

CIMCOOL[®]

Technical Report

Milacron Marketing Co. | Consumable Products Division | Cincinnati, Ohio 45209

TREATMENT AND DISPOSAL OF USED METALWORKING FLUIDS

Introduction

Even with the best fluid management procedures, water-based metalworking fluids will not last indefinitely. Typically, two situations can dictate disposal of the fluid. These are excessive contamination (oil, dirt, metals, etc.) and rancid odors. Though these criteria are subjective, most dump, clean and recharge (DCR) decisions are made because the fluid is too oily and dirty, or simply smells bad. More sophisticated controls can be used where the decision is made based on performance problems such as pH, concentration, bacteria/mold counts, oil contamination, or other measurements. The user must decide how and when to treat and dispose of the fluids. For disposal purposes, used metalworking fluids are considered oily wastewater.

Typical considerations when selecting a waste treatment method include:

- Hazardous vs. Non-Hazardous regulatory classification of the waste (from RCRA*)
- Volume of the waste
- Waste characteristics
- Availability of sewer disposal
- Availability and cost of contract hauling services
- Availability of waste treatment assistance
- Equipment, labor and chemicals required for onsite treatment
- Liability
- Cost
- Applicable pretreatment standards

* RCRA = Resource Conservation and Recovery Act, administered by U.S. EPA

The primary disposal options for plants are contract hauling or treatment for sewer disposal. Used metalworking fluids become contaminated with oils, fines, metals, bacteria, etc. These fluids require treatment prior to disposal to meet local sewer discharge standards, which are subject to Local, State and Federal laws.

Sewer discharge standards restrict pH, "oil and grease", solids, metals and other components. These standards vary from place to place, however some typical effluent criteria are:

<u>Parameter</u>	<u>Sewer Limit</u>
COD (Chemical Oxygen Demand)	500 ppm
TSS (Total Suspended Solids)	250 ppm (max.)
pH	6.0 - 9.0
Oil and Grease	10 - 100 ppm (max.)
Metals	Varies
Other Inorganics	Varies

For small quantity generators of oily wastewater, typically contract hauling or evaporation is the most effective and economical disposal method. There are national, regional and local contract haulers. They can be found in the business telephone directory or by calling CIMCOOL[®] Technical Services (513-458-8199). A certified hazardous waste hauler is required to haul and treat hazardous wastes (per RCRA).

The liability issue affects any business that generates, transports, stores, treats or disposes of waste. It is important that each step of the process is completed in an ethical and legal manner. In every case, the most effective methods for treatment and disposal must be used in order to minimize future liability.

Physical Treatment

Various physical treatment methods are used effectively to treat metalworking fluids for disposal. Evaporation is a common treatment for low to moderate volumes of oily wastewater (25 to 3,000 gallons per day). This effective method uses heat to evaporate water from the used fluid and to concentrate the oil. Sewer discharge is avoided. Air discharge permits are required.

Another common physical treatment method is membrane separation. There are two types of membrane separation treatments, Ultrafiltration (UF) and Reverse Osmosis (RO).

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UF uses a membrane to separate oil and large molecular weight material from the water to provide an effluent of generally acceptable quality for sewer discharge. UF is used for wastewater volumes from approximately 50 to 15,000 gallons per day. UF provides a relatively simple and consistent process to treat oily wastewater.

For plants needing further improvements in effluent quality, a "secondary treatment" using RO can be used. The effluents from either UF or RO typically are not reused.

Incineration is used for final treatment of oily concentrates and hazardous wastes.

Chemical Treatment

Chemical treatment uses various inorganic chemicals (ex. aluminum sulfate or ferric chloride) or organic chemicals (ex. cationic or anionic polymers) to destabilize or "break" emulsions of used oily wastewater.

Chemical treatment can be used for volumes of wastewater from 50 to over one million gallons per day, however it is generally more cost-effective for larger volumes of oily wastewater. A by-product of chemical treatment is a sludge or oily waste concentrate that requires further treatment for oil recovery.

Chemical treatment is effective for treatment and removal of metals in oily wastewater.

CIMCOOL[®] products can be tested in the CIMCOOL[®] LAB for compatibility with a customer's waste treatment process.

Biological Treatment

The high organic content of most metalworking fluids makes them good candidates for degradation by bacteria for waste treatment. However, the high oil content of these fluids typically eliminates using biological treatment as the primary treatment method. A chemical or physical treatment process precedes the use of biological treatment for metalworking fluids.

Biological treatment is an excellent "secondary or tertiary" treatment of metalworking fluids for organics reduction. However, this process is most economical for large users, especially where there is not an option for sewer discharge.

Summary

With greater emphasis on fluid longevity and fluid recycling, it is important to remember that water-based metalworking fluids are "consumable" and have a finite life. The selection of a treatment or disposal method is based on a number of factors, including the volume to be treated and other wastewater characteristics. It is important that the fluid treatment method comply with all applicable Local, State and Federal regulations.