

POLLUTION PREVENTION

IN RHODE ISLAND

Case studies of the Rhode Island On-Site Technical Assistance Program

Electroplater Freon

Electroplater replaces Freon in a flash drying operation.

Industry \ Contact

SIC Code: 3471 Rack and Barrel Contract Electroplater, Rhode Island.

Contact: Company # 117

Technology Description

The company employs an average of 50 people. It is principally engaged in the rack and barrel plating of jewelry and novelty items in gold, rhodium, copper, brass, nickel and tin.

Originally, the company used 11,000 lbs/year of Freon for flash-drying plated parts. The operation was designed to produce a completely dry, spot-free finish on the plated pieces. Increased awareness of the hazards associated with Freon prompted the company to explore alternative drying processes. In 1993, the company replaced the Freon drying operation with a non-hazardous aqueous rinsing and drying process. The new process utilizes a monorail conveyor system to automatically transfer racks of plated pieces from the plating area, through a closed-loop deionized water rinse, and into a recirculating oven where the pieces are dried spot-free. The monorail operates at an optimum constant speed throughout the day. This constant speed allows the operation to go unmonitored from the deionized rinse to the oven-drying step, resulting in a clean, dry, spot-free finish.

Feedstock Materials

11,000 lbs of Freon per year

Wastes

55 gallons/year of spent Freon sent off-site for reclamation

Costs

Gas-fired recirculating oven manufactured by Gehrich in Commack, NY: \$23,000
Monorail conveyer system, manufactured by Machinery Maintenance in Providence, RI: \$19,700
300-gallon tank with carbon and ion exchange resins, manufactured by Environmental Control Systems: \$8,000
Plumbing: \$2,500
Electrical work (including materials): \$3,900
Total Investment: \$57,100

Operation \ Maintenance

Gas costs for heating oven: \$1,200/month
Minimal replacement resin costs

Savings

Annual feedstock savings in Freon: \$36,000
Spent Freon disposal
Savings on Freon chiller operating costs

Payback Period

Approximately 1.6 years

Impact

The company no longer purchases or uses 11,000 pounds of Freon per year in the flash-drying procedure. The company has found that the new automated closed-loop deionized rinse and oven-drying process is able to produce a quality, spot-free finish without the use of ozone-depleting solvents. The new system has been running for over six months with zero downtime and minimal maintenance. The company is very pleased with the quality of the finished parts and is relieved that they no longer have to contend with rising solvent costs and CFC phaseout issues. In addition to these benefits, employee health and safety risks associated with the use of Freon have been eliminated.