



# PRODUCT INFORMATION

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EMERGENCY - MARTRON 704-289-1934  
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REF. # MFC-004505 and MFC-004525

## MARTRON 870

“AN ADVANCED BRIGHT HIGH-SPEED, SELF-pH REGULATING ELECTROLESS NICKEL SYSTEM”

**Martron 870** is an easy to use Advanced Medium Phosphorus Electroless Nickel Process designed to meet most bright EN applications today. With over 20 years of Electroless nickel research and development experience, **Martron Inc.** offers this newest EN formula to meet and exceed most competitive EN processes available today in terms of overall brightness, plating rate consistency and stability. Exceptional brightness and life on Aluminum is one of its many benefits.

**Martron 870** is supplied as 3 separate liquid concentrates. **Martron 870A** and **Martron 870B** are used for make-up; **Martron 870 A** and **Martron 870C/870D** are used for replenishment (**870D** is not self-pH regulating).

**Martron 870** meets Mil-26074B, AMS 2404B and AMS 2405 specifications.

### SECTION 1 - FEATURES

- \* Exceptional Stability
- \* Consistent Plating Rates
- \* No Break-In Period
- \* Consistent Pit-Free Smooth Bright Deposits
- \* Self-pH Regulating Replenishment
- \* High Tolerance to Impurities
- \* 1: 1 Replenishment Add Back

### SECTION 2 - DEPOSIT PROPERTIES

Nickel Content	92.0 - 93.0 % w/w
Phosphorus Content	7.0 - 8.0 % w/w
Melting Point	880 - 960°C
Hardness	52 - 56 R as plated, 68 R (400°C 1hr)
Density	7.9 g/cc
RCA Nitric Acid Test	FAIL
Neutral Salt Spray (ASTM B-117)	100 hours
Magnetic Properties	Slightly magnetic
Hydrochloric Acid Test (50% HCL, 3 min, RT)	Pass
Electrical Resistivity	50-100 micro-ohm/cm

### SECTION 3 - CONCENTRATE PROPERTIES

<b>Martron 870A</b>	Green make-up and replenishment component
<b>Martron 870B</b>	Clear, slightly yellow make-up component
<b>Martron 870C</b>	Colorless replenishment component
<b>Martron 870D</b>	Colorless replenishment component (non-pH regulating)

### SECTION 4 - SOLUTION MAKE-UP

<b>Martron 870A</b>	6 % by volume
<b>Martron 870B</b>	15 % by volume
D. I. Water	79 % by volume

### SECTION 5 - OPERATING PARAMETERS

	<u>Range</u>	<u>Optimum</u>
Nickel Metal Content (oz/gal)	0.65 - 0.85	0.80
Sodium Hypophosphite Content (oz/gal)	3.2 - 4.5	4.00
* pH	4.5 - 5.2	4.9
Temperature (°F)	185 - 200	190
Bath Loading (sq. ft/gal)	0.1 - 1.5	0.50
Frequency of Additions	Activity should be maintained at 85 - 100 %	

### SECTION 6 - BATH PERFORMANCE

Solution Life	8 - 10 MTO (Steel) minimum 5 - 7 MTO (Aluminum) minimum
Plating Rate (mils/hr)	0.8 - 1.0 (190°F, pH 4.9)

### SECTION 7 - EQUIPMENT

Tanks should be constructed from anodically passivated stainless steel or high-density polypropylene. Continuous mechanical or air agitation using a low-pressure blower is recommended to reduce localized overheating. Heaters should be 316 stainless steel low density electric or PTFE steam coils. Filtration should be continuous, using 5 micron or smaller media. Exhaust ventilation is recommended to remove steam and solution mist due to elevated temperature and gas evolution of the EN solution while plating.

### SECTION 8 - SOLUTION MAINTENANCE

To ensure optimum results of the **Martron 870 EN** process, the solution chemistry should be maintained at optimum concentrations (0.8 oz/gal Nickel concentration, 4.0 oz/gal Sodium Hypophosphite concentration). The procedure to analyze for these two parameters follows:

#### Nickel Metal Analysis

##### Reagents

Concentrate Ammonium Hydroxide  
1 % Murexide Indicator w/CP grade Sodium Chloride

EDTA (Disodium Dihydrate Salt)  
0.1 molar = 37.235 g/l

**Procedure**

1. Pipette 10 ml sample of EN solution into a 250 ml. Erlenmeyer flask.
2. Dilute to 100 ml with DI water,
3. Add 5 - 10 ml of concentrated Ammonium Hydroxide to form a light blue color.
4. Add sufficient Murexide Indicator to form a light-yellow color solution.
5. Titrate with 0.1 M EDTA to a violet endpoint.
6. Calculations:  
 (ml) (0.1 M EDTA) x 0.078 = oz/gal Nickel metal  
 (ml) (0.0575 EDTA) x 0.045 = oz/gal Nickel metal

**Note:** For every 0.1 oz/gal of nickel low, add 1.0 fl oz/gal of **Martron 870A**

**Hypophosphite Analysis**

**Reagents**

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

**Procedure**

1. Pipette a 5 ml sample of bath into a 250 ml Iodine flask.
2. Add 50 ml of 0.1N Iodine solution.
3. Add 30 ml 6 Normal Hydrochloric Acid and mix.
4. Stopper flask and set in dark for 45 minutes.
5. Titrate with 0.1 Sodium Thiosulfate to a colorless endpoint.
6. Calculation:  
 [(ml of 0.1N Iodine) - (ml of Sodium Thiosulfate)] x 0.141 = oz/gal Sodium Hypophosphite

**Note:** For every 0.1 oz/gal of Sodium Hypophosphite low, add 0.20 oz/gal **Martron 870C** or **Martron 870D**.

**Replenishment Chart**

For optimum results, bath replenishment should be maintained by nickel metal analysis. Recommended nickel concentration is 0.8 oz/gal **Martron 870A and Martron 870C/870D**, added at a 1:1 ratio.

<u>ml EDTA</u> <u>(.0575 M)</u>	<u>(0.1 M)</u>	<u>Nickel</u> <u>Concentration</u> <u>oz/gal</u>	<u>g/l</u>	<u>870A</u>	<u>870C/870D</u>
17.8	10.2	0.80	6.0	0	0
16.9	9.7	0.76	5.7	1140 ml	1140 ml
16.0	9.2	0.72	5.4	2270 ml	2270 ml
15.1	8.7	0.68	5.1	3400 ml	3400 ml
14.2	8.2	0.64	4.8	4540 ml	4540 ml

**(Replenishment Chart for 100-gallon tank.)**

**SECTION 9 - pH CONTROL**

To raise and maintain pH for normal operation, adjustments should be made with 50% Ammonium Hydroxide or 2 lbs/gal Potassium Carbonate. To lower pH, if necessary, add 25% reagent grade Sulfuric Acid. Make all additions slowly, with agitation, and preferably without work in the tank.

**SECTION 10 - WASTE TREATMENT**

**Martron 870** solutions contain nickel metal and must be treated to meet local, state and federal guidelines. Contact **Martron Inc.** for detailed information for procedures applicable to your plating facility.