

Metal Finisher Fact Sheet

There are over 31,000 metal finishing facilities in the United States that generate hazardous waste from their production processes. Pollution prevention (P2) and the reduction of hazardous waste generation can save money and reduce future liabilities. Typical wastes generated are:

- Industrial wastewater and treatment residues
- Spent plating baths
- Spent process baths
- Spent cleaners
- Waste solvents and oils

Waste Reduction

Both state and federal regulations require large quantity generators of hazardous waste to file a biennial generator's report including a description of efforts undertaken and achievements accomplished during the reporting period to reduce the volume and toxicity of hazardous waste generated.

Pollution prevention and waste minimization practices reduce the amount of waste generated, reduce the amount of waste subject to regulation, and help businesses comply with the requirements while saving money. Management commitment to P2 and waste minimization is just a beginning. Passing that on to employees through training in P2, waste minimization, hazardous waste handling, emergency response, and incentive programs for new waste reduction ideas is critical for success.

Source Reduction

Waste assessments are used to list the sources, types and amounts of hazardous waste generated to make it easier to pinpoint where wastes can be reduced. Source reduction is usually the least expensive approach to prevent or minimize waste. Many of these techniques involve housekeeping changes or minor in-plant process modifications.

Improved Procedures and Segregated Wastes

- Keep work areas clean.
- Improve inventory procedures to reduce the amount off-specification materials generated.
- Designate protected raw materials and hazardous waste storage areas with spill containment.
- Keep the areas clean and organized and give one person the responsibility for maintaining the areas.
- Label containers as required and cover them to prevent contact with rainfall and to avoid spills.
- Use a "first in, first-out" policy for raw materials to keep them from becoming too old to be used.
- Give one-person responsibility for maintaining and distributing raw materials.
- Designate one person to accept chemical samples and return unused samples to suppliers.
- Limit bath mixing to trained personnel.
- Segregate waste streams for recycling and treatment, and to keep non-hazardous materials from being contaminated.
- Prevent and contain spills and leaks by installing drip trays and splashguards around processing equipment.
- Conduct periodic inspections of tanks, tank liners, and other equipment to avoid failures.
- Repair malfunctions when they are discovered. Use inspection logs to follow up on repairs.
- Inspect plating racks for loose insulation that would cause increased drag-out.
- Use dry cleanup where possible to reduce the volume of wastewater.

Material Substitution

- Use process chemicals that are recyclable or treatable on-site.
- Use deionized water instead of tap water in process baths and/or rinsing operations to reduce sludge volume.
- Use non-chelated process chemistries to reduce sludge volume.
- Use non-cyanide process baths to simplify treatment required.
- Use alkaline cleaners instead of solvents for degreasing operations. They can be treated on-site and usually discharged to the sewer with permit authorization.

Extending Process Bath Life

- Treatment (filtration, electrolytic dummying) of process baths can extend their useful life.
- Bath replenishment extends the useful life of the bath.
- Monitoring (using pH meters or conductivity meters) the process baths can determine the need for bath replenishment.

Drag-Out Reduction

- Minimize bath concentrations to the lower end of their operating range.
- Maximize bath operating temperatures to lower the solution's viscosity.
- Use wetting agents (which reduce the surface tension of the solution) in process baths to decrease the amount of drag-out.
- Withdraw work pieces from tanks slowly to allow maximum drainage back into process tank.
- Use air knives or spray rinses above process tanks to rinse excess solution off work piece and into process bath.
- Install drainage boards between process tanks and rinse tanks to route drag-out back to process tank.
- Use dedicated drag-out tanks after process baths to capture drag-out.
- Install rails above process tanks to hang work piece racks for drainage prior to rinsing.

Rinse Systems

- Use spray rinses as initial rinse after process tank and before dip tank.
- Use air agitation or work piece agitation to improve rinse efficiency.
- Install multiple rinse tanks (including counter flow rinse tanks) after process baths to improve rinse efficiency and reduce water consumption.

Recycling and Resource Recovery

- Reactive rinsing reuses the acid rinse wastewater as the in-take for the alkaline rinse tank. This allows the fresh water feed to the alkaline rinse tank to be turned off. This can also be applied to process tank rinses.
- Treat rinse wastewater to recover process bath chemicals. This allows the reuse of the waste water for rinsing or neutralization prior to discharge.
- Reuse the spent by-products from the process baths in the wastewater treatment process.
- Recycle spent solvents on-site or off-site.
- Use treatment technologies to recycle rinse waters in a closed or open loop system.
- Some recycling and most treatment processes require a permit. Be sure to contact the state Division of Solid and Hazardous Waste to determine if you need a permit to treat or recycle your wastes.

Treatment Alternatives

- Pre-treat process water to reduce the natural contaminants that contribute to sludge volume.
- Use treatment chemicals that reduce sludge generation (e.g., caustic soda instead of lime).
- Use sludge de-watering equipment to reduce sludge volume.
- Use treatment technologies (such as ion exchange, evaporation, or electrolytic metal recovery) that do not use standard precipitation/clarification methods, which generate heavy metal sludge.

For More Information, Please Contact:

Division of Drinking Water, Source Protection Program - (801) 536-4200