



MARQUEE ENVY MP

TECHNICAL DATA
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MARQUEE ENVY MP

PROCESS FOR MID PHOSPHOROUS ELECTROLESS NICKEL PLATING

- MARQUEE ENVY MP does not contain any lead or cadmium to meet ELV requirements.
- MARQUEE ENVY MP has fast deposition rate throughout the life of the bath.
- MARQUEE ENVY MP meets ASTM-B-733 and AMS2404 C specifications.
- MARQUEE ENVY MP is a simple two component process with an easy to use 1:1 replenishment rate.
- MARQUEE ENVY MP provides deep, brilliant decorative finish.
- MARQUEE ENVY MP produces uniform plating thickness and hardness.
- MARQUEE ENVY MP has excellent stability with long solution life.

OPERATING PARAMETERS

	<u>RANGE</u>	<u>OPTIMUM</u>
Nickel Metal:	5.25 - 6 g/Liter (0.7 - 0.8 oz/gal)	
Operating Temperature:	88 - 92° C (190 - 197° F)	
pH:	4.5-5.1	4.85 - 4.95
Bath Loading:	0.5 - 2.50 sq.dm//L (0.20 - 1.0ft ² /gal)	
Typical Plating Rate:	17.8 micron/hour (0.70 mil/hr.)	

SOLUTION MAKEUP

- MARQUEE ENVY MP-A-10 6.0 %/vol
- MARQUEE ENVY MP-B-10 15.0 %/vol
- MARQUEE ENVY MP-C-10 Not required for make-up

When making a new solution it is important to follow these steps. Taking shortcuts can increase the cost of your electroless nickel process.

1. Remove the old operating solution.
2. Remove the old filter bags or cartridge filters. If necessary, re-seal the filter unit. Fill the tank with 50 %/vol Nitric acid.
3. Circulate the solution through the pumps and filter housings. Turn off air agitation. Allow the solution to contact all the surfaces that it would contact when in operation. Allow the solution to stand overnight to completely strip and passivate the tank.
4. Remove the nitric acid solution from the tank.
5. Rinse the tank/ pumps and filter housings thoroughly.
6. Fill the tank with water higher than the level of the nitric solution and add approximately 1 liter Ammonium hydroxide per 400 liters of volume. Allow this solution to circulate for 1 hour. While the solution is circulating, turn the agitation on and off. The ammonium hydroxide will neutralize the Nitric acid.
7. Drain the system then rinse with clean water. Test the rinse water for nitrates (Fisher Scientific carries M-10020 EM quant test strips for testing for nitrates).
8. Install new filter bags or cartridges.
9. Equipment is now ready for a new operating solution.
10. Fill tank to half its volume with distilled or D.I. water.
11. Add the required amount of MARQUEE ENVY MP-A-10 and mix well.
12. Add the required amount of MARQUEE ENVY MP-B-10 and mix well.
13. Add distilled or D.I. water to volume and mix well.
14. Check pH and adjust to a pH of 4.8. Use dilute 1:1 ammonium hydroxide or potassium Hydroxide to raise the pH. Use 20%/volume sulfuric acid to lower the pH.

EQUIPMENT

TANKS

If the tank size is less than 500 gallons then tanks made of high density, natural, unpigmented, polypropylene is suggested. Tanks larger than 500 gallons (1900 Liters) should be reinforced using fiberglass, stainless steel or other suitable material. It is a good idea to have two tanks set-up so a spare tanks is available if there is nickel build-up on the heaters or tank. Contact your Columbia Chemical representative for recommendations.

HEATERS

316 Stainless Steel heat exchanger, PTFE steam coils, or electric immersion heaters fabricated from PTFE or 316 stainless steel is recommended.

AGITATION

Clean, mild air agitation from a low-pressure blower is recommended. Other means of agitation may be used such as mechanical or reciprocal.

MAINTENANCE ADDITIONS

MARQUEE ENVY MP-A-10	See Replenishment Schedule below
MARQUEE ENVY MP-C-10	See Replenishment Schedule below

Nickel Content by Analysis

6.0 g/L (0.80 oz/gal) -
5.7 g/L (0.76 oz/gal) -

% Nickel Activity

100%
95%

Amount of Marquee ENVY MP-A-10 & Marquee ENVY MP-C-10 to add

0 ml/L (0.0 fl.oz./gal)
3 ml/L (0.38 fl.oz./gal)

5.4 g/L (0.72 oz/gal) -	90%	6 ml/L (0.76 fl.oz./gal)
5.1 g/L (0.68 oz/gal) -	85%	9 ml/L (1.15 fl.oz./gal)
4.8 g/L (0.64 oz/gal) -	80%	12 ml/L (1.54 fl.oz./gal)
4.5 g/L (0.60 oz/gal) -	75%	15 ml/L (1.92 fl.oz./gal)
4.2 g/L (0.56 oz/gal) -	70%	18ml/L (2.30 fl.oz./gal)

Regular analysis of the nickel content should be the basis for additions of the MARQUEE ENVY MP-A-10 and the MARQUEE ENVY MP-C-10. Add back equivalent amounts of the MARQUEE ENVY MP-A-10 and MARQUEE ENVY MP-C-10 as needed from the chart above.

Example: If the nickel metal analysis is 5.7g/L (0.76 oz/gallon) then add back 3 ml/L (0.38fl.oz/gal) MARQUEE ENVY MP-A-10 and 3 ml/L (0.38 fl. oz/gal) MARQUEE ENVY MP-C- 10.

pH - Measure the pH after all other adjustment have been made. Make adjustments using dilute 1:1 ammonium hydroxide or potassium hydroxide to raise the pH. Use 20%/volume sulfuric acid to lower the pH.

ANALYTICAL PROCEDURE

DETERMINATION OF NICKEL METAL

REAGENTS REQUIRED:

- Standardized 0.1M or 0.0575 M EDTA
- Concentrated ammonium hydroxide
- Murexide
- Table sugar
- Deionized water
- Table sugar
- Murexide indicator – thoroughly mix approximately 0.25 grams murexide with 95 grams of table sugar.

1. Pipette 5 ml. bath sample into a 250 ml Erlenmeyer flask.
2. Add approximately 100 ml Deionized water.
3. Add 10 ml of concentrated ammonium hydroxide.
4. Add 0.2 grams murexide indicator.
5. Titrate immediately with the 0.1 or 0.0575M standardized EDTA to a magenta endpoint.
6. Calculate the nickel metal content:

CALCULATION: Nickel metal (g/L) = mL 0.0575M EDTA x 0.674 or ml 0.1M EDTA x 1.174

Nickel metal (oz/gal) = mL 0.0575M EDTA x 0.090 or ml 0.1M EDTA x 0.1565

HELPFUL HINTS

pH

Use a calibrated pH meter to check the pH. Make measurements with the sample cooled to room temperature. The solution pH should be checked regularly to insure it is maintained within the operating parameters.

pH papers are not recommended.

To raise the pH use 1:1 dilute ammonium hydroxide or potassium hydroxide. To lower the pH, use 20%/vol. sulfuric acid.

TEMPERATURE

Maintain the temperature of the plating bath within specified limits. It is highly recommended that derated heaters (low watt density) are used to maintain the solution temperature of the bath. High temperatures can spontaneously decompose the bath. Low temperatures will slow the plating rate of the bath.

NICKEL DEPOSIT PROPERTIES

Phosphorous Content:	5-9% (varies depending on operating pH and bath age)
Hardness:	500-700 (VHN) as plated, 900-1000(VHN) heat treated
Appearance:	Bright reflective deposit
Density:	Approximately 7.9 g/cc

HANDLING & STORAGE

Columbia Chemical recommends referring to the specific product Safety Data Sheets for safety, handling, and storage precautions.

NON-WARRANTY

The data contained in this bulletin is believed by Columbia Chemical Corp. to be accurate, true, and complete. Since, however, final methods of use of this product are in the hands of the customer and beyond our control, we cannot guarantee that the customer will obtain the results described in this bulletin, nor can we assume responsibility of the use of this product by the customer in any process which may infringe the patents of third parties.