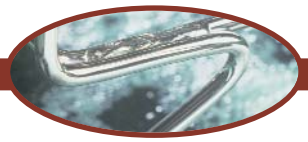
NickelPur™
Nickel Recovery Unit



Eco-Tec's Nickel Recovery System ensures dramatic cost savings while maintaining plating performance. NickelPur™ is a proven method to recover and recycle nickel from duplex nickel plating rinse waters and will:

- ***eliminate nickel salt purchases***
- ***lower waste treatment costs***
- ***recover >95% of all nickel currently lost***
- ***ensure a purified, pH balanced, concentrated nickel salt product***

NickelPur™

To ensure effective nickel recovery without affecting plating quality, several factors must be considered, such as; pH, brightener levels, sulfate/chloride ratio, sodium contamination and concentration of the recovered nickel. The Eco-Tec system is designed ensuring that these factors are taken into consideration.

What is the NickelPur™?

Eco-Tec's nickel recovery unit utilizes the next generation of ion exchange with compressed-bed, counter-current technology. With the philosophy of a simple package and proven reliability, the NickelPur™ recovers over 95% of nickel dragged out from the plating baths into the rinses.

The NickelPur™ System:

- does not recover brighteners from rinses, allowing nickel salts to be recycled back to semi-bright tanks
- ensures a properly pH generated nickel salt that can be directly recycled
- rejects sodium from rinse water to prevent build-up in the plating tank
- recovers nickel salt in the correct sulfate/chloride ratio

Why use a NickelPur™?

"Nickel salt drag-out" is a normal operational occurrence during the electroplating process that results in nickel loss and sludge generation. Operational costs related to both the replenishment of the nickel, and sludge waste disposal can seriously impact an operations efficiency. The NickelPur™ is specifically designed and manufactured to assist companies in their efforts to increase efficiencies, and lower waste and operating costs.

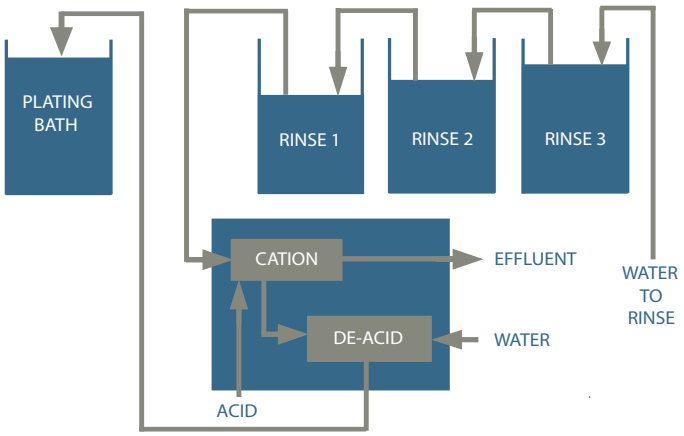
How Does a NickelPur™ Work?

The combination of ion exchange resin and acid sorption resin ensure the effective recovery of nickel in electroplating operations.

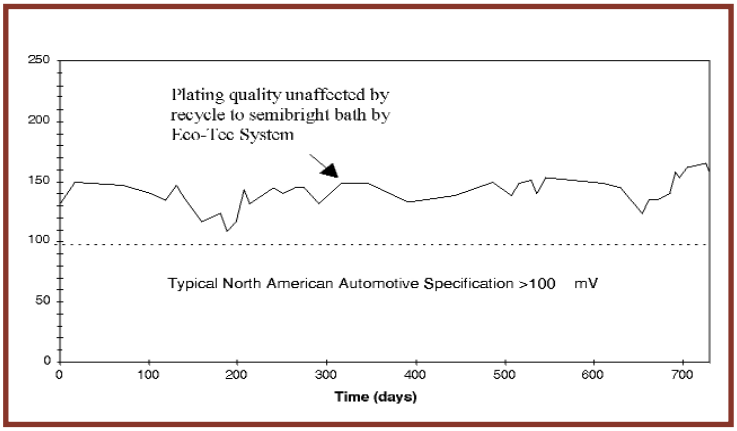
The cation exchange and acid sorption beds are coupled in a manner that produces a concentrated de-acidified nickel salt product. Rinse water is pumped through cartridge filters and then through the strong acid cation resin bed where the nickel is exchanged on the resin. Regeneration is accomplished using a mixture of sulfuric and hydrochloric acids, which are pumped into the cation resin bed. Regeneration yields a concentrated nickel sulfate and nickel chloride product, which then passes through the de-acidification bed to remove excess acids.

The resulting concentrated, purified, pH adjusted, nickel chloride/nickel sulfate product is stored and added to the plating baths as required.

NickelPur™ Process Flow



Quality



S.T.E.P. test results indicate the Eco-Tec System conforms to this widely accepted quality assurance rating.

Sizing a NickelPur™

It is simple to select the right NickelPur™ for your needs. Here are two methods:

Boric Acid (H_3BO_4) Calculation

Required Information:

Annual Boric Acid Purchases (kg/hr) _____

Hours of operation (hr/yr) _____

Calculation:

H_3BO_4 / hr/yr **x** 1,875 = ____g/hr Ni

Rinse Water Calculation

Required Information:

Rinse Water Flowrate (m^3/hr) _____

Ni concentration in rinse water (g/l) _____

Calculation:

m^3/hr **x** g/l **x** 1,000 = _____g/hr Ni

Notes:

- crosscheck with amount of nickel in sludge
- do this calculation for each line in operation
- use typical flowrates not maximum

NickelPur™ Capacity Chart

Model Number	Maximum Capacity (g/hr) based on Feed Concentration (g/L)		
	1 g/L	3 g/L	5 g/L
151-500	335	540	620
151-501	595	965	1,105
151-502	935	1,505	1,730
151-503	1,345	2,170	2,495
151-504	2,395	3,855	4,435
151-505	3,740	6,030	6,930
151-506	5,390	8,680	9,980

Eco-Tec Inc. designs, develops and manufactures water purification, gas processing and chemical recovery systems for industrial operations and facilities around the world. Eco-Tec systems incorporate proprietary technology including the Recoflo® ion exchange process, which uses a short, compressed resin bed to reduce overall equipment size and improve system operating efficiency.

Applications for Eco-Tec systems include:

- Industrial Water Treatment
- Aluminum Anodizing
- Stainless Steel Finishing
- Amine Purification
- CO_2 Recovery
- Produced Water
- Electroplating
- Hydrometallurgy
- Pulp & Paper
- Biogas Purification

Eco-Tec offers continuous product and process development, engineering design, equipment manufacture and assembly, sales and technical support for clients. Equipment is manufactured at the Canadian headquarters and is ISO 9001:2000 registered.

Complete systems often incorporate additional process technologies such as filtration, membrane processes, crystallization and evaporation. Efficient processes provide high throughput and performance and address environmental issues, while keeping lifecycle costs low. The equipment is skid-mounted and manufactured with a compact design. This allows for ease of installation and minimizes equipment costs. Essentially, Eco-Tec systems enable our clients to economically, effectively and efficiently manage Earth's resources.

Over 1,500 systems have been commissioned and installed in over 55 countries around the world. Eco-Tec is represented in all major and emerging markets through a network of agents and distributors. Eco-Tec is proud to have been recognized as one of Canada's 50 Best Managed Private Companies and has received the Canada Award for Business Excellence.

For a Fast Quote - Email: NickelPur@eco-tec.com

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