



Product Bulletin

Better Chemistry. **Better Business.**

Enerox™ Additive 111

Product Code: 2850000
Revised Date: 10/10/2006

Enerox™ Additive 111

Enerox™ Additive 111 is a product used in the Enerox nickel systems. **Enerox™ Additive 111** is an auxiliary brightener. In conjunction with the other addition agents, **Enerox™ Additive 111** enhances the overall desired nickel deposit characteristics (brightness & leveling). **Enerox™ Additive 111** is readily used in rack, barrel, and reel to reel (continuous strip) nickel plating applications.

SPECIAL FEATURES

- Very Effective to Brighten Low Current Densities
- Helps to Extend Throw in Low Current Densities
- Complements the Enerox Bright Nickel System Performance
- Economical Consumption Rate
- Carbon Filtration Tolerant
- Compatible With Most Bright Nickel Systems

RECOMMENDED APPLICATION

	Range	Optimum
Concentration	1.25 – 2.5% v/v	2 % v/v
Nickel Bath Temperature	130-150 degF (54-66 degC)	140 degF (60 degC)
Nickel Bath pH	3.5 – 4.5	4.0
Nickel Bath Agitation	Air or Mechanical	As Required

Note: Your Hubbard Hall Inc. Sales Representative or the Corporate Technical Center will be pleased to recommend the optimum conditions for the particular nickel plating application.

ANALYSIS PROCEDURE NICKEL PLATING SOLUTION

The routine procedure should include wet analysis of the plating salts and the **Enerox™ Additive 111** concentration, bath pH, and a plating cell test. The Corporate Technical Center can provide the analysis procedures, along with the required solutions, labware, and testing equipment. Hull cell testing is a reliable method for determining overall condition of the nickel deposit. Additions of



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Enerox™ Additive 111 as required, should be made to the hull cell in 0.1 – 0.2% by volume increments. Improved or preferred brightness & leveling characteristics should be achieved, with the bath analysis in range, at the operating parameters.

PROCESS SUGGESTIONS

Enerox™ Additive 111 is a multifunctional additive. It is the auxiliary brightener operating in conjunction with the other *Enerox* agents. **Enerox™ Additive 111** is consumed by electrolysis at the rate of one gallon per 8,000 to 12,000 amp hours (11 to 16 fl oz per 1,000 amp hours). **Enerox™ Additive 111** is removed, to some degree, by batch carbon treatment. Continuous filtration of the nickel bath through a carbon pack removed only a slight amount of **Enerox™ Additive 111**. Additions of **Enerox™ Additive 111** can be made directly to the nickel bath, a required, or in conjunction with the specific *Enerox Bright Nickel* process additives. Low concentration of **Enerox™ Additive 111** will result in dull low current density deposits, In addition, the *Enerox* maintenance brightener response will not be as effective. High concentration of **Enerox™ Additive 111** will result in dark low current density swirls. Like wise the *Enerox* maintenance brightener response will be “hotter”, or indicate an excess. High brightener levels will affect ductility and reception of additional plating, such as flash chrome.

PHYSICAL CHARACTERISTICS

Appearance	Clear colorless liquid
Odor	Bland
Foaming Tendency	None
Maximum Solubility	Complete

HAZARD CLASSIFICATION

DOT Hazard Class	Not applicable
DOT Shipping Name	Not applicable
UN Number	Not applicable
Packing Group	Not applicable
Guide Number	Not applicable

WASTE TREATMENT & DISPOSAL

The nickel plating solution is mildly acidic. Sources for treatment, such as drag out losses and batch purification, should be processed in accordance with appropriate steps, to meet local POTW or municipal effluent discharge requirements. Sludges should be separated out before discharge.



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Mixed solutions of nickel effluent and other plant waters may require additional treatment to meet discharge requirements.

SAFETY INFORMATION

Please read and understand the **Enerox™ Additive 111** Material Safety Data Sheet before handling and using this product.

WARRANTY

THE QUALITY OF THIS PRODUCT IS GUARANTEED ON SHIPMENT FROM OUR PLANT. IF THE USE RECOMMENDATIONS ARE FOLLOWED, DESIRED RESULTS WILL BE OBTAINED. SINCE THE USE OF OUR PRODUCTS IS BEYOND OUR CONTROL, NO GUARANTEE EXPRESSED OR IMPLIED IS MADE AS TO THE EFFECTS OF SUCH USE, OR THE RESULTS TO BE OBTAINED.