
# THE CITY OF ELMHURST
# FATS, OILS, AND GREASES (FOG)
# GUIDANCE DOCUMENT

DEPARTMENT OF PUBLIC WORKS
WATER PROGRAMS
DECEMBER 2013

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# Table of Contents

## INTRODUCTION

The purpose of this manual is to provide an information manual regarding oils, fats and greases for restaurants. This guidance document focuses primarily on the control of edible oil and grease. Unless otherwise stated, further references to oil and grease will specifically pertain to animal/vegetable oil and grease from sources that would not already be covered by a pretreatment program. In addition, this manual focuses on oil and grease (lipids) from restaurants, but other entities that process food (i.e., churches, schools, etc.) may also be contributing to these problems. References to restaurants may also apply to these entities.

This manual is not intended to be an exhaustive treatise covering all facets of grease and its control and/or disposal. This manual rather is intended to provide the business owner with a basic understanding of grease, its significance in affecting the operation of sewer systems, the various devices that are used to remove grease from waste streams, some of the recycling options, and specific examples of oil and grease management techniques.

## SECTION I: WHY WE ARE CONCERNED WITH OIL AND GREASE

By its very nature, grease will adhere to many types of surfaces, and sanitary sewers are especially vulnerable to grease build-up. The cool internal surfaces of sewers provide an ideal location for thin layers of grease to build up. While a large clump of grease will generally not attach itself to a sewer, it will leave behind a residue where it does come into contact with the sewer.

Over time, small amounts of grease will build up to the point that the sewer is completely choked off by a "grease log." Grease also accumulates due to cooling and dilution of surfactants, enabling the grease to separate and collect on all sewer system surfaces, including wet wells at pump stations, where controls can become fouled and prevent pumps from operating properly.

When sewage can no longer get past a grease build-up, it will back up in the sanitary sewer mains. The sewage will seek the nearest outlet, which may be a manhole or a service lateral, sometimes backing up into a house or business. If the blockage or damage results in a violation of a permit that is issued by the Illinois EPA, enforcement action against the City of Elmhurst is a distinct possibility. The IEPA requires enforcement of regulations related to fats, oils, and greases, and failure to comply may result in fines or other penalties.

By minimizing the amount of oil and grease entering the sanitary sewer collection system, it is estimated that the risk of sewer line blockages and sewage backups can be reduced by up to 50 percent.

### Controlling Fats, Oils, and Grease

In order to control oil and grease, it is important to have a basic understanding of its characteristics. Oil and grease are found in wastewater either as an emulsion or as free-floating agglomerates. Chemicals, such as detergents and solvents, as well as mechanical agitation, can cause oil and grease to become emulsified. Triglycerides are glycerol esters of fatty acids. Fats are mixtures of various triglycerides, with a small percentage of monoglycerides and diglycerides.

Triglycerides that are liquid at room temperature are often referred to as oils. Grease is a general classification for grouping such materials as fats, oils, waxes, and soaps according to their effect on wastewater collection and treatment systems or their physical (semisolid) forms. For the purpose of this document, the acronym "FOG" will be used as a general term for fats, oil, and grease.

When setting FOG limits, municipalities take many things into consideration: protection of the collection system and wastewater treatment plants (WRF), the practicality of monitoring and enforcing limits, and cost and manpower necessary to monitor these discharges. This section will discuss the different types of limits, the sampling and the analysis required.

Numerical Limits

The most commonly used numerical limit for FOG is 100 mg/L, which is the limit in the City of Elmhurst Sewer Ordinance. This limit does not appear to be based upon any empirical evidence, but rather on general correlations and on industry consensus that this level limits the build-up of FOG in the collection system.

In most municipalities, FOG limits of 100 mg/L to 300 mg/L help to protect the collection system. Limits may need to vary depending on factors such as the number of wet wells, type of sewers, slope of sewers, flow in sewers, operation and maintenance (O&M) of the sewers, and history of grease-related clogs.

Another numerical limit that may be useful is setting a temperature limit for the effluent from a grease trap. Grease traps are not as effective if the temperature is too high (more information on grease trap design is in Section III); therefore, the temperature of the grease trap effluent should be less than 85°F in order to facilitate the separation of the oil fraction from the water.

Similar to the FOG numerical limits, using this numerical limit can help the Elmhurst Water Reclamation Facility (EWRF) uniformly apply an established, enforceable limit for all restaurants. In addition, temperature can be easily monitored by city or restaurant personnel. The results are instantly available and are meaningful to both parties. Monitoring temperature alone, however, cannot guarantee that the grease trap is being maintained and operated properly. Temperature limits can be a useful monitoring tool when used in conjunction with other control mechanisms.

**Best Management Practices**

Many cities have found that requiring that restaurants implement Best Management Practices (BMP) is an effective tool in controlling FOG without the need for extensive monitoring. BMPs can range from posting “no grease” signs above sinks and on the front of dishwashers, to requiring grease traps and under sink grease interceptors to be routinely cleaned (on a set time schedule and/or when a certain volume is reached). The following table lists many BMPs and their benefits.

| BMP | Benefit |
|---|---|
| Instruct all restaurant personnel to “dry wipe” pots, pans, and dishware (scrape food and FOG into the trash and/or use paper towels to wipe away excess FOG). | This will keep food and FOG from ever going into the sewer system. |
| Discontinue the use of garbage grinders (food disposals) – food waste should be deposited in the trash. | This will decrease solids in the grease trap/interceptor, increasing efficiency of the grease trap/grease interceptor. |

| BMP | Benefit |
|---|---|
| Have grease traps cleaned on a regular basis – routine cleaning can be set up on a pre-determined schedule (e.g., once a month) or when a certain percentage of the trap becomes full (e.g., grease trap must be pumped when it is 30% full of grease and solids). Under sink grease interceptors must be cleaned according to manufacturers' recommendations (usually daily) . | Grease traps and grease interceptors that are not maintained properly are not effective. Mandated cleaning schedules for restaurants will ensure that grease traps and grease interceptors are maintained. |
| Require restaurants to keep signed copies of manifests detailing dates when their grease trap is pumped. In certain instances, the City of Elmhurst may want to make provisions on the manifest for restaurant personnel to certify that they witnessed the grease trap being pumped or that they inspected it afterwards to ensure that the trap was pumped completely. | This would help to protect the restaurants from disreputable haulers that might take shortcuts, and it helps the restaurants to understand that they are ultimately responsible to ensure that the haulers they hire legally dispose of the grease trap waste. |
| Create a video showing the proper handling of grease for restaurants. Distribute it to restaurants to show new employees. | Restaurants with high turnover may have a better chance of keeping grease out of the system if employees understand its importance. |
| Move oil recycle container to a convenient location. The condition of the oil recycle container should be checked when the restaurant is inspected. If the oil in the container is very old, or if the container is full, the City of Elmhurst may question what is being done with the oil that should be recycled. | Restaurant personnel are more likely to put used oil in the recycle container and not down the drain. |

**Sampling**

In accordance with standardized testing methods, all samples for FOG testing must be collected as grab samples. Composite samples should not be used because of the accumulation of the FOG inside the tubing and components of the sampler, thus lowering the FOG readings.

The grab sample should be collected in a specially cleaned, 1 L wide-mouth glass container. The sample should be preserved with the addition of hydrochloric acid or sulfuric acid to a pH

of less than 2.0. Samples should be kept refrigerated (0-4°C), with a holding time of not more than 28 days. Establishments should construct adequate sampling facilities at each interceptor.

Before sampling, the City of Elmhurst will determine whether samples should be taken at the effluent of the grease trap or at the end of the lateral before it empties into the City sewer. If collecting from a weir outfall, the City will collect the entire flow until the container is full, but will not let it overflow the top of the container.

Ideally, the sampling point should be a specially designed exterior structure, constructed on the effluent pipe of the trap. This structure should result in a free-falling liquid, so that a sample bottle can be held under the flow to capture a sample. Sampling from the "Tee" in the effluent end of the inside of the grease trap is not recommended. If that is the only sample point available, clean the inside of the "Tee" with a brush or scraper before lowering the sample bottle into the "Tee." If this is done, the person conducting the sampling must be sure that the scraped material is not allowed to enter the sample bottle. Additional water may be allowed to flow into the trap so that the scraped material is flushed out of the "Tee" prior to sampling. If collecting the sample from the effluent "Tee" of a grease trap, use the widest mouth container that will fit into the "Tee" and fill by submersing.

Traditional environmental monitoring is based on representative samples (the average concentration of a pollutant), but with FOG, the samples should represent the worst-case scenario. The worst-case scenario (peak flow) is the point at which the FOG removal equipment is most likely to fail, and FOG loading of the collection system will occur. The goal of the equipment is to remove FOG even at peak flow; therefore, sampling needs to occur at peak flow to ensure that the equipment is adequate. In instances where FOG sampling is conducted for surcharge purposes, the sampling should represent the average flow, not peak flow.

Frequency of sampling, by the City of Elmhurst or the restaurant, is determined by the need for data. Surcharge monitoring should be performed at least once per month. When setting a schedule for the restaurant to follow to ensure that FOG or temperature limits are being met, take into account what can be reasonably managed (staff availability, cost of sampling) and the compliance history of each facility (the number of blockages or other problems caused by the facility), whether dumping at the end of each day is suspected, how often the facility pumps out its grease trap or cleans its grease interceptor). FOG sampling may be scheduled or performed as part of compliance monitoring on an unannounced basis.

**Analysis**

The EPA-approved FOG analysis method is Method 1664. The price for analysis is approximately $45-$50.

## SECTION II: PREVENTING GREASE FROM ENTERING THE SEWER COLLECTION SYSTEM

The most economical and prudent method for dealing with the growing grease problem is proper pretreatment of waste streams to reduce or eliminate the introduction of grease into the collection system. There is no simple solution to this challenge, as virtually every discharger's waste stream is unique. Variations can include building layout, property location, wastewater volume, staff training, management, cleaning practices, maintenance chemicals, pretreatment systems, monitoring and maintenance of the pretreatment system, and preparation/serving volume of different menu items. What might be effective for reducing grease discharges in one location may be inadequate in another, even among restaurants in the same restaurant chain. This variation in waste streams dictates that many different treatment options should be considered. This section will discuss different aspects of FOG production and ways to keep it out of the sewer.

### Zero Discharge of FOG

The most effective way to prevent FOG from causing problems in the collection system is to keep it from entering the collection system in the first place. Some ways to do this are as follows:

1) The person who removes plates from dining tables should be responsible for scraping all leftover food into a container for disposal as a solid waste. Semi-flexible scrapers or spatulas are commercially available for this purpose. Both sides of each plate should be scraped.

2) All cookware should likewise be scraped before being washed.

3) Garbage grinders should not be used.

4) Restaurant managers and personnel should be trained to dispose of cooking oil properly in recycling containers rather than pouring it down the drain as a short-cut. If necessary, some restaurants may need to consider installing a video camera to show drains and any potential misuse.

### Grease Removal Devices

Ideally, FOG should never go down the drain. However, most restaurants cannot keep 100% of FOG out of the collection system, making FOG removal devices and their proper maintenance very important.

A FOG removal device should be capable of removing emulsified, as well as free-floating FOG. FOG removal devices are typically one of the following types: passive under-sink devices, large outside passive devices, and mechanical devices. These devices will be described in greater detail in section III.

**Kitchen Sources and Operation/Maintenance**

There are multiple sources of FOG in restaurant kitchens. FOG from some of these sources can be recycled and should never be discharged to the sewer system. Waste cooking oil is one of the major sources of FOG that can be recycled, and in some areas, recyclers may pay the restaurant a small fee for the waste oil.

Kitchen sources that discharge to the sewer system include pre-wash sinks, garbage grinders, dishwashers, prep sinks, floor drains, can-wash sinks, steam trays, tilt kettles, floor drains, floor sinks, and hood-cleaning residue (see Figure 1). **Ideally, garbage grinders should not be used at all.** They greatly increase the amount of solids and FOG discharged to the sewer system. If they are used, they must discharge into a grease trap/interceptor, not directly to the sewer. Use of a garbage grinder will most likely increase the frequency of maintenance needed for a grease trap/interceptor.

Disposal of food as solid waste (in the trash) should be encouraged as an alternative to garbage grinders.

It is required for the discharge from dishwashers to bypass the grease trap because of the high temperature of the discharge water. Ideally, grease will have been dry-wiped from pots and pans or rinsed in a pre-wash sink, decreasing the amount of FOG expelled from the dishwasher.

**Enzymes, Detergents, Bacteria and Solvents**

Enzymes can dissolve FOG and move it downstream in the sewer. 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 some enzymes that will work only on the compounds found in FOG. Although the actual enzymatic action is complex, the end result is that the fatty acids are severed from the glycerol base. This allows the FOG to dissolve.

Enzyme reactions, however, are all reversible chemical reactions. The free fatty acids can re-join the glycerol base and become FOG, complete with the same characteristics it once had. While this may be beneficial to the restaurant owner because the grease interceptor or trap may not need to be pumped as frequently, the FOG problem is just moved downstream and may re-appear in a sewer or a pump station wet well. 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 also not an effective treatment option. 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 can create other problems for the Elmhurst Water Reclamation Facility (EWRF).

Using bacteria to consume sewer grease is effective only when the proper microorganisms are used and applied through a highly developed service system. Bacteria products commonly sold with "do-it-all" claims typically give facility managers a false sense of security.

Many distributors of biological liquefiers, enzymes, and other such products claim that their products will eliminate the need to pump a grease trap ever again. 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, terpene, surfactants, etc. It is actually the solvent, not the bacteria, that dissolves the grease.

Solvents, caustics, and acids may dissolve FOG and transport it out of the facility, but they can have harmful effects on the treatment system. They may also pose a potential hazard to the EWRF employees. The use of these chemicals for control of grease in the sewer collection system is absolutely prohibited.

## SECTION III: GREASE SEPARATION DEVICES

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 because fats and grease have a lower specific gravity (are less dense) than water, and rise to the surface under favorable conditions. Wastewater treated in this manner, passes through the chamber and on to the sewer. In order to ensure efficient operation, the separation device must be cleaned periodically to remove the accumulated grease and settled solids and to restore the required separation volume.

Often the words “grease trap” and “grease interceptor” are used interchangeably. Generally, however, a grease interceptor refers to a separation device installed indoors at or near the kitchen fixtures with a design flow rate of 50 gallons per minute (gpm) or less. The term grease trap usually refers to an outdoor separation device with a design flow rate of more than 50 gpm and/or a capacity of at least 750 gallons. (The Universal Plumbing Code is opposite of this and refers to interceptors as the large in-ground type of passive devices.)

Grease traps and interceptors must be designed to satisfy three basic criteria in order to ensure effective separation: time, temperature, and turbulence.

1) Time - The separation device must provide sufficient retention time for emulsified grease and oil to separate and float to the surface of the chamber.

2) Temperature - The separation device must provide adequate volume to allow the wastewater to cool sufficiently for emulsified grease to separate.

3) Turbulence - Turbulence through the device must be controlled so that grease and solids are not kept in suspension in the wastewater. Turbulence must be controlled, especially during high discharge rates associated with draining a triple sink or multiple fixtures simultaneously.

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

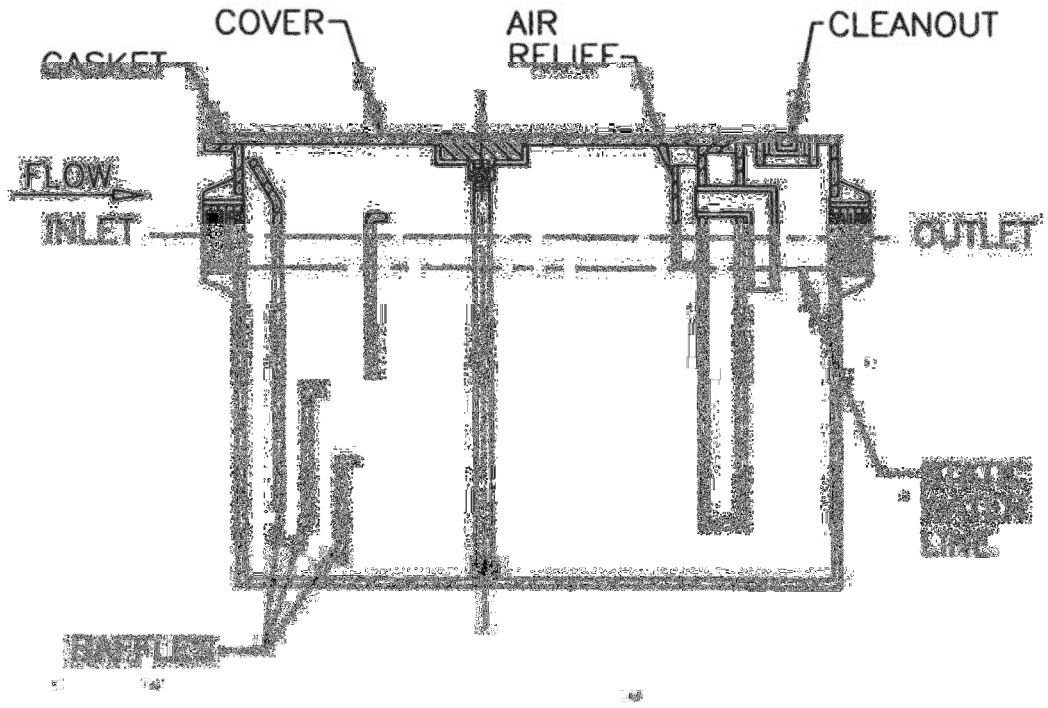
There are two basic categories of grease separation devices: passive and automatic. Passive devices have no moving parts and simply trap and retain grease and solids until physically accessed and cleaned. Automatic or electromechanical devices typically use a heating element to melt the accumulated grease and an automatic skimmer or dipper to periodically remove melted grease to a separate storage compartment. These are discussed in greater detail in the following paragraphs.

**Passive Separation Devices**

Small Point-of-Use Interceptors

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, about the size of a 2-drawer file cabinet), are usually constructed of fabricated steel, and are equipped with a vented flow control device and internal flow-diffusing baffle (see Figures 1 and 2). 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. New installation costs may range from $1,000 to $1,500.

**Figure 1: Example Grease Interceptor**

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These devices are often certified as to flow and grease capacity by the Plumbing and Drainage Institute or other such entities. It should be understood, however, that certification testing is performed under controlled conditions with clean devices, hot water (150°-160° F), and no detergents. The controlled testing does not reflect the actual operating conditions in a restaurant kitchen.

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 require frequent grease and solids removal – as much 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.

**Precast (or Prefabricated) In-Ground Traps**

The typical in-ground trap consists of a pre-cast concrete chamber with a liquid volume of 750 to 3,000 gallons (a grease trap with a useable capacity of 1,250 gallons is actually about the size of a box that could hold a Volkswagen Beetle). Such traps are designed to be installed in the ground just outside the restaurant or kitchen (see Figure 3). Design features include the following:

1) Construction - Traps must be constructed of durable, watertight materials, usually concrete, with sufficient structural load-bearing capacity for use in traffic areas. Traps should be designed with at least two compartments separated by a full-width baffle. The baffle should be located 2/3 to 3/4 from the influent wall and extend above the liquid level. Liquid depth in the trap should be at least 42 inches.

2) Access - Access for cleaning should be provided by two 24-inch diameter manholes terminating 1 inch above finished grade with sealed cast iron frames and cover. Manholes should be located above the inlet and outlet tees.

3) Inlets and Outlets - Sanitary tees should be installed vertically on the inlet and outlet pipes. Tees should be the same size as the inlet and outlet piping, but not less than 4 inches in diameter. A pipe nipple with open top should be installed in the top of the tee and should terminate 6 inches below the roof of the trap. The inlet tee should have a vertical pipe drop extending 12 inches below the water surface. The outlet tee should have a vertical pipe drop extending to 1/3 of liquid level capacity from the floor. The elevation of the inlet pipe should be approximately 2.5 inches above the elevation of the outlet pipe.

**Figure 2: Interceptor Example**

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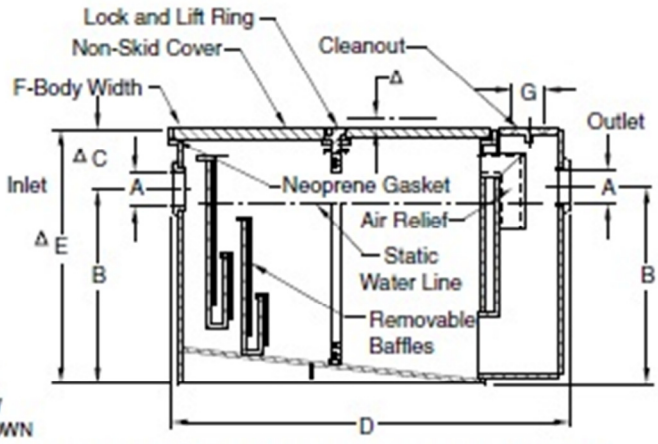
LOCATION

# GREASE INTERCEPTORS

**FUNCTION:** Used in kitchens, restaurants, institutions, and all types of food processing areas where waste water contains grease, fats and oil. Rate of flow into interceptor is controlled by a flow control fitting, thus enabling the interceptor to collect over 90% of the grease which flows into it. "Uni-lock" cover design permits fast cover removal for periodic cleaning. Interceptor may be set on floor, semi-recessed in floor or fully recessed with cover flush with finished floor. Fig. 8100 Series are extra low designs adaptable for use with dishwashers or low roughing sinks.




SIDE VIEW
FIG. 8010 SHOWN

Figs. 8007 thru 8050 and 8120 carry the Plumbing and Drainage Institute Certification Seal Certifying conformance to Grease Interceptor Standard PDI-G101.

Δ NOTE: When tile top is specified add 1"(25). When Terrazzo top is specified add 1 1/4"(32)

| | FIG NO. | GPM FLOW RATE | GREASE CAP. LBS. | INLET AND OUTLET SIZE A* | DIMENSIONS ROUGHING DIMENSIONS B | C | D | BODY HEIGHT E | WIDTH F | C.O. PLUG SIZE G |
|---|---|---|---|---|---|---|---|---|---|---|
| ☐ | 8004 | 4 | 8 | 02(50) | 7 3/4(195) | 3 1/4(83) | 16 3/4(425) | 11(280) | 9(230) | 2(51) |
| ☐ | 8007 | 7 | 14 | 02(50) | 8 1/2(215) | 3 1/2(89) | 19(485) | 12(305) | 10(255) | 2(51) |
| ☐ | 8010 | 10 | 20 | 02(50) | 9 1/2(240) | 3 3/4(95) | 21 1/4(540) | 13 1/4(335) | 11 1/2(290) | 2(51) |
| ☐ | 8015 | 15 | 30 | 02(50) | 12(305) | 3 1/2(89) | 25(635) | 15 1/2(395) | 13 1/2(345) | 2(51) |
| ☐ | 8020 | 20 | 40 | 03(75) | 13(330) | 4(100) | 28 1/2(725) | 17(430) | 15 3/4(400) | 2(51) |
| ☐ | 8025 | 25 | 50 | 03(75) | 15 1/4(390) | 4 1/2(115) | 30(760) | 19 3/4(500) | 16 3/4(425) | 2(51) |
| ☐ | 8035 | 35 | 70 | 03(75) | 16(405) | 5(125) | 32 1/2(825) | 21(535) | 18 1/4(465) | 2(51) |
| ☐ | 8050 | 50 | 100 | 03(75) | 17 1/2(445) | 6 3/4(170) | 35 1/2(900) | 24 1/4(615) | 20 3/4(525) | 2(51) |
| | LOW TYPE | | | | | | | | | |
| ☐ | 8120 | 20 | 40 | 03(75) | 7(180) | 3 1/2(89) | 38 1/2(980) | 10 1/2(265) | 21 3/4(550) | 2(51) |
| ☐ | 8135 | 35 | 70 | 03(75) | 7(180) | 4 3/4(120) | 49 1/2(1257) | 11 3/4(300) | 27 3/4(705) | 2(51) |
| ☐ | 8150 | 50 | 100 | 03(75) | 10(255) | 6(150) | 49 1/2(1257) | 16(405) | 27 3/4(705) | 2(51) |

*Available with larger inlet and outlet when specified.

**NOTE:** It is the responsibility of the installer to check all parts (internal and external) to verify they are in their proper operating order and location.

**NOTE:** Whenever an interceptor is to be installed suspended in a floor slab with a cradle or independently, proper support is essential for safety and functional integrity of the installation.

Supports/support system shall be of sufficient strength and proper design for the purpose intended and meet the approval of the architect and structural engineer. Jay R. Smith Mfg. Co. is not responsible for the design or recommendation of such supports.

Upon request, Jay R. Smith Mfg. Co. will provide the weight of the specific unit. Additional weight must be added to compensate for the weight of the liquid/grease when full and in the flowing mode of operation.

**REGULARLY FURNISHED:**
Steel Interceptor with Gray Duco Coating Inside and Outside and Flow Control Fitting.

**VARIATIONS:**
- ☐ Δ Cover Recessed for Terrazzo, Ceramic or Quary Tile -QC
- ☐ Δ Cover Recessed for Vinyl or Asphalt Tile -TC
- ☐ Lift Out Sediment Bucket -B
- ☐ NO-HUB Adaptor (2) Req'd (Specify Fig. 2646Y)
- ☐ Traffic Rated Cover-H20

**OPTIONAL MATERIALS:**
- ☐ Acid Resistant Coating Inside - ARI
- ☐ Acid Resistant Coating Outside - ARO
- ☐ Acid Resistant Coating Inside and Outside - ARIO
- ☐ Aluminum Cover -AC

NOTE: Dimensions shown in parentheses are in millimeters.

| REV. | DATE | DESCRIPTION | BY | CKD. BY |
|---|---|---|---|---|
| N | 2-19-13 | Revised PMI Note | TBW | CL |
| M | 2-3-05 | Revised Variations | RN | CL |
| L | 7-09-99 | Revised Text | JJ | BS |
| K | 12-10-98 | Added Note | CMD | BS |

WEIGHT POUNDS | VOLUME CUBIC FEET | FIGURE NUMBER 8000 SERIES

FIGURE NUMBER 8000 SERIES | DRAWING NUMBER S8000 SERIES | SIZE A | SCALE: NONE | DATE: 4-24-85 | APPROVED BY: SJM | CHECKED BY: JD | DRAWN BY: PJ

DIMENSIONS ARE SUBJECT TO MANUFACTURERS TOLERANCE AND CHANGE WITHOUT NOTICE
WE CAN ASSUME NO RESPONSIBILITY FOR USE OF SUPERSEDED OR VOID DATA

1) Location - Traps should be located just outside the restaurant or kitchen in an easily accessible location out of the way of normal traffic. The trap, however, should not be located near the flow from rainwater down spouts or other storm water conveyances and should not be located in flood-prone areas. Outdoor installation is preferred due to accessibility, but indoor installation may be approved by the Building Commissioner in special circumstances.

2) Prohibited Discharges - Sanitary wastewater (black water) should connect to the drain line downstream of the grease trap. Garbage grinders are not recommended, but if they are installed, they should be connected to the grease trap, and the size of the trap increased accordingly.

3) Sizing - Traps should be designed to provide at least 2 hours detention time at the design flow rate, modified by a loading factor that takes into account the type or location of the restaurant. Several methods of sizing grease traps are available.

4) Cleaning - Traps must be inspected and cleaned at regularly scheduled intervals as dictated by on-site experience, but generally not less than monthly. If cleaning is found to be necessary sooner, the grease trap is probably undersized. This could be possible for large buffet or cafeteria-style facilities. It is also a problem when housekeeping BMPs are not used.

5) Sampling Cleanouts - Sampling cleanouts should be provided in the inlet and outlet piping just upstream and downstream of the grease trap. In addition, a sampling port should be provided at the point after which the facility sanitary sewer line is combined with the grease trap effluent line before it connects to the City sewer. If no combination of the lines occurs before the connection with the City sewer, a sampling port should be installed between the effluent outlet of the grease trap and the City sewer connection. (Additional sampling information can be found in Section 1.)

Use of pre-engineered fabricated steel grease traps may be required if outdoor underground grease traps cannot be used, due to site restrictions. Such traps must have internal baffles, an approved flow control device or flow control means, a vent, and a gas-tight removable cover. Prefabricated steel grease traps must be designed, sized, built, and installed to City of Elmhurst standards.

When sizing a grease trap, 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 2,000 gallons or more. Having two smaller grease traps in a series is easier to pump and maintain. Also, there may be some old established sections of a community where there is no space available to install a regularly sized grease trap.

The Building Commissioner may also address the question of “grandfathering” facilities under any FOG control program. The City of Elmhurst may opt to allow restaurants currently without a grease trap to continue operation and only require a grease trap to be installed if the current operation goes out of business and a new restaurant moves in, provided that best management practices are followed and sewer blockages due to FOG accumulation are not occurring.

Installation costs for new, in-ground grease traps range from $2,500 to $4,000.

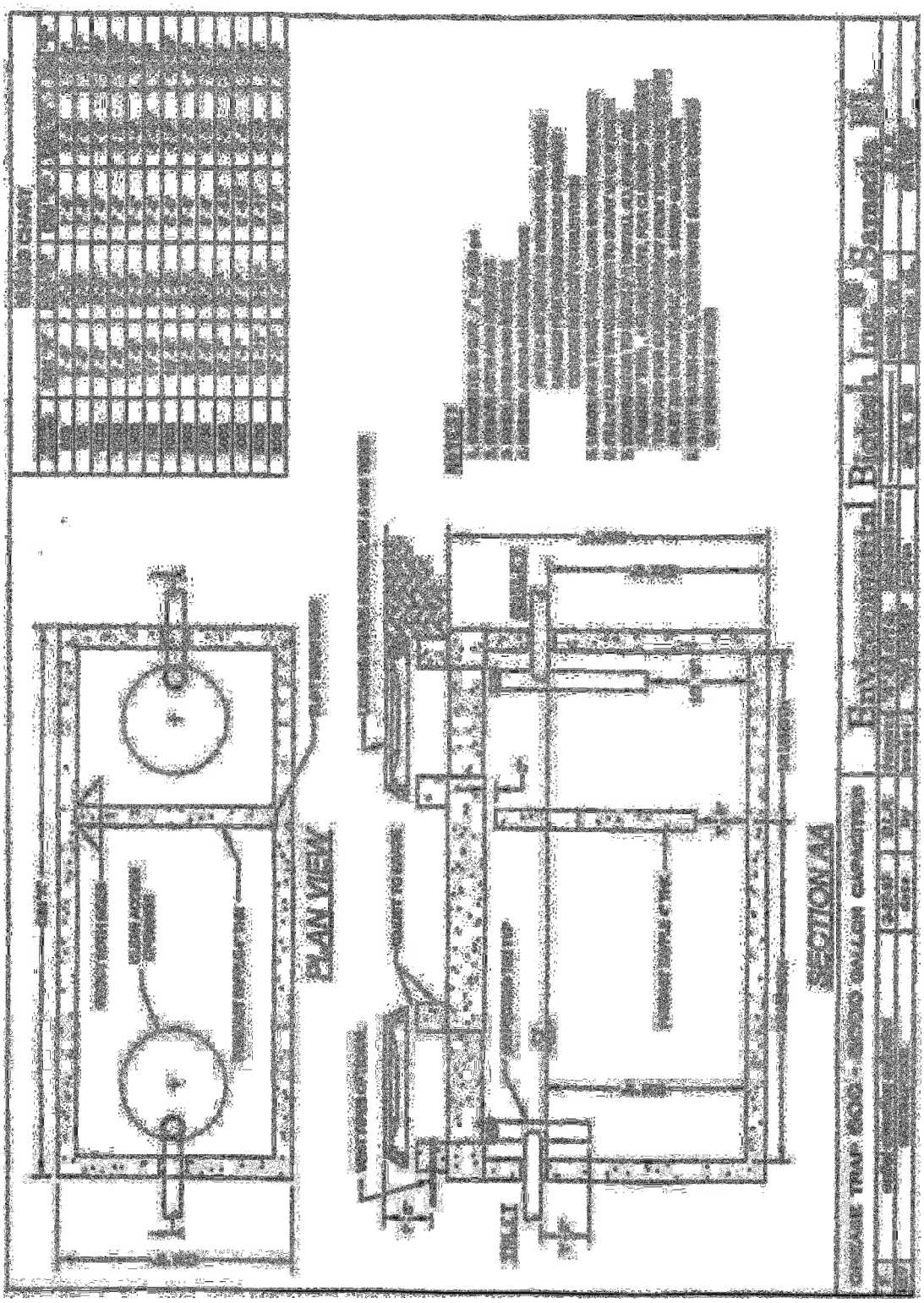



Figure 3: Grease Trap

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 are usually made up of a prefabricated steel or stainless steel enclosure with internal baffles, a removable solids separator screen, a grease level sensing probe, electric heater elements and a skimming or dipper device. The electric heating elements periodically 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. Costs for new installations range from $4,000 to $6,000.

Properly sized automatic interceptors may effectively trap free-floating grease and oils. Detention times, however, 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.

The best advice that can be given to restaurant owners/managers is to do your homework! Evaluate several vendors and call current and/or previous clients of vendors to see how well the equipment works and how much maintenance is required. Regardless of the type of equipment the restaurant chooses to purchase, if a vendor's equipment does not support the vendor's claims, the restaurant is still responsible for meeting FOG limits. The restaurants must bear the burden of choosing and maintaining equipment so that limits are met.

## SECTION IV: FOG DISPOSAL OPTIONS

### Pumping

The ultimate disposal of FOG is an important part of a FOG control program. If grease trap pumpers are not adequate for cleaning a grease interceptor/trap, or if they discharge the contents of the grease trap into a manhole, the other aspects of the grease control program will not be effective. When dealing with the issue of grease trap pumping, it is important to consider 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 well-designed, it may be necessary to consider a smaller percentage. Never allow the grease layer to extend below the bottom of the effluent tee.

2) The requirement in Elmhurst for grease trap pumping is for the contractor to pump the entire contents of the grease trap, removing the grease layer, solids layer, and water. The sides and bottom are cleaned with a scraper. Tees, baffles, and the bottom are then inspected for problems.

3) Other methods that are not permitted in Elmhurst include grease layer pumping, which removes only the grease layer, leaving the solids and water in the trap, and using separator trucks to pump the contents of the grease trap into the truck, separating the water layer from the FOG, then returning the water to the grease trap. Both of these methods are problematic and may not be used in Elmhurst.

4) A common, but disreputable practice used by some pumpers is the so called “dump and pump” method, where they will empty their current truckload into a grease trap, forcing what is in the trap into the collection system. The hauler then pumps what is left in the trap, goes to the next restaurant and repeats the process.

The City of Elmhurst will diligently enforce any rules in the Sewer Ordinance applicable to the pumpers and haulers. Disreputable contractors not only can cause problems in the collection system, but those that falsify records and/or dump grease-trap waste into the sewer have a competitive advantage over reputable haulers. A properly developed and implemented manifest system is invaluable in minimizing the problems associated with disreputable haulers.

### Recycling

If a restaurant recycles all of the oil that can be recycled, relatively small amounts of FOG should actually get to the sewer system. Waste cooking oil (e.g., from deep fryers) can be recycled. However, because the waste oil must be kept outside in a storage tank to be picked

up by the recycler, it is not unheard of for a restaurant employee to take a “shortcut” and pour this waste oil down a drain or a sink instead of taking it outside to the storage container, especially in bad weather or if the container is not in a convenient location. The City of Elmhurst encourages restaurant managers to do everything they can to keep this from happening. The following are examples of efforts the City of Elmhurst has made to encourage proper recycling of FOG:

1) Restaurants are required to post signs reminding employees not to pour grease in floor drains or in the sink.

2) Restaurants are required to train employees in FOG disposal.

3) Restaurants are required to pay a surcharge for excessive FOG discharges into the sanitary sewer system.

4) When the City of Elmhurst inspects restaurants, careful attention is paid to the condition of floor drains and other areas where FOG may be poured.

In addition, some vendors can recycle grease trap waste. The grease trap waste must not be contaminated with sewage (grease traps should not have sewage going through them). Recycled grease trap waste can be used as a dust suppressant, as a binder for pesticides and fertilizers to help them stick to plants when sprayed on a field, and as a manufacturing lubricant. Some grease renderers have even used recycled cooking grease and recycled grease trap waste as a fuel substitute for natural gas. Local grease trap pumpers and grease recyclers can usually be found in the yellow pages under “grease traps.”

## SECTION V: EDUCATION

Education of restaurant personnel and the public at-large is an important part of the City of Elmhurst FOG control program. This will lead to greater support of the program and increase the chance of its success. Part of an education program is alerting restaurants and the general public to the benefits of a fats, oils, and grease (FOG) control program. Some of the benefits waste generators and handlers can experience by increased awareness and proper training are:

1) Restaurants – Restaurants suffer from grease-related wastewater backups that create health concerns, employee safety issues and expenses to correct them. Proper disposal and handling of FOG wastes are predictable and enable management to schedule preventive maintenance. These preventive measures can easily be included in current training programs or presented as stand-alone training sessions for employees. The training will carry over into the homes of the restaurant employees and impact practices in the disposal of domestic wastes.

2) Water Reclamation Facility – Proper awareness and handling of FOG by those producing the waste and those treating the waste will permit more cost-effective practices for the Elmhurst Water Reclamation Facility (EWRF). Decreases in sewer collection system blockages will save the EWRF time and money.

3) Environment – Sewer blockages caused by grease can cause raw sewage to back up into restaurants, homes, and streets. The overflows are considered violations of National Discharge Elimination System (NPDES) and State issued operating permits. Proper disposal of FOG will decrease blockages and sewer back-ups, which will, in turn, decrease the amount of harsh chemicals used to clear blockages in the sewer system.

4) Recyclers – Stressing to restaurants the importance of keeping FOG out of the sewer system should increase the amount of FOG recycled, benefiting recyclers as well as the environment.

5) Public – Blockages in sewer collection systems can cause sewage to back up into houses, destroying personal property and jeopardizing the health of the public. Control of FOG by restaurants and the public can greatly reduce blockages. In addition, savings by the Water Reclamation Facility will ultimately be passed on to the public.

6) The City of Elmhurst began a public education program in 2011 presenting workshops at City Hall to business owners, posting on the City website, inserting pamphlets into the water/sewer bills, talking to local school and civic groups, and issuing press releases in our local newspapers and TV stations about fats, oils and grease (FOG) problems and what residents can do to minimize impact on their sewer system.

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