Grease Trap / Interceptor Specification

ADVICE

This document provides Specifications for **Grease Trap Interceptors**.

This document must be read in conjunction with:

- Qatar Construction Specification (QCS) 2014

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Application: This specification applies with immediate effect from the date of approval

0	Nov 2023	Issued for Restaurants and Food processing units	SR	VB/AK	MODD
Rev	**Date**	**Reason For Issue**	**Author**	**Chk**	**App**

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1. SCOPE

1.1 This part specifies the requirement for the design, manufacture, construction, installation, maintenance, and compliance of grease trap/interceptors to oil and grease from restaurants and food processing units prior to discharge into public sewerage networks.

1.2 This document must be read in conjunction with relevant QCS 2014 Sections and Parts referred as follows:

Section 1 General

Section 8 Drainage Works

Section 9 Mechanical and Electrical Equipment

Section 10 Instrumentation, Control and Automation

Section 20 Drainage Works for Buildings

2. REFERENCES

IAPMO / ANSI UPC 1-2021	Uniform Plumbing Code.
ASME A112	Standardization of Plumbing Materials and Equipment (14.3 & 14.4 Hydromechanical Grease Interceptors).
Plumbing & Drainage Institute	(PD - G 101) – Testing and Rating Procedure for Hydro Mechanical Grease Interceptors.
BS 970 (ISO 683)	Wrought steels for mechanical and allied Engineering purposes.
BS 1646 (ISO 3511)	Symbolic representation for process measurement control functions and instrumentation.
BS EN 1092	Circular flanges for pipes valves and fittings.

Where codes, standards and regulations are in conflict, the more stringent criteria and requirements shall be applicable.

3. SUBMITTALS

The Contractor/supplier shall provide data and information as described as below:

1. Design submittals involving Historic data, Inlet and Outlet guaranteed performance, QCS compliance, Operation philosophy, GA drawings, shop drawings, datasheets, specification, catalogue, past supply references, warranty details of the equipment.
2. Calculations to justify the sizing of the grease trap and flow control devices.
3. End user certificates.
4. Equipment unloading, handling, installation methodology, operation and maintenance manual.
5. Start-up, shutdown procedures and troubleshooting guide.
6. Recommended best Management Practice (BMP) for periodic maintenance and servicing of the equipment.
7. Local representation (agent) and aftersales service provider/agency details.

4. PRODUCTS

4.1 GENERAL

1. A grease trap conforming to be designed and certified to operate efficiently at its maximum flow rate and retain a minimum of twice its rated flow rate in kgs of grease. The larger the trap the higher the flow rate it will handle efficiently with a greater quantity of grease retained before cleaning is required.
2. Fixture drainage period in combination with the service required and the quantity of wastewater involved, establishes the rate of flow through the grease trap. Flow rate is therefore the primary gauge; and flow rate establishes interceptor size or capacity.
3. The link between flow rate and installation to produce satisfactory grease interceptor operation is a Flow Control Fitting. A correctly sized grease interceptor will not regulate the flow of water discharged from the fixture it is serving. Therefore, to ensure that the flow rate does not exceed the grease interceptor's rated capacity, a Flow Control Fitting is required. The Flow Control Fitting is essential for protection against overloading the grease interceptor which could otherwise occur from sudden surges from the fixture. The Flow Control Fitting will always control the flow of wastewater, enabling the interceptor to operate at its certified capacity.
4. A separate grease interceptor is recommended for each commercial dishwasher. The size of the interceptor is determined by the flowrate discharge rate of the dishwasher as specified by the manufacturer. Select proper interceptor of equivalent or next higher rate.
5. All installations must be readily accessible for inspections and maintenance.
6. These units shall be connected to individual fixtures, including low temp dishwashers (<40°C), sinks, and other drains with a potential for receiving grease. In such cases, units will be considered acceptable only if appropriate flow control fittings are provided to prevent overloading of the Grease Trap/Interceptor and to allow for proper operation.
7. Only wastewater discharges from kitchen facilities (i.e., sinks, low temp dishwashers(<40°C), etc.) shall pass through the grease interceptor. Discharges from restrooms shall enter the wastewater service lateral downstream of the Grease Trap/Interceptor.

4.2 GREASE TRAP / INTERCEPTOR REQUIREMENTS

Factors affecting performance of Grease Trap/Interceptors:

1. Several factors can affect the performance of a grease trap:
   a) Wastewater temperature,
   b) Solids concentrations
   c) Inlet conditions
   d) Retention time
   e)
2. The main application of grease trap is treating kitchen wastewaters from cafeterias, restaurants, hospitals, schools, motels, and other institutions with large volumes of kitchen wastewaters.
3. Influents to grease traps usually contain high organic loads including grease, oils, fats, and dissolved food particles, as well as detergents and suspended solids. Sanitary wastewaters are not usually treated by grease traps. Wastewater from garbage grinders should not be discharged to grease traps as the high solids' loadings can upset grease trap performance and greatly increase both solids' accumulations and the need for frequent pump out.
4. By placing the grease trap close to the source of the wastewater (usually the kitchen) where the wastewater is still hot, grease separation and skimming (if used) are facilitated. As previously

mentioned, high solids concentrations can impair grease flotation and cause solids to build up on the bottom, which necessitates frequent pump out. Flow control fittings should be installed on the inlet side of traps to protect against overloading or sudden surges from the sink or other fixtures. These surges can cause agitation in the trap, impede grease flotation, and allow grease to escape through the outlet. Hydraulic loading and retention time can also affect performance. High loadings and short retention times may not allow sufficient time for grease to separate fully, resulting in poor removals. Maintenance practices are important, as failure to properly clean the trap and remove grease and solids can result in excessive grease buildup that can lead to the discharge of grease in the effluent.

5. Grease trap/interceptor locations to be adequately ventilated to avoid odour buildup.
6. Grease traps shall be equipped with devices to control the rate of water flow so that the water flow does not exceed the rated flow.
7. To deal with largely varying flow, if required necessary attenuation storage shall be considered in the design.
8. Design should ensure that the flow control component of the system is not clogged frequently.
9. Must be located as close to the source of the grease generating fixture as physically possible, while remaining accessible for maintenance.
10. All traps/interceptors are to be installed with “grab sample” capability.
11. Dishwashers, steamer units, other high temperature sources, and garbage grinders shall not piped directly to “under-the-counter” or below ground-type grease traps.
12. Solids separation is required on all traps less than 2000 liters total volume.
13. Each establishment is required to have a trap/interceptor installation.
14. Multiple establishments manifolded to 1 trap/interceptor are not allowed except where explicitly approved in writing by the engineer.
15. Minimum gradient of 1 in 50 on the inlet pipe.
16. The design of the traps/interceptors should permit easy access and inspection of internal parts. Further, the design to Facilitate prompt trouble shooting and routine maintenance as well.
17. A removable cover is set on top of the grease trap to provide accessibility to the inside of the grease trap when clearing or cleaning the grease trap. The cover or lid must have a gasket to properly seal the grease trap and prevent water from overflowing when water passes through the grease trap chambers.

5. DESIGN AND SIZING

The following two equations are used for restaurants and other types of Commercial kitchens:

A. For Restaurants and Food Service Establishments with Fixed Seating

Size (liters) = D x L x SF x (HR/2) x LF

D = Number of seats in dining area

L = Liters of wastewater per seat. Typically, 19.0 liters of wastewater per meal

SF = Storage capacity factor

- 1.7: for single service kitchen
- 2.5: for fully equipped commercial kitchen

HR = Number of hours open

LF = Loading factor

1.25: Locations adjacent freeways

1.00: Other freeways, recreational areas, & tourist areas (high concentration of food serving establishments

0.80: Main highways

0.50: Other highways

B. For Catering, Hospitals, Nursing Homes & Other types of Commercial Kitchen's with Varied Seating Capacity and Room Service.

Size = M x GL x SF x 2.5 x LF

M = Number of meals per day

GL = Liters of wastewater per meal. Typically, 17.0 liters of wastewater per meal

SF = Storage capacity factor

1.7: Minimum or

2.5: On site disposal

LF = Loading factor

1.25: Garbage disposal & dishwashing

1.00: w/o disposal

0.75: w/o dishwashing

0.50: w/o disposal & dishwashing

C. Typically used where there is very limited seating, e.g., temporary waiting area with no dining tables or No Seating at all

1. The flow capacity (l/s) of the trap is calculated by determining the volume of each fixture that will be connected to the grease trap. Typically, this will be done by multiplying the fixture's width by its length by its depth. The volumes of each fixture will be added to one another to arrive at an overall volume of all the fixtures discharging to the grease trap. Next, the volume must be converted to liters and divided by an unloading rate of two (2) minutes. Recommended minimum flow-rate capacities of traps connected to different types of fixtures are given in below Table.

S.No.	Type of Fixture	Flow rate	Grease Retention Capacity Rating	Recommended Maximum Capacity per fixture connected to trap
		l/s	Kg	Lit
1	Restaurant Kitchen sink	0.95	14.0	190.0
2	Single compartment scullery sink	1.26	18.0	190.0
3	Double compartment scullery sink	1.58	23.0	237.0
4	2 single compartment sinks	1.58	23.0	237.0
5	2 double compartment sinks	2.21	32.0	331.0
	Dishwashers for restaurants			
6	Up to 114lits water capacity	0.95	14.0	190.0
7	Up to 190lits water capacity	1.58	23.0	237.0
8	Up to 190 to 378lits water capacity	2.52	36.0	379.0

2. These types of traps/interceptors are only permissible for food service establishments with limited to no seating. Examples of these food service establishments are: Takeaway Shops, Parlors, establishments, Candy/Chocolate Shops, Coffee Shops, etc.,
3. The capacity (sizing) of traps/interceptors will be calculated by multiplying its trap retention time by its flow capacity. This sizing method often (though not always) results in a calculated volume that is small enough to enable a unit to be placed "Under the Counter" or "On the floor". The components of this calculation are as follows:
4. The flow capacity of the trap is calculated by determining the volume of each fixture that will be connected to the grease trap. Typically, this will be done by multiplying the fixture's width by its length by its depth. The volumes of each fixture will be added to one another to arrive at an overall volume of all the fixtures discharging to the grease trap. Next, the volume must be converted to liters and divided by an unloading rate of two (2) minutes.
5. The trap retention time (min) shall be a minimum of two (2) minutes, to a maximum of ten (10) minutes, and will vary in accordance with the table found below:

S.No.	Type of Food Establishment	Retention Time (mins)
1	Beverage Shops (serving no food)	2
2	Establishments w/o Fryers such as: Sandwich Shops, Coffee Shops (serving food), Ice Cream/Yogurt/Gelato Shops, and Candy/Chocolate Shops	4
3	Pizza Parlors and Food Establishments Using Baking Sheets/Pans	6
4	Food Establishments that have Some Fried Items on Menu	8
5	Food Establishments that Primarily Serve Fried Food	10

6. The minimum grease trap size for bakeries of any type shall be 950 liters capacity.
7. When required, a solids separator shall be provided to a volume that is 5% of that of the grease trap.
8. The minimum grease retention capacity for interceptors shall be at least two times the flow-through rate.

6. GREASE TRAP CONSTRUCTION

1. Grease Traps to be constructed by SS316 material unless otherwise specified elsewhere in the specification.
2. Grease traps must be level, located where they are easily accessible for cleaning and close to the wastewater source. Where efficient removal of grease is very important, an improved two-chamber trap has been used which has a primary (or grease- separating) chamber and a secondary (or grease-storage) chamber. By placing the trap as close as possible to the source of wastewaters, where the wastewaters are still hot, the separating grease at the surface of the first chamber can be removed by means of an adjustable weir and conveyed to the separate secondary chamber, where it accumulates, cools, and solidifies. This decreases the requirement for cleaning and allows better grease separation in the first chamber.
3. The inlet, outlet, and baffle fittings are typically of "T" design with a vertical extension 30 cm from the tank floor and reaching well above the water line.

7. INSTALLATION

1. All permitting, construction, and inspection activities must be completed in accordance with all current policies, standards, permits, and guidelines.
2. Grease Trap/Interceptors are to be installed at a minimum distance of 5mt from sinks and dishwashers to allow for adequate cooling of wastewater. Water temperatures must be less than 60°C prior to entering the Grease Trap/Interceptor.
3. All grease bearing waste streams should be routed through an appropriate Grease Trap/Interceptor, including but not limited to compartment sinks, pot/pan sinks and any other sources which are placed inside kitchen.
4. The following fixtures SHALL NOT be connected to a Grease Trap/Interceptor: Garbage disposals, high temp dishwashers (water temperatures greater than 60° C) and exterior mop sinks.
5. A sample port shall be installed on the effluent line of the grease trap/interceptor. The port shall be minimum of 100mm in diameter and be connected to the wastewater line at a 90-degree angle to allow for visualization and sampling activities.
6. Hazardous wastes, such as acids, strong cleaners, pesticides, herbicides, paint, solvents, or gasoline should not be disposed of where they would go through grease or grit traps. If commercial dishwashers are discharged through a Grease Trap/Interceptor, care must be taken in system design. Dishwashers use detergents and elevated water temperatures that will melt grease. If the interceptor is either too small or too close to the commercial dishwasher, grease may pass through the interceptor and into the collections system.
7. Grease traps should, whenever possible, be located outside the establishment.

8. MAINTENANCE

1. Cleaning and maintenance of the Grease Trap/Interceptor or oil/water separator shall be the responsibility of the establishment. It shall be the responsibility of the establishment to inspect the Grease Trap/Interceptor or oil/water separator during the pumping or maintenance procedure to ensure that the cleaning is done properly and that all fittings and fixtures inside the interceptor, or separator are in working condition and functioning properly.
2. Each interceptor in active use shall be cleaned frequently as needed to prevent carryover of grease into the collection system as SOP for maintaining the unit. Additional pumping may be required during time periods where increased loading is anticipated.
3. Grease Trap/Interceptors shall be pumped out completely in accordance with the minimum frequencies outlined above, or more frequently as needed to prevent carryover of grease into the collection system. If the pump-out frequency is monthly there shall be a minimum period of three weeks between each required pumping.
4. All waste removed from each interceptor shall be disposed of at a facility permitted and authorized to receive such waste in accordance with all applicable local regulations.

9. COMPLIANCE

1. Determination of Compliance with Maintenance Requirements

Grease Trap / Interceptor shall be considered out of compliance if any of the following conditions exist:

A. The grease layer on top exceeds 6 inches in depth as measured by an approved dipping method.

B. The solid layer on the bottom exceeds 8 inches in depth as measured by an approved dipping method.

C. The total volume of captured grease and solid material displaces more than 20% of the capacity of the interceptor as calculated using an approved dipping method.

D. The removal efficiency, as determined by sampling and analysis of D or TSS, is less than eighty Percent (80%).

E. FOG from interceptor contains more than 100 mg/l.

F. Emulsifiers are used; and

G. Temperature more than 60° C.

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