

LEARNING TO LET GO

*Even with the best fluid-management procedures,
water-based metalworking fluids will not last forever.*

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With today's emphasis on fluid longevity and recycling, it is important for manufacturers to remember that water-based metalworking fluids still have a finite life and must be eventually treated and disposed of. Selecting the proper treatment and disposal method is based on a number of factors, including the volume to be treated, wastewater characteristics, and local, state, and federal disposal regulations.

Several situations also dictate disposal of metalworking fluids: excessive contamination, rancidity, or filter malfunction. Though some of these criteria are subjective, most



dump, clean, and recharge decisions are made because the fluid is too oily, dirty, or smelly. However, more sophisticated controls are available on which to base the decision, such as performance indicators like pH levels, concentration, bacteria counts, mold counts, oil contamination, or other measurements.

Another issue affecting any business that generates, transports, stores, treats, or disposes of waste fluids is liability. It is important that each step of the treatment and disposal process is completed in an ethical and legal manner, and in every case, the most effective methods for treat-

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ment and disposal must be fully employed to minimize any future liability.

The most effective methods for treating and disposing exhausted fluids differ depending on a number of considerations, including:

- Hazardous versus non-hazardous waste (as classified by the Resource Conservation and Recovery Act [RCRA])
- Volume of 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 on-site treatment
- Liability
- Cost
- Applicable pretreatment standards

The primary disposal options for plants are contract hauling or treatment for sewer disposal. Sewer discharge standards restrict the amount of pH, oil and grease, solids, and metals allowed in waste. Since metalworking fluids become contaminated with such substances, they require treatment prior to disposal to meet local sewer standards.



For small quantities of oily wastewater, 25 to 3,000 gallons per day, typically contract hauling or a physical treatment like evaporation are the most effective and economical disposal methods. Most national, regional, and local contract haulers are certified to haul and treat hazardous wastes per RCRA standards and guidelines.

The evaporation method uses heat to evaporate water from the used fluid and to concentrate the oil. Thus, sewer discharge is avoided; however, air-discharge permits may be required.

Another common physical treatment is membrane separation, of which there are two types, ultrafiltration (UF) and reverse osmosis (RO).

In UF, a membrane separates oil and large molecular weight material from the water to provide an effluent of acceptable quality for sewer discharge. UF is well suited for removing oil, grease, and suspended solids, but it is typically ineffective for extracting dissolved solids. UF handles wastewater volumes from approximately 50 to 15,000 gallons per day and provides a relatively simple and consistent process to treat oily wastewater.

For plants needing further improvements in effluent quality, a secondary RO treatment is the answer. The

RO separation process is similar to ultrafiltration, but it incorporates higher pressures and tighter semipermeable membranes. This reverses the natural process of osmosis, causing water to flow from the more concentrated to the more dilute solution side of the membrane.

Continuing membrane developments offer various pore sizes, membrane materials, and configurations to optimize oily

Typical sewer standards for fluid disposal	
Parameter	Sewer Limit
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

wastewater treatment. The effluents from either UF or RO are typically not reused. Incineration is a solution for final treatment of oily concentrates and hazardous wastes.

For producers of larger volumes of oily wastewater, chemical treatments are typically more cost-effective than physical treatments. A chemical treatment uses various inorganic chemicals (aluminum sulfate or ferric chloride) or organic chemicals (cationic or an-



requires further treatment for oil recovery.

While not usually a primary method, biological treatment is an excellent secondary or tertiary treatment of metalworking fluids for organics reduction. The high organic content of most metalworking fluids makes them good candidates for degradation by bacteria for waste treatment. A chemical or physical-treatment process almost always precedes the use



ionic polymers) to destabilize or “break” emulsions of used oily wastewater. In addition, chemical treatment is effective for treatment and removal of metals in oily wastewater.

Chemical treatment is best for volumes of wastewater from 50 gallons per day to over a million gallons per day. A by-product of chemical treatment is a sludge or oily waste concentrate that



of a biological treatment. Again, as is the case with chemical treatment, this process is most economical for large users, especially in cases where there is not an option for sewer discharge. CT

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