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Pollution Prevention Opportunities  
for Metal Fabricators

The keys to pollution prevention in metal fabrication are to recycle metal working fluid in machining, find alternatives to organic solvents in cleaning, and minimize overspray during application of coatings.

<u>Y/N</u>	<u>Opportunities</u>	<u>Comments</u>
	<b>I. Machining Operations</b>	
_____	Seal and wiper replacement	Mitigates chance of oil contamination of metalworking fluid if seal or wiper should fail.
_____	Use demineralized water	For mixing purposes, use of high quality water mitigates contamination problems of machining fluid.
_____	Extend life of fluid	Clean fluid through filtration and clarification and use of specialized biocides.
_____	Change to synthetic fluids	Synthetic fluids are less susceptible to contamination, therefore, have a longer useful life.
_____	Change to gas coolant	Use a gas coolant for certain applications instead of a liquid.
_____	Recycle metalworking fluids	Extend useable life of fluid through filtration, skimming, dissolved air flotation, coalescing, hydrocycloning, centrifugation and pasteurization.

Y/N      Opportunities      Comments

**I. Machining Operations (continued)**

\_\_\_ Keep fluids from floor drains Do not allow discharge of spills or spent fluids to sewer. Eliminate floor drains if necessary.

\_\_\_ Reuse high performance fluids Reuse hydraulic fluids that no longer meet spec for less stringent spec cutting oils.

**II. Metal Parts Cleaning and Stripping**

\_\_\_ Reuse secondary rinse Reuse second rinse as primary rinse or makeup for cleaning solutions.

\_\_\_ Lengthen dragout time Allows more chemical to drip back to process tank, so reduces the amount of chemical introduced in rinsewater.

\_\_\_ Establish dragout timing Post dragout times at tanks to remind employees.

\_\_\_ Install drain boards or drip guards Boards and guards minimize spillage between tanks and are sloped away from rinse tanks so dragout fluids drain back to plating tanks.

\_\_\_ Install drip bars Drip bars allow personnel to drain part hands free without waiting, so personnel will not use too short a dragout time.

\_\_\_ Mechanize dragout Eliminates possibility of employee using too short a dragout time, maintains product QA/QC standards if timing is set properly.

Y/N      Opportunities      Comments

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II. Metal Parts Cleaning and Stripping (continued)

- \_\_\_\_\_ Reduce pockets on parts      Place parts on dragout rack to minimize chances of chemical pooling in corners or in other pockets.
- \_\_\_\_\_ Agitate rinse bath      Agitation promotes better rinsing. Agitate water or part.
- \_\_\_\_\_ Use countercurrent rinses      These rinses dramatically reduce the amount of water required for rinsing and therefore reduce the amount of wastewater to be treated or sent for metal recovery.
- \_\_\_\_\_ Use spray or fog rinsing      Reduces rinsewater quantity required and can also be used over plating baths.
- \_\_\_\_\_ Use foot pump or photo-sensor to activate rinse      These items allow use of water only when processing parts. A photosensor may be used on automatic plating lines.
- \_\_\_\_\_ Reuse alkaline rinsewater      Reuse rinse water from an alkaline cleaner operation to rinse parts from an acid cleaning operation.
- \_\_\_\_\_ Optimize bath concentrations      Only replace plating chemical when necessary. Lengthens bath life.

II. Metal Parts Cleaning and Stripping (continued)

<p>___ Install bath filter</p>	<p>Filter can remove particulates and trace contaminant organics in the process bath, lengthens bath life. Use a filter that can be unrolled, cleaned and reused.</p>
<p>___ Raw material purity</p>	<p>Use high quality raw materials in bath so bath will not become contaminated as quickly.</p>
<p>___ Reuse deionized rinsewater</p>	<p>Depending on product, this rinsewater can be reused in a plating bath as evaporated water make-up.</p>
<p>___ Ion exchange on rinsewater</p>	<p>Ion exchange can be used to concentrate metals in rinsewaters and metal can be recovered from the ion exchange acid regenerant stream.</p>
<p>___ Reuse spent acid/alkaline</p>	<p>Spent acid can be used to neutralize an alkaline waste stream. Spent alkali can be used to neutralize an acid waste stream.</p>
<p>___ Reverse osmosis</p>	<p>Concentrate dragout for reuse in plating bath; the water stream can also be reused.</p>
<p>___ Evaporation</p>	<p>Concentrate dragout for reuse; the water condensate can also be reused.</p>
<p>___ Electrodialysis</p>	<p>Recover chromium from hard chromium plating baths and rinsewaters.</p>

Y/N      Opportunities      Comments

**II. Metal Parts Cleaning and Stripping (continued)**

\_\_\_\_\_ Electrowinning      Recover metals from spent plating baths or ion exchange acid regenerant streams.

\_\_\_\_\_ Reuse mild acid rinsewater      Use mild acid rinsewater as influent to rinse following alkaline cleaning bath. Improves efficiency of rinse, so less rinsewater is required.

**III. Metal Surface Treatment and Plating Operations**

\_\_\_\_\_ Change to UV-cured coatings      Eliminates use of carrier solvents, maximizes paint transfer efficiency, and minimizes overspray wastes.

\_\_\_\_\_ Change to powder coatings      Eliminates use of carrier solvents, maximizes paint transfer efficiency, and overspray powder can be collected, filtered, and reused.

Y/N	Opportunities	Comments
<b>VI. Process Operation and Maintenance (continued)</b>		
_____	Raw material purity	Use high quality raw materials in bath so bath will not become contaminated as quickly.
_____	Reduce bath dumps	Optimize bath operation so bath dumps are infrequent.
_____	Spill cleanup procedures	Establish procedures for what to do with a spill. Mitigates chance of spill being discharged to wastewater treatment plant.
_____	Perform preventive maintenance	Routinely check for leaks in valves and fittings. Repair immediately.