



Plating International, Inc.

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One-Plate® 3001 Low Phosphorus ELV, RoHS Compliant Electroless Nickel Technical Data Sheet



DESCRIPTION:

ONE-PLATE® 3001 is the only ELV ROHS compliant single component system of its kind; the process is made up and maintained with the same single product. The bath is highly stable, simple to operate; depositing a smooth bright mid phosphorus coating on a variety of substrates. The deposit contains 3 to 5% by weight phosphorus, which provides a coating with high hardness and excellent corrosion resistance in alkaline environments. ONE-PLATE® 3001 may also be blackened in a subsequent process available from Mile Chemical Company Inc. for applications requiring a black nickel finish.

ONE-PLATE® 3001 process is tolerant of many typical impurities. It is designed to provide a high rate of deposition and long service life. It is well suited for those production facilities where maximum economy of operation is required.

ONE-PLATE® 3001 process is a patented process and covered under US Patent 10,006,126 with others pending. ONE-PLATE® 3001 meets or exceeds MIL-C-26074D and AMS 2404C.

ADVANTAGES AND PROPERTIES:

Stable Long-Life Solution with Consistent pH through-out
Same Single Component for both Make-Up and Maintenance
Avoids Confusion Between Multiple Components
Easy to Use, Easy to Make Up, Easy to Ship, Easy to Stock
Less Inventory
Makes Up at only 15 %
Consistent High Rate of Deposition
ELV ROHS Compliant
Bright Uniform Deposit

<u>Deposit Properties</u>	
<u>Property</u>	<u>Typical Value</u>
Phosphorus Content	3-5%
Melting Point	1630°F
Hardness	
1. As plated	700 HK100
2. Heat treated @ 750°F for 1 hour	1000 HK100
Stress	Compressive
Wear Resistance:	
1.(As plated)	20-25 TWI
2. (Heat treated @ 750°F for 1 hour)	10-15 TWI
Magnetic Tendency as plated	Magnetic
Electrical Resistivity	75-100 micro-ohm/cm
Corrosion Resistance	95-100Hours NSS (ASTM B-117)

MAKE UP INSTRUCTIONS AND EQUIPMENT:

- Plating tank Natural high-density polypropylene or anodically protected stainless steel.
- Heating Steam or hot water via externally mounted heat exchanger or internally mounted electric using stainless steel or titanium immersion heaters. Teflon® coated immersion heaters can be used.
- Agitation Solution movement using a circulation pump or a cathode agitator rod or clean mild air from a low-pressure, high-volume air blower.
- Filtration Continuous through a 1-micron filter at the rate of 10 tank volumes per hour. Filters can be bags or cartridges that are rinsed in water before use in the plating bath.

Bath Make Up

A new bath is made up with 15% by volume of ONE-PLATE® 3001.

<u>Tank Size</u>	<u>ONE-PLATE® 3001</u>
100 gallons	15 gallons

Note: Ask your Plating International Representative for a customized spreadsheet that will automatically calculate the exact make-up and replenishment requirements for your specific plating tank size and titration results

To make up the bath:

1. Clean & passivate the plating tank using 30-50% nitric acid solution for 4-8 hrs. Rinse the tank thoroughly after passivating including clean water with ammonium hydroxide if needed. Plating tank must be free of all traces of nitric acid. The use of nitrate test strips is recommended.
2. Fill the clean plating tank to about one half of its volume with deionized water.
3. Add the required amount of ONE-PLATE® 3001 and mix well.
4. Fill the tank to its final operating level with deionized water and mix thoroughly.
5. Measure the solution's pH and adjust to the working range as needed. (25% sulfuric acid is used to lower pH and 50% ammonium hydroxide is used to increase pH).
6. Heat to operating temperature.

THE BATH IS NOW READY FOR OPERATION.

OPERATING PARAMETERS:

<u>Operating Condition</u>	<u>Range</u>	<u>Optimum</u>
Nickel g/l	5.0-6.0	5.6
oz/gal	0.67-0.80	0.74
Hypophosphite g/l	22.5 – 35.0	25
oz/gal	3.0-4.7	3.3
Temperature °F	190-198	194
pH	4.8-6.1	5.8
Replenishment ratio	(15 % per MTO)	
Plating rate - micron/hr.	17.0-23.0	20
mil/hr.	0.75-2.5	1.5
Bath loading – dm ² /l	0.75-2.5	1.5
ft ² /gal	0.3-1.0	0.6

During operation, the solution's nickel and sodium hypophosphite concentration should be maintained between 80 and 100 percent activity to achieve consistent deposit quality and plating rate performance. Maintaining these concentrations between 90 and 100 percent is preferred for optimal performance.

Replenishment additions may be made while parts are plating. For best results, however, replenishment should be made away from parts in the bath and in 5 or 10 percent activity increments. Many smaller volume additions are preferred over fewer larger additions.

pH measurements should be made after replenishment additions have been completed and solution mixed well to assure homogeneity. If necessary, pH may be adjusted upward by small additions of dilute ammonium hydroxide (50% by volume) or lowered by additions of dilute sulfuric acid (25% by volume).

Solution Analysis

Nickel analysis

Procedure:

1. Pipette a 10 mL cooled sample of the ONE-PLATE® 3001 bath into a 250 mL Erlenmeyer flask.
2. Add approximately 100 mL of DI water and 10 mL ammonium hydroxide.
3. Add a “pinch” of murexide indicator to form a yellow/brown color.
4. Titrate with 0.0575M EDTA to a purple endpoint.

Calculations:

The nickel concentration is determined using the EDTA titration procedure outlined in the solution analysis section. The ONE-PLATE® 1001 bath may be replenished as illustrated in the following table:

mls EDTA (0.0575 M)	Nickel Concentration		Replenishment
	Percent	g/l	ONE-PLATE® 3001 (gal/100 gals)
14.8	100	5	0
14.2	95	4.75	0.75
13.4	90	4.5	1.5
12.7	85	4.25	2.25
11.9	80	4.0	3.0

IT IS EXTREMELY IMPORTANT TO FOLLOW THE ABOVE RECOMMENDATIONS TO MAINTAIN A CONTINUOUS SUCCESSFUL OPERATION.

Note: Ask your Plating International Representative for a customized spreadsheet that will automatically calculate the exact make-up and replenishment requirements for your specific plating tank size and titration results.

SAFETY, HANDLING AND DISPOSAL:

Consult the Safety data Sheet for additional safety, health, and environmental information. Dispose in accordance with applicable regulations. Consult your Plating International, Inc. Representative. THE DATA SET FORTH IN THIS BULLETIN IS BELIEVED BY PLATING INTERNATIONAL, INC. TO BE TRUE, ACCURATE AND COMPLETE, BUT IS NOT GUARANTEED. WE MAKE NO WARRANTIES, IMPLIED OR EXPRESSED CONCERNING THIS PRODUCT OR ITS USAGE AND HANDLING. WE ASSUME NO RESPONSIBILITY TO USE OUR GOODS. THEIR QUALITY AND SUITABILITY FOR ANY PARTICULAR PURPOSE OR USE SHOULD BE CONFIRMED BY THE USER'S OWN TESTS.



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