



BUILDING AND CODES DEPARTMENT

Phone
931-648-5718

350 Pageant Lane Suite 309
Clarksville, TN 37040

Fax
931-553-5121

Food Service Establishment Fats, Oil and Grease Best Management Practices

1. Introduction

Application

The major focus of this document is food service establishments, since these establishments tend to be the largest generators of waste fats, oils and grease (FOG). However, any business that generates waste FOG is required to use appropriate Best Management Practices (BMPs) to strictly limit the amounts discharged into sewers and septic systems. Examples of other establishments that may generate waste fats, oils and grease would include, but are not limited to, food processing companies, cosmetic manufacturers, rendering companies, meat processors, tanneries, and soap manufacturers.

This document does not regulate materials that are non-organic in nature. Federal pretreatment regulations (40 CFR 403.5 (b) (6)) specifically prohibit petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through treatment systems. These are specified as priority pollutants by the Environmental Protection Agency, and are forbidden to be discharged into sewers, septic systems or into the Montgomery County Municipal Separate Storm Sewer system.

What is FOG? Where does it come from?

“FOG” refers to fats, oils and grease, which are commonly found in such things as meats, sauces, gravy, dressings, deep-fried foods, baked goods, cheeses, butter and others. Residential users and many different businesses generate FOG wastes by processing or serving food, and include eating and drinking establishments, caterers, hospitals, nursing homes, day care centers, schools and grocery stores.

What's the problem with FOG?

FOG is often washed into the plumbing system through the kitchen sink. FOG sticks to the insides of sewer/septic pipes (both on your property and in the streets) and over time, the grease can build up and block the entire pipe. When sewer/septic pipelines become

blocked with FOG, sewage or septage can flow out of the system and into the storm drains. Sewer/septic overflows pose a threat to public health, adversely affect aquatic life, and are expensive to clean up.

The water in storm drains flows into local creeks, streams and rivers. FOG that is discharged into streams forms a thin film on the water's surface that blocks oxygen absorption, limiting the oxygen available to aquatic organisms. The FOG will eventually break down naturally, but this creates a high Biological Oxygen Demand. This high oxygen demand results in oxygen starvation to aquatic organisms, and the time it takes for the FOG to breakdown results in strong impacts to the environment.

In some areas, most sewer/septic maintenance costs involve unblocking FOG plugs from sewer/septic pipes. Studies have shown that most of the damage is caused by restaurants discharging FOG into the sanitary sewer or using a septic system for FOG disposal.

In Montgomery County, the Stormwater Regulations prohibit the discharge of FOG to Montgomery County waters, into storm drains, or dumping FOG anywhere that these pollutants can be washed into the storm drains or waters of the county. FOG water that flows out from a non-functional septic system overflows as a result of a blocked sewer pipe or that is dumped on the ground and carried away by storm water runoff is pollution, and these discharges will be treated as violations of the Montgomery County regulations. Violation of these regulations will subject the violator to a civil penalty of not less than fifty dollars (\$50.00) nor more than five thousand dollars (\$5,000.00) per day for each day of violation. Each day of violation may constitute a separate violation. It is therefore in your best interests to follow the best management practices listed in this document for disposal of FOG.

2. Controlling FOG with Solvents, Enzymes, Detergents, and Bacteria

Solvents, caustics, and acids may dissolve FOG and transport it out of the facility, but they can have harmful effects on sewage and septic systems. They also pose a potential hazard to employees. The use of these chemicals for control of grease in sewer collection systems and septic systems is not recommended. Inadvertent release of these chemicals, during storage or after use, is considered pollution and will be prosecuted as such.

An enzyme is a protein that will act on a compound and break it into several smaller compounds. Enzymes are compound specific; in fact, there are enzymes that will work only on the compounds found in FOG. Although the actual enzymatic action is quite complex, the end result is that the fatty acids are severed from the glycerol base. This allows the FOG to dissolve and move downstream. However, enzyme reactions are all reversible chemical reactions. The free fatty acids can re-join the glycerol base and become FOG, with the same characteristics it had before treatment. While this may be beneficial to the facility owner because the grease interceptor or trap does not have to be pumped as frequently, the FOG problem is just moved downstream and may re-appear in a sewer, pumping station or septic system. In addition, enzymes do not replicate themselves. They will be carried out along with the dissolved grease. As a result,

enzymes must be frequently introduced into the grease interceptor/trap, representing a continual operation and maintenance aspect of restaurant management.

Detergents are not an effective treatment option, either. They break up grease deposits, but the grease can re-congeal further downstream in the collection system. This may clean blockages from the restaurant's lines, but creates other problems.

Using bacteria to consume sewer grease is effective only when the proper microorganisms are used and applied through a highly developed service system. Many distributors of biological liquefiers, enzymes, and other similar products claim that their products will eliminate the need to pump grease traps. This defeats the purpose of a grease trap. Some of the products that claim to be bacterial products are actually inactive forms of bacteria packed in solvents such as kerosene, toluene, turpentine, surfactants, etc. It is actually the solvent, not the bacteria, that dissolves the grease. This may move it out of the food processor's grease trap, but the grease can re-congeal in sewer or septic system.

3. Basic Requirements

Best Management Practices

This document provides guidance and recommendations for all food service establishments and other FOG producers to conform to Best Management Practices (BMP) to control FOG wastes. BMPs are practices, procedures, and maintenance activities performed by food service establishments to reduce the FOG in the waste water discharge. Food service establishments causing or contributing to environmental discharges of FOG will be required to conform to BMPs.

BMPs are procedures and practices that reduce the discharge of FOG to the building drain system and to waste water systems. Existing establishments should develop and use BMPs to control FOG discharges.

The following suggested BMPs are provided to assist food service establishments with development of procedures and/or practices to reduce the amount of FOG discharged. Implementation of BMPs has the added benefit of reducing FOG accumulation in Grease Traps and Grease Interceptors, thereby reducing the maintenance needs and costs of these control devices. These efforts can also minimize the likelihood that an establishment will cause a waste water system blockage that results in a backup into their facility or their neighbors' homes or businesses, a release to the environment, and/or an enforcement action. Implementation of BMPs can also help reduce a food service establishment's maintenance needs and costs for building sewer line or septic system cleaning. Because of the variety of establishments that generate FOG, every BMP described in this manual may not apply to every establishment. It is recommended that food service establishment operators identify the FOG sources at their establishment and adopt BMPs to fit the establishment's needs.

Establishment BMPs

The success of a food service establishment's BMP program is largely dependent upon employees. To promote effective employee implementation:

- Train employees on the BMPs that have been adopted for their establishment. All food service establishments should instruct employees not to pour FOG down the drain and not to use the sinks to dispose of food scraps.
- Post "No Grease" signs above sinks and on the front of dishwashers. Signs should be written in the language(s) that is commonly spoken by employees.

Excluding food particles from the waste water system can eliminate a large amount of FOG from a food service establishment's discharge. To practice this:

- Disconnect or minimize the use of garbage disposals (garbage grinders). Operators can reduce FOG discharge by up to 50 percent by disconnecting their garbage disposals and scraping food into the trash.
- Retain or install a fine meshed screen (1/8-inch and 3/16-inch screen openings are recommended) in the drain of each kitchen, mop, and hand sink. Clean drain screens frequently by placing the collected material in the garbage.
- The person who removes plates from dining tables should be responsible for scraping all left-over food into a container for disposal as a solid waste. Both sides of each plate should be scraped.
- All cookware should be scraped before being washed.
- Restaurant managers and personnel should be trained to dispose of cooking oil properly in recycling containers and not pour it down the drain as a short-cut.

Establishment procedures must be instituted to limit FOG releases and to help in the smooth functioning of the food service establishment. BMPs would include:

- Have grease traps cleaned on a regular basis – routine cleaning can be set up on a set time schedule (e.g., once a month) or based on when a certain percentage of the trap becomes full (e.g., grease trap must be pumped when 30% of it is full of grease and solids). Under sink grease interceptors must be cleaned according to manufacturers' recommendations (usually daily)
- Keep signed copies of manifests for each time their grease trap is pumped, or each time the grease interceptor is cleaned out.
- Move the oil recycling container to a convenient location. Restaurant managers should regularly inspect the condition of the oil recycle container, as well as the level of FOG stored in the container.

Grease Removal Devices

Ideally, FOG should never go down the drain. However, most restaurants cannot keep 100% of the FOG out of the collection system. This is why FOG removal devices and the proper maintenance of these devices are so important. It is also important that a FOG removal device be able to remove emulsified as well as free-floating FOG.

Grease Traps

A grease trap or interceptor consists of an enclosed chamber, which is designed to separate and retain oil and grease from the kitchen wastewater. Separation is accomplished by virtue of the fact that fats and grease have a lower specific gravity (are less dense) than water and rise to the surface under favorable conditions. Treated wastewater passes through the chamber and on to the sewer or septic system. In order to ensure efficient operation, the separation device must be cleaned periodically to remove the accumulated grease and settled solids and to restore required separation volume.

In addition, the grease trap or interceptor must provide sufficient storage capacity for accumulated grease (the floating particles) and solids (the settling particles) between cleanings.

FOG Separation Devices

Passive, small interceptors are designed to be installed under the counter or in the floor adjacent to the source of the wastewater, such as a sink or dishwasher. Such devices are typically small (less than 50 gallons capacity), are usually constructed of fabricated steel, and are equipped with a vented flow control device and internal flow-diffusing baffle. They are classified in terms of rated flow and grease storage capacity. Sizes range from 4 gallons per minute with 8 pounds of grease storage capacity up to 50 gallons per minute with 100 pounds of grease storage capacity.

Most interceptors have flow restrictors on the influent pipe to control flow, which minimizes turbulence. Many restaurants, frustrated with slow-draining sinks, remove the flow restrictors. Needless to say, this keeps the interceptor from working well. In addition, due to their small size, interceptors take a fair amount of maintenance (frequent grease and solids removal – as often as daily).

In some cases, due to lack of space, some restaurants cannot utilize a large, outdoor, in-ground grease trap and prefer to use a point-of-use interceptor. It is recommended that several vendors be evaluated to see how well their equipment works and how much maintenance is required. The restaurant bears the burden of choosing and maintaining equipment so that limits are met.

In-Ground Grease Traps

The typical in-ground trap consists of a pre-cast concrete chamber with a liquid volume of 750 to 3,000 gallons. In ground traps are designed to be installed just outside the restaurant or kitchen.

When sizing a grease trap, keep in mind that some experts recommend using two or more grease traps in a series instead of one large trap if the sizing formula requires a grease trap of around 2000 gallons or more. Having two smaller grease traps in a series is easier to pump and maintain, and reduces the chance of accidental discharge.

Automatic Separation Devices

Automatic or electromechanical grease interceptors are designed to automatically trap and remove free-floating (non-emulsified) grease and oils (and, in some cases, accumulated solids). These devices usually consist of a prefabricated steel or stainless steel enclosure with internal baffles, removable solids separator screen, grease level sensing probe, electric heater elements, and a skimming or dipper device. The electric heating elements periodically energize to heat the accumulated grease to 115°F to 130°F so that it melts and can be dipped or skimmed off to a separate storage container. Flow ratings and grease accumulation capacities are similar to those for small point-of-use, passive grease interceptors. Interceptor rating is based on controlled testing conditions similar to those used for passive interceptors described above.

Properly sized automatic interceptors may effectively trap free-floating grease and oils. However, detention times are generally inadequate to break hot, detergent-laden grease and water emulsions. Therefore, most manufacturers do not recommend use of automatic interceptors downstream of dishwashers. Likewise, because of limited solids retention capacity, manufacturers recommend against use of garbage grinders upstream of the devices.

4. Disposal Options

Pumping

The ultimate disposal of FOG is an important part of an FOG control program. If grease trap pumpers do not do an adequate job of cleaning a grease interceptor/trap or if they discharge the contents of the grease trap improperly, the other aspects of the grease control program cannot be effective. When dealing with the issue of grease trap pumping, it is important to remember the following:

- 1) Generally, grease traps should be pumped when the grease and solids combined measure 30% of the depth of the tank. If a grease trap is not designed well, it may be necessary to consider a smaller percentage. Never allow the grease layer to extend below the bottom of the effluent tee.
- 2) There are three ways grease traps are usually pumped.
 - a. Pumping the entire contents of the grease trap removes the grease layer, solids layer, and water. The sides and bottom are cleaned with a scraper. Pipe tees, baffles, and the bottom can be inspected for problems. This is the recommended method.

- b. Grease layer pumping removes only the grease layer, leaving the solids and water in the trap. Leaving the solids in the trap does not restore the free water volume necessary to ensure FOG separation. In addition, it will lead to a buildup of solids, which may wash out. Solids accumulation will also reduce hydraulic flow and restrict flow under baffles, creating turbulence. Decaying accumulated solids can lower the pH of the trap, which can corrode the bottoms and baffles of concrete traps. In addition, the interior of the trap cannot be inspected. It is recommended that this method of pumping not be allowed.
- c. Separator trucks pump the contents of the grease trap into the truck and separate the water layer from the FOG, then return the water to the grease trap. Hauling costs tend to be lower with this method, but it returns a highly emulsified liquid to the grease trap. By the very nature of the operation, the holding tank in the truck does not provide the proper conditions needed for FOG to separate from water (time, temperature, and turbulence). Use of the basic separator trucks that do not allow adequate separation is not recommended.

Recycling

If a restaurant recycles all of the oil that can be recycled, relatively small amounts of FOG should actually get to the sewer or septic system. Waste cooking oil (e.g., from deep fryers) can be recycled. As part of an overall recycling program, food service establishments should post signs reminding employees not to pour grease in floor drains or in the sink. In addition, some vendors can recycle grease trap waste. The grease trap waste must not be contaminated with sewage.

Recycled grease trap waste can be used as a dust suppressant, as a binder for pesticides and fertilizers to help them stick to plants, and as a manufacturing lubricant. Some grease renderers have even used recycled cooking grease and recycled grease trap waste as a fuel (biodiesel). Direct, untreated land application of grease and/or the contents of grease traps is not allowed.

5. Resources

Dodd, J. P., and Lemasters, R. D., Editors. Fat, Oil and Grease Guidance. Tennessee Department of Environment and Conservation, Division of Water Pollution Control. <http://www.tn.gov/environment/water/docs/wpc/GuidanceDoc.pdf>

Ouellette, K. Fats, Oil, and Grease Best Management Practices Manual. City of St. Petersburg, FL Water Resources Department, Environmental Compliance Division, Grease Management Program.