

POLLUTION PREVENTION

IN RHODE ISLAND

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

Jewelry Manufacturing Trichloroethylene

Jewelry manufacturer replaces trichloroethylene with an aqueous cleaner.

Industry \ Contact

SIC Codes: 3961 Jewelry Manufacturer, Rhode Island.

Contact: Company #25

Technology Description

The company manufactures rhinestone-set jewelry findings and finished jewelry. Average employment of the company is 800.

In 1989, a plant-wide pollution prevention steering committee was formed to provide oversight and guidance to pollution prevention project teams. Members of this committee included staff from the RI DEM Pollution Prevention program, University of Rhode Island's Chemical Engineering Department, and key departments of the company itself. Replacement of trichloroethylene with an aqueous-based cleaner was identified as a high priority project by the steering committee.

Trichloroethylene was originally used to clean and prepare surfaces for plating. Approximately 50%-70% of this solvent was lost due to evaporation and spills. Hazards associated with trichloroethylene prompted the company to explore alternative cleaning processes. The company was able to replace the solvent cleaner with a heated (150 degrees F) aqueous spray wash followed by ultrasonic soak tanks. Two ultrasonic soak tanks were used in this operation. Equipment for this replacement existed in-house, so no new capital expenditure was necessary. After replacement, the company reported savings in both raw material and disposal costs.

Feedstock Materials

50 gallons per week of trichloroethylene

Water used to cool degreasers

Wastes

Approximately 10-20 gallons of spent trichloroethylene per week was drummed and sent off site.

Costs

No capital costs were incurred due to existing equipment. However, labor was required to set up the aqueous washing system.

Operation \ Maintenance

The aqueous soap used is Clepo-Buffer CW, manufactured Frederick by Gumm Chemical Co., Inc. of Kearny, NJ. Clepo-Buffer CW costs \$1 per lb. The raw soap powder is mixed at 25 lbs. per 50 gallons of water.

Ultrasoak 127, manufactured by Hubbard Hall Chemical Co. of Waterbury,CT, was being tested as a possible future replacement for the Clepo-Buffer CW as the company believes that the Ultrasoak 127 may be more effective at cleaning. Ultrasoak 127 costs \$10 per gallon. The concentration of Ultrasoak 127 tested was at 2.5 gallons per 50 gallons of water.

Savings

Annual feedstock savings in trichloroethylene: \$20,800

Annual cost savings for trichloroethylene transportation and off site treatment: \$ 5,000

Payback Period

Immediate

Impact

The company no longer purchases or uses 2,600 gallons per year of trichloroethylene for parts degreasing. The company has found that a heated aqueous spray wash followed by an ultrasonic cleaning system provides satisfactory results.

With the replacement of trichloroethylene, solvent air emissions have been eliminated, thus reducing health and safety risks to the employees. The company's pollution prevention attitude has led to a continual push to reduce its own wastes. The company won the 1992 Governor's Award for Excellence in Pollution Prevention for their efforts.