

It's Not Easy Being Green

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Most of us are familiar with the negative impact fats, oils and grease (FOG) can have on wastewater collection and treatment systems. Although some businesses use a safety compliant program, they are not properly disposing of FOG. This improper disposal may lead to blockages in drains, outlet lines and elsewhere in the wastewater collection system. The significance of this issue can run from a nuisance to a serious problem, including grease trap backups, manhole overflows, sewage spills and pollution in our nation's streams and rivers. A visit from the city inspector may cost an offending facility thousands in municipal fines if proper FOG disposal is not being followed.

FOG blockages happen more than you might think. In fact, the majority of all blockages in a restaurants' wastewater collection systems can be traced back to the improper FOG disposal.

Who is at Risk?

Any business dealing with FOG and its need for proper disposal must consider the risks of not fully addressing this concern. There is a lot to consider. Whether you deal with low grease production, such as at a sandwich shop or convenience store, medium grease production in a coffee house or grocery store, or high grease production in a steak house or family restaurant, you have to deal with the issues of FOG. This means calculating your grease capacity before coming up with the right process. These businesses and ensuing FOG-related issues are the reasons behind the many regulations and ordinances now in place pertaining to the discharge of grease materials into sanitary sewer systems.

While all restaurants have to deal with FOG disposal, refurbished or repurposed restaurants are most at risk. Jim Blume, former Director of Facilities and Construction for Smokey Bones barbecue restaurants, knows this issue all too well. Smokey Bones has several locations throughout the country, and while many are newly built, some are refurbished facilities with older FOG disposal systems.

"Prevention is the best policy," Blume said. All of his restaurants have their grease traps serviced quarterly, despite typical six-month service requirements. This is a smart business tactic that creates fewer headaches and costs.

Playing Offense

When it comes to FOG, the best defense is a good offense. Having adequate and effective systems in place is critical.

Wikipedia defines a grease trap as "a plumbing device designed to intercept most greases and solids before they enter a wastewater disposal system." On the other hand, an interceptor is actually located outside of a building; it is under the ground and will hold more than a grease trap. A grease trap is designed to remove grease from water, while an interceptor allows the retained liquid to cool and the grease to solidify and float to the top of the trap. As fats, oil and grease get into inlet and outlet lines, the grease hardens and sticks to the inner lining of the pipes, which will lead to a blockage if left untreated, snaked or jetted.

As a minimum standard, the grease needs to be removed periodically to prevent back-ups and grease build-up in the lines. When interceptor solids and FOG reach 25 percent of a trap's capacity, the interceptor contents must be pumped out. In most jurisdictions, professional licensed pumpers must clean the interceptors with a truck designed to pump out the trap and then send the materials to an approved disposal plant.

Since it is important for a location to meet minimum requirements, normally it is the municipality that states exact guidelines for the size, capacity and frequency of interceptor pump outs. The type of grease trap required will depend upon the size of the two or three compartment sink, dishwasher, and pot and mop sinks. For reference, The National Model Plumbing Code adopts the ASME Standard (ASME A112.14.3), which removes 90 percent of incoming FOG.

Choosing the Right Device

In order to determine what size interceptor is needed at a restaurant, facility managers in Europe reference the Gauckler-Manning formula. As Wikipedia states, "...in the United States, it is frequency called the Manning's Equation, which estimates the average velocity of liquid flowing in a conduit that does not completely enclose the liquid." When sizing a grease trap, the flow rate, fixture ratings, discharge rates and 24-minute retention time should all be considered.

Under the Manning Formula, interceptor size (in gallons) equals the flow rate of the sink or fixture multiplied by the sum of fixture ratings plus the discharge rate from any mechanical washers (i.e., dishwashers, glass washers, laundry machines, etc.) and multiplied by a 24-minute retention time:

According to the website for the City of Lakeport, Calif., flow rate is measured in gallons per minute (GPM) and is determined based on the slope, pipe texture and pipe diameter. The following rates are pre-calculated and can be applied to your calculation as shown below:

Fixture ratings of grease-laden waste streams are pre-determined values for specific kitchen drainage points, such as sinks, wash basins and floor drains. In essence, these values represent factors by which you can multiply the flow rate of a drainage pipe to get the potential rate of water movement out of the fixture:

Next, the discharge rate from dishwashers, laundry machines, glass washers, etc. must be added to your Manning Formula calculation because of their potential for introducing large quantities of water down the drain in a short amount of time. The user's manual for these appliances should indicate the manufacturer's discharge rate in GPMs, or you can call the manufacturer directly. Apply them to your calculation, as demonstrated in the examples below.

The 24-minute retention time is a pre-calculated amount of time that engineers have determined to be necessary for grease to separate from water. Be sure to apply it to your calculation.

Staying in Compliance

Another consideration when determining the right device is the size of the FOG droplet. Large grease droplets separate more quickly than smaller ones. Grease interceptors, since they are larger units than a grease trap, are designed to operate more effectively on 150 micron FOG droplets or larger. However, FOG droplets less than 150 microns, which are too small to be separated by an interceptor, are common in a restaurant waste water stream. These are the measurements cities test for when looking at FOG levels in the interceptor.

Depending on where your business is located, you will need to know which codes you are required to comply with before making any decisions. It is important to know what cities require so a restaurant may set up best practices when it comes to scraping dishes into the trash prior to pre-rinsing.

The Whole Picture

Of course, having the proper equipment in place to dispose of FOG is only half the picture. Hiring the right vendor to help maintain these systems is key to having an effective overall plan. The right vendor can even help you save money by recycling grease trap waste into usable products.

A quality vendor will also recommend proactive inspections that use the most advanced equipment in order to detect, prevent and eliminate backups. Routine maintenance should also include regularly cleaning grease traps, lift stations and drains, as well as drain line cleaning and high-pressure jetting of interior and exterior plumbing lines. This type of proactive FOG compliance can also prevent odor problems, as well as other health issues related to FOG blockages, promoting efficient flow of grease and waste water.

FOG management can be a complicated issue. The good news is, quality systems and vendors can help your business not only have the right equipment in place, but also to manage the overall FOG process.

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