City of Carmel Utilities

Fats, Oils and Grease (FOG) Facility Instructions

FOG FACILITY REQUIREMENTS All restaurants and food service establishments which may include truck stops and gas stations, all industrial or commercial enterprises when, in the opinion of the Utilities, the facility has the potential to discharge fats, oils, or greases in concentrations deemed potentially detrimental to the Utilities' collection or treatment system, or

Facilities that will be expanded or renovated to include a FOG facility, or

Newly constructed facilities that could or will include FOG facilities, and

New multiuse facilities,

All are required to install and maintain appropriate FOG equipment.

Following are the general requirements for Non-Residential Sewer Use Permit and sizing criteria based on common engineering standards, plumbing codes for such devices and the current Sewer Use Ordinance in order to prevent excess discharge of FOG.

Contact Carmel Utilities for any questions or additional information. 317-571-2477

FOG Equipment DEFINITIONS

Hydro-mechanical Grease Interceptor, generally installed inside of a building, is a plumbing appurtenance or appliance that is installed in a sanitary drainage system to intercept non-petroleum fats, oil, and grease (FOG) from a wastewater discharge and is identified by flow rate, and separation and retention efficiency. The design incorporates air entrainment, hydro-mechanical separation, interior baffling, and/or barriers in combination or separately, and one of the following:
A - External flow control, with air intake (vent): directly connected
B - External flow control, without air intake (vent): directly connected
C - Without external flow control, directly connected
D - Without external flow control, indirectly connected
These interceptors are required to have a vent installed downstream of the interceptor.

Calculation Sheet for Sizing Hydro-mechanical Grease Traps (generally installed inside of a building)

Sample calculations for a two (2) or three (3) compartment sink:
Enter Dimensions (in inches) of each sink compartment

_____x _____x_____ = _____cubic inches

Multiply the result above by the number of compartments

_____cubic inches x number of compartments = _____cubic inches

Divide the result above by 231 cubic inches to convert to gallons

_____ Cubic inches ÷ 231 = _____gallons (this will be assumed to be your gallons per minute flow (GPM)

Since the sink will not likely be completely full, multiply the above GPM by 0.75 to arrive at the ¾ full GPM flow from the multi-compartment sink

_____GPM x 0.75 = _____GPM at ¾ full sink

Add any additional fixture load(s) in gallons from appliances, apparatus, or other equipment required to be connected into the grease trap.

The final result will be the properly sized grease trap in GPM flow through the unit.

Please note that when ordering a grease trap it will be rated in both GPM and pounds of grease the unit can accommodate. For our purposes ignore the pound capacity and order by the flow through GPM.

Also note the flow restrictor device which may be ordered separately, depending on your source.

Example shown below for a 3-bay sink and rated appliance (dishwasher):

24" x 24" x 12" deep = 6,912 cubic inches

6,912 cubic inches x 3 (number of bays) = 20,736 cubic inches

20,736 cubic inches ÷231 = 89.766 gallons (GPM)

89.766 GPM x 0.75 = 67.34 GMP @ ¾ full sink

67.34 + 2 (dishwasher load) = Total 69.34 gpm **Use a Hydro-mechanical grease trap and flow restrictor rated at 70 GPM.**

Gravity Grease Interceptor, generally installed outside of the building, is a plumbing appurtenance or appliance that is installed in a sanitary drainage system to intercept nonpetroleum fats, oils, and greases (FOG) from a wastewater discharge and is identified by volume, 24 minute retention time, baffle(s), not less than two compartments, a total volume of not less than 300 gallons, and gravity separation.

Calculation Sheet for Sizing Gravity Grease Interceptor (generally installed outside of the building)
The Manning Formula:
Interceptor Size (in gallons) = **F**low **r**ate (GPM)/sink or fixture **x** sum of fixture **R**atings **+** the **D**ischarge rate from any mechanical washers (i.e. dishwashers, glass washers, laundry machines, etc.) **X** a 24 minute retention time.

Fixture Drain size and Fixture Rating/GPM "B"– This is derived from the Manning Formula. It takes into account the slope; roughness of the pipe (plastic) used, and pipe diameter size. When applying the Manning Formula, we arrive at the drainage rates of various pipe diameter sizes:
0.5 inch pipe diameter = 0.8 GPM/fixture
1.0 inch pipe diameter = 5.0 GPM/fixture
1.5 inch pipe diameter = 15 GPM/fixture
2.0 inch pipe diameter = 33 GPM/fixture
2.5 inch pipe diameter = 59 GPM/fixture
3.0 inch pipe diameter = 93 GPM/fixture

Fixture Ratings of Grease-Laden Waste Streams: Fixtures that have more grease in their waste stream received higher values while less grease corresponds to a lower value. The table is shown below:

Table of Common Commercial Kitchen Fixtures and their Fixture Multiplier/Corresponding Rating (each): "C"
2, 3, or 4 compartment pot sink = 1.0
1 or 2 compartment meat prep sink = 0.75
Pre-rinse sink = 0.5
1 or 2 compartment vegetable prep sink = 0.25

Direct Flow from Dishwasher, Can Wash, and Mop Sink: Use the following gpm values: Dishwasher = 10 gpm, can wash and mop sink = 6 gpm.

Twenty-four minute retention time: Engineers have determined that when applying several criteria to determine proper grease (animal and vegetable lipids) separation (using Stoke's Law, specific gravity of lipids, etc.), a twenty-four minute retention time is required.

Example #1: A restaurant has the following fixtures in their kitchen:
(1) 3-compartment pot sink, 1.5 inch waste drain
(1) pre-rinse sink, 1.5 inch waste drain
(1) 1-compartment meat prep sink, 1.5 inch waste drain
(1) 1-compartment vegetable prep sink, 1.5 inch waste drain
(1) can wash (use 6 gpm)

Using the formula to size exterior grease interceptors, we get: Gallons needed for grease interceptor
= [[15 GPM x [1 + 0.5 + 0.75 + 0.25] + 6 GPM] x 24 minutes
= [[15 GPM x 2.50] + 6 GPM] x 24 minutes
= [37.5 GPM + 6 GPM] x 24 minutes
=43.5 GPM x 24 minutes
=1,044 gallons ***Use 1,000 gallon interceptor size***

Example #2: A restaurant has the following fixtures:
GPM x Grease Factor
(1) 3 Compartment Pot Sink, 2.0 inch waste drain 33 x 1.0 = 33.00 gpm
(1) 1 Compartment Prep Sink (Meat), 1.5 inch waste drain 15 x 0.75 = 11.25 gpm
(1) 1 Compartment Prep Sink (Vegetable), 1.5 inch waste drain 15 x 0.25 = 3.75 gpm
(1) Pre-rinse Sink, 2.0 inch waste drain 33 x 0.5 = 16.50 gpm
(1) Dishwasher (use 10 gpm) 10.00 gpm
(1) Mop Sink, 3 inch waste drain (use 6 gpm) 6.00 gpm__

Total 80.50 gpm using the formula to size exterior grease interceptors, we get:
80.50 gpm x 24 minutes = 1,932 gallons
Use 2,000 gallon interceptor size

Fixture Connected to FOG equipment	Fixture Drain Size (inches)	Qty "A" X	Fixture rating (GPM) "B" X	Fixture multipler "C" =	Maximum GPM "D"
		Sum of column "D" (GPM) = "E"			

X Retention Time, Minutes **X 24 =**

Minimum Grease Interceptor size, Gallons

Calculation Sheet *Uniform Plumbing Code Appendix H Grease Interceptor Sizing*

(# of meals per peak hour) x (waste flow RATE) x (retention) x (storage) = SIZE (1) (2) (3) (4)
Factors:
1) # of meals served at peak operating hour (Seating Capacity) x (Peak Factor)
a. Peak Factor for Fast Food Restaurant is……1.33
b. Peak Factor for all other food service types is…1.00

2) Waste Flow Rate:
a. with dishwasher…….…… 6 gallon flow
b. without dishwasher……..…… 5 gallon flow
c. single service kitchen…….…. 2 gallon flow
d. food waste disposer……..……1 gallon flow

3) Retention times
a. commercial kitchen waste/dishwasher…….……2.5 hours
b. single service kitchen/single serving……1.5 hours

4) Storage factors
a. Fully equipped commercial kitchen…... 8 hr. operation = 1
b. Fully equipped commercial kitchen..... 16 hr. operation = 2
c. Fully equipped commercial kitchen …..24 hr. operation = 3
d. Single service kitchen……..= 1.5

MY FACILITY:
1.) # meals per peak hour = _____
2.) Waste flow RATE = _____
3.) Retention = _____
4.) Storage = _____

_____ X _____ X _____ X _____ = _____ Size in Gallons

#1 X #2 X #3 X #4 = SIZE in Gallons

EXAMPLE:
A 75 seat restaurant is open from 4:00 pm. until 12:00 am. It has a dishwasher and a fully equipped commercial kitchen on a normal street.
(Number of meals) x (waste flow) x (retention) x (storage) = size requirement
[(75)(1)] x (6 gallons) x (2.5 hours) x (1) = 1125 gallons
Use 1,500 gallon interceptor size

Oil/Water Separator: A device designed to remove oil (e.g. petroleum-based) from the waste stream while allowing the remaining wastewater to be discharged to the wastewater collection system by gravity. This type of device shall be utilized at, but not limited to, mechanical maintenance repair shops, car washes and businesses where floor drains collect motor oil, transmission fluid, lubricating oil, grease, hydraulic oil., etc.

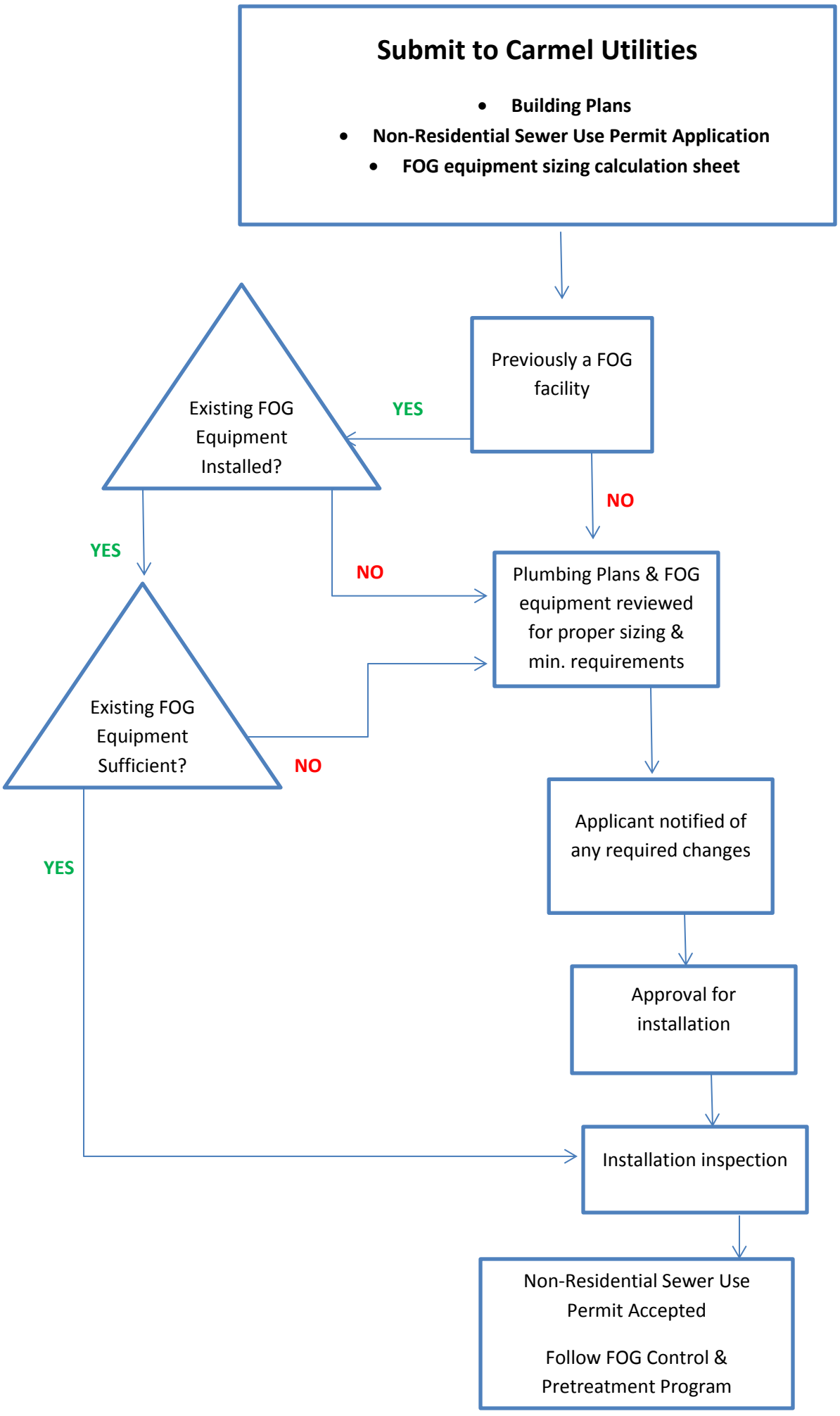
Sand Interceptor:
A device used to separate sand and other soils from the waste stream before discharging to the wastewater collection system.

GENERAL REQUIREMENTS FOR PERMIT APPLICATIONS AND FOG EQUIPMENT SIZING CRITERIA

Plans submitted for review shall include complete plumbing plan showing food preparation and cleaning areas (including sinks, wok stations, dishwashers, janitorial sinks and mat cleaning areas) car washes, repair shop and maintenance areas. Also show which fixtures are plumbed to the FOG equipment and which fixtures discharge directly to the sanitary sewer.

Sizing methods described herein are intended as guidance in determining FOG equipment sizes that will afford the Utilities a minimum degree of protection against grease and other obstructing materials. Sizing determinations are based on standard industry practices and guidance found in the International Plumbing Code (IPC), the Uniform Plumbing Code (UPC) Appendix H, operational data provided by business owners or their engineers/contractors. Size, type and location of FOG equipment shall be in accordance with the manufacturer's instructions, and the requirements of Carmel Utilities Sewer Use Ordinance.
In approving a generators' plumbing or FOG equipment design, Carmel Utilities does not accept liability for the failure of a system to adequately treat wastewater to achieve effluent quality requirements specified in Carmel's Sewer Use Ordinance. It is the responsibility of the generator and/or engineer/contractor to ensure the appropriate level of treatment necessary for compliance with environmental and wastewater regulations.

PERMIT PROCESS
1. Submit a Non-Residential Sewer Use Permit Application along with FOG equipment sizing calculation sheet, plumbing plans and any other documents necessary of approval.
Non-Residential Sewer Use Permit Fats, Oils and Grease (FOG) Review
2. Carmel Utilities will review the application, plans, FOG equipment type, size, and location according to common engineering practices, current ordinance and plumbing code for acceptability.
Inspections
3. Once accepted by the Utilities, and all applicable fees have been paid, a final plumbing inspection is required and must be requested 24 hours in advance by calling 317-571-2645. This inspection is included in your connection & availably fee. Depending on the scope of work, additional re-inspections may be required at a fee of $73 each.


Submit to Carmel Utilities
Building Plans
Non-Residential Sewer Use Permit Application
FOG equipment sizing calculation sheet
Previously a FOG facility
Existing FOG Equipment Installed?
YES
NO
YES
NO
Plumbing Plans & FOG equipment reviewed for proper sizing & min. requirements
Existing FOG Equipment Sufficient?
NO
YES
Applicant notified of any required changes
Approval for installation
Installation inspection
Non-Residential Sewer Use Permit Accepted
Follow FOG Control & Pretreatment Program