

CASE STUDY METAL FINISHING

NICKEL AND CADMIUM PROCESS CLOSED-LOOP

Overview

A major Southern California metal finisher needed to remove the presence of nickel from its wastewaters and meet the zero discharge limit for cadmium. Due to some regulatory restrictions the site was experiencing difficulty in treating these metals.

PROBLEM

Exergy was asked to help this finishing customer address the problem associated with the nickel in their processing – this includes:

- ❖ Remove specific metal from waste discharge from the plant – in this case Nickel
- ❖ Help the site bring the overall facility discharge into compliance with local standards
- ❖ Provide continuous deionized water for processing and reuse in the electroless nickel and cadmium plating processes



The electroless nickel line uses approximately 10 gallons per minute (10-gpm) of constant DI water supply for rinsing.

The system provided had to meet this demand and also be able to produce DI quality water to meet customer specifications.

SOLUTION

Exergy had supplied and installed its EthorCEL® based on Advanced Electrodeionization (AEDI) technology. The system is used removal of electroless nickel chemistry from the rinses and recycling of the water used for processing. These are some of the features of the final systems:

- ❖ System can remove impurities such as nickel and recover the process water for reuse

- ✔ The metal rinses are closed looped with 90% efficiency; a 10-gallons per minute for nickel (gpm) system and a 5-gpm system for cadmium.
- ✔ The water rinses are recycled continuously for reuse in the process; high-quality D.I. water is purified and send back into the rinse system.
- ✔ The 10% reject from the recycling process is collected for offsite recycling/batch treatment.

RESULTS

EthorCEL[®] has now successfully operated for several years at the site, removing the metals of concerns. The systems have demonstrated the performance of the EthorCEL[®] technology in an industrial application. The evaluation of operational data allowed a cost/benefit analysis for deionized (DI) water cost/savings and nickel electrolyte recovery resulting in a one-year payback.

CUSTOMER BENEFITS

Besides the compliance and regulatory costs avoided, Exergy was able to also save customer the following cost savings:

ABOUT EXERGY AND ETHORCEL[®] PRODUCT

Exergy is a technology provider of advanced recycling systems for recovery and purification of purification of resources such as water. Exergy's proprietary and patented Advanced Electrodeionization (AEDI) system is named EthorCEL[®], which allows for the recovery of valuable plating chemicals from rinses; and, secondly the production of high-quality deionized water. EthorCEL[®] continuous electrolytic regeneration does not require chemicals and downtimes, and simply allows for ionic impurities to be segregated and removed from process rinses, making clean deionized water available again for reuse in the process.

Implementation Benefits

- Removal of Metals from rinses to address the site's regulatory requirement
- Generation of high purity DI water for use back in wet processing
- Allowing the customer to meet the water demands of the process with the recycling system

Water Savings

- Water savings to over 250,000 gallons of water savings per month for the one process line, and over 2.8 million gallons of water saved annually

Cost Savings

- Cost savings in waste treatment chemicals,
- Cost of saving fresh water purchases and sewer charges
- Cost Saving in DI water production
- ROI of the systems for 1 and 1.5 years respectively.

