

ACCU-LABS INC.

4831 S. Whipple Avenue

Chicago IL 60632

Phone: 773.523.3100 Fax: 773.523.4008

www.acculabsinc.com E-mail: sales@acculabsinc.com

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ACCU-LABS NILUX

Bright Nickel System for Barrel and Rack Plating

Introduction

Today's nickel plater must meet the challenge of opposing demands for higher quality and lower costs. The **NILUX Bright Nickel** series of products for bright nickel plating are formulated to help the plater meet those challenges. **NILUX** products adapt to most specific needs: barrel and rack, bright and semi-bright, steel and mixed metal. **NILUX** provides dependable, economical results with maximum operator ease.

Features and benefits

High-speed leveling.....Beautiful bright nickel finish
Versatile products.....Can be adapted to most applications
Wide operating parameters.....Easy to control
Excellent chrome receptivity.....Maximum production rate

Chemical concentrations	Barrel	Rack	LTC
Nickel sulfate hexahydrate.....	32 oz/gal.....	35 oz/gal.....	18 oz/gal
Nickel chloride hexahydrate.....	10 oz/gal.....	15 oz/gal.....	15 oz/gal
Boric acid.....	6 oz/gal.....	6 oz/gal.....	6.5 oz/gal
pH.....	3.5 - 4.5.....	3.5 - 4.5.....	3.5 - 4.5

Brightener balance for plating steel:

NILUX Carrier ST - 1.....3 - 5 % by volume
NILUX Carrier Z - 2.....0.5 - 1.5% by volume
NILUX NXZ Brightener.....0.1 % by volume
Non-Pitter.....0.2-0.5% by volume

Brightener balance for plating zinc die castings:

NILUX Carrier ST – 1.....	2 - 3 % by volume
NILUX Carrier Z - 2.....	2 - 3 % by volume
NILUX NXZ Brightener.....	0.1 % by volume
Non-Pitter.....	0.2-0.5% by volume

Maintenance Guidelines:

NILUX Carrier ST – 1.....	1 gallon per 20,000 amp-hours
NILUX Carrier Z - 2.....	1 gallon per 15,000 amp-hours
NILUX NXZ Brightener.....	1 liter per 10,000 amp-hours

Operating conditions

Tanks and equipment.....	Lined steel or heat-resistant plastic
Anodes.....	Sulfur depolarized suggested
Anode baskets.....	Titanium, bagged
Filtration.....	Continuous
Agitation.....	Mechanical or filtered air
Temperature.....	145°±5°F (conventional)
Cathode current density.....	5 - 100 amps per square foot
Anode current density.....	3 - 100 amps per square foot

New bath make-up (100 gallons)	Barrel	Rack	LTC
Nickel sulfate hexahydrate	200 pounds	220 pounds	112 pounds
<i>Liquid nickel sulfate (5 lb. /gal)</i>	<i>40 gallons</i>	<i>44 gallons</i>	<i>22.5 gallons</i>
Nickel chloride hexahydrate	62 pounds	94 pounds	94 pounds
<i>Liquid nickel chloride (6 lb. /gal)</i>	<i>10.5 gallons</i>	<i>16 gallons</i>	<i>16 gallons</i>
Boric acid	38 pounds	38 pounds	40 pounds
pH	Adjust to 4.0-4.5 with sulfuric acid or nickel carbonate		
NILUX Bright Nickel components	Follow suggested guidelines for specific application		

Preparation of new solution

1. Carefully review all equipment to verify that tanks, pumps, heaters, and related items meet the requirements for the work this line will do.
2. Thoroughly clean all tanks and equipment. Use a separate tank for bath preparation if possible.
3. Fill tank with water ²/₃ full for granular salts or ¹/₄ full for liquid salts.
4. While agitating (mechanical preferred) slowly add chemicals. Mix until fully dissolved.

5. Bring solution to 90% of final volume, mix well, and adjust pH of solution. If pH is high, add dilute sulfuric acid to reduce; if pH is low, add $\frac{1}{2}$ pound nickel carbonate powder per 100 gallons to raise. Allow to dissolve completely before rechecking pH. Continue adjustments until pH is within range.
6. Add appropriate combination of **NILUX Bright Nickel** components and mix well. Dilute to final volume and mix. Analyze solution and fine-tune balance.
7. Electrolyze the new solution at low current (below $\frac{1}{2}$ amp/ft²) for 24 hours to remove trace impurities that may have been in the make-up chemicals. Bath is now ready for plating.

Conversion of existing baths

NILUX Bright Nickel components are fully compatible with most existing systems, so that a simple "slide-in" conversion is acceptable. It is common to allow existing brightener to deplete as much as possible while still producing acceptable work. We suggest that a representative sample of the solution be sent to Accu-Labs, Inc. for analysis and Hull cell testing. We will then advise the best conversion method.

Pretreatment for bright nickel plating

Proper conditioning of the work to be plated is often more important than the rest of the plating operation. Work must be clean and free of metalworking lubricants, rust, fines, mold releases, and so on. Consult with your sales representative for information and assistance with pretreatment products.

Filtration and purification

All plating solutions benefit from filtration. For bright nickel, it becomes critical: even small particles will show up readily on the mirror finish. Depending on the type of solid contaminant, either pitting or roughness can result.

Filtration should be continuous with media capable of one-micron retention. Turnover should be at least once per hour. Activated carbon should be used in filtration on a regular basis to maintain organic contaminants at a tolerable level.

Even with carbon-packed filter units, a thorough carbon treatment may sometimes be required. This is the result of a combination of cleaner being carried into the nickel bath and electrolytic breakdown of additives. Consult with your sales representative or for information and assistance with purification.

Metallic contamination is usually caused by work lost in the plating tank, drag-in from pickling, corrosion of busing, or leaks in the tank liner. Proper equipment maintenance is the best way to avoid problems. Adjusting the balance of the **NILUX Bright Nickel** components can mask reasonable levels of metallic impurities. Low-current dummieing may be required when contamination is more severe.

Nickel anodes

Only high-purity nickel anodes should be used. Several types are commercially available, and the choice of anodes depends in part on the type of plating being done. Consult with your sales representative or for information on anodes for your application.

Anode baskets should be constructed from titanium, which will not corrode in the properly maintained nickel solution. Anodes should also be bagged to retain nickel fines.

Operating temperatures

NILUX Bright Nickel baths produce exceptionally bright plating through a temperature range of 110 - 150⁰ F. Temperature range depends on the chemical balance of the bath, brightener levels, and type of work being plated.

Handling and storage

Follow normal safe handling guidelines when using **NILUX Bright Nickel** and related products. Nickel plating solutions are highly irritating to skin and mucous membranes. Proper safety precautions should always be observed. Read, understand, and follow all safety information for all chemicals used. This consideration should include all stages of the plating cycle.

Non-warranty

The information contained in this bulletin is, to the best of our knowledge, true and accurate. All recommendations are made without guarantee, and Accu-Labs, Inc. disclaims any and all liability arising from the use of this product or the information contained herein.

Related products and services

NILUX M-50 (mechanical) and A-60 (air) non-pitters are used to minimize pitting in the nickel plate. It is important to keep in mind that pitting can be caused by several factors and all sources of this problem need to be controlled. Recommended concentrations of non-pitters are 0.2-0.5% by volume.

Pretreatments for a wide variety of applications are available through Accu-Labs, Inc. These include soak and electrocleaners, descalers, acid salts, acid inhibitors, and more.

Anodes and chemicals for bath maintenance, waste treatments, plant maintenance, etc.

Laboratory and chemical consulting services to help you maximize production with a minimum of difficulties. Our laboratory is staffed and equipped to assist both your production and environmental needs.