



# PRODUCT INFORMATION

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EMERGENCY - MARTRON 704-289-1934  
CHEMTREC 800-424-9300

REF. # MFC-004544, 004545, and 004546

## MARTRON HIGH PHOS OG PROCESS

“AN ADVANCED HIGH-SPEED HIGH PHOSPHORUS, SEMI-BRIGHT ELECTROLESS NICKEL SYSTEM DESIGNED TO MEET THE NEEDS OF THE OIL AND GAS INDUSTRY”

**Martron High Phos OG** is an easy to use next generation High Speed High Phosphorus Electroless Nickel Process designed to meet most high phosphorus EN needs *including oil and gas industry applications*. With over 40 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 corrosion resistance, ductility, plating rate consistency, smoothness and stability.

**Martron High Phos OG** is supplied as 3 separate liquid concentrates. **Martron High Phos OG-A and Martron High Phos OG-B** are used for bath make-up; **Martron High Phos OG-A and Martron High Phos OG-C** are used for replenishment and is pH self-regulating.

**Martron High Phos OG** meets Mil-26074E, AMS 2404G and ASTM B733-04 specifications.

### SECTION 1 - FEATURES

- \* Exceptional Stability
- \* Fastest Available High Phosphorous
- \* No Break-In Period
- \* Consistent Pit-Free Smooth Deposits
- \* Stain Resistant Deposit
- \* Excellent Corrosion Resistance
- \* Self-Regulating pH
- \* RoHS, WEEE and ELV Compliant

**SECTION 2 - DEPOSIT PROPERTIES**

<b>Nickel Content</b>	88-90 % w/w
<b>Phosphorus Content</b>	10.5 -12 % w/w
<b>Melting Point</b>	880 - 960° C
<b>Hardness</b>	46- 48 R as plated, 68 R (400° C)
<b>Density</b>	7.7-7.9 g/cc
<b>RCA Nitric Acid Test</b>	PASS
<b>Neutral Salt Spray (ASTM B-117)</b>	1000 hours
<b>Magnetic Properties</b>	Non-magnetic
<b>Hydrochloric Acid Test (50% HCL, 3 min, RT)</b>	Pass
<b>Electrical Resistivity</b>	50-100 micro-ohm/cm

**SECTION 3 - CONCENTRATE PROPERTIES**

<b>Martron High Phos OG-A</b>	Green, make-up and replenishment component
<b>Martron High Phos OG-B</b>	Colorless, make-up component
<b>Martron High Phos OG-C</b>	Colorless, pH regulating replenishment component

**SECTION 4 - SOLUTION MAKE-UP**

<b>Martron High Phos OG-A</b>	6% by volume
<b>Martron High Phos OG-B</b>	15% by volume
<b>Deionized Water</b>	79 % by volume

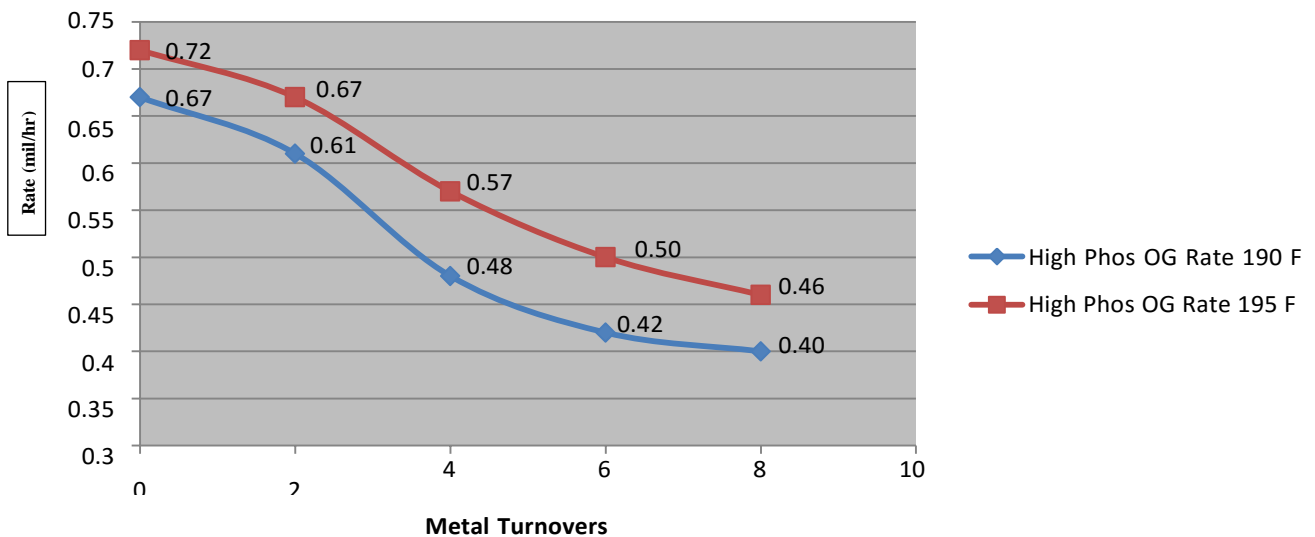
SECTION 5 - OPERATING PARAMETERS

	<u>Range</u>	<u>Optimum</u>
Nickel Metal Content	0.65 -0.85 (oz/gal)	0.80
	4.9-6.4 (g/l)	6.0
Sodium Hypophosphite Content	4.2 - 5.5 (oz/gal)	5.00
	31.5-41.3 (g/l)	37.5
pH	4.2 - 5.4	4.9
Temperature (°F)	185 – 200	190
Bath Loading (sq ft/gal)	0.1 - 1.5	0.20-0.40
Frequency of Additions	Activity should be maintained at 85 - 100 %	

SECTION 6 - BATH PERFORMANCE

Solution Life	8 - 10 MTO (Steel) minimum 4 - 6 MTO (Aluminum) minimum
Plating Rate (mils/hr)	0.4 - 0.7 (190 °F, pH 4.9)

Martron High Phos OG Rate verse MTO



**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 insure optimum results of the **Martron High Phos OG** EN process, the solution chemistry should be maintained at optimum concentrations (0.8 oz/gal Nickel concentration, 5.0 oz/gal Sodium Hypophosphite concentration). The procedure to analyze for these two parameters is as followed:

**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  
0.0575 M = 21.410 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 or 0.0575 M EDTA to a violet endpoint.
  6. Calculations:  
 $(\text{ml}) (0.1 \text{ M EDTA}) \times 0.078 = \text{oz/gal Nickel metal}$   
 $(\text{ml}) (0.0575 \text{ M EDTA}) \times 0.045 = \text{oz/gal Nickel metal}$

**Note:**

For every 0.1 oz/gal of nickel low, add 1.0 fl oz/gal of **Martron High Phos OG-A**.

**Hypophosphite Analysis**

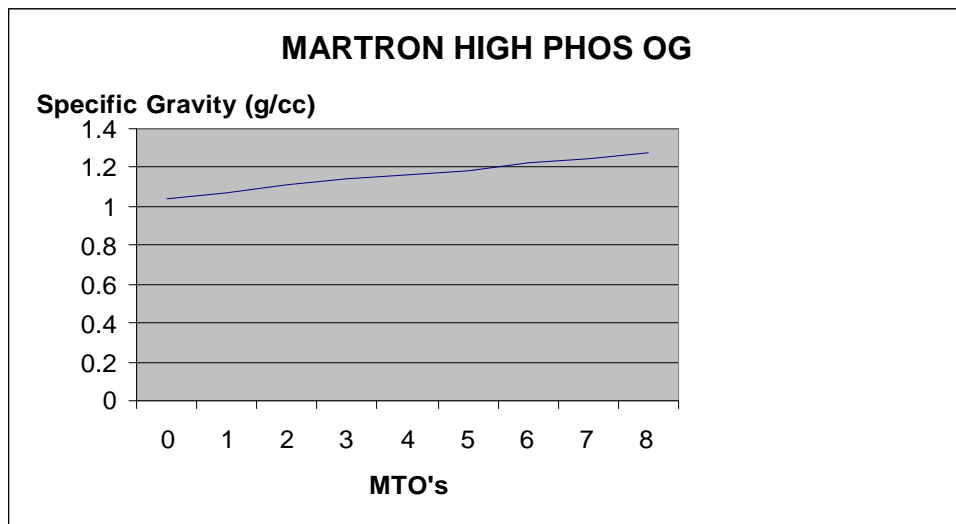
**Reagents:** 6 Normal Hydrochloric Acid  
 0.1N Iodine solution  
 0.1N Sodium Thiosulfate solution

- Procedure:**
1. Pipette a 5-ml sample of bath into a 250 ml Iodine flask.
  2. Add 40 ml of DI water
  3. Add 30 ml 6 N Hydrochloric Acid and mix.
  4. Add 50 ml of 0.1N Iodine.
  5. Stopper flask and set in dark for 45 minutes.
  6. Titrate with 0.1N Sodium Thiosulfate to a colorless endpoint.
  7. Calculation:

$[(\text{ml of 0.1N iodine}) - (\text{ml of Sodium Thiosulfate})] \times 0.141 = \text{oz/gal Sodium Hypophosphite}$

**Note:**

For every 0.1 oz/gal of Sodium Hypophosphite low, add 0.175 fl.oz/gal **Martron High Phos OG-C**.



**SECTION 9 - REPLENISHMENT CHART**

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

<i>ml EDTA</i> <i>(0.0575 M)</i>	<i>ml EDTA</i> <i>(0.1 M)</i>	<i>Nickel</i> <i>Concentration</i> <i>oz/gal</i>	<i>Nickel</i> <i>Concentration</i> <i>g/L</i>	<i>MARTRON</i> <i>HIGH PHOS</i> <i>OG- A</i>	<i>MARTRON</i> <i>HIGH PHOS</i> <i>OG-C</i>
17.8	10.2	0.80	6.0	0	0
16.9	9.7	0.76	5.7	1160 ml	1160 ml
16.0	9.2	0.72	5.4	2270 ml	2270 ml
15.1	8.7	0.68	5.1	3380 ml	3380 ml
14.2	8.2	0.64	4.8	4490 ml	4490 ml

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

**SECTION 10 - pH CONTROL**

In normal use, the **Martron High Phos OG** with the self-regulating pH, **Martron High Phos OG-C**, does not require any additional pH adjustments. However, when necessary to raise the pH, 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 11 - WASTE TREATMENT**

**Martron High Phos OG** 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.

**SECTION 12 - WARRANTY**

This product is guaranteed as to quality upon shipment from our plant. If the use recommendations are followed, desired results will be obtained. Since the use of our product is beyond our control, no guarantee expressed or implied is made as to the effects of such use or the results to be obtained.