High Sulfur Nickel

Properties

- High content of sulfur in the deposited nickel layer
- Very high corrosion resistance in the tri-nickel system: Semi Bright Nickel – High Sulfur Nickel - Bright Nickel
- Is deposited with a layer thickness of about 1 µm

Application

Make-up concentrations:

Nickel sulfate	285 g/l (250-320 g/l)
Nickel chloride	60 g/l (55-65 g/l)
Boric acid	40 g/l (35-40 g/l)
High Sulfur Add. TNA	16 ml/l (12-20 ml/l)
Wetting Agent	1.5 ml/l (1-3.0 ml/l)

Make-up: In a separate tank, dissolve nickel salts and boric acid in very hot (at least 60 °C) deionized water of about 2/3 of the final volume, stirring well. Add 5 g/l active carbon and stir again for about 2 hours. Then allow to settle, filter into the active tank, and fill up to the final volume with deionized water. Do dummy plating for about 4 hours at 0.4 A/dm2, then plate a test panel at 4 A/dm2 and 15 minutes. If this is ductile enough, the additives can be added, if not, dummy plating has to be continued further.

Temperature:	52 °C (45-60 °C)
pH-value:	3.0 (2.5-3.5) Adjust with diluted sulfuric acid or increase by plating
Agitation:	rack agitation; air agitation is not possible
Tank material:	Polypropylene (PP) or steel coated with heat resistant plastic
Filtration:	continuously at 1-5 x bath volume per hour
Heating:	Thermostatic heating out of porcelain, glass or teflon
Exhaustor:	Recommended for worker's protection
Maintenance:	Compensate evaporation losses by deionized or distilled water.

The analytical values must be restrained: A loss of nickel or boric acid leads to burnings, an excess of boric acid leads to pitting. A loss of chloride causes a low anodic dissolution. A low pH-value decreases the levelling power, a high pH-value leads to burnings.

Consumption: The consumption is heavily depending on the drag-out.

High Sulfur Add. TNA: 4-8 l per 10,000 Ah

Analysis

Sample Preparation

Take the sample at a homogeneously mixed position and let it cool down to room temperature. If dull, allow to settle and decant or filter.

Nickel

Reagents: 0.1 N EDTA, concentrated ammonia solution, indicator: Murexid
Process: Pipette 1 ml bath solution into a 250 ml Erlenmeyer beaker, add approx. 100 ml deionised water, 12 ml ammonia, and a spatula tip of indicator. Titrate with 0.1 N EDTA from yellow to violet.
Calculation: Consumption in ml X 5.87 = g/l nickel
Correction: To increase 1 g/l =addition of: 4.8 g/l nickel sulfate·7 aq
or: 4.1 g/l nickel chloride·6 aq

Chloride

Reagents: 0.1 N silver nitrate solution, indicator: 5 % Potassium Chromate solution or 5 g $K_2Cr_2O_7$ + 95 g $NaHCO_3$
Process: Pipette 1 ml bath solution into a 250 ml Erlenmeyer beaker, add approx. 100 ml deionised water, and some indicator. Titrate with 0.1 N silver nitrate from yellow to brown.
Calculation: Consumption in ml X 3.54 = g/l chloride
Corection: To increase 1 g/l = addition of: 3.0 ml/l HCl (30%)
or: 3.4 g/l nickel chloride·6 aq

Boric Acid

Reagents: 0.1 N NaOH, EDTA sodium salt, mannitol, 15 % NaOH solution
Process: Pipette 10 ml bath solution into a 250 ml Erlenmeyer beaker, add approx. 50 ml deionised water, and 2-4 g EDTA salt. Adjust the pH to 7.9

with 15 % NaOH solution and add 2 g mannitol to the **clear** solution. Titrate with 0.1 N NaOH to a pH of 7.9 again.
Calculation: consumption in ml · 0.618 = g/l boric acid

Guarantee

Our guarantee extends to the continuous quality of our products as they leave our factory and not to their usage in the field. Our technical service will be pleased to answer any question you may have concerning operation and use of our products:

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