

Section 12. Grease Interceptors And Automatic Grease/Oil Removal Units

Oil and grease entering a facility's drainage waste system will eventually solidify somewhere' -- down stream and eventually clog the sewer line and/or cause potential problems for the onsite or public sewage system. The oil and grease from foods and cooking liquefy at high water temperatures primarily originating from the three compartment sink, warewashing machine or some pieces of equipment such as an oriental wok cooker.

Oil and grease can occur in a combination of four forms:

1. **Dissolved oil** is oil that has dissolved in the water via a degreasing compound and will not separate from the water.
2. **Chemically emulsified oil** is oil that has been broken down into very small particles via a detergent and will not float to the surface.
3. **Free oil**, which is the majority of the oil produced in a food service facility, is not dissolved or chemically emulsified but is in a liquid form that is available to float to the water surface-when it is -allowed to-coalesce (consolidate or-congeal on the water surface).
4. **Mechanically emulsified oil** is free oil that has been agitated in water to form small droplets. These droplets will congeal, as free oil does, provided enough time is allowed for the process.

HOW GREASE INTERCEPTORS WORK

A grease interceptor (or grease trap) is a chamber designed for wastewater to pass through and allow any free or mechanically emulsified oil to float to the top for retention as the remainder of the effluent passes through. (This concept is similar to a septic tank, but remember a septic tank is designed to collect solids on the bottom and scum on the top of the tank.) For the oil to float to the top, it is necessary to calm the water as turbulence only perplexes the separation. To assist in the ponding or calming process, the waste water enters through an inlet baffle and may pass through additional baffles before exiting through the outlet baffle. Flow rate (volume of water per unit of time, i.e. 7 gallons per minute [GPM]) affects time and turbulence in the interceptor. Too fast a flow rate does not allow the "time" necessary for separation and creates turbulence. Thus, many of these installations are equipped with a flow control valve prior to the inlet baffle.

Only the facility's grease laden waste should be plumbed to the grease trap, otherwise suspended solids would fill the unit and a larger tank would be needed for the higher volume of waste water. Also, some installations are designed with a solids strainer prior to the interceptor, to prevent solids from interfering with grease separation.

SIZING THE INTERCEPTOR

Trap installations are designed and sized based on anticipated flow rates and organic load for maximum efficiency. Specific gravity (density) of the grease filtrates affects the time necessary for separation. For example, the specific gravity of water is 1.0, thus the lower the specific gravity of the oil, the less time it takes to separate and float to the top of the tank. Also, the higher the flow rate, ratio of grease to water, suspended solids, and total grease volume to be retained between cleaning/emptying, the larger the grease interceptor must be.

INTERCEPTOR LOCATION

Grease traps range in size from 35 gallon units located inside the kitchen area to 1,000 gallon in-ground installations outside the facility. Installation should be properly vented and as close to the source as possible but in a manner that facilitates the ease of cleaning and service without creating a nuisance.

Automatic Grease/Oil Removal Units Used In Conjunction Or In Place Of Standard Vault Type Grease Interceptor.

Trend Analysis: Good News - Bad News

The good news is that there are record numbers of restaurants in the U.S.A. The bad news is that these restaurants are discharging record amounts of grease and foodstuffs into sewage collection systems.

The salient factors affecting a restaurant, hospital kitchen, school cafeteria, casino or other food processing facility are:

- a. Ware-washing equipment.
- b. Production equipment
- c. Menu
- d. Management/operating practices

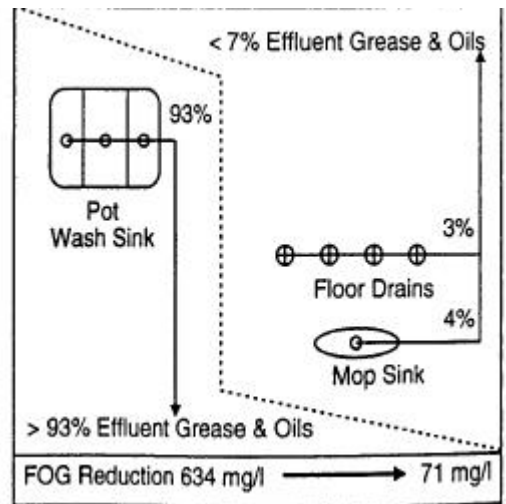
Although there are a wide span of restaurants and food handling facilities, they tend to fall into four distinct categories: 1) Past-Food, 2) Full-Service Restaurants, 3) Institutional Kitchens and 4) Special Sites. The choice of automatic grease removal system relates to these four categories. In all cases, ware-washing and production equipment is taken into consideration as you design to reduce FOG (fats, oils and grease) and BOD (Bio-chemical oxygen demand - the amount of digestible foodstuffs) present in the effluent.

Fast-Food Restaurants

Fast-food restaurants have the simplest production equipment. In a fast-food kitchen nearly 93% of all fats, oils, greases and other foodstuffs pass into the three compartment pot washing sink.

Tips. The more fryer-type cooking appliances, the high levels of effluent grease and oils. An one automatic grease/oil removal unit point source system in a fast food restaurant servicing a three compartment sink typically removes 6 to 9 lbs. (2.7 - 4.1 kg) of grease per day.

Typical Fast food Grease Source of Fixture

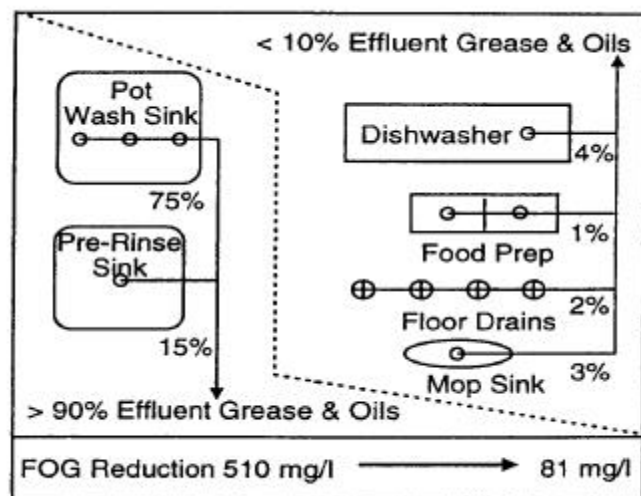


Full Service Restaurants

Full service restaurants offering table service with washed, nearly 90% of all fats, oils, greases and other foodstuffs pass into the three compartment sink (75%) and the pre-rinse sink at dishwashing (15%).

Tip: To minimize effluent FOG values, do not route the dishwasher discharge into the grease interceptor or automatic grease removal system. Dishwasher flows are rich in detergent and emulsify a high percentage of the separated fats held in a grease trap or other kind of separator. This is frequently seen at sites where the sewer district's sampling shows high levels of FOG, but visual inspection shows only minor amounts of free-floating fats and oils in the grease trap.

**Typical Full-Service Restaurant:
Grease Sources By Fixture**

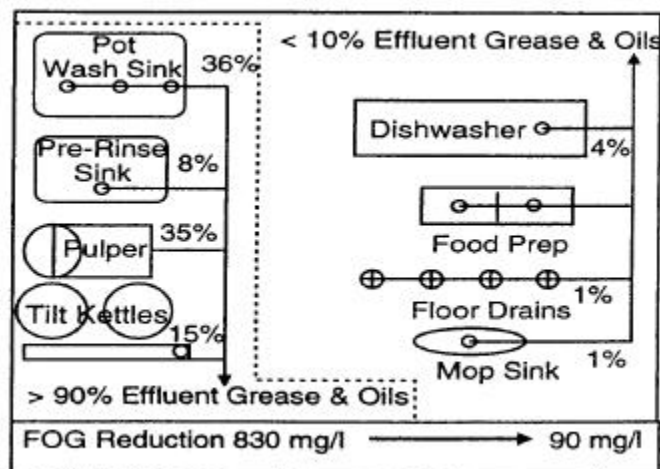


Institutional and Large Commercial Kitchens

These large, multi-purpose kitchens utilize a wide range of warewashing and food preparation equipment. The increased number of grease bearing point sources generally mandates use of central-type automatic grease removal systems. One large automatic grease/oil removal unit servicing a 300 bed hospital kitchen typically removes a barrel of grease every 10 to 14 days.

Tips. Rarely seen in full service kitchens, tilt kettles which are used to cook large volumes of cooked meats, soups, sauces and other foods are installed in more than 70% of institutional kitchens. Tilt kettles can put large volumes of greases and foodstuffs into the drainage system. Large institutional kitchens such as prisons, hospitals, and college cafeterias also frequently incorporate potato peelers, pulpers, bakery sinks, wet hoods and other equipment that can discharge high volumes of greases and other foodstuffs into the drainage system. When specifying central removal systems for institutional kitchens, determine the maximum drainage flow value and provide at least 100 pounds (45 kg) of grease removal capacity per day.

**Typical Institutional Kitchen:
Grease Sources By Fixture**



Special Food Preparation Sites

Casinos, military mess halls, large correctional institutions and food processing plants often have a negative effect on a sewer system. For example, casinos serve high volumes of food 24 hours per day. The casino is often in a location such as a waterfront, which requires the sewage to be pumped through one or more lift stations. This leads to high sewer maintenance costs and high effluent FOG numbers. Automatic grease removal systems are steadily gaining favor with casino operators because of their round the clock operation. More than 40% of all U.S. casinos are equipped with automatic grease removal systems ranging from the smallest one automatic grease/oil removal units to the largest systems.

Tip: When selecting an automatic removal system, determine the peak flow volume. The gallons per day figure are not as important as determine the peak flow value. Peak flow volume can be determined by using the following sizing information.

References: Big Dipper-Thermaco® 646 Greensboro Street, Asheboro, North Carolina 27203
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