH and adjust* to 10.0 if necessary.

Operating Parameters

Bath Parameter	Range	Optimum
Nickel Metal	4.8-6.3 g/l	6.0 g/l
Hypophosphite	24.0-32.0 g/l	30.0 g/l
pH	9.50-10.50	10.00
Temperature	80-110°F	95°F
Bath Loading (sq. ft. /gal)	0.20-1.00	0.50
Immersion	3-15 minutes**	

*Increase pH with 50% ammonium hydroxide. Lower pH with solution of 1#/gal sulfamic acid.

**May vary depending on bath temperature, age, pH and type of aluminum processed.

MAINTENANCE AND REPLENISHMENT

To ensure proper operation of this EN system, the solution chemistry must be maintained between 80% and 100% of its initial activity. This is accomplished by measuring and monitoring the nickel metal concentration via a standard EDTA titration.

Upon determination of the nickel concentration, additions of both **388-N** and **388-R** are made based on the following replenishment guide.

100 GALLON TANK

% Activity	Ni (g/l)	388-N	388-R
100	6.0	0	0
95	5.7	950 mls	1900 mls
90	5.4	1.9 liters	3.8 liters
85	5.1	2.8 liters	5.6 liters
80	4.8	4.7 liters	9.4 liters
75	4.5	5.6 liters	11.2 liters

% Activity is determined by EDTA titration and is calculated as follows:

mls 0.1M EDTA x .0975 = % Activity
mls .0575M EDTA x .0561 = % Activity

Bath Temperature

The recommended operating temperature is 95˚F with a range of 80-110˚F. Lower temperatures will yield slower rates and may lead to poor adhesion due to slow initiation and/or coverage. Special stabilizers in this bath allow its use at elevated temperatures for special applications (i.e. plating directly onto zinc die cast), however copious amounts of ammonia may be given off.

Bath pH

The **Accu-Labs 388** process is self pH regulating but may occasionally require adjustment. A 50% solution of ammonium hydroxide is used to raise the pH whereas a 1#/gal sulfamic acid solution is used to lower the pH. It is critical that pH is maintained above 9.0. Solution stability is reduced dramatically if pH is allowed to drift below this point resulting in equipment plate out and possible solution decomposition.

ANALYTICAL CONTROL Sodium Hypophosphite Concentration:

Equipment

5 ml pipette
250 Erlenmeyer flask
50 ml graduated cylinder
50 ml pipette
50 ml burette

Reagents

0.1N Iodine solution
0.1N Sodium Thiosulfate solution
6N Hydrochloric Acid

Procedure

1.) Pipette 5.0 ml of cooled bath into a 250 ml Erlenmeyer flask.

2.) Add 30 mls of 6N hydrochloric acid.

3.) Pipette 50 mls of 0.1 N iodine into the flask.

4.) Shake flask well, rinse down sides with DI water, stopper and let stand in the dark for 60 minutes.

5.) Titrate with 0.1N sodium thiosulfate to a clear endpoint.

Calculation

oz/gal hypophosphite = (50 – mls 0.1N thiosulfate) x 0.141
gm/l hypophosphite = (50 – mls 0.1N thiosulfate) x 1.06

ANALYTICAL CONTROL Nickel Metal Content:

Equipment

10 ml pipette
250 ml Erlenmeyer flask
50 ml burette

Reagents

0.1 or .0575 M EDTA Solution
AR grade ammonium hydroxide
1% murexide indicator

Procedure

1.) Pipette 10 mls of cooled bath sample into a 250 ml Erlenmeyer flask.

2.) Add 50 mls of deionized water.

3.) Add 10 mls of ammonium hydroxide (will form a blue amine complex).

4.) Add murexide indicator to form a straw color.

5.) Titrate with standard EDTA solution to a purple endpoint.

Calculation

Grams/liter of Ni Metal = (mls 0.1 M EDTA x 0.589)
(mls 0.0575 M EDTA x 0.339)

HANDLING: Always wear eye protection and personal protective gear when working with or handling this material. Read MSDS prior to use.