

COLLIER TOWNSHIP MUNICIPAL AUTHORITY

**GREASE REMOVAL
REQUIREMENTS AND PROCEDURES**

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Collier Township Municipal Authority
Grease Removal
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Introduction

Restaurants and other food service businesses generate literally tons of fats, oils and grease (**FOG**) waste every day. If this waste is not managed properly, it can cause major environmental problems. Some of the **FOG** waste generated by these businesses is in solid form and can be properly disposed of in the trash.

However, liquid waste containing **FOG** when improperly discharged to the municipal sewer system will build up inside sewer lines and cause wastewater overflows to occur inside the restaurant or elsewhere in the sewer system. This can cause a major disruption in the operation of a business, be a significant public health hazard, and be very expensive to clean-up.

If your business generates greasy wastewater, you can reduce the likelihood of a sewer back-up by adopting good housekeeping practices and minimizing the amount of **FOG** waste that go down your drains by installing and properly maintaining a grease removal system. Currently, several types of grease removal systems are available. Typical installations utilize a grease trap and/or a grease interceptor.

How Grease Removal Systems Work

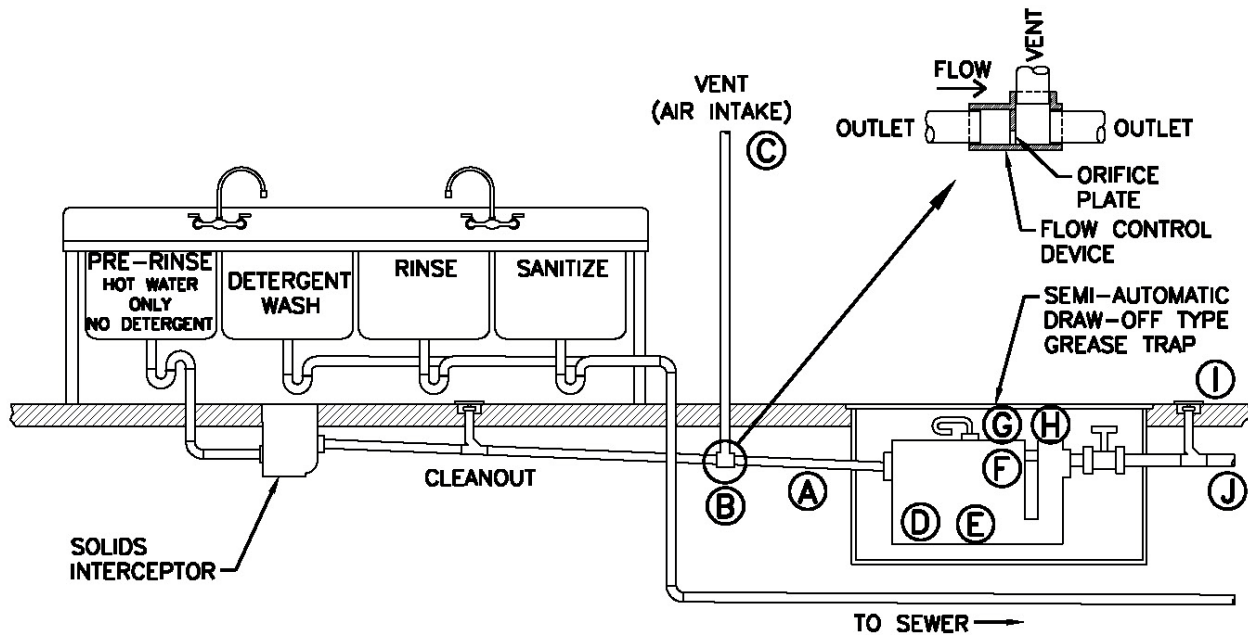
Properly sized systems create sufficient detention time for the oil laden waste contained within the unit to separate by means of gravity. A flow control device at the front end of the unit slows down the flow and minimizes the turbulence to allow the separation of the **FOG** and water. Once this separation occurs, the clarified water exits the collection chamber and flows to the sewer system, leaving behind the **FOG** and food solids to be removed later. Most grease removal systems function in this manner. Consequently, bigger is usually better because of increased detention time and less frequent cleanings. However, grossly oversizing a grease removal system is not recommended. Extended time periods between cleanings can result in septic conditions which allow the formation of corrosive hydrogen sulfide gas and foul odors.

What Is A Grease Trap

A grease **trap** is typically a smaller grease removal system installed inside the building and frequently under a sink. Its purpose is to remove **FOG** from the wastewater flow stream of one (1) or more (up to four (4)) smaller grease emitting fixtures. Where inside the building grease traps exist, food disposals and other “solids” producing equipment, such as potato peelers, must be connected to a solids interceptor first, then be routed to the building’s sanitary sewer, bypassing the grease **trap**. Additionally, automatic dishwashers typically create a soapy, high temperature, waste flow stream that will inundate a grease **trap** emulsifying the **FOG** already collected and wash it downstream. Consequently, facilities with only an inside the building grease **trap**, automatic dishwashers, must be connected directly to the sanitary sewer.

Allegheny County Health Department Plumbing Division Regulations require that inside the building grease traps, that are located in the same room where food is prepared, cooked, handled, or stored, must be the semi-automatic draw-off type.

“Inside the Building” Grease Trap Installations (Typical)

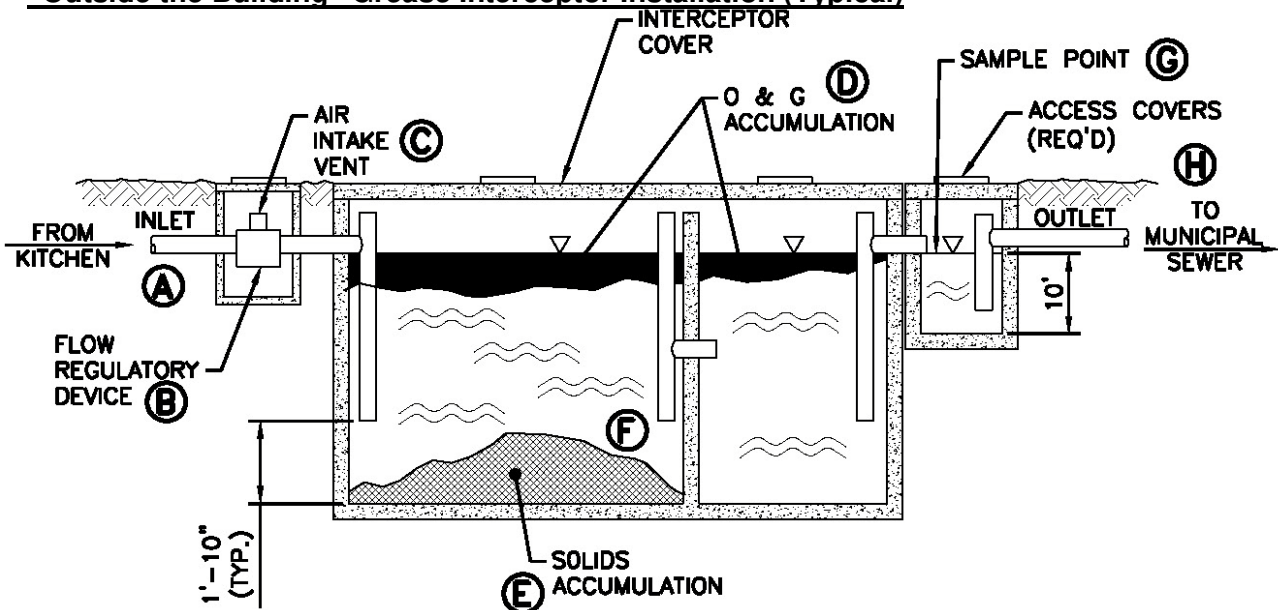


A	Flow from four (4) or fewer kitchen fixtures enters the grease trap.
B	An approved flow control device is installed to restrict the flow to the grease trap to the rated capacity of the trap. Required by the Collier Township Municipal Authority (C.T.M.A.).
C	An air intake valve allows air into the open space of the grease trap to prevent siphonage and back-pressure.
D	The baffles help to retain grease toward the upstream end of the grease trap, since grease floats and will generally not go under the baffle. This helps to prevent grease from leaving the grease trap and moving further downstream where it can cause blockage problems.
E	Solids in the wastewater, that do not float, will be deposited on the bottom of the grease trap and will need to be removed during trap cleaning.
F	Oil and grease floats on the water surface and accumulates behind the baffles. The oil and grease will be removed during routine grease trap cleaning.
G	Air relief is provided to maintain proper air circulation within the grease trap.
H	Some grease traps have a sample point at the outlet end of the trap to sample the quality of the grease trap effluent flow. Required by C.T.M.A.
I	A cleanout is provided at the outlet or just downstream of the outlet to provide access into the pipe to remove any blockages.
J	The water exits the grease trap through the outlet pipe and continues on to the grease interceptor or to the sanitary sewer system.

What Is A Grease Interceptor

A grease interceptor is a larger grease removal system installed outside and underground frequently collecting the waste from all grease bearing equipment within an establishment. Some installations, however, utilize both an inside the building grease trap and an outside grease interceptor. This arrangement works well in that equipment that emits higher concentrations of FOG, such as the pre-rinse sink and wok ovens are connected to the grease trap and the dishwasher, disposal, floor drains and mop sinks are connected to the grease interceptor.

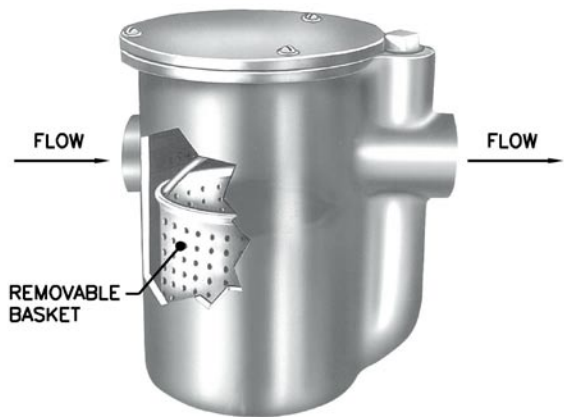
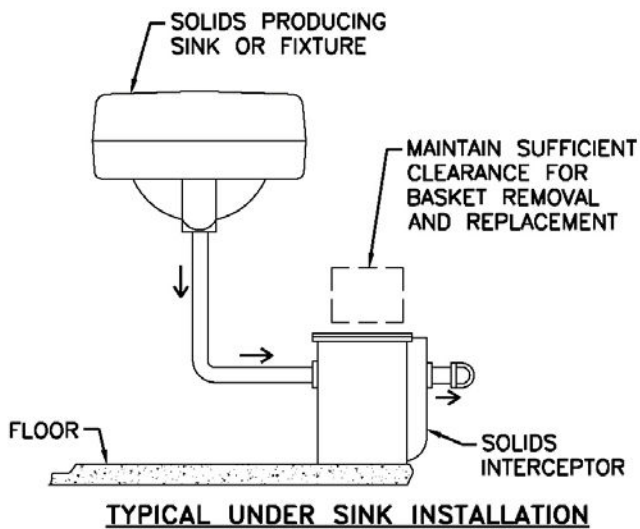
“Outside the Building” Grease Interceptor Installation (Typical)



A	Flow from under sink grease traps or directly from plumbing fixtures enters the grease interceptor. C.T.M.A. requires that all flow entering the interceptor must enter through the inlet pipe.
B	An approved flow control or restricting device is installed to restrict the flow to the grease interceptor to the rated capacity of the interceptor.
C	An air intake valve allows air into the open space of the grease interceptor to prevent siphonage and back-pressure.
D	Oil and grease floats on the water surface and accumulates behind the grease retaining fittings and the wall separating the compartments. The oil and grease will be removed during routine grease interceptor cleaning.
E	Solids in the wastewater, that do not float, will be deposited on the bottom of the grease interceptor and will need to be removed during routine grease interceptor cleaning.
F	Grease retaining fittings extend down into the water to within 12 inches of the bottom of the grease interceptor. Because grease floats, it generally does not enter the fitting and is not carried into the next compartment. The fittings also extend above the water surface to provide air relief.
G	Some grease interceptors have a sample box so that inspectors or employees of the establishment can periodically take effluent samples. Having a sample box is required in all new installations by C.T.M.A.
H	Flow exits the grease interceptor through the outlet pipe to the sanitary sewer system.

What Is A Solids Interceptor/Separator

A solids interceptor is a passive device installed very close to food disposals or other equipment that produce a waste stream contaminated with solids. Smaller units typically serve one (1) fixture and have low inlets and high outlets and are located where a fixtures p-trap is positioned. Larger units can collect the waste from multiple fixtures and are either built into the floor or are mounted on the floor. All types of solids interceptors are equipped with easily removable strainer baskets that serve to retain the filtered solids, while allowing the water to pass through. Solids interceptors greatly improve the operation and efficiency of semi-automatic draw-off type grease traps, greatly reducing the conditions that result in foul odors. Consequently, C.T.M.A. requires that solids interceptors be installed when “solids” producing equipment is present and only an inside the building grease trap is used.



Inside the Building Grease Trap Requirements

- Semi-automatic draw-off type grease trap – minimum thirty (30) gpm flow rate, if located in same room food is present.
- Hot water only pre-rinse dish and pot washing procedure maximum temperature 140° F.
- Applicant must provide grease trap sizing calculation to C.T.M.A. prior to approval and installation.
- Use of appropriately sized solids interceptors at disposal.
- Automatic dishwashers are not permitted to be connected to interior grease traps under any circumstances.

Outside the Building Grease Interceptor Requirements

- New installations, as well as remedial improvements to malfunctioning existing systems, generally will require an exterior in-ground two (2) chamber grease interceptor (1,000 gallons or larger) that are sized to provide a minimum of twenty-four (24) minutes of retention during peak hydraulic load conditions.
- Grease removal systems must be equipped with a sampling box and access cover at the effluent discharge end of the grease interceptor.
- Each installation must provide all ancillary equipment recommended by the manufacturer including, but not limited to, the following: flow control fixture, air intake vents, removable baffles, 30” diameter manway access covers for systems located outside.
- Applicant must provide a Grease Interceptor sizing calculation to C.T.M.A. prior to approval and installation.
- Dishwasher and disposal waste can be discharged to an outside the building grease interceptor, but not to an inside the building grease trap.

Operational Requirements

- C.T.M.A. requires that all grease removal systems be cleaned when the grease and solids accumulation reach fifty percent (50%) of the unit’s capacity or every forty-five (45) days, whichever occurs first.
- C.T.M.A. requires that grease removal system operators (Restaurant and Kitchen Managers) conduct twice monthly inspections of the system and record the depth of collected grease in the trap, as well as confirmation the system is functioning properly.

Operational Requirements (continued)

- C.T.M.A. requires that grease removal system operators (Restaurant and Kitchen Managers) maintain a log of system cleanings and inspections. For cleaning and disposal, the following information shall be recorded: date of the cleaning and disposal, amount of solids and grease removed, method/place of disposal, hauler's name (company), hauler/driver's signature, and manager's signature. For system inspections the following information shall be recorded: date of inspection, capacity % or depth/amount of grease in unit, verification of proper system function, and manager's signature. These Maintenance/Inspection Logs must be made available to C.T.M.A. upon request for the previous three (3) years of operation.
- C.T.M.A. prohibits the use of all enzymes, bacteria's and chemicals for the intended use of grease digestion, removal or abatement. These products only transfer the grease downstream in the sewer system.

Sizing of Inside the Building Grease Traps

Currently, no industry wide sizing standard has been adopted. Various manufacturers approach sizing differently. This information illustrates one (1) particular manufacturer's recommended sizing calculations.

Sizing for Single Fixture: Inside the Building Grease Trap Applications

Grease traps are sized according to the rate of incoming flow, in gallons per minute (GPM). Associated with the incoming flow rate is the grease trap capacity. The rated capacity, in lbs., is listed at twice the flow rate in GPM. For example, a 10 GPM grease trap has a rated capacity of 20 lbs. Interior grease traps do not include "Detention Time" in their sizing calculations.

General Procedure:

To determine the flow rate of each sink:

1. Calculate the capacity of the sink in cubic inches:
 $\text{_____ (Length) x _____ (Width) x _____ (Depth) = _____ Cu. In.}$
2. Convert the capacity from cubic inches to gallons per minute (GPM):
 $\text{_____ Cu. In. x 231 Cu. In. / Gal. = _____ GPM.}$
3. Adjust for displacement: $\text{_____ GPM x 0.75 = _____ GPM.}$
4. Result is the flow rate required to drain the sink in one (1) minute.

Example:

Three (3) compartment pot sink each compartment 12" x 12" x 15".

1. $12" \times 12" \times 15" = 2160 \text{ Cu. In.} \times 3 \text{ Comp.} = 6480 \text{ Cu. In.}$
2. $6480 \text{ Cu. In.} \div 231 \text{ Cu. In. / Gal.} = 28 \text{ GPM.}$
3. $28 \text{ GPM} \times 0.75 = 21 \text{ GPM.}$

A 20 GPM grease trap would permit the sink to drain in slightly more than one (1) minute.

*Discharge from spray hoods is determined by the flow rate of the hood.

Grease Traps shall not exceed a flow rate of 35 GPM. Grease Interceptors shall be used when flow rate exceeds 35 GPM.

Sizing for Multiple Fixtures: Inside the Building Grease Traps

1. Determine the flow rate for each fixture to be serviced by the grease trap.
2. Add together 100% of the largest flow rate, 50% of the second largest, and 25% of all others.
3. Result is the recommended flow rate of the grease trap.

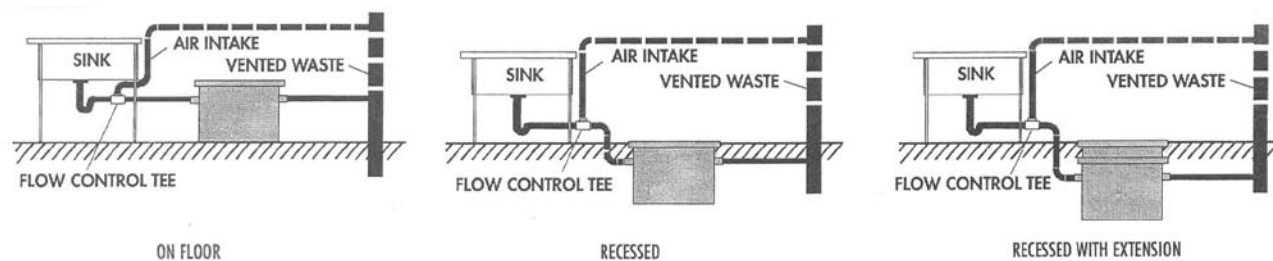
Example:

1. Fixture A: 35 GPM Flow Rate
 Fixture B: 26 GPM Flow Rate
 Fixture C: 18 GPM Flow Rate
 Fixture D: 12 GPM Flow Rate
2. $35 \text{ GPM (A)} \times 100\% = 35 \text{ GPM}$
 $26 \text{ GPM (B)} \times 50\% = 13 \text{ GPM}$
 $30 \text{ GPM (C + D)} \times 25\% = 7.5 \text{ GPM}$

 Total Flow Rate = 55.5 GPM

In this case a 50 GPM outside grease interceptor is recommended for this installation.

Typical Configurations



- * C.T.M.A. requires a minimum 22.5 GPM interior grease trap.
- + Automatic dishwashers must by-pass interior grease traps.
- ++ Food waste grinders, disposals and potato peelers must be connected to a solids interceptor then go to the sanitary sewer in this type of installation.

Sizing of Outside the Building Grease Interceptors

Example No. 1

Use this chart to size exterior grease interceptors that will serve multiple fixtures. Use the sizing calculation to select the grease interceptor when the interceptor is not more than four (4) feet (vertically) below the fixtures being served. Use the next size larger (grease interceptor) than the calculation indicates, when the interceptor is more than four (4) feet below the equipment being served. Never install a grease interceptor smaller than the calculation indicates.

Description of Installation

A grease interceptor installed to receive wastes from multiple fixtures including: one (1) dish washing machine (floor sink), a grease extracting ventilation hood, one (1) tilt kettle floor trough, one (1) mop sink, a three (3) compartment pot sink, one (1) pre-rinse sink with garbage disposal, and four (4) floor drains. No solids interceptor is required. Use, a twenty-four (24) minute retention time period. The following examples are based on two (2) different manufacture's requirements.

Manufacture #1		Manufacture #2		
Step1 – Determine the Hydraulic Loading of Each Fixture, in Fixture Units (FU)		Kind of Fixture	Trap and Arm Size	Fixture Units
1.	Dishwasher receptor (floor sink) with 4" trap and trap arm = 8 FU	3 Compartment Sink	1-1/2", 2"	3,4
2.	Grease extracting ventilation hood receptor (2" floor sink) = 3 FU	2 Compartment Sink	1-1/2"	2
3.	Tilt kettle trough (minimum 2" trap and trap arm) = 4 FU. Mop sink = 3 FU	Dishwasher	2"	4
4.	Three (3) compartment (commercial sink) = 3 FU	Garbage Grinder	1-1/2"	2
5.	Pre-rinse sink with garbage disposal (2" trap and trap arm) = 4 FU	Wok Stove	2"	4
6.	Four (4) floor drains x 2 FU each = 8 FU	Hand Sink	--	0
Step 2 – Establish the Total Hydraulic Loading on the Interceptor in Fixture Units		Mop Sink	--	0
8FU + 3FU + 4FU + 3FU + 4 FU + 8FU = 30 Fixture Units		Floor Drains (2", 3", 4")	2", 3", 4"	2, 3, 4
Step 3 – Determine the Minimum Size Interceptor Required in Gallons		Floor Sinks (3", 4")	3", 4"	3,4
The twenty-four (24) minute retention time applies to all fixtures even though all fixtures may not discharge simultaneously.		Notes: Hand sinks and mop sinks are not required to be plumbed to the grease trap. For indirect waste systems where hub drains and floor sinks are used as receptors for dishwashers, 2- and 3-compartment sinks, etc., the fixture unit count shall be twice (2x) the floor sink or hub drain fixture unit count. In such cases, the fixture count of the indirect waste is not counted.		
30 (FU) x 3 (GPM) x 24 (Minutes) Retention Time = 2,160 Gallons				
Solution				
Choose the next larger available size three (3) compartment interceptor (i.e. 2,500 or 3,000 gallon capacity).				

Sizing of Outside the Building Grease Interceptors

Example No. 2

The Uniform Plumbing Code Formula

Follow these six (6) simple steps to determine grease interceptor size.						
Enter Calculations > Here	No. of Meals Per Peak Hours	Waste Flow Rate	Retention Time	Storage Factor	Calculated Interceptor Size	Grease Interceptor
	_____ x	_____ x	_____ x	_____ =	_____	_____
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
1	Number of Meals per Peak Hour (Recommended Formula): Seating Capacity x Meal Factor = Meals per Peak Hour _____ x _____ = _____ Establishment Type: Fast Food (45 min.) 1.33 Restaurant (60 min.) 1.00 Leisure Dining (90 min.) 0.67 Dinner Club (120 min.) 0.50 Meal Factor				Notes:	
2	Waste Flow Rate: Condition With a Dishwashing Machine 6 Gallons Without a Dishwashing Machine 5 Gallons Single Service Kitchen 2 Gallons Food Waste Disposer Only 1 Gallon Flow Rate			Notes:		
3	Retention Time Commercial Kitchen Waste Dishwasher 2.5 Hours Single Service Kitchen Single Serving 1.5 Hours Retention Time			Notes:		
4	Storage Factor Kitchen Type - Commercial Hours of Operation 8 Hours 1.00 12 Hours 1.50 16 Hours 2.00 24 Hours 3.00 Single Service Kitchen 1.50 Storage Factor			Notes:		
5	Calculate Liquid Capacity Multiply the values obtained from Step 1, 2, 3 and 4. The result is the approximate grease interceptor size for this application.				Notes:	
6	Select Grease Interceptor Using the approximate required liquid capacity from Step 5, select an appropriate size as recommended by the manufacturer.				Notes:	

Best Management Practices (BMP)

The Collier Township Municipal Authority (C.T.M.A.) encourages those commercial foods establishments that are served by the C.T.M.A. Sewage Collection System to institute a program of Best Management Practices.

1. Train kitchen staff about how they can help ensure BMPs are consistently maintained.
2. Post “No Grease” signs at sinks and dishwashers.
3. Reduce hot water temperatures at all sinks, but especially at the pre-rinse sink, before the dishwasher to 140° F. Grease emulsifies at temperatures above 140° F.
4. Utilize a three (3) sink dishwashing system – wash, rinse and sanitize in a 75-100 ppm chlorine bleach solution, in lieu of using a mechanical dishwasher, which operates at temperatures well above 140° F.
5. Recycle waste cooking oil.
6. “Dry wipe” pots, pans and dishware prior to washing with disposable towels. Discard used towels to trash.
7. Dispose of food waste directly to the trash bin.
8. Inspect grease removal traps and/or interceptors every two (2) weeks. Record findings in a Maintenance Log. Keep Logs available for review by C.T.M.A. for three (3) years.
9. Clean exhaust system filters only in areas where the “run-off” will be conveyed to a grease removal device. Do not clean filters where the run-off will be collected in a storm sewer.
10. Use absorbent pads to clean-up grease or oil spills. Do not use granular materials such as kitty litter or oil dry for these purposes.
11. Locate grease and oil receptacles away from stormwater inlets, catch basins and drains. Protect grease and oil receptacles from weather and vandalism. Provide secure lids for all receptacles.