



## **IMMERSION NICKEL FOR FERROUS**

### **INTRODUCTION**

RRR pioneered the introduction of commercial immersion nickel plating in India way back in 1979. Over the years, it has perfected the chemistry and the technology of **Immersion Nickel for Ferrous** in order to make this process user- and eco-friendly.

### **DEPOSIT PROPERTIES**

The deposits are amorphous or fine-crystalline. Baking at more than 250°C for a certain duration of time leads to the formation of Ni<sub>3</sub>P dispersion in a crystalline matrix of nickel. This also leads to an increase in the hardness of the coating. The deposits have high corrosion resistance and the bath has a high plating speed, which can range from 12.5 to 20 microns per hour. The process offers remarkable stability and is suitable for various applications. The deposits are bright and non-magnetic.

As deposit material has a hardness of 500 to 600 HV 0.1. After heat treatment at 400°C for one hour, the hardness increases to between 900 to 1100 HV 0.1. The ductility is in the range of 1 to 2% and the density of the coating is between 7.8 to 8.1 g/cc. The electrical resistance is between 60 and 90 micro ohms centimeter. The deposits are non-magnetic and might become slightly ferromagnetic after heat treatment.

### **BATH PREPARATION**

The **Immersion Nickel for Ferrous** runs at a bath temperature of 88°C, with a working temperature range of 85 to 90°C. There are three components which make up the Immersion Nickel HP Process bath, namely,

**Immersion Nickel for Ferrous Part A** (source of nickel ions)

**Immersion Nickel for Ferrous Part B** (source of complexing and stabilizing agents)

Bath agitation, mechanically or by air, is recommended. For barrel immersion nickel coating, air agitation is recommended.

To prepare 1 litre of a new bath, use

**Immersion Nickel Part A** 45 g/L  
**Immersion Nickel Part B** 40 g/L  
pH 4.5 (either with ammonia or 10% V/V sulphuric acid)  
Bath operating temperature 85 – 90 Deg C  
DI Water, q.s. to make 1 litre.

Immersion Nickel Part B is added with stirring, followed by the addition of Immersion Nickel Part A. Adjust the pH value to 4.5 (either with ammonia or 10% V/V sulphuric acid). Heat the solution to the operating temperature 85 to 90°C and adjust the pH again, if needed.

Please consult our technical staff before installation of a new bath.

While preparing a new bath upto 10% volume of the old bath can be added. Mechanical agitation is recommended during the process of deposition of the **Immersion Nickel for Ferrous**. In the running bath, the ratio of added Immersion Nickel Part A to Immersion Nickel Part B must be 1:1.

## **PLATING EQUIPMENT & ACCESSORIES**

Stainless steel tanks or FRP tanks with inner PP tanks are recommended. The SS tank should be anodically protected. Ducting is required, because the process involves the formation of hydrogen in the bath, which escapes as bubbles/mist. Continuous filtration is recommended, with a bath volume turnover of 10 per hour. For heating the bath, indirect heating is recommended, though electroless heating with passivated stainless steel is usually followed. Avoid local overheating of the bath, since the bath gets decomposed otherwise. Heat insulation of the tank is strongly recommended.

## **EFFLUENT TREATMENT**

Precipitation of nickel as hydroxide at high pH is carried out, followed by filtration. It is recommended to plate out as much of nickel as possible by immersion plating and then to subject the bath to effluent treatment. Please consult our lab for guidance. Please follow local municipal guidelines and rules for discharge of effluents.

*Warranty: The above information has been given in good faith and based on our knowledge, information and experience. RRR has no control over the goods once it leaves our premises. All chemicals, including those which are not classified as hazardous, must be treated with proper care and all necessary precautions for handling and disposing of chemicals must be followed. No liability arises out of handling or use.*

**RANE RAO RESHAMIA LABORATORIES PVT. LTD.**

Plot 80, Sector 23, CIDCO Industrial Area  
Turbhe Naka, Navi Mumbai – 400 705 INDIA

Tel. +91 22 2768 3175 & 2768 4646

Fax +91 22 2783 4814

[rrrlabs@rrrlabs.com](mailto:rrrlabs@rrrlabs.com); [www.rrrlabs.com](http://www.rrrlabs.com)

*An ISO 9001:2008 certified company*