

## Grease Traps introduction

Grease Traps (also known as grease interceptors, and grease recovery devices) are plumbing devices designed to intercept most greases and solids before they enter a wastewater disposal system. Common wastewater contains small amounts of oils which enter into septic tanks and treatment facilities to form a floating scum layer. This scum layer is very slowly digested and broken down by microorganisms in the anaerobic process. However, very large amounts of oil from food production in kitchens and restaurants can overwhelm the septic tank or treatment facility, causing a release of untreated sewage into the environment. Also high viscosity fats and cooking greases such as lard solidify when cooled, and can combine with other disposed solids to form blockages in drain pipes. Grease traps have been used since the Victorian era. They are used to reduce the amount of fats, oils and greases (FOG's) that enter the main sewers. Effectively they are boxes within the drain run that are located between the sinks in a kitchen and the sewer system. They only have waste water flowing through them and are not served by any other drainage system such as toilets. They can be made from a number of different materials; e. g Fiber reinforced polymer such as the MTgroup-Trap design, Stainless steel, Plastics, concrete, cast Iron and can hold anywhere between 40 liters to 45000 liters and above. They can be located above ground, below ground, inside the kitchen or outside the building.



## Fat and Grease Generation

One of the greatest drainage problems faced in kitchens and food preparation areas is the collection of fats, oils and greases (FOG's) within the drainage system. These substances form naturally from animal and vegetable foodstuffs and can have a major effect on the

performance of any drainage system – both internal and external to the food processing area . As these substance cool, they solidify and subsequently can block drain pipes , gullies , foul air traps and access chambers . Blockages in drainage systems is not uncommon and quickly manifest themselves with backfilling and eventual flooding of sinks , dishwashers and food processing plant into the food preparation area giving rise to significant health risks . Hygienic , effective and reliable methods of dealing with fats , oils and grease is therefore vital if a clean and efficient working environment is to be maintained . **MTgroup Co** provides solutions to these problems with a wide range of effective Grease Recovery Devices (GRD)and accessories to suit all applications.



### Uses

Restaurant and food service kitchens produce a lot of waste grease which is present in the drain lines from the various sinks dishwashers and cooking equipment such as combi ovens and commercial woks .This is known as “fats , oils , and grease “(FOG).

If we do not remove FOG , the grease will congeal within the sewer and cause blockages and back-ups . In the united states , sewers back up annually “an estimated 400.000 times and municipal sewer overflows on 40.000 occasions . The EPA has determined that sewer pipe blockages are the leading cause of sewer overflows , and grease is the primary cause of sewer blockages.Even if accumulated FOG dose not escalate into blockages and sanitary sewer overflows,it can disrupt wastewater utility operations and increase operations and maintenance requirements”.For these reasons,depending on the country,nearly all municipalities require commercial kitchen operations to fit some kind of interceptor device to collect the grease before it enters the sewer. Additionally where FOG

is a concern in the local wastewater collection system communities have set up inspection programs to ensure that these grease traps and / or interceptors are being maintained on a routine basis .



### Method of Operation

The traditional means of achieving this is with the passive grease trap (interceptor). The first patent was lodged by Nathaniel whitening of California in the late 1800's . The design remains pretty much unchanged . The current industry standard for passive grease interceptors is ASME A112.14.3,(or PDI-GD101).A grease recovery device (GRD) is a recent development which aims to separate out the grease and water and collect the grease for recycling. Recovered grease from a GRD is referred to as yellow grease . The recovered grease is typically added to the waste vegetable oil ( wvo ) bin where spent vegetable oil is put from the deep-fryer . The current industry standard for GRD's is ASME A112.14.4.

Both traditional traps and GRD's use the same physics which is that grease and oil are lighter than water and will rise to the top when the mix is allowed to stand for a time. They both feature a tank with an inverted weir at the outlet in order to allow water out but not grease . A traditional trap is designed to hold the grease within its tank constantly reducing its working volume and hence its ability to allow the required dwell time of 27 seconds or more for the grease / water separation to occur . The design codes for traditional traps allow for an average efficiency of as little as 85% between cleanouts for the trap to be considered adequate . This means that on average 15% of the grease in the waste water is entering the sewer line . Eventually , even with a robust cleanout regime , it is likely that there will be a sewer backup .

A traditional grease trap is not a food disposal unit . Unfinished food must be scraped into the garbage or food recycling bin. Milkshakes , gravy , sauces and food solids must be scraped off the dishes before they enter the sink or dishwasher .

A problem with a traditional trap is that it must be emptied either by scooping out or pumping all the contents and carting the effluent away to a specialist renderer or to a landfill . This is a very unpleasant undertaking and is , in consequence , often neglected , causing the same problems as if the trap were not there at all. When a trap is full of fat , oil , and grease , the grease has nowhere to go but down the drain and into the sanitary sewer or enter the septic system.

To try to maintain some degree of efficiency there has been a trend to specify larger and larger traps. Unfortunately , providing a large tank for the effluent to stand also means that food waste scraps also have time to settle to the bottom of the tank , further reducing the available volume and adding to the clean out problem . A bigger interceptor is not a better interceptor. Traditional grease traps/ interceptors cannot handle the grease coming from dishwashers as the water comes in too and too fast . The grease from a dishwasher bypasses the trap and interceptor . A traditional grease trap / interceptor do not properly control the flow of the water to allow the grease to cool and settle.

Because it will have been in the trap for some time, grease collected in this way will have been contaminated and is unsuitable for further use. This kind of grease is referred to as brown grease . Imagine leaning a fresh chicken in your refrigerator for longer than two weeks . The rancid smell would be unbearable. There is no difference between rotten food and brown grease . Brown grease ends up in a landfill or hazardous waste site. The essential difference between a GRD and a traditional trap or interceptor is that the GRD constantly removes the captured grease into a separate container and thus maintains its efficiency. A good GRD will have the following.

- A)** Means of preventing the food scraps from entering the tank ( a strainer basket)
- B)** Effluent flow control to give time for the grease to cool and separate from the effluent ( retention time using tube stabilizer )
- C)** Means of regularly flushing out the silts which would otherwise collect in the bottom of the tank. ( flush valve )
- D)** Fiber reinforced polymer construction ( no rust or leaking )



A good GRD will take out a minimum of 98 percent of the grease from effluent or higher . GRD's are also referred to active grease traps or active grease recovery devices. Properly installed in the correct kitchen environment a GRD will continuously give high levels of efficiency , ensuring the sewers remain clear with no blockages or back-ups .

A GRD stops the grease at the source. ( The drain )

Grease trap enzymes , chemicals and bacterial agents liquefy the grease and push the grease further downstream.The grease problem is fixed on a temporary basis leading to bigger grease clogs and blockages in the near future.The liquefied grease will end up in the sanitary sewer. This grease will harden causing clogs and blockages.The clogs and blockages will lead to sanitary sewer overflows.Grease trap ordinances and sewer bylaws will result in fines to the restaurant .Grease trap bacteria's are illegal and banned in most counties, cities, states ,provinces,and countries.in the UK certain grease trap manufacturers recommend the "combined approach" as describe by London grease traps.This combination approach uses the mechanical efficiency of the grease trap to physically stop FOGs, along with the biological action of do sing through the direct application of biological agents into the grease trap.It can be highly effective as well as very simple to maintaining and cost effective.

### Grease Trap Sizing

Selecting the correct size of grease trap for a particular application is probably the most difficult task facing the specifier as each installation tends to be unique in the equipment contained in the food production area and the type of food being processed. Unfortunately there are no hard and fast rules to determine the size of trap to be used. How ever there are two areas that do need careful consideration in order to reach a satisfactory conclusion. Clearly,any grease trap must have the hydraulic capacity to cope with the maximum volumetric flow rate entering the trap from the drainage system but in addition, consideration also needs to be given to the concentration of fats , oils and grease within the waste water. For example, a fast food restaurant is likely to produce a higher concentration of FOG's from the production process than that of a salad production plant of the same size.

Very often, grease traps are generally sized on flow rate alone , but this takes no account of the food production process being used . In practice , this is very difficult to assess as the flow rates from various appliances and fittings within the food preparation area are often unknown.

Flow rate alone is therefore not particularly helpful . A more reliable indicator is to combine flow rate with the number of meals per day produced in the food processing area.

### ● **Meals per Day**

A convenient measure for the assessment of FOG loading into a system is to use 'meals per day' and for the convenience of sizing ,1meal per day =1 course of food.For some applications this will be easier to assess than others.Where applicable , the meals per day figure also helps with the application of the correct dosage of biological activator.

For example , a hotel providing three meal sittings on a daily basis for its guests – breakfast (1 course), lunch (3 courses) and evening meal (3 courses) yields a total number of courses for each guest of 7 'meals per day' . If the hotel has total number of 40 double rooms , then the maximum number of meals per day that could be produced is given by :  $7 \times 40 \times 2 = 560$

For other food processing applications , equivalent 'meals per day' figures need to be derived . For fast food restaurant , fish and chip shops , takeaway , etc . use 1meal per day each food portion produced.For example,a burger bar producing 150 portions of burgers and fries together,estimate this as150 meals per day.For sandwich production factories , the grease and fat content will vary according to the type of fillers used in the sandwiches but as a guide , estimate 10 rounds of sandwiches equal to1 meal per day (1 round of sandwich comprises two pieces of bread).

### ● **Flow Rates**

Most kitchen equipment manufactures do provide and publish sizes and capacities of sinks , dishwashers , brat pans and Bain Marie kettles etc.but very often,the specifier and/or the client dose not have this information readily to hand.A wide variation of water capacities of various appliances and fixtures can be found in food processing areas,for example:

- Sinks – 55 liters typically
- Pot wash sink – 130 liters typically
- Brat pans – 75 to 130 liters

- Bain Marie kettles – 80 to 200 liters

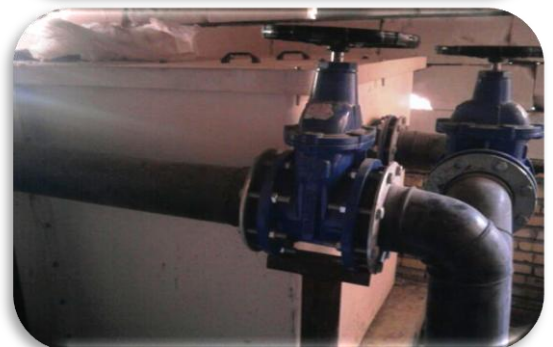
Industrial dishwashers are generally designed to conserve energy and water. Although they usually have a high throughput with a fast cycle time, the net amount of water consumed during each cycle is generally low. Refer to the manufacturer for specific details. To determine the flow rates from sinks for example, calculate the total volume of all fixtures (length cm x width cm x height cm) and divide by 1000 to convert cm<sup>3</sup> to liters. The actual drainage volume is calculated to be approximately 75% of the total fixture volume due to pots, pans and other utensils displacing around 25% of the water volume, therefore:

Actual drainage volume = total fixture volume ( liters ) × 0.75 liters

The drainage period can easily be assessed by a simple test. Fill the empty sink to approximately 75% full, remove the drainage plug and record the time in seconds to completely empty. In practice, it is unlikely that all fixtures and appliances consuming water will be used simultaneously; therefore a reasoned view should be taken depending upon the operational conditions of the process area.

### Benefits of MTgroup Grease Trap

- Compliant with current legislation.
- More than 98% efficiency.
- Hygienic, fully air sealed durable fiber Reinforced Polymer construction.
- Units are supplied complete with universal fittings for simple installation.
- Full access lids allow for ease of inspection and maintenance.
- Standard grease recovery devices available in short period.
- Special dimensions order will be accepted.
- MTgroup service guarantee, readily available spare parts.
- Technical services advice via telephone, on site visits.



- MTgroup units have quick release for swift internal inspection.
- MTgroup units can be removed and re-installed following refurbishments etc.
- MTgroup allows disposal of F.O.G retained in the grease trap to landfill rather than disposal via drains.
- Cost and performance effective.

Regulations require that an adequate drainage system be installed i.e., A drainage system that will work under given conditions, this also includes mandatory installation of a grease interceptor in new & refurbished premises.

### Venting

Grease interceptors must have a vented waste, sized in accordance with code requirements for venting traps , to retain a water seal and to prevent siphoning.

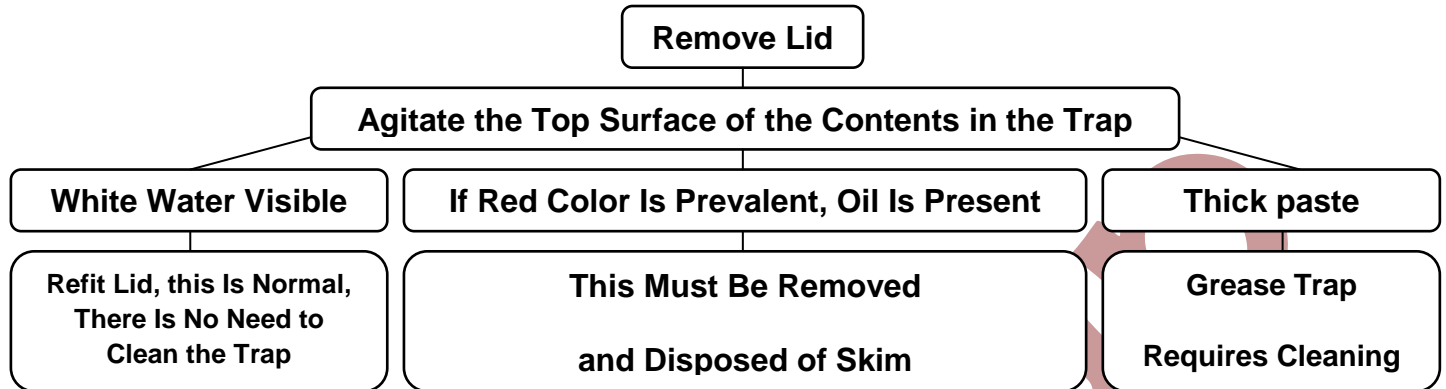
### Cleaning & Maintenance

The importance of Managed Maintenance has already been mentioned , but it is so crucial to the optimum performance of the grease trap that it cannot be stressed enough . A specific cleaning schedule should be worked out that suits particular premises and staff should be appointed with responsibility for checking & cleaning . Instruction (Supplied by MTgroup) should be given to staff on good management and cleaning procedures and training should be an additional consideration . Written instructions should be visually available in the wash-up are at all times.



\*Filters should be used in all wash-up sinks to prevent solid waste entering the trap.





### Variables Affecting Grease Interceptor Performance

- **Velocity of incoming water**

A higher velocity of water will contribute to a more turbulent mixture. This will slow the grease separation process, thereby reducing efficiency.

Recommended solution install additional flow control fitting at all sources of flow.

- **Ratio of Grease to the Water**

The higher the ratio of grease particles to the water, the lower the efficiency of the interceptor. Recommended Solution increase the size of the interceptor.

- **Specific Gravity (Weight) of the Filtrates**

Grease has a lower specific gravity than water and will rise to the surface quickly. Grease-laden food particles having a higher specific gravity than water will linger and accumulate at the bottom, eventually passing out of the interceptor.

Recommended Solution Install a solids interceptor at the source of solid particles, prior to the grease interceptor.

- **Possible Presence of Detergents in the System**

Grease-cutting detergents will break the liquid grease into minute particles that can cause these liquids to pass through the interceptor.

Recommended Solution increase the size of the interceptor.

- **Percentage of Maximum Flow Capacity**

If the maximum recommended flow is exceeded , the efficiency of the interceptor will decrease considerably.

Recommended Solution Install additional flow control fitting at all sources of flow.

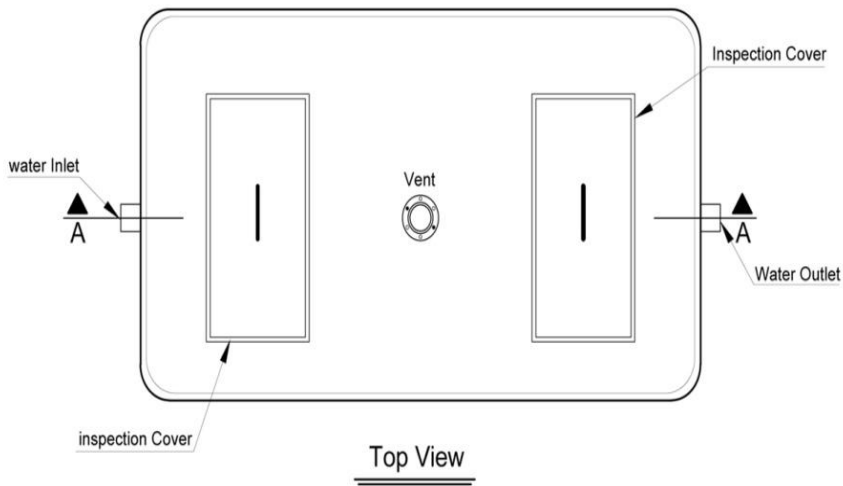
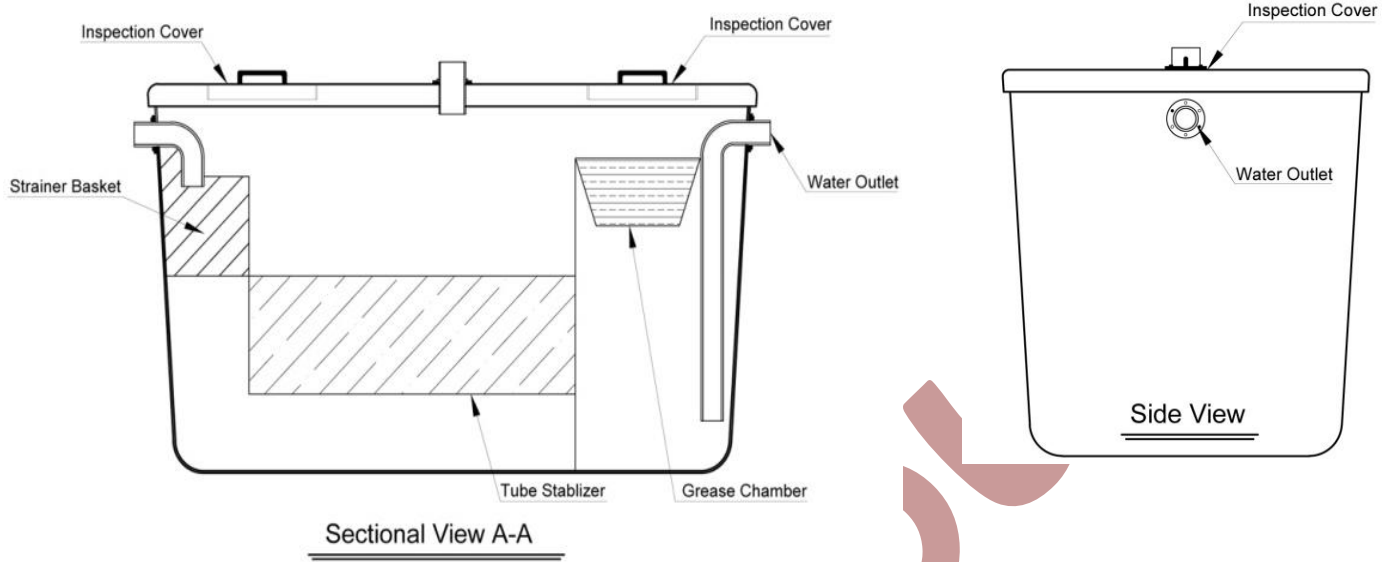
- **Location of Grease Interceptor**

The interceptor should be located as close as possible to the source of grease. Waste pipes leading to the grease interceptor may become clogged if liquid cools prior to entering the grease interceptor.

**MTgroup Dimensional Data**

Model	Capacity liter	Length cm	Width cm	Height cm	Inlet inches	Outlet inches	Grease Outlet inches	Drain inches	Vent Inches	Weight Operation Kg
GT 30	30	48	35	55	2	2	2	1	1	50
GT 60	60	65	45	55	2	2	2	1	1	80
GT 120	120	100	55	55	2	2	2	1	1	130
GT 180	180	117	65	55	2	2	2	1	1	200
GT 500	500	75	70	100	3	3	3	1 1/2	1 1/2	400
GT 750	750	115	70	100	3	3	3	1 1/2	1 1/2	600
GT 1000	1000	100	100	110	4	4	3	2	1 1/2	800
GT 1500	1500	145	100	110	4	4	3	2	1 1/2	1000
GT 2000	2000	200	100	110	4	4	3	2	2	1500
GT 2500	2500	200	100	135	5	5	4	2	2	1900
GT 3000	3000	240	100	135	5	5	4	2	2	2300
GT 3500	3500	270	100	135	5	5	4	2	2	2800
GT 4000	4000	200	150	140	6	6	4	2	2	3200
GT 5000	5000	250	150	140	6	6	4	2	2	3600
GT 6000	6000	300	150	140	6	6	4	3	2	4500

\*Larger capacities will be accepted on request



SECTIONAL VIEW			MTgroup
DWG TITLE : Grease Separators			SCALE :
Drwn by :	CHECKED by :	DWG NO.	Data: 1394.11.25