ELECTROLESS NICKEL MP PROCESS

INTRODUCTION

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

Allour Electroless Nickel processes are based on reduction by hypophosphite. The content of phosphorous in the deposit determines whether the electroless nickel coating is low-phosphorous, medium-phosphorous or high-phosphorous.

The **Electroless Nickel MP Process** (MP = medium phosphorous) is described here in detail.

DEPOSIT PROPERTIES

The deposits are amorphous or fine-crystalline. Baking at more than 2500C for a certain duration of time leads to the formation of Ni_3P dispersion in a inecrystalline matrix of nickel. This also leads to an increase in the hardness of the coating. The average percentage of phosphorous in ENP MP baths is 8% and can range from 7-9%, depending on bath composition, age and working parameters. The density of the deposit ranges from 7.86 to 8.10g/cc3.

The coating deposition rate on an average is 15mm/h and can range from 12.5 to 20ìm/h, depending on various factors. It is recommended to load jobs based on area of between 1.6 to 2.5dm^2/L of the bath volume.

The ratio of ENP MP A to ENP MP C must be kept at 1.4:1.0. For maximum metal turnover (MTO), it is strongly recommended to do continuous filtration using a 5 micron filter.

BATH PREPARATION

The **Electroless Nickel MP Process** runs at a bath temperature of 880C, with a working temperature range of 85 to 900C. There are three components which make up the **Electroless Nickel MP Process** bath, namely,

ENP MP A (source of nickel ions)
ENP MP B (source of complexing and stabilizing agents) and
ENP MP C (source of reducing agent)

The nickel content is maintained ideally at 6g/L and the reducing agent at 30g/L. Bath agitation, mechanically or by air, is recommended. For barrel electroless nickel coating, air agitation is recommended.

To prepare 100 litres of a new bath, use

DI Water 76.33 L
ENP MP A 8.67L
ENP MP B 15.0 L

After adding the DI water to the clean tank, ENP MP B is added with stirring, followed by the addition of ENP MP A. Adjust the pH value to between 4.3 and 4.5 (either with 20% w/V potassium carbonate or 10% V/V sulphuric acid). Heat the solution to the operating temperature and adjust the pH again, if needed.

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

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 immersion 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.

BATH ANALYSIS

Nickel is measured by complexometry and the reducing agent is measured by iodometry. Please contact our lab for full analytical procedures.

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 electroless 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 knowldege, 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.

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