Why are electroplating wastes a concern?

Electroplating wastes are potentially hazardous to human health and the environment when they are improperly managed. Several special and hazardous wastes are commonly generated by the electroplating industry. The “Do I Have a Special Waste?” fact sheet defines and discusses special wastes. In Illinois, electroplating wastes are special wastes because they are industrial process wastes and may also be hazardous. This fact sheet will help you determine the hazardous waste, air, and water regulations that apply to your electroplating operations and how to properly manage your waste to protect your employees, the community, and the environment.

What are the regulatory definitions of Electroplating and Metal Finishing?

Electroplating [40 Code of Federal Regulations (CFR) 413] covers job shop facilities. A plant is considered a job shop facility if at least 50 percent of the parts it processes are made elsewhere. Metal finishing (40CFR 433) covers facilities that can be either job shops or captive shops. Over 50 percent of the parts used in a captive shop facility are made at the facility. Generally, electroplating is only one step in the processes at a captive shop (metal finishing shop).

Are electroplating wastes hazardous?

The “Do I Have a Special Waste?” fact sheet defines hazardous waste and will help you determine if your waste is characteristic for ignitability, corrosivity, reactivity, or toxicity, or if it is listed. Some common U.S. Environmental Protection Agency (EPA) waste codes for hazardous electroplating wastes are listed in Table 1. For a detailed hazardous waste list, call the Office of Small Business.

**Table 1. Hazardous Wastes Generated by the Electroplating Industry**

<table>
<thead>
<tr>
<th>EPA Hazardous Waste Code No.</th>
<th>Hazardous Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>D006 (cadmium)</td>
<td>Waste hazardous because of the characteristic of toxicity for these metals; examples include wastewater treatment sludge, spent plating bath solution, sludge from plating baths, and spent process solutions</td>
</tr>
<tr>
<td>D007 (chromium)</td>
<td></td>
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<tr>
<td>D008 (lead)</td>
<td></td>
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<tr>
<td>D009 (mercury)</td>
<td></td>
</tr>
<tr>
<td>D010 (selenium)</td>
<td></td>
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<tr>
<td>D011 (silver)</td>
<td></td>
</tr>
<tr>
<td>D002</td>
<td>Spent alkaline and acidic cleaning solutions</td>
</tr>
<tr>
<td>D003</td>
<td>Reactive wastes</td>
</tr>
<tr>
<td>F001</td>
<td>Spent halogenated solvents used in degreasing</td>
</tr>
<tr>
<td>F003 through F005</td>
<td>Spent nonhalogenated solvents</td>
</tr>
<tr>
<td>F006</td>
<td>Wastewater treatment sludge from electroplating operations except certain process</td>
</tr>
<tr>
<td>F007 through F012</td>
<td>Waste specific to cyanide plating</td>
</tr>
</tbody>
</table>

Your wastes are hazardous if one of the following applies to you:

- The flashpoint of your spent cleaning solvent, lacquer, or other waste is less than 140°F.
- Your spent cleaning solution or degreaser contains solvents on the F-list.
- Sludge from the bottom of process tanks is on the F-list.
- The pH of your spent cleaning solution is less than 2 or greater than 12.5 unless it is used for pH adjustment in your wastewater treatment plant.
- Spent plating and cleaning solutions contain metals or organic chemicals.
What types of regulations apply to my electroplating shop?

Hazardous solvents, liquids, and sludges must be managed by a hazardous waste transporter and a treatment or disposal company in accordance with hazardous waste requirements. The fact sheet “How Do I Manage My Hazardous Waste?” will help you determine what type of hazardous waste generator you are and what general hazardous waste requirements apply to you, such as labeling, manifesting, and storage requirements. Generators of special waste are responsible for completing an annual waste report if 1) they ship their waste out of state or 2) if the waste is hazardous. In addition, listed below are common compliance issues that your electroplating shop should follow.

- Close drums; drums should be closed at all time unless you are adding or removing waste
- Properly fill out hazardous waste manifests
- Keep annual training current for employees that work at waste accumulation points
- Use proper containers that meet federal U.S. Department of Transportation performance-oriented packaging standards and that are in good condition
- Complete and update contingency plans
- Use a hazardous waste manifest when sending precious metals waste categorized as a “spent material” or a “listed waste”
- Mark “Hazardous Waste” and the start date on the waste container at the accumulation point
- Classify hazardous waste and nonhazardous waste properly

AIR REGULATIONS

Do air regulations apply to my shop?

Air regulations apply to all electroplating shops. All electroplating facilities in Illinois require an air pollution control permit. Most emissions from electroplating and anodizing baths come from fine mists formed by the process. If the mist is reduced, emissions are reduced. Another source of emissions is from solvents used in various processes such as vapor degreasing, lacquering operations, and phosphating.

Electroplating shops may also be affected by federal regulations. The Clean Air Act (CAA) regulates air emissions of 189 toxic chemicals. To control emissions of these chemicals, EPA issued National Emission Standards for Hazardous Air Pollutants (NESHAP) for particular industries, including the electroplating industry. NESHAP regulates chromium emissions from hard and decorative chromium electroplating and chromium anodizing tanks. NESHAP contains standards that covers emissions limits, work practices, initial performance testing, ongoing compliance monitoring, recordkeeping, and reporting.

Does my business need an air pollution control permit?

Construction permits are required prior to beginning construction of an emission source or air pollution control equipment. Operating permits are required for operation of an emission source or air pollution control equipment subject to the permit requirements. Even if your business did not have a construction permit prior to construction of your emission source, you may be required to have an operating permit. If you have air pollution control equipment, you have an emission source.

What type of operating permit is required?

Lifetime permits are for small companies that do not cumulatively emit 25 tons per year of all contaminants including less than 10 tons of any Hazardous Air Pollutant (HAPs) or 25 tons per year combined HAPs.
Federally Enforceable State Operating Permits (FESOPs) are permits with enforceable conditions to avoid the Title V or Clean Air Act Permit Program (CAAPP) permits. These permits have enforceable conditions that limit the businesses emissions to less the CAAPP thresholds.

CAAPP permits are for major air emission sources. If you potentially emit 25 tons per year of volatile organic compounds (VOCs) or 100 tons of other contaminants (nitrogen oxide, carbon monoxide, sulfur dioxide and particulate matter) in an ozone nonattainment area, you have a major source and must apply for a CAAPP permit. If you potentially emit 100 tons per year of VOCs or the other contaminants in an attainment zone, you must apply for a CAAPP permit.

In addition, if you potentially emit 10 tons per year of a single hazardous air pollutant (HAP) or 25 tons per year of combined HAPs, you must apply for a CAAPP permit. Other rules may also require you to apply for a CAAPP permit. For more information on air permits, contact the Office of Small Business and see the Illinois EPA fact sheet “Does My Business Need an Air Pollution Control Permit.”

Other local regulations may apply to your business. Check with your city for other permitting requirements.

WATER REGULATIONS

Which specific water regulations apply to my electroplating shop?

Spent solutions and wastewater may be discharged to your city’s sanitary sewer if they meet local, state, or federal discharge limits or with permission from your local publicly owned treatment works (POTW). The federal discharge regulations for electroplating indicate a single day maximum and a 4-day average. The federal discharge regulations for metal finishing indicate a single day maximum and a 30-day average. For a list of the federal discharge limits, contact the Office of Small Business. The POTW or city sewer may have pretreatment regulations. Contact them to determine discharge limits and compliance monitoring requirements. You may also be required to submit semiannual or more frequent compliance sampling and reporting information. Spent solutions or wastewater should never be discharged to a septic system or storm water sewer.

If wastewater is discharged to a sanitary sewer system, the business owners must apply for a state construction permit and may also need to apply for a state operating permit. Contact the Office of Small Business for more information on Illinois EPA water permits.

POLLUTION PREVENTION

Are there pollution prevention (P2) techniques that I can implement in my shop?

Electroplaters can use many P2 techniques and technologies to reduce pollution and operating costs within their shops. These options are often inexpensive and usually have payback periods of less than 2 years!

Dragout Reduction

A common P2 target for electroplaters is to reduce dragout. Methods to reduce dragout are summarized on the next page.

OTHER AIR PERMIT REQUIREMENTS

✔ If you do not use more than 5,000 gallons of coating including thinner, you do not need to apply for an Illinois EPA air permit for your coating operation.

✔ If your cold cleaning degreasers are not in-line and have a solvent vapor pressure that never exceeds:
  • 15mm mercury or 0.3 psi measured at 38°C or 100°F or
  • 5mm mercury or 0.1 psi measured at 20°C or 68°F

you do not need to apply for an Illinois EPA permit for your cold cleaning degreasers.

Other local regulations may apply to your business. Check with your city for other permitting requirements.

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Allow for drain time over the bath. An additional 2 to 3 seconds of drain time can cut dragout by 50 percent.

✔ Install spray rinses. Spray rinses directly over heated baths washes dragout directly into the plating bath and uses a minimal amount of water.

✔ Position parts to keep dragout at a minimum. Tilt parts so that liquid drains freely as the parts are removed from the baths. Orient parts so that the smallest surface area is in contact with the solution as a part is removed.

✔ Install drain boards between process and rinse tanks.

Reduce Water Use

Another P2 technique is to reduce water use, which will result in lower water purchase costs, less wastewater generation, and lower wastewater treatment costs. Continuously flowing rinse water is not always needed! Methods to reduce water use are summarized below.

✔ Use conductivity control systems, which can reduce water use and wastewater generation by as much as 35 percent. Conductivity control systems monitor rinse water conductivity to maintain adequate chemical concentrations and reduce water use by adding rinse water to rinse tanks only when necessary.

✔ Use low-cost flow restrictors or solenoid valves and timers to reduce water use and wastewater generation by up to 60 percent on selected rinse systems. Solenoid valves can be installed with spring-wound timers on rinse water lines to control flow to each of the rinse tanks.

✔ Use counter-current rinsing to reduce water use and wastewater generation by 40 percent or more. For each rinse tank operation place into counter-current configuration, a reduction by a factor of 10 in water use will be achieved with the same rinsing quality.

Extend Bath Life

Process baths can be costly for electroplaters to manage. With proper bath maintenance, process bath life can be greatly extended. Some techniques to extend process bath life are summarized below.

✔ Improve bath purity by using deionized water for bath makeup and filtering the bath continuously.

✔ Maintain each bath by measuring its pH, temperature, and concentration daily. Add chemicals only when needed.

✔ Use bath additives, which can replenish process chemicals and add chemical agents to boost bath performance.

✔ Remove impurities in the process tank through membrane filters, ultrafiltration, and ion exchange.

How do I obtain more information?

For more information on electroplating wastes, applicable regulations, and where to receive other fact sheets, call the Office of Small Business Helpline toll-free at (888) 372-1996 or the DCCA Small Business Environmental Assistance Helpline at (800) 252-3998. All calls are considered confidential, and the caller can remain anonymous. For other information about environmental issues, see the Illinois EPA web page at www.epa.state.il.us. Technical assistance is also provided by the Waste Management Research Center at (217) 333-8940.