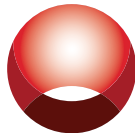




HAVILAND NICKELS



Haviland
PRODUCTS COMPANY

SEMI-BRITE NICKEL PROCESS

HP OPTIMA (100 / 200 / 200HL)

- A high performance system for plating a ductile, low stressed, sulfur-free, semi-bright nickel deposit.
- Excellent performance over a wide range of operating conditions.
- Provides exceptional corrosion protection when used as an undercoat in duplex or triplex nickel deposits.
- Offers exceptional leveling properties for decorative applications.
- Contains no formaldehyde, coumarin or coumarin-based derivatives
- No regulatory compliance concerns.
- No strong odor and less organic breakdown reducing frequent carbon treatments.

OPERATING PARAMETERS:

Typical Range

Nickel (as metal) 9.8 oz/gal 9.5 -10.5 oz/gal
75.0 g/l 70.0 - 80.0 g/l

Nickel Chloride 4.0 oz/gal 3.0- 5.0 oz/gal
25.0 g/l 22.0 - 28.0 g/l

Nickel Sulfate 35.0 oz/gal 30.0 - 40.0 oz/gal
250.0 g/l 240.0 - 260.0 g/l

Boric Acid 6.0 oz/gal 5.5- 65 oz/gal
45.0 g/l 40.0 - 50.0 g/l

HP OPTIMA 100 15.0 ml/L (1.5%) 10.0 - 20.0 ml/L
(1.0 – 2.0%)

HP OPTIMA 200 / 200 HL 3.0 ml/L (0.30%) 0.5 - 1.0 ml/L (.05 – 0.1%)

HP OPTIMA 300 STEP .0375 ml/L
(0.0375%) .025 - .050 ml/L (0.025– 0.050%)

HP NI WA5 2.0 ml/L (.2%) 1.0 - 3.0 ml/L (0.1–0.3%)
pH 4.0 3.8 - 4.2

Temperature 145 °F 135 - 155 °F

Current Density 10 - 100 ASF

Agitation Low Air Pressure

Filtration Continuous 1 - 2 turnovers per hour

CONSUMPTION RATES:

HP OPTIMA 100 is used only for make-up of a new solution or conversion of existing solutions. On occasion it may be needed to balance the brightener process.

HP OPTIMA 200 and **HP OPTIMA 200 HL** is fed at the rate of 1gallon per 6 -12,000 amp hours. This product should be added by an automatic feeder for optimum results. Normal carbon pack will remove a small amount of the brightener; heavy carbon treatment will remove as much as 30%.

HP OPTIMA 300 STEP is fed as required to increase S.T.E.P. Initial addition usually 0.25 to 0.5 ml/liter (0.025 to 0.05%)

HP Optima HCD is an additive that brightens the high current density area without affecting the S.T.E.P. (0.025 to 0.1% by volume)

HIGH SULFUR STRIKE

HP SUREGUARD HS

- High sulfur nickel deposit that increases corrosion resistance as part of a multi-layered nickel deposit system often specified in the automotive industry.
- Up to 96 hrs CASS, as part of HP Optima/ ULTIMA multi-layer nickel systems.
- Electro-potential adjustable” to various specifications. Potential should be 20mV less noble vs brite nickel layer.
- Ductile deposit with good adhesion
- Economical.

OPERATING PARAMETERS:

Typical Range

Nickel (as metal) 10.0 oz/gal 10.0 -12.0 oz/gal
82.0 g/l 75.0 - 90.0 g/l

Nickel Chloride 8.0 oz/gal 6.0 - 10.0 oz/gal
82.0 g/l 72.0 - 92.0 g/l

Nickel Sulfate 35.0 oz/gal 35.0 - 45.0 oz/gal
270.0 g/l 260.0 - 335.0 g/l

Boric Acid 6.0 oz/gal 5.5 - 6.5 oz/gal
40.0 g/l 35.0 - 45.0 g/l

HP SUREGUARD HS 3.0 ml/L (0.30%) 2.0 - 4.0 ml/L
(0.2 – 0.4%)

HP NI WA5 2.0 ml/L (.2%) 1.0 - 3.0 ml/L (0.1–0.3%)
pH 4.0 3.8 - 4.2

HP NI-Index 4 ml/L (0.4%) 3 - 5 ml/L (0.3 –0.5%)
pH 3.2 3.0 - 3.5

Temperature 120 °F 115 - 125 °F

Current Density 10 ASF

Agitation Low Air Pressure

Filtration Continuous - 1 - 2 turnovers per hour

Plating Time: Minimum 2 - 5 minutes

Additions of the of the HP SUREGUARD HS and the HP SUREGUARD WA are typically added according to Ampere hours. Although exact dosing rates should be calculated according to practical experience gained on site and continuous measuring results of electro-potential with a S.T.E.P. tester

Additions of HP SUREGUARD HS should not exceed 0.5 ml/l at any one time. (i.e. small doses are recommended).

Consumption(nominal) per 10,000 amp/hours:

Regular additions of HP NI WA5 is optional to adjust surface tension.

Hull-cell tests are recommended to control performance. (2A, 5min, 120oF, air agitation)

BRITE NICKEL PROCESS

HP ULTIMA HD MIX

- A single brightener system for nickel-plating of both ferrous, non-ferrous metals and plastic substrates.
- Produces uniformly bright and ductile deposits with exceptional leveling, ductility, and receptivity to chromium plate.
- Operates effectively over a wide solution composition range and is ideal for all high volume production applications where simplicity of operation and control is required.
- Offers exceptional leveling properties for decorative applications, and features a high tolerance to zinc and copper contamination.

OPERATING PARAMETERS:

Typical Range

Nickel (as metal) 10.0 oz/gal 10.0 -12.0 oz/gal
82.0 g/l 75.0 - 90.0 g/l

Nickel Chloride 10.0 oz/gal 8.0 - 16.0 oz/gal
90.0 g/l 60.0 - 120.0 g/l

Nickel Sulfate 35.0 oz/gal 35.0 - 45.0 oz/gal
270.0 g/l 260.0 - 335.0 g/l

Boric Acid 6.5 oz/gal 5.0 - 7.5 oz/gal
45.0 g/l 37.0 - 52.0 g/l

HP ULTIMA HD MIX 1.5 ml/L (0.15%) 1.0 - 2.0 ml/L
(0.1 – 0.2%)

HP NI-Carrier 30 ml/L (3.0%) 25 - 35 ml/L (2.5 – 3.5%)

HP NI-Index 10 ml/L (1.0%) 8 - 15 ml/L (0.8 –1.5%)

pH 4.0 3.8 - 4.2

Temperature 145 °F 135 - 155 °F

Current Density 10 - 100 ASF

Agitation Low Air Pressure

Filtration Continuous 1 - 2 turnovers per hour

HP ULTIMA HD MIX

A brightener designed to produce grain refinement, ductility, brightness and leveling in the deposit as a single maintenance component.

HP ULTIMA HD Mix can be used to provide partial maintenance additions of HP NI-CARRIER and HP NI-INDEX, or these items can be added separately.

Frequent additions are recommended at a rate of one (1) gallon per 8,000 - 12,000 amp hours. Specific addition rates will depend on the degree of brightness and leveling required.

Low brightener content will result in poor leveling and lack of brightness of the deposit.

Brightener content over the recommended level can produce a loss of ductility and poor chrome coverage. (The HP ULTIMA HD MIX process has a wide operating latitude before overloads have this effect.)

This product should be added by an automatic feeder for optimum results. Normal carbon pack will remove a small amount of the brightener; heavy carbon treatment will remove as much as 30%.

HP PERFORMA HD MIX

- A technological breakthrough in ultra-high performance non-index bright nickel systems.
- Stable compounds that enable uncommon ease of control with less need for batch carbon treatment.
- White-bright, highly leveled, super ductile, and extremely low stressed deposits.
- Uniform performance across the entire plating range, especially in extremely low current density areas.
- Outstanding brightness and leveling, even in solutions contaminated with zinc and copper impurities.
- Requires less nickel thickness, thus reducing nickel consumption and plating costs.
- A multi-component system is also available.
- Provides excellent performance under a wide variety of current densities, or agitation.

OPERATING PARAMETERS:

Typical Range

Nickel (as metal) 10.0 oz/gal 6.0 -12.0 oz/gal
82.0 g/l 45.0 - 90.0 g/l

Nickel Chloride 10.0 oz/gal 7.0 - 20.0 oz/gal
75.0 g/l 52.0 - 150.0 g/l

Nickel Sulfate 35.0 oz/gal 30.0 - 45.0 oz/gal
262.0 g/l 225.0 - 337.0 g/l

Boric Acid 6.5 oz/gal 5.0 - 7.5 oz/gal
49.0 g/l 37.0 - 56.0 g/l

HP PERFORMA HD MIX 1.0 mL/L (0.10%) 0.5 – 2.5 mL/L (0.05 – 0.25%)

HP NI-CARRIER 32.5 mL/L (3.5%) 30 - 35 mL/L (3.0 – 3.5%)

HP NI-WA 5 1.5 mL/L (0.15%) 1.0 – 3.0 mL/L (0.1- 0.3%)

HP PERFORMA LEVELER 2.0 mL/L (0.20%) 1.0 – 3.0 mL/L (0.1 – 1.4%)

pH 4.0 3.8 - 4.2

Temperature 140 °F 130 - 150 °F

Cathode Current Density 40 ASF 10 - 100 ASF

Anode Current Density <35 ASF <35 ASF

Voltage 6 Volts 3-9 Volts

Agitation Low Air Pressure

Filtration Continuous - 1 - 2 turnovers per hour

COMPONENTS:

HP PERFORMA HD MIX:

This is the brightener / replenisher material used to maintain addition agent components at their proper operating levels. This blend is normally the only material (other than wetting agent) required. High concentrations (brightener overloads) can be quickly corrected without loss of production or cracked, brittle deposits.

This product should be added by an automatic feeder for optimum results. Normal carbon pack will remove a small amount of the brightener; heavy carbon treatment will remove as much as 30%.

MICRO-POROUS NICKEL

HP ARMOR

- Specifically designed to provide increased corrosion protection when deposited over a Bright nickel plating layer.
- Meets or exceeds automotive and non-automotive specifications for pore count and active sites over HP Ultima or HP Performa
- Increases corrosion resistance.
- If additional dispersal of HP Armor is required, HP DISPERSANT may be used to further disperse the solids. HP will greatly increase performance life of solids between treatments .

OPERATING PARAMETERS:

Typical Range

Nickel (as metal) 10.0 oz/gal 6.0 -12.0 oz/gal
67.0 g/l 45.0 - 90.0 g/l

Nickel Chloride 8.0 oz/gal 6.0 - 10.0 oz/gal
60.0 g/l 45.0 - 75.0 g/l

Nickel Sulfate 35.0 oz/gal 30.0 - 40.0 oz/gal
265.0 g/l 260.0 - 300.0 g/l

Boric Acid 6.25 oz/gal 5.5 - 7.0 oz/gal
45.0 g/l 41.0 - 52.0 g/l

HP ARMOR 4.0 mL/L (0.4%) 3.0 - 5.0 mL/L (0.3 – 0.5%)

HP Ni-Carrier 15 mL/L (1.5%) 10- 20 mL/L (1.0 – 2.0%)

HP Ni-Index 8.0 mL/L (0.8%) 6-12 mL/L (0.6 –1.0%)

pH 3.6 3.4 - 3.8

Temperature 140 °F 135 - 145 °F

Current Density 10 - 100 ASF

Agitation Low Air Pressure - (Interrupted)

Filtration Continuous - 1 - 2 turnovers per hour

HP ARMOR:

Blend of large (10 micron) and small (1 Micron) powders providing excellent corrosion protection. Provides excellent dispersal and deposition for optimum performance. Maintain solids at 0.3 - 0.5 oz/gal based on analysis for optimum performance. Periodic lab analysis required. Prior to adding, vigorously mix HP ARMOR in container with warm water.

Low HP ARMOR can cause poor pore count and low active sites. Excessively high levels of HP will adversely effect dispersion, pore count, and active site results.

HP NI-INDEX:

Low current additive to improve coverage and brightness. Use for new bath make-ups, and periodic adjustments based on lab analysis. Low concentrations can cause blue hazing of the deposit and poor low current density coverage. Slight excesses of the HP NI-INDEX are typically not detrimental to the deposit.

HP DISPERSANT:

Dispersing agent for the solids.

To promote good dispersion of the solids within the bath, small amount of the HP DISPERSANT may be added. This additive is excellent in maintaining good dispersion to combat low level organic contamination. Typical additions of the HP DISPERSANT are in the 0.01-0.025% range and are added on an as needed basis based on pore count results.

HP NI-CARRIER:

Grain refiner and ductilizing agent used for new bath make-ups, and periodic adjustments based on lab analysis. Low concentration produce loss of ductility and a tendency toward high current density burning. High concentrations are not harmful.

Manufacturing Chemists Industry Specialists Distributive Excellence

“It’s like the good old days again.”

We are saving 20 percent on the cost of chemicals, using less and getting better results.”

Wayne Fish, Vice-President
Southwest Plating, Inc.
Duncan, Oklahoma

Southwest Plating, Inc. made the switch to Haviland's Optima 200 HL Semi-Bright and HP Performa HD Bright-Nickel Process in 2010. See the rest of the story at www.havilandusa.com/m2m

Nickel Additives and Service Tools

HP NI- CARRIER

Grain refiner and ductilizing agent.

- Used for new bath make-ups, conversions and periodic adjustments. Regular maintenance of HP NI-Carrier can be supplied by Brightener Mixes additions if a single maintenance product is desired.
- Low concentration will produce a loss of ductility and a tendency toward high current density burning. High concentrations are not harmful.
- Used in both HP ULTIMA and HP PERFORMA

HP NI-INDEX

- Normally used only for new bath make-ups, conversions, and periodic adjustments. Regular maintenance of HP NI-Index can be supplied by HP ULTIMA additions if a single maintenance product is desired or can be added separately.
- A low concentration will result in lack of leveling and a blue haze in the deposit. Slight excesses are not harmful.
- HP PERFORMA HD MIX does not contain Index.

HP NI-WA 5

- In the event that a wetting agent is necessary, HP NI-WA 5 wetting agent is suitable for use in air-agitated nickel-plating baths.
- Maintain a concentration range of 0.1 to 0.3% by volume.

HP NI-FEX (Iron Controller)

- Where iron contamination is a persistent problem, the use of HP NI-FEX is recommended. Exact initial additions should be made based on Hull-cell analysis then maintained by feed as necessary. Addition rates are typically 350 to 400 grams of HP NI-FEX for 10,000 amp hours of plating.

HP NI PURIFIER

- Not applicable in the PERFFORMA process
- A corrective additive used to help correct the following potential nickel-plating problems in HP ULTIMA HD process:
 - o Poor low current density brightness.
 - o Secondary brightener overload.
 - o To plate out Non-ferrous metallic (particularly zinc and copper) contamination.
 - o Poor chrome coverage.
 - o Low S.T.E.P. test results.
- Can be added separately in 0.025% by volume increments to a maximum of 0.1% by volume.

HP DISPERSANT

- Used to eliminate star dusting and light speckling on the work and to provide dispersion of solids in the HP ARMOR process

HP PERFORMA LEVELER

- A component of the HP Performa HD process.
- Adjustments based on laboratory analysis.
- Improves plate distribution across all current densities.

AIR AGITATION

- Clean, oil-free air supplied by a low-pressure blower is recommended. Blower capacity should provide 1 to 2 cfm per square foot of tank surface.

FILTRATION

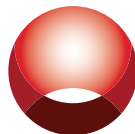
Continuous filtration is required to operate the Bright Nickel Processes. Two to five turnovers per hour are recommended. Activated carbon, with a pre-coat of filter aid, should be added at 1 to 3 lbs. per 1,000 gallons of solution per week. Additions of carbon and filter aid can be made until the flow rate drops significantly at which time the filter should be cleaned and repacked.

EQUIPMENT

Tanks Rubber or plastic lined steel
Anode bags Cotton, Dynel, or napped polypropylene
Heaters Titanium or Teflon coated

AUTOMATIC FEEDER CONTROLLERS

- Provide continuous and consistent Brightener additions
- Maintain consistent level of brightness.
- Prevents overloading and underloading of Brighteners
- Reduces overall Brightener consumption by 10-20%



Haviland
PRODUCTS COMPANY

www.havilandusa.com

421 Ann St. N.W., Grand Rapids, Michigan 49504 | (616) 361-6691 | Fax (616) 361-9772 | Toll Free (800) 456-1134

chemicalexperts@havilandusa.com

a division of Haviland Enterprises, INC