

HOW TO SUCCESSFULLY RECYCLE YOUR ETHYLENE GLYCOL ANTIFREEZE

TIPS ON MAKING AN ANTIFREEZE
CONSERVATION AND RECYCLING PROGRAM
WORK TO *SAVE YOU MONEY.*

PLUS,

A COMPLETE LISTING OF FEDERAL AND
STATE ENVIRONMENTAL REGULATIONS FOR
THE DISPOSAL OF USED ANTIFREEZE,
ALONG WITH AGENCY ADDRESSES AND
PHONE NUMBERS.

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THE COOLING SYSTEM: AN OVERVIEW

The cooling system removes about $\frac{1}{3}$ of combustion heat from the engine and sheds it to the outside air.

Improper maintenance of the cooling system will result in:

1. Deposits will form on the inside surface of the water jacket and radiator. These deposits may be composed of mineral scale, rust, sludge and silicate scale. This coating doesn't transfer heat nearly as well as bare metal. In fact, it acts as an insulator. Just $\frac{1}{16}$ th of an inch-thick layer of scale or sludge is the equivalent of several inches of metal! This layer will cause overheating, especially under the following conditions:

- heavy load
- hot weather
- high altitude

2. Degradation of the coolant itself. Antifreeze does not only prevent the coolant mixture from freezing. It also prevents rust, corrosion, growth of microbes and foaming. Over time, the additives that make that possible are used up. When that happens, the coolant itself becomes corrosive, and starts attacking the engine and radiator. The radiator is the first to be attacked, with the zinc from the solder being dissolved. The soft metals in the engine are next. A good example would be aluminum heat exchangers, oil coolers, and the newer aluminum radiator cores. Finally, the block itself begins corroding from the inside out.

Depletion of the anti-foaming additives will result in the formation of bubbles. Not only do bubbles transfer heat poorly, but they also cause pitting of the liners.

Depletion of the dispersant package will result in suspended solids and dissolved metal salts settling out. This can easily result in water pump failure.

Not only that, but as the biocide is depleted, the growth of microorganisms will speed up. If the engine is run at high temperatures for prolonged periods, such growth will be killed off. However, if the engine idles a lot and/or never really works hard and gets up to high temperature, then the growth of microorganisms could form a slime problem, possible causing blockages in the system and a coating problem as noted above in (1).

SPECIFICATIONS

The specifications that antifreeze/coolant must meet are clearly set forth by ASTM. They relate to freeze point, pH, boiling point and corrosiveness. Quality antifreeze will have no trouble meeting these specifications. The factors that are most within control of the fleet user are *freeze point* and *pH*.

Freeze point is how cold the coolant mixture can get before it freezes. A 33% ethylene glycol - 67% water mixture has a freeze point of zero degrees F., and a 50 - 50 mix has a freeze point of -34 degrees F. Don't put in pure antifreeze, however. Pure ethylene glycol has a freeze point of -9 degrees F. Also, in overheat situations, it turns into a jelly-like consistency that will greatly complicate repair work.

pH is a measure of how acid or alkaline a substance is. Engine coolant should be alkaline, showing a pH of around 10. Over time and use, coolant degradation will cause a build-up of acidic by-products, reducing the pH. When the pH drops to 8 and below, it becomes corrosive to the cooling system components.

(See above)

TESTING

Field testing the coolant mixture is not a very complicated job. The pH is determined with litmus paper or a pH meter. You dip the paper in the coolant mixture, pull it out and compare the color with a color range on the package. Matching it tells you the pH. The pH meter does the same job, but with less work and slightly more precision.

The freeze point is measured with either a hydrometer or a refractometer (the latter, a newer device, is reputed to be more accurate). In either case, you are measuring the specific gravity of the coolant mixture, which in turn tells you the percentage that it contains of ethylene glycol.

In a laboratory, the testing is far more complete and precise. Various chemicals and testing machines determine pH, specific gravity, freeze point, sediment, appearance and the presence of microbes.

FLUSHING

As mentioned before, even a very thin coating of scale, slime, sludge, etc. can seriously undermine the efficiency of the cooling system. Therefore, Centaur recommends that you empty and flush the system once a year, *unless you know for certain that your additive package was kept up and doing its job.*

The flushing is a two-step process. The first step is an alkaline flush. This will remove silicate build-up and scale ("green goo") as well as sludge. It also exposes rust and carbonate scale, which is removed with an inhibited acid flush. If using an acid flush, it may be necessary to follow it up with a neutralizer. Check the individual manufacturer's instructions before use. (NOTE: the use of radiator flushes may produce hazardous and/or toxic wastes. For more information, see below, "The Legislative Picture".)

ANTIFREEZE CONSERVATION AND COST CONTROL

Over the last several years, the cost of ethylene glycol has sky-rocketed. From \$3 a gallon just a few years ago, it is \$8 a gallon and up today. And there doesn't seem to be any relief in sight.

Even though a 50-50 mix of ethylene glycol and water brings the cost of what actually goes into the radiator down to \$4 a gallon, antifreeze is just too expensive to waste.

An antifreeze conservation program should start with good PM — make sure that hoses are on tight and don't have breaks or cracks. Makes sure gaskets and seals are OK. This is important: if a fleet has 50 trucks, and each truck loses just 8 ounces of coolant mix a day, that fleet will have dropped \$3,000 on the road in a year's time.

Another method of coolant conservation is expansion tanks, also known as a "coolant recovery system". These provide two advantages. First, under normal operating conditions, coolant is not lost. As it heats up and expands, the coolant in the radiator overflows into the expansion tank. When the engine is shut down and cools, the coolant in the radiator contracts, forming a vacuum. Since the end of the overflow tube is immersed in coolant in the recovery tank, coolant is drawn back into the radiator, instead of air.

Second, since air isn't drawn into the system, foaming and bubbling is kept to a minimum. Liquid transfers heat far better when it isn't full of bubbles and foam.

So if you're not using a coolant recovery system, start.

RECYCLING

NOTE: *After careful consideration, we have elected not to include the names of the manufacturers of the various brands of recycling chemicals and/or filter systems. This is a rapidly growing industry, and such a list would surely become obsolete within months after publishing. Rather than face that problem, we suggest that you contact Centaur for a complete and up to date list.*

Still another method of cost control is recycling. Here, the used coolant mixture is filtered and then tested for pH and specific gravity (freeze point). A chemical package is added to renew the depleted inhibitor package, and 100% ethylene glycol is added to restore the proper freeze point.

Centaur's research in this area has led us to believe that it is a sound practice. Interviews with several large public utilities in Pennsylvania and the state of Washington have demonstrated widespread use over 3 to 4 years with no ill effects. To the contrary, the fleet managers showed remarkable enthusiasm toward recycling, citing its relative ease and significant cost savings.

Recycling is attractive from several standpoints. First, it is economically sound: recycled coolant can actually cost just 10% of the cost of new. Second, it is ecologically sound. Third, it can protect the fleet operator from rising antifreeze costs.

While Centaur generally recommends recycling as an effective cost-cutting practice, the user must be cautious about several things. First, there is the matter of the additive itself. There is a growing number of competing brands on the market, most of similarly high quality. Of these, some are more economical to use than others. For example, one brand costs over \$45 to treat 100 gallons of coolant mixture, whereas another costs only \$17 to treat the same 100 gallons of coolant mixture.

Make sure that the additive you choose will replenish the coolant's biocide package and anti-foaming agents.

Also, heavy corrosion metals, chlorides and sulfates (spent additives) are usually soluble and cannot be removed by a filtering process, including the water filters found in many diesel engines today. Upon reaching a saturation of the coolant, they start to precipitate out and cause water pump failure. Any additive that you choose for recycling must contain enough dispersants to replace those that have been consumed, so that these compounds will remain suspended and not cause trouble.

And above all, make certain that the additive will restore the coolant back to its original ASTM standards. Tests that it should pass are (NOTE: *This list does not mention every ASTM Standard Specification for Ethylene Glycol Base Engine Coolant. Rather, it only contains those relevant to the recycled coolant mixture. For a complete list, contact ASTM and request Designation: D 3306-86b*):

D 1121, Test Method for Reserve Alkalinity of Engine Antifreezes, Antirusts, and Coolants,
D 1122, Test Method for Specific Gravity of Engine Coolants by the Hydrometer,
D 1177, Test Method for Freezing Point of Aqueous Engine Coolant Solution,
D 1287, Test for pH of Engine Antifreezes, Antirusts, and Coolants,
D 1384, Corrosion Test for Engine Coolants in Glassware,
D 1881, Test for Foaming Tendencies of Engine Antifreeze in Glassware,
D 2570, Method for Simulated Service Corrosion Testing of Engine Coolants,
D 2809, Test Method for Cavitation Erosion-Corrosion Characteristics of Aluminum Pumps with Engine Coolants,
D 4340, Test Method Corrosion for Corrosion of Cast Aluminum Alloys in Engine Coolants Under Heat-Rejecting Conditions.

TO FILTER OR NOT TO FILTER?

Some recycling companies sell filter systems along with their chemical packages. These are OK for removing large particles of rust and other particulate matter. However, if your anti-rust and anti-corrosion packages are kept up, there shouldn't be large particles of rust in your coolant. And as noted above, most of your contaminants are in chemical solution in the form of chlorides and sulfates, which can't be removed by filters.

In order to make these contaminants filterable, it is possible to use a *flocking agent*. What this does is cause the dissolved salts and small particulates to settle out of solution, so that they can be removed by filtration.

At present, only one after-market manufacturer is offering such a chemical, and it must be purchased as part of a product package. Centaur is researching alternate suppliers.

Centaur recommends the use of flocking agents, but advises caution in their use. If too much flocking agent is added, it is possible that some would remain in the recycled coolant solution, and thus tend to neutralize some or all of the newly-added dispersant package. Also, the residue produced by some flocking agent may itself be hazardous waste.

While there are commercially produced filter units designed only for antifreeze recycling, our interviews have shown that the individual consumer can make its own unit for just as much, or less, that will do the job just as well. Further, portable filter/pump units, in combination with properly-sized tanks, will do the job just as well and be more versatile in the bargain. For example, if the used antifreeze is normally kept in a 500-gallon skid-tank, it could be recycled in that same tank, without the need to transfer it into a smaller, self-contained unit. *Also, before spending upwards of \$2,000 on a filter unit, see if one can be rented or leased.*

HOW OFTEN MUST COOLANT BE FILTERED?

In most cases, if the additive package has been kept up, there won't be any need to filter the coolant. However, if coolant analysis reveals high levels of particulates, chlorides and/or sulfates, it's a good idea to flock and filter.

If you're about to start a coolant recycling program, Centaur advises you to flock and filter first, so that you start off with a clean coolant mixture. Once you have that, then you can probably go for years just testing periodically and boosting the additives accordingly. *That can be done without draining the coolant from the system, thus saving time, money and inconvenience.*

STORAGE

Storage is another problem. Garage personnel will have to be trained that the used antifreeze is a valuable resource, and no longer a convenient dumping ground for solvents or other liquid refuse. It should be stored in closed containers to avoid additional contamination, and the containers' contents should be clearly labeled. The mechanic should be able to tell at a glance whether the antifreeze in a given container needs to be recycled or is ready for use.

The choice of containers will depend on the amount of antifreeze used and recycled. Large generators will most likely opt for 500-gallon skid-tanks, while smaller operators may do very well with 55-gallon drums. In any event, the container must be clean, and free of oil, fuel, or any other solvents or chemicals other than antifreeze.

If recycling is decided upon, Centaur Equipment Management recommends testing the coolant at 3-month intervals, and reconditioning it when the pH drops into the 8.5 to 9.0

range, or when the freeze point is no longer low enough to be safe. This program will avoid the chance of the coolant ever becoming corrosive in the first place, thus prolonging the life of the cooling systems in general.

PRODUCT SAFETY

Most additives are safe to handle and store if the proper precautions are observed. Specifically, one should not inhale the additive fumes or droplets, one should not drink it, and one should wear rubber gloves and eye protection when handling these additives. For more specific data, check with the individual manufacturers.

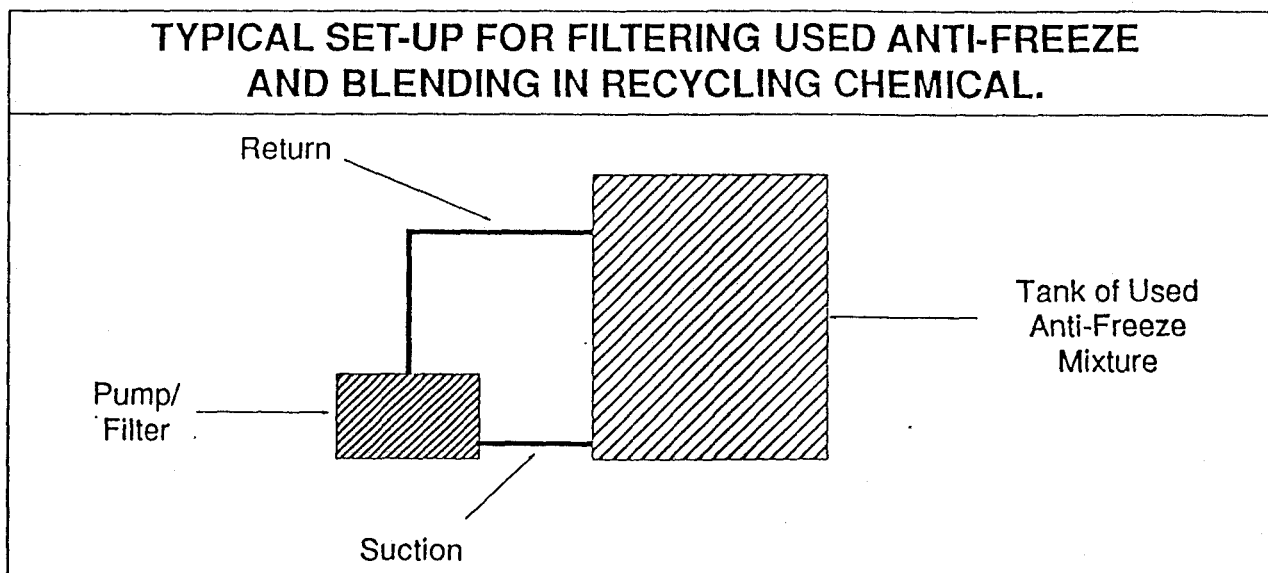
WILL NEW DEVELOPMENTS MAKE RECYCLING OBSOLETE ?

Currently, there is work going on that, if it is

successful, may make ethylene glycol obsolete. Experimentation is being performed on *Propylene Glycol*, which does not need to be mixed with water. At present, propylene glycol cooling systems are still in the infant stages of development, and there are far more questions than answers.

One thing is certain, however. It would not be applicable, at least as its designers currently view it, for all engines. Any engine that uses coolant for cooling turbocharged air would not be a good candidate for this system, due to the higher coolant temperatures that it allows. Only air-to-air charge air coolers can use this system.

Also, it is not yet known how long the coolant lasts or if it can be recycled.



The tank, as mentioned earlier, should be sized to suit the needs of the fleet in question. Steel is certainly an acceptable material, but a plastic, such as polyethylene, is also good.

It's a good idea to have the tank covered, to prevent both contamination and evaporation.

The pump/filter combination should also be specified to suit the volume that the fleet is likely to generate. The motor should be rated

for continuous use, as the filtering process lasts from 12 to 24 hours. A typical motor/pump combination might be a 1/2 hp motor coupled to a gear pump with an output of 6 GPM at 60 psi. That should be adequate for tanks of 300 to 600 gallons.

The filters that Centaur recommend are a coarse suction filter of about 30 microns and a final stage of 5 microns. There are filter manufacturers that produce filters of these specifications.

THE LEGISLATIVE PICTURE

Some firms that manufacture recycling systems warn us that used antifreeze is now classed as toxic and/or hazardous waste by federal and state authorities. That being the case, they warn, fleets will have to spend significant sums of money on disposal, thus making recycling even more attractive.

As of this writing, the above statement is at least partially misleading. Ethylene glycol, in and of itself, is not on the EPA's list of toxic/hazardous substances. After it has been used, however, the content of metals and other substances would determine whether it is in that class or not.

Therefore, as far as the EPA is concerned, whether or not used anti-freeze is hazardous/toxic waste must currently be determined on a case-by-case basis.

NOTE: This applies to used antifreeze only. If the used antifreeze is mixed with a hazardous waste, it automatically becomes hazardous waste as well. An example is radiator flush.

Radiator flushes are very likely to be classed as hazardous waste. If the used flush has a pH of less than 2.0 or more than 12.5, it is hazardous waste, due to its corrosiveness. Also, it may qualify as hazardous waste due to other characteristics. In that case, the amount produced determines the status of the generator (the term the EPA gives to anyone who produces hazardous waste). The generator's status determines what regulations must be followed.

To find out more about Federal Hazardous Waste regulations, get publication "EPA / 530 - SW - 86 - 019", UNDER STANDING THE SMALL QUALITY GENERATOR HAZARDOUS WASTE RULES. A list of EPA regional offices and their telephone numbers

appears at the end of this booklet.

The situation with the individual states is even more up in the air. Some states are very strict on the disposal of used coolant, whereas others seem to be unaware of the very existence of it.

Around half the states say that they follow EPA guidelines for determination of whether or not a substance is hazardous waste. So their position is the same as EPA.

Many states allow generators of used anti-freeze to dump it down the sanitary sewer, as long as it goes to a treatment plant. In these cases, the plant must be able to treat both the substance and the amount. In many cases, the treatment plant wishes to be notified prior to the actual dumping so that it can be ready. If large amounts are going to be dumped, the plant may instruct the generator to release the used anti-freeze slowly over a period of several hours. In no case, however, can used anti-freeze be discharged to septic systems, streams and/or dumped on the ground. That is a violation of the federal Clean Water Act. If it is going into a general landfill, it can't go as a liquid. It has to be solidified.

Also, if you start a recycling program, note that the filters through which the used anti-freeze is passed may accumulate sufficient concentrations of lead and other substances that they themselves may become hazardous waste. If they do, then they will have to be disposed of as hazardous waste in accordance with state regulations.

At least one state cautioned that they do not have a separate classification for "Small Generators" of hazardous waste. This has a definite impact on how long hazardous waste can be stored, and how it must be handled. Therefore, be certain to learn your state's current regulations regarding storage and handling. (See Directory of States)

Following is a list by state of the current regulations regarding the disposal of used engine coolant. To the best of our knowledge, this was complete and accurate as of the time of writing. However, since regulations are subject to change without notice, Centaur

Equipment Management Corp. recommends that you check the current regulations for your state yourself.

The term "POTW" stands for "Publicly Owned Treatment Works".

DIRECTORY OF STATES

ALABAMA

Alabama Department of
Environmental Management
1751 Federal Drive
Montgomery, AL 36130
205-271-7730
EPA ZONE 4
Sanitary sewer to POTW, no permit required

ALASKA

Department of Environmental
Conservation
PO Box 0
Juneau, AK 99811
907-465-2666
EPA ZONE 10
Follows EPA definition of hazardous waste,
used antifreeze would be determined haz-
ardous waste on a case-by-case basis. May be
sewered to POTW, no permit required.

ARIZONA

Arizona Department of
Environmental Quality
Office of Waste Programs
Waste Compliance Unit
2005 N. Central Ave., Rm 402
Phoenix, AZ 85004
602-257-2211
EPA ZONE 9
Not hazardous waste, no regulations.
May be sewered to POTW with operator's
consent. If no consent, next suggested treat-
ment method is recycling.

ARKANSAS

Dept of Pollution Control & Ecology
Hazardous Waste Division
PO Box 9583
Little Rock, AR 72219
501-562-7444

EPA ZONE 6

Follows EPA definitions for hazardous
waste, used antifreeze would be determined
to be hazardous waste on case-by-case basis.
Used antifreeze may be sewered to POTW
with operator's consent.

CALIFORNIA

Department of Health Services
Toxic Substances Control Division
714 P Street, Room 1253
Sacramento, CA 95814
916-324-1826
EPA ZONE 9
Classed as hazardous waste,
3 disposal options: solidifying and disposal
in Class 1 landfills, recycling, or sewer to
POTW with agreement of operator.

COLORADO

Colorado Department of Health
Waste Management Division
4210 East 11th Avenue
Denver, CO 80220
303-320-8333
EPA ZONE 8
Follows EPA definition of hazardous waste,
used antifreeze would be determined haz-
ardous waste on a case-by-case basis. May be
sewered to POTW with operator's consent,
although large amounts may require pre-
treatment.

CONNECTICUT

Dept. of Environmental Protection
Hazardous Waste Management Section
State Office Building
165 Capitol Avenue
Hartford, CN 06106
203-566-8843
EPA ZONE 1
Classed as special waste, must go to an authorized treatment or disposal facility.

DELAWARE

Dept of Natural Resources and
Environmental Control
Waste Management Section
PO Box 1401
Dover, DE 19903
302-736-4781
EPA ZONE 3
Not regulated waste, sanitary sewer to POTW with agreement of plant operator.

DISTRICT OF COLUMBIA

Dept of Consumer and Regulatory
Affairs
Pesticides and Hazardous Waste
Materials Division
614 H Street, Room 505
Washington, DC 20001
202-767-8414
EPA ZONE 3
Sanitary sewer to POTW, no permit required.

FLORIDA

Department of Environmental
Regulation
Solid & Hazardous Waste Section
2600 Blair Stone Road
Tallahassee, FL 32301
904-488-0300
EPA ZONE 4

If lead content is greater than 5 parts per million, classed as hazardous waste, disposed of accordingly, otherwise sewer to POTW.

GEORGIA

Georgia Environmental Protection Division
Hazardous Waste Management Program
Land Protection Branch
Floyd Towers East, Suite 1154
205 Butler Street, S.E.
Atlanta, GA 30334
404-656-2833
Toll-free 1-800-334-2373
EPA ZONE 4
No policy, first choice sanitary sewer to POTW.

IDAHO

Department of Health and Welfare
Bureau of Hazardous Materials
450 West State Street
Boise, ID 83720
208-334-5845
EPA ZONE 10
Follows EPA definition of hazardous waste, used antifreeze would be determined hazardous waste on a case-by-case basis. Used antifreeze may be sewerred to POTW with operator's consent.

ILLINOIS

Environmental Protection Agency
Division of Land Pollution Control
2200 Churchill Road #24
Springfield, IL 62706
217-782-6760
EPA ZONE 5
Classed as special waste, must go to an authorized treatment or disposal facility.

INDIANA

Départment of Environmental
Management
Office of Solid and Hazardous Waste
105 South Meridian
Indianapolis, IN 46225
317-232-4535
EPA ZONE 5
Follows EPA definition of
hazardous waste, used antifreeze would be
determined hazardous waste on a case-by-
case basis. May be sewerred to POTW with
operator's consent, or sent to treatment plant.

IOWA

Iowa Department of Natural Resources
Environmental Protection Division
Wallace State Office Building
Des Moines, IA 50319
515-281-6284
EPA ZONE 7
Follows EPA definition of hazardous waste,
used antifreeze would be determined haz-
ardous waste on a case-by-case basis. May be
sewerred to POTW with operator's consent.

KANSAS

Department of Health and Environment
Bureau of Waste Management
Forbes Field, Building 321
Topeka, KS 66620
913-862-9360, Ext. 292
EPA ZONE 7
Sanitary sewer to POTW, permit required
from POTW.

KENTUCKY

Natural Resources and Environmental
Protection Cabinet
Division of Waste Management
18 Reilly Road
Frankfort, KY 40601
502-564-6716
EPA ZONE 4
Follows EPA definition of hazardous waste,

used antifreeze would be determined haz-
ardous waste on a case-by-case basis. May be
sewerred to POTW with operator's consent, as
long as it doesn't exhibit hazardous charac-
teristics.

LOUISIANA

Department of Environmental Quality
Hazardous Waste Division
PO Box 44307
Baton Rouge, LA 70804
504-342-1227
EPA ZONE 6
Not hazardous waste. Regulated as solid or
industrial waste. First recommendation is to
recycle. Could go to POTW with the permis-
sion of Solid Waste Division, Water Quality
Division and the POTW operator.

MAINE

Department of Environmental Protection
Bureau of Oil and Hazardous Materials
Control
State House Station #17
Augusta, ME 04333
207-289-2651
EPA ZONE 1
Not listed hazardous waste, case-by-case
determination for hazardous waste, sewer to
POTW with permit.

MARYLAND

Department of Health and Mental Hygiene
Maryland Waste Management
Administration
Office of Environmental Programs
201 West Preston Street, Room A3
Baltimore, MD 21201
301-631-3304,
301-225-5709
EPA ZONE 3
Not listed hazardous waste, case-by-case
determination for hazardous waste, sewer to
POTW with permit, or recycle.

MASSACHUSETTS

Department of Environmental Quality
Engineering
Division of Solid and Hazardous Waste
One Winter Street
Boston, MA 02108
617-292-5589
617-292-5851

EPA ZONE 1

Follows EPA definitions, either POTW or hazardous waste facility.

MICHIGAN

Michigan Department of Natural Resources
Hazardous Waste Division
Waste Evaluation Unit
PO Box 30028
Lansing, MI 48909
517-373-2730

EPA ZONE 5

Classed as "Liquid Industrial Waste", can go to POTW if there is sewer line. If no hookup, and Generator hires carrier to remove used antifreeze to disposal facility, carrier must be licensed. If Generator transports, no license required.

MINNESOTA

Pollution Control Agency
Solid and Hazardous Waste Division
1935 West County Road, B-2
Roseville, MN 55113
612-296-7282

EPA ZONE 5

Sanitary sewer to POTW, no permit required.

MISSISSIPPI

Department of Natural Resources
Division of Solid and Hazardous Waste
Management
PO Box 10385
Jackson, MS 39209
601-961-5062
EPA ZONE 4

Follows EPA definition of hazardous waste, used antifreeze would be determined hazardous waste on a case-by-case basis. May be sewer to POTW with consent of Mississippi Department of Pollution Control and local POTW operator, or recycled.

MISSOURI

Department of Natural Resources
Waste Management Program
PO Box 176
Jefferson City, MO 65102
314-751-3176

EPA ZONE 7

Follows EPA definition of hazardous waste, used antifreeze would be determined hazardous waste on a case-by-case basis. Recycling is encouraged. May be sewer to POTW with operator's consent.

MONTANA

Department of Health and Environmental
Sciences
Solid and Hazardous Waste Bureau
Cogswell Building, Room B-201
Helena, MT 59620
406-444-2821

EPA ZONE 8

Follows EPA definition of hazardous waste, used antifreeze would be determined hazardous waste on a case-by-case basis. May be sewer to POTW with operator's consent.

NEBRASKA

Department of Environmental Control
Hazardous Waste Management Section
PO Box 94877, State House Station
Lincoln, NE 68509
402-471-2186
EPA ZONE 7

Not classed as hazardous waste, recommended disposal is mixing with waste oil.

NEVADA

Division of Environmental Protection Waste Management Program
Capitol Complex
Carson City, NV 89710 • 702-885-4670
EPA ZONE 9
Follows EPA definitions, used antifreeze not regulated, preferred method of disposal is that it be given to used-oil companies for recycling.

NEW HAMPSHIRE

Department of Health and Human Services
Division of Public Health Services Office of Waste Management
Health and Welfare Building
Hazen Drive
Concord, NH 03301-6527 • 603-271-4608
EPA ZONE 1
Follows EPA definitions, sanitary sewer to POTW, no permit required. May also be taken to licensed facility.

NEW JERSEY

Department of Environmental Protection
Division of Waste Management
32 East Hanover Street, CN-028
Trenton, NJ 08625
609-292-8341
EPA ZONE 2
Not hazardous waste, can be sewerred to POTW, permit required from POTW. Or, used antifreeze can be sent to a commercial waste treatment facility, but it must be accompanied with a hazardous waste manifest.

NEW MEXICO

Environmental Improvement Division
Ground Water and Hazardous Waste Bureau
Hazardous Waste Section
PO Box 968
Santa Fe, NM 87504-0968 • 505-827-2922
EPA ZONE 6

Not hazardous waste, no regulations. May be sewerred to POTW with operator's consent.

NEW YORK

Department of Environmental Conservation
Bureau of Hazardous Waste Operations
50 Wolf Road, Room 209
Albany, NY 12233
518-457-0530
EPA ZONE 2
Not considered hazardous waste. Sanitary sewer to POTW.

NORTH CAROLINA

Department of Human Resources Solid and Hazardous Waste
Management Branch
PO Box 2091
Raleigh, NC 27602
919-733-2178
EPA ZONE 4
Follows EPA definitions. Sanitary sewer to POTW, permit required from POTW.

NORTH DAKOTA

Department of Health
Division of Hazardous Waste -
Management and Special Studies
1200 Missouri Avenue
Bismarck, ND 58502-5520 • 701-224-2366
EPA ZONE 8
Sanitary sewer to POTW, no permit required.

OHIO

Ohio EPA Division of Solid and Hazardous Waste Management
361 East Broad Street
Columbus, OH 43266-0558 • 614-466-7220
EPA ZONE 5
Sanitary sewer to POTW, no permit required.

OKLAHOMA

Waste Management Service Oklahoma State
Department of Health
PO Box 53551
Oklahoma City, OK 73152 • 405-271-5338
EPA ZONE 6
Sanitary sewer to POTW, no permit required,
or solidify and dump in sanitary landfill.

OREGON

Hazardous and Solid Waste Division
PO Box 1760
Portland, OR 97207
503-229-6534
EPA ZONE 10
Sanitary sewer to POTW, no permit required.

PENNSYLVANIA

Bureau of Waste Management Division of
Compliance Monitoring
PO Box 2063 • Harrisburg, PA 17120
717-787-6239
EPA ZONE 3
Classed as special waste, must go to an au-
thorized treatment or disposal facility.

RHODE ISLAND

Department of Environmental Management
Division of Air and Hazardous Materials
Room 204, Cannon Building
75 Davis Street
Providence, RI 02908
401-277-2797
EPA ZONE 1
Sanitary sewer to POTW, no permit required.

SOUTH CAROLINA

Department of Health and
Environmental Control
Bureau of Solid and Hazardous Waste
Management
2600 Bull Street
Columbia, SC 29201

803-734-5200

EPA ZONE 4

Sanitary sewer to POTW, permit required
from POTW, or recycling or use as fuel
source.

SOUTH DAKOTA

Department of Water and Natural Resources
Office of Air Quality and Solid Waste
Foss Building, Room 217
Pierre, SD 57501
605-773-3153
EPA ZONE 8
Follows EPA definition of hazardous waste,
used antifreeze would be determined haz-
ardous waste on a case-by-case basis. May be
sewered to POTW with operator's consent, or
go to landfill following regulation treat-
ment/containment. Check for local regula-
tions.

TENNESSEE

Division of Solid Waste Management
Tennessee Department of Public Health
701 Broadway
Nashville, TN 37219-5403 • 615-741-3424
EPA ZONE 4
Not hazardous waste, no regulations. May be
sewered to POTW, with permission of opera-
tor and payment of surcharge.

TEXAS

Texas Water Commission
Hazardous and Solid Waste Division
Program Support Section
1700 North Congress
Austin, TX 78711
512-463-7761
EPA ZONE 6
Classed as "Non-hazardous Class 1 Waste",
must go to permitted treatment facility.

UTAH

Department of Health
Bureau of Solid and Hazardous Waste
Management
PO Box 16700
Salt Lake City, UT 84116-0700 • 801-538-6170
EPA ZONE 8

Follows EPA definition of hazardous waste, used antifreeze would be determined hazardous waste on a case-by-case basis. May be sewerer to POTW with operator's consent.

VERMONT

Agency of Environmental Conservation
103 South Main Street
Waterbury, VT 05676
802-244-8702
EPA ZONE 1

Classed as hazardous waste. Sanitary sewer to POTW, permit required from POTW.

VIRGINIA

Department of Health
Division of Solid and Hazardous Waste
Management
Monroe Building, 11th Floor
101 North 14th Street
Richmond, VA 23219
804-225-2667
EPA ZONE 3

State follows EPA definitions. However, local restrictions may apply, so check locally first. Most common method of disposal is sewer to POTW. No permit required at this time, but some POTWs, particularly in densely populated areas, are discouraging the practice, so check first. Recycling is encouraged.

WASHINGTON

Department of Ecology
Solid and Hazardous Waste Program Mail
Stop PV-11
Olympia, WA 98504-8711 • 206-459-6322
EPA ZONE 10

Not automatically hazardous waste. Status depends on testing, which regulated Generators must perform. May be sewerer to POTW with operator's consent. Be certain to check if your particular POTW is equipped to handle ethylene glycol.

WEST VIRGINIA

Division of Water Resources
Solid and Hazardous Waste/
Ground Water Branch
1201 Greenbrier Street
Charleston, WV 25311 • 304-348-2107
EPA ZONE 3

Not hazardous waste. Sanitary sewer to POTW, with agreement of POTW operator. Recycling encouraged.

WISCONSIN

Department of Natural Resources Bureau of
Solid Waste Management PO Box 7921
Madison, WI 53707
608-266-1327
EPA ZONE 5

Follows EPA guidelines. Sanitary sewer to POTW, no permit required.

WYOMING

Department of
Environmental Quality
Solid Waste Management Program
122 West 25th Street
Cheyenne, WY 82002
307-777-7752
EPA Zone 8

Special waste, contact DEQ for advice specifically geared to your circumstances. Recycling is encouraged.

U. S. EPA REGIONAL OFFICES

EPA Region 1
State Waste Programs Branch
JFK Federal Building
Boston, MA 02203
617-223-3468

EPA Region 2
Air and Waste Management Division 26
Federal Plaza
New York, NY 10278
212-264-5175

EPA Region 3
Waste Management Branch
841 Chestnut Street
Philadelphia, PA 19107
215-597-9336

EPA Region 4
Hazardous Waste Management Division
345 Courtland Street, N.E.
Atlanta, GA 30365
404-347-3016

EPA Region 5
RCRA Activities
230 South Dearborn Street
Chicago, IL 60604
312-353-2000

EPA Region 6
Air and Hazardous Materials Division 1201
Elm Street
Dallas, TX 75270
214-767-2600

EPA Region 7
RCRA Branch
726 Minnesota Ave.
Kansas City, KS 66101
913-236-2800

EPA Region 8
Waste Management Division
(8HWM-ON)
One Denver Place
999 18th Street Suite 1300
Denver, CO 80202-2413
303-293-1502

EPA Region 9
Toxic and Waste Management Division
215 Fremont Street
San Francisco, CA 94105
415-974-7472

EPA Region 10
Waste Management Branch - MS-530 1200
Sixth Avenue
Seattle, WA 98101
206-442-2777

How To Save **BIG \$\$\$** on Antifreeze

It's time that you stopped paying today's high cost of antifreeze.

It's time that you stopped worrying about antifreeze shortages, and how to legally dispose of it once it's used up.

It's time that you started recycling.

For a mere 50 cents a gallon, you can restore your used antifreeze back to it's original condition and specifications.

Just 50 cents a gallon. As opposed to the \$6 to \$8 a gallon that you're paying for a gallon of new antifreeze.

Centaur Equipment Management Corporation can supply you with all the materials and know-how to start and maintain a successful coolant recycling program.

So call today, or return the enclosed post-paid reply card, and start saving thousands of dollars **NOW!**

Carefully Cut Along Dotted Line.

YES, I want to start saving thousands of dollars NOW by recycling my antifreeze.

- Please contact me immediately to set up a FREE, no-obligation meeting at my office.
- NO**, I don't need these services right now, but send more information on how Centaur Equipment Management Corp. can save me money on maintenance and operations.

Company _____

My Name _____

Title _____

Address _____

City _____ State _____ Zip _____

Phone () _____ Extension _____

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