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## CASE STUDY: Tin Originals Incorporated

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Location:	Gastonia, NC (Cumberland County)
Industry:	Metal Finishing (SIC: 3471)
Pollution Prevention Application:	Waste Stream Separation and Reuse, Water Conservation, Elimination of Indirect Discharge Permit (IDP)
Annual Savings:	\$4500
Payback Period:	3 months
Contact:	Keith Starling, Plant Manager (910) 424-1400

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### Background

Tin Originals Incorporated is a small manufacturer and wholesale distributor of gift and home decorating items, specializing in tin ware with a decorative finish. Most material is completely manufactured in-house, and processing involves cutting, folding, assembly, finishing and shipping. The finishing process consists of baths of phosphates, acids, baking soda, and sealer. Each bath is followed by a rinse. In 1995, the facility was having difficulty meeting its permitted discharge limits for zinc. While investigating treatment alternatives, a solution was discovered that not only ensured compliance, but also eliminated the need for their discharge permit altogether and significantly reduced water consumption.

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### Waste Reduction Activities

Two in-line filters, a 25 micron bag filter followed by a five micron cartridge filter, were installed to remove solids so that free-flowing rinsing stations could be replaced with re-circulating rinse baths. Re-circulating rinse water significantly reduced the volume of wastewater generated and also worked to greatly increase the concentration of zinc in the rinse. The company then began looking at systems to reduce the concentrations of zinc in the rinse baths so that it would not build to concentrations that could adversely affect the finish quality. Traditional chemical precipitation processes were determined to be too expensive and labor-intensive, and required space that was not available at the small facility. The facility sought a simple, low-cost, compact method of treating waste in small, discrete batches.

The company installed an ion exchange unit containing 1 cubic foot of loose, chemical specific ion exchange media, both after and in line with the two previous filters. The original purpose of the ion exchange unit was to treat the rinse water prior to discharge. However, the company discovered that after treatment through the unit, the rinse water could be re-circulated back into use. Since the installation of the ion exchange unit there has been no discharge of process wastewater. Additionally, the ion exchange media only needs replacement once every three to four months. The maintenance of the system has proven quite simple. Once each week, the in-line bag filters are allowed to dry and the solids are shaken off into the regular waste receptacles. Cartridge filters are allowed to dry and the solids are discarded in the same way. The ion exchange media is emptied into a container and allowed to dry before it is disposed of as solid waste also. Occasionally a biocide is added to the rinse baths to reduce biological activity.

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**Waste Reduced**

During 1995, Tin Original consumed approximately 100,000 gallons of process water each month. In 1996, the total consumption decreased to 13,000 gallons each month, a reduction of 87%. Additionally, because Tin Originals no longer discharges process water to the sewer, they no longer have the liabilities associated with an Indirect Discharger Permit. Zinc emissions in wastewater have decreased by 100%.

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**Annual Savings**

During the first year of operation, the entire installation and maintenance cost was approximately \$1100 with installation costs of approximately \$1000 (including all additional plumbing and filter purchases) and the replacement cost of the ion exchange cartridge media and filters. However, with the drastic decrease in water consumption came a corresponding decrease in utility bills. In 1995, the average monthly sewer bill was \$455.65; in 1996, after the installation of the recycling system, the average monthly bill was \$61.98, an annual savings of over \$4,500. The payback time on the project was less than 3 months.

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**Other Activities**

Tin Originals was selected as a Facility Case Study in the 1996 Governor's Award for Excellence in Waste Reduction competition.