Antifreeze Recycling

CASE STUDY

Argonne Warms Up to Antifreeze Recycling

Laboratory Reuses 85% of its Antifreeze

Argonne National Laboratory's Vehicle Maintenance Group began recycling antifreeze in 1993. Recycling reduces costs because less new antifreeze must be purchased, and disposal and cleanup costs are avoided. Previously, antifreeze was removed from vehicles, stored, and then transported from the Laboratory by an outside contractor. Now, about 85% of the used antifreeze is reclaimed; only 15% is unrecoverable. Purchases of new antifreeze have declined, resulting in a savings of more than $4,000 in 1995.

Why Recycle Antifreeze?

Recycling prevents improper dumping of antifreeze on land or into waterways. Used antifreeze is hazardous in the following ways:

- Antifreeze contains ethylene glycol, which is harmful when ingested or inhaled. It can cause nausea, vomiting, and headache at low exposures and kidney, brain, and liver damage — even death — at higher levels.
- During use, antifreeze may become contaminated with heavy metals or organic compounds that can contaminate soil and groundwater.

Although it is not specifically listed by the U.S. Environmental Protection Agency, used antifreeze may be

continued

considered hazardous waste under the Hazardous Waste Standards (40 CFR 261-268) if it is tested and found to contain regulated levels of heavy metals or organics. Many states and local communities also regulate the disposal of ethylene glycol.

How Argonne Recycles Antifreeze

Argonne's fleet of 300 vehicles consists of automobiles, pickup trucks, forklifts, fire equipment, and construction vehicles. Every two years, the Vehicle Maintenance Group flushes out each vehicle and replaces its antifreeze. Mechanics may also replace antifreeze when vehicles undergo their twice-yearly service and maintenance checks or when a vehicle's cooling system must be repaired. A particular vehicle may need 4–6 gallons of antifreeze. Argonne's goal is to recycle one 55-gallon barrel of antifreeze each week.

Antifreeze recycling consists of removing contaminants from used antifreeze and using additives to restore coolant properties to the appropriate level. The Vehicle Maintenance Group uses two antifreeze recycling machines: a stand-alone recycler with a capacity of 42 gallons and a portable unit. Argonne mechanics recycle antifreeze according to the manufacturers' guidelines:

- The pH of the used antifreeze is tested before recycling. If it is below 7, the antifreeze cannot be recycled, and it is stored in an underground storage tank used only for antifreeze to await disposal by an outside contractor.
- The freeze capacity of the recycled antifreeze is tested after it is cleaned. If it is not at least 35, fresh antifreeze is added to restore its strength, equivalent to a 50/50 mixture of antifreeze and water.
- The stand-alone unit uses reverse osmosis to filter impurities from large quantities of antifreeze. The antifreeze is drained from the vehicle and undergoes filtration and testing. After the antifreeze is recycled, it is stored in 55-gallon drums until needed. When the machine needs to be cleaned, clean water is run through the recycling process. The water is drained and placed in the underground storage tank for antifreeze to await disposal.
- The portable unit connects directly to a vehicle, flushes out the radiator, cleans the antifreeze, and returns the reclaimed antifreeze to the vehicle in a closed loop. A corrosive capture agent, a radiator treatment, and a radiator sealant are added as the radiator is flushed out in three steps. Because they cannot be recycled, the filters used to clean the antifreeze are bagged, tagged, and disposed of as hazardous waste when they become unusable.

For further information, contact Earl Powell, Vehicle Maintenance Supervisor, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439, phone: 630-252-7096.