



# PRODUCT INFORMATION

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EMERGENCY - MARTRON 704-289-1934  
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REF. # MFC-004564, 004565 AND 004566

## MARTRON F-TX-20

“A Lead and Cadmium Free Medium Phosphorus, Bright, Ductile, High Speed, Self-pH regulating Electroless Nickel Bath”

**Martron F-TX-20** is an easy to use Advanced Lead and Cadmium Free, Medium Phosphorus Electroless Nickel Process designed to meet most Bright EN applications today. The **Martron F-TX-20** process is the next generation of Pb/Cd free plating baths, surpassing traditional Pb/Cd chemistries in brightness and plating copper alloys. With over 30 years of Electroless Nickel experience, *Martron Inc.* offers this EN formula to meet and exceed the standard Pb/Cd Medium Phosphorus nickel bath in all general categories. **Martron F-TX-20** offers excellent ductility, making it ideal for applications where parts are stamped or crimped after plating.

**Martron F-TX-20** is supplied as 3 separate liquid concentrates. **Martron F-TX-20MU** is used for make-up; while **Martron F-TX-20A** and **Martron F-TX-20C** are used for replenishment.

**Martron F-TX-20** meets Mil-26074B, AMS 2404B and AMS 2405 specifications. **Martron F-TX-20** is compliant with ELV (automotive), ROHS requirement (electronics), WEEE (electronics) and the Green Initiative (all industries).

### SECTION 1 - FEATURES

- No Lead or Cadmium
- SELF pH Regulating Replenishment
- Exceptional Stability
- Excellent Copper Initiation
- Exceptional Ductility and Brightness
- Consistent Pit-Free Smooth Bright Deposits
- RoHS, WEEE and ELV Compliant

**SECTION 2 - DEPOSIT PROPERTIES**

<b>Nickel Content</b>	92.0 - 94.0 % w/w
<b>Phosphorus Content</b>	6.0 - 8.0 % w/w
<b>Melting Point</b>	880 - 1100°C
<b>Hardness</b>	50– 54 R as plated, 66 – 68 R (400°C)
<b>Density</b>	7.9 – 8.3 g/cc
<b>RCA Nitric Acid Test</b>	Fail
<b>Neutral Salt Spray (ASTM B-117)</b>	100 hours (at 1 mil)
<b>Magnetic Properties</b>	Slightly magnetic
<b>Hydrochloric Acid Test (50% HCL, 3 min, R.T.)</b>	Pass
<b>Electrical Resistivity</b>	35 - 80 micro-ohm/cm

**SECTION 3 - CONCENTRATE PROPERTIES**

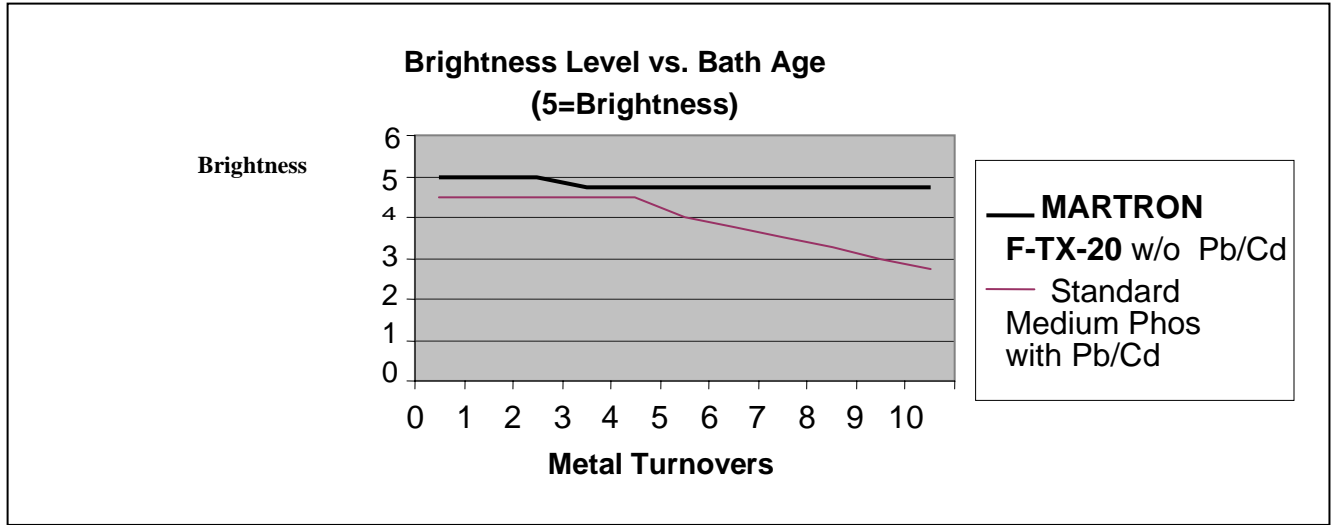
<b>Martron F-TX-20MU</b>	Green make-up component
<b>Martron F-TX-20A</b>	Green replenishment component
<b>Martron F-TX-20C</b>	Clear, slightly yellow replenishment component

**SECTION 4 - SOLUTION MAKE-UP**

<b>Martron F-TX-20MU</b>	30 % by volume
<b>D.I. Water</b>	70 % by volume



**Brightness Level**



**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 F-TX-20** 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 is as 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 working bath into a 250 mL Erlenmeyer flask
  2. Add 50 ml of DI water.
  3. Add 5 ml of concentrated ammonium hydroxide to form a light blue solution.
  4. Add a pinch of Murexide to form a light brown color solution.
  5. Titrate with std. 0.1 M EDTA to a violet purple (magenta) endpoint.
  6. Calculations:
 
$$\begin{aligned} \text{ml 0.1 M EDTA} \times 0.078 &= \text{oz/gal Nickel metal} \\ &\times 0.587 = \text{g/l Nickel metal} \\ \text{ml 0.0575 EDTA} \times 0.045 &= \text{oz/gal Nickel metal} \\ &\times 0.338 = \text{g/l Nickel metal} \end{aligned}$$

**Note: Optimum nickel concentration is 0.8 oz/gal.** For every 0.1 oz/gal low of nickel metal, add 1.0 fl. oz/gal of **Martron F-TX-20A**.

### Hypophosphite Analysis

- Reagents:**
- 6 Normal Hydrochloric Acid (Dilute conc. HCl 50/50 with DI water)
  - 0.1N Iodine solution
  - 0.1N Sodium Thiosulfate solution

- Procedure:**
1. Pipette exactly 5 ml aliquot of room temp working bath into an Iodine glass flask.
  2. Add 50 ml DI H<sub>2</sub>O and 30 ml of 6N HCL.
  3. Exactly pipette 50 ml of 0.1 N Iodine Solution into the iodine flask.
  4. Stopper flask and swirl it to ensure mixing. Then put it in a dark place for at least 35 minutes.
  5. Remove stopper, rinse flask neck with DI water.
  6. Titrate immediately with 0.1N Sodium Thiosulfate solution to a clear endpoint.
  7. Calculations:
 
$$[(\text{ml 0.1N iodine}) - (\text{ml 0.1N sodium Thiosulfate})] \times 0.141 = \text{oz/gal sodium hypophosphite}$$

$$[(\text{ml 0.1N iodine}) - (\text{ml 0.1N sodium Thiosulfate})] \times 1.06 = \text{g/l sodium hypophosphite}$$

**Note: Optimum concentration is 4.0 oz/gal** For every 0.1 oz/gal of Sodium Hypophosphite low, add 0.20 oz/gal **Martron F-TX-20C**.

**Replenishment Chart**

For optimum results, bath replenishment should be maintained by nickel metal analysis. Recommended nickel concentration is 0.8 oz/gal. **Martron F-TX-20A and Martron F-TX-20C** added at a 1:1 ratio.

ml EDTA (.0575 M)	ml EDTA (0.1 M)	Activity %	Nickel Conc. oz/gal	Nickel Conc. g/l	Martron F-TX-20A	Martron F-TX-20C
17.8	10.2	100	0.80	6.0	0	0
16.9	9.7	95	0.76	5.7	1140 ml	1140 ml
16.0	9.2	90	0.72	5.4	2270 ml	2270 ml
15.1	8.7	85	0.68	5.1	3400 ml	3400 ml
14.2	8.2	80	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 F-TX-20** 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.