

# Internship report

LEO PRIME COMP, PRIVATE LIMITED

Perungudi, Chennai -60009



**LEO PRIMECOMP PVT LTD**

Lead, Excel, Optimize - Next Generation Technology Partner

Submitted to partial fulfilment of requirements

For award of degree of

**BACHELORS OF SCIENCE**

In

**CHEMISTRY**

Submitted by

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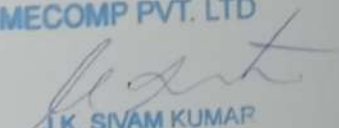
## TO WHOM SO EVER IT MAY CONCERN

This is to certify that Ms. SATHVIKA S (Reg.no. 41030018) Bachelor of Science in CHEMISTRY 2<sup>nd</sup> Year student of Sathyabama Institute of Science and Technology has successfully completed her **INTERNSHIP** in our organization from 16<sup>th</sup> May 2023 to 01<sup>st</sup> June 2023.

During her stay at our organization she took initiative in learning and acquiring knowledge.

We wish her all the best for all her future endeavors.

For LEO PRIMECOMP PVT. LTD

  
J.K. SIVAM KUMAR  
Head - HR



IATF 16949 : 2016

# Acknowledgement

I want to thank my advisers and everyone at the company for their patience and assistance during my on-site training. Thanks to their guidance, I was able to develop my industrial skills and learn about electro less Nickel plating.

## ABSTRACT

This report is an attempt to gather all the learnt information about the characteristics, advantages and a detailed description of electroless Nickel plating in surface finishing over the metals.

In the electro less nickel plating the metal ion in solution is reduced to free metal and deposited as a metallic coating without the use of electric current. This reaction involves reduction of metal ion by simultaneous oxidation of a chemical reducing agent.

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## INTRODUCTION

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## INTRODUCTION

LEO PRIME COMP. PVT.LTD is started as a small industry in 1984. Today they are the leading one in the production of ferrous and non-ferrous shafts for making of automobile parts, parts in the road transport vehicles, electrical and electronic machine parts.

The company is certified by ISO 9001 in the year of 2000. The company has focussed its research and development in latest technology equipment's for the production and measuring. It is one of the top companies in India using, sliding head shot CNC and Teasa scan 50 machines.

This is the first company using, sliding head shot CNC machine, micro turning and milling machine to latest technology machines in it. The company is updated regularly to provide good results with the customers.

The safety policies are well maintained by the company the working environment is good which support a lot of upliftment of the company. The company is having 5 units. Each unit is equipped with necessary latest technology machines.

## RAW MATERIALS

Electroless solution like electro plating solution consist of metallic salts with the number of addition agent having specific functions. The constituents of electroless solution are mainly,

- a. Nickel salt-mainly nickel sulphate or nickel chloride
- b. Reducing agent -Sodium hypophosphite, dimethyl amino -borane or hydrazine hydrate.
- c. Complexing agent – Organic acids like lactic acid, propionic acid or salts like ammonium chloride etc.
- d. Stabilizer-Organic and inorganic thio component, some heavy metal ions like Pb, Sn and thiourea.
- e. Accelerator-Lactates, succinctness, hydroxyl acetates, glycerine or meliorates fluorides, etc.
- f. Brightener-Sodium benzene disulphate, thiourea in acid solution, selenic acid, cadmium ion, lead ion etc.

We are using three solution which contains all the constituents as:

- \* NI STAR HP PART1
- \* NI STAR HP PART 2
- \* NI STAR HP PART 3

## PROCESS DESCRIPTION

In electroless nickel plating, metal ions are reduced to free metal by the action of chemical reducing agents, which are simply electron donors. The metal ions are electro acceptors which react with the electron donors. The catalyst is the substance which accelerates the electro less chemical reaction, allowing oxidation of reducing agent. Electroless nickel plating baths are of two distinctly different types: acid and ammoniacal. Unlike conventional electro plating, no electrical plating current is required for deposition.

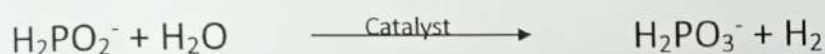
The electroless nickel plating bath contains the solution A and B in the ratio of 1:3. It also contains rest of the bath capacity with the D.M water. The bath must be maintained for a temperature of 80-95°C with the pH of 4-5. The optimum range in all the parameters will lead to effective plating. When the plating starts it may decrease the metal concentration and pH of the solutions A and C along with the ammonia. Air agitation is also provided.

A proper work piece provides a catalysed surface and once introduced into the electro less deposition then continues, a uniform deposition begins. Minute amount of the electroless metal itself will catalyst the reaction, so the deposition then continues, providing that the metal ion and reducing agent are replenished.

Catalytic dehydrogenation of hypophosphite with the anhydride transfer for the catalytic surface is the first step in the deposition process.



The hydride ion can then react with nickel ions to produce the deposit;



Once the plating is completed the alkaline impurities present in them can be removed by nitric acid cleaning. For this process nitric acid of 50% concentration is used. Since nitric acid corrodes metal, we have shortened the time of the treatment compared to others.

The electroless bath provides a deposit which follows all contours of the substrate exactly without building up at the edges and corners. A sharp edge receives the same thickness of deposit as a blind hole.

# PROCESS CONTROL

## ANALYSIS TO DETERMINE NICKEL METAL IN BATH

To estimate the metallic content in the bath, 5ml of the bath is diluted to 15mL and to it conc. Ammonia is added. It is titrated against 0.1N of EDTA with a pinch of murexide acting as a indicator. The end point is the appearance of dark violet colour.

Improper cleaning, excessive acidity or alkalinity of the solution may causes improper adhesion which can be rectified by cyclic cleaning, pH check and adjust the remedies as the case may be.

## PROS AND CONS

There are many benefits to electroless nickel plating, including that it:

- \* Provides an even coating on irregular shapes.
- \* Can be applied to many different base materials, both conductive and non-conductive.
- \* Can reach the hidden surfaces of complex parts.
- \* Results in better corrosion resistance due to the coating's consistency.
- \* Requires no electricity, which decreases its cost.
- \* Has a customizable finish, from matte to bright.
- \* Saves money due to the less wasted nickel.

There are some limitation also which includes:

- \* The solution needs to be heated at very high temperature, so it can be more inconvenient to use
- \* The nickel is depleted from the solution, not anodes, so it will need to be replenished constantly
- \* It is more expensive to operate than regular plating.

## APPLICATION

Electro less metal plating is used in the variety of applications, including

- \* Hard disk drives for computer
- \* Automotive brake cylinders, gears, shock absorbers, brake pistons, heat sinks, etc
- \* Pumps, valves, and other engineering products
- \* Circuit boards, with a layer of gold
- \* Medical instruments
- \* Aircraft parts
- \* Oil field valves
- \* Mixing blades, filter units, heat exchangers, pump housings, impellers, etc. for chemical processing
- \* Plugs, gates, balls and other valve components, pipe fittings, barrels, pumps, packers, etc. for petroleum and gas industries.



## CONCLUSION

The industrial training offered by M/S LEO PRIME COMP.PVT.LTD. helped me to understand the technology of manufacture process of electroless nickel plating.

The exposure of the industry has developed wide spectrum of knowledge about process utilities, safety etc. and the confident to whole in an industry in future.