# Factsheet: Waste Minimization Options for Machine Coolants

Board of Public Works
HTM Office
City of Los Angeles

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## Introduction

Due to the increasing number of regulations and expenses of hazardous waste disposal, new methods are being developed and implemented to reduce the amount of hazardous waste generated, thereby achieving compliance with environmental regulations and decreasing disposal costs. Waste minimization is receiving greater attention rather than "end-of-pipe treatment." This fact sheet provides information on potential waste minimization method for machine coolants.

## Waste Streams

The waste streams of coolant contamination originate mainly from coolant sump changes and from coolant losses due to spills, leaks and carryout of metal chips and parts. Coolant replacement is necessary because of bacterial build-up and contamination by hydraulic fluids, i.e. tramp oil, due to leaks. Hydraulic fluid needs to be replaced on a routine basis, also. Contamination of coolants due to tramp lubricating and hydraulic oils results in bacterial growth, which is also a major cause of coolant degradation. Tramp oils in coolant can also affect product quality and hinder the possibility of recycling.

## Waste Minimization

The best method for minimizing tramp oil contamination is by practicing good housekeeping procedures such as periodic replacement of hoses, seals and wipers, and routine machine maintenance. If there is a blown hose or leak, hydraulic fluid may escape until the equipment can be shut off. Use of emergency shut-offs, either manually operated or automatic, allow for immediate shutdown of equipment in case of a sudden leak. Manual shut-offs should be obvious, clearly labeled buttons or switches mounted on all pieces of equipment; automatic shut-offs employ pressure-drop activated valves installed at key junctures. Sealing lock-nuts, designed with an integral elastomeric sealing ring, may be used to prevent fluid leakage from cover plates, valves and other bolted items.

Methods of removing unintentional tramp oil contamination should be considered after all measures of reducing oil leakage into coolant sumps have been taken. Small, sump mounted, belt skimmers could be installed on each sump provided that the coolant type does not emulsify tramp oil.

When possible, coolant channels in the machines should be covered or screened to minimize contamination from dirt and dust, floor sweepings and metal chips. Coolant filters should be regularly cleaned or replaced. Blind spots

that allow chip accumulation and bacterial growth should be cleaned out and sealed. Coolant life may be extended and waste generation reduced if these practices are followed.

The coolant formulations typically contain more than 95% water. Tap water contains dissolved ions such as calcium, magnesium, and sodium carbonates and sulfates which can affect coolant quality and bacterial growth. Sulfates act as oxygen sources for sulfate-reducing bacteria. Coolant life may be extended and work quality is improved by substituting demineralized water in place of tap water which can reduce coolant consumption by 30 to 40 percent.

There are a wide variety of recycling techniques available for on-site coolant recycling. They include skimming, vacuum and pressure filtration, centrifugation, pasteurization, ozone injection, UV irradiation and chemical sterilization. An effective recycling system will typically employ two or more of these techniques in order to remove the different types of contaminants present. The factors of selecting a recycling system depends on such factors as coolant type (straight synthetic, high lubricity synthetic, semi-synthetic or soluble oil), amount of coolant to be processed and amount or severity of contamination.

Standardization of the coolants should be considered in order to promote recycling which can actually reduce material and administrative costs and waste management expenses as well. All spent coolants should be recycled at one location by an experienced crew of operators or contract personnel. Standardization would also eliminate the potential for cross contamination of coolants.

Following coolant standardization should be the establishment of standard procedures for coolant recycling. The procedures should outline the duties of staff in order to minimize coolant contamination, and specify routine test procedures for performance monitoring of the coolant and the coolant recycling system. The specifications for the recycled coolant should include required lubricity and coolant concentration and maximum action levels for the following parameters: bacteria count, total dissolved solids, total suspended solids, tramp oil concentration, and odor (i.e. sulfide content).

The recycling of hydraulic fluids is also possible in addition to coolants. The recycling systems available range from simple filtration systems up to more complex systems using vacuum distillation or centrifugal separation. The economic feasibility of the recycling system depends on the amount of contaminated fluid generated, disposal costs, the capital and operating expenses, and the savings in raw material purchase costs for new fluid.

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For further information and assistance or to request additional publications please contact the City of Los Angeles HTM Office at:

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***Contact Pinellas County's Pollution Prevention and Resource Recovery (P2R2) Program at 464-4761 for Waste Reduction Assistance***