

# POLLUTION PREVENTION

*Information and Updates from HWRIC*

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## *Waste Reduction in Metal Coating*

Thousands of metal fabricators use what is referred to as a "three-stage process" for phosphating/degreasing metal. This process is accomplished by dipping metal parts into a bath which has been charged with phosphating/degreasing agents. The degreasing portion of the process removes oil rust inhibitors from manufactured parts while the phosphating portion serves as a surface preparation to promote paint adhesion.

A company the Hazardous Waste Research and Information Center is assisting produces painted metal shelving in Bloomington, Illinois. The tank utilized for phosphating/degreasing contains about 5,000 gallons of phosphating/degreasing bath solution. Emulsified oil builds up in the bath over time resulting in reduced efficiency of the phosphating agents. Consequently, the bath must be disposed of approximately three times per year in order to maintain product quality. Due to the presence of emulsified oil in the solution, the bath is considered hazardous waste and must be disposed of accordingly at a cost of approximately \$15,000 annually.

To extend the life of the bath and reduce the amount of hazardous waste being generated, HWRIC evaluated a range of options. Ultrafiltration, the option chosen, involves pumping the contaminated liquid, under low pressure, through a cylinder which contains a membrane filter column. Small amounts of clean material weep through the membrane, leaving the contaminants behind. The clean fluid is returned to the bath solution, while the contaminated fluid continues to circulate and be cleaned, thus becoming more concentrated.

Pilot and full-scale testing of ultrafiltration equipment was conducted on the bath solution both at HWRIC's pilot lab facility and the plant facility. Results to date indicate that hazardous waste generation can be reduced through ultrafiltration from 15,000 gallons annually to approximately 30 gallons, a reduction of over 99 percent in waste volume. Additionally, significant reduction in

chemical usage associated with recharging the bath solution with phosphating/degreasing chemicals will also be realized. The company also improved the effectiveness of the process while maintaining product quality.

It is estimated that payback associated with investment in this technology will occur in less than a year due to reduced waste disposal and chemical costs. It is likely that many facilities that degrease and paint metal parts will benefit from this technology.

### For further information contact:

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### ***How HWRIC Can Help:***

- Engineering Problems
- On-site Assessment
- Regulatory Compliance
- Industrial Training
- Case Studies
- Waste Reductions
- Matching Funds for Industrial Research
- Information Services
- Improved Productivity