11.5 APPENDIX

Fat, Oil ang Grease (FOG) Management

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Fat, Oil & Grease (FOG) Management of Wastewater systems: Specification for Tenant Fit Out

Introduction

For sites involved in the preparation and sale of food it is mandatory that grease trapping and recovery equipment is fitted to cover all sources of contamination in the wastewater leaving the demise to prevent fat, oil and grease (FOG) from entering the Landlord's drainage system.

Grease trapping equipment shall be fitted to cover all lines which will be used for conveying kitchen wastewater. The Tenant's grease trapping equipment selected shall be test certified and installed by a licensed plumbing professional in accordance with the plumbing standards. Once installed the equipment shall be maintained to a high standard by a specialist licensed contractor and service records shall be kept on site for auditing by the Landlord. In addition, the Tenant's site staff shall be trained to check the equipment on a daily basis to ensure its full operating efficiency is maintained.

Discharge of any FOG into the Landlord's drainage system will not be permitted. If this does occur the Landlord will seek to recover costs for any blockages or contamination which arise from FOG discharged from unprotected lines or ineffective grease management equipment in addition to imposing remedial works within the Tenant's demise prior to permitting food preparation operations to recommence.

Background

The term FOG is used to define material which is either liquid or solid, composed primarily of Fat, Oil and Grease from animal and vegetable sources. It is generated by the preparation and cooking of food and subsequent plate scraping and pot/ware washing. FOG must be treated, reduced and removed from the wastewater in the kitchen to avoid it entering the Landlord's drainage system and subsequent discharge to the local authority/sewerage company.

Kitchen wastewater is complex, with components that float and sink, added to which is the issue of differing water temperatures of the discharge, plus the rate of discharge and impact of detergents. Effective FOG removal is also affected by the residence and contact time within the recovery equipment, so by maximising the time that a system has to work on the wastewater will improve the effectiveness of the FOG recovery.

Legislation:

The following legislation shall be complied with:

- UK Water Industry Act 1991
- Approved Document H building regulations – Drainage and Waste Disposal, 2015 Edition.
- Passive grease traps shall be certified, designed, installed, operated and maintained in accordance with BS.EN 1825:2004 and BS.EN.1825:2002.
- Grease removal units (GRUs) shall be designed, tested and certified to Standard PDI-G101.
- Environmental Protection Act 1990
- Food Safety & Hygiene Regulations 2013 & European Regulation (EC) No. 852/2004*
- Construction Products Regulations (CPR) requirement under the Scope of harmonised European standards (hEN's) for CE marking

- BS EN12056-1:2000 with regards to the health and safety of users and occupiers and the penetration of toxic or noxious odours in buildings

*Relates to ensuring grease is not allowed to build up and that premises and equipment are cleaned regularly to remove grease and dirt

Site Evaluation & FOG Audit

Any item of equipment in a foodservice operation, including those that do not have a direct water connection, has the potential to contribute to FOG entering the drainage system and so must be taken into consideration. This shall include:

- Combination ovens
- Steamers
- Rotisserie ovens
- Fryers
- Wok stations
- Dish and pot washer machines
- Sinks – pre wash prior to going into the dishwasher / pot wash / preparation sink
- Floor gullies* – receiving wastewater from floor cleaning regime
- Beverage equipment – where dairy product or coffee residue are sent to drain
- Ventilation system (including cooker hoods, soot abatement and spark arrestor hoods) incorporating a drain for water wash down.

Note: * Floor gullies receiving FOG from the cleaning regime or residue from bratt pans, boiling pans/kettles, ovens, cookers etc are not permitted unless they discharge into a grease recovery unit; note this is subject to prior agreement with the Landlord. Floor gullies shall have lockable covers to prevent misuse and capture any food particulate.

The kitchen designer shall ensure that all areas of the kitchen which can generate FOG are identified early in the design process. Consideration shall be given to how the FOG will be removed from the wastewater, based on the drainage connections that are available to the Tenant's demise and route through the kitchen.

An independent FOG audit shall be carried out on behalf of the Landlord at both the design and installation phase of the Tenant fit out process. The audit will determine the level of trade, the selection and location of grease management equipment within the kitchen, compliance with the legislation and Landlord lease agreements and the maintenance procedures and training in place and a review of the Tenant's submitted sizing calculations. The cost of the audits shall be borne by the Tenant. The audit shall be carried out by the Landlord's approved FOG audit consultant.

Equipment Solutions

Best practice will involve a combination of product types to maximise the removal and treatment of FOG prior to discharge of wastewater to the drains. Care should be taken with combining discharges into a common grease removal unit, as combining for example a plate scrape sink waste with a dishwasher waste could result in the hot emulsified water from the dishwasher reducing the effectiveness of the grease removal unit to separate the grease. Additionally, the grease removal

equipment selection for hot waste discharges (ie dishwashers, ovens etc) shall be carefully selected to allow sufficient residency time for the waste to cool and grease to separate prior to the wastewater discharging to drain.

The equipment types and their recommended applications are as follows:

Grease separators:

An EN1825 certified grease separator/grease trap is a passive device which works by slowing the water flow rate allowing the FOG to rise to the surface. The FOG is retained within the unit by baffles, whilst food waste drops to the bottom of the tank and wastewater flows away to drain.

Sizing of the unit is dependent on the residence time required for the wastewater to cool and water flow rate to slow sufficiently for the FOG to rise to the surface. This type of unit requires regular cleaning out, servicing and maintenance by licensed contractors to deal with the waste product.

Grease removal units (GRUs):

A PDI-G101 certified grease removal/recovery unit is an automated, mechanical grease trap. It is installed at source directly on the appliance discharge pipework. It works by mechanically skimming the FOG from a tank that contains the wastewater and automatically discharges the oil content of the trap into an external container for manual disposal.

The sizing of the unit will impact on the frequency of manually emptying the external container. Additionally where the wastewater discharge is of high temperature the unit shall be sized for adequate residency time to allow the wastewater to cool sufficiently.

Where discharges are laden with detergents from sinks and dishwashers, the ability of the GRU to separate the FOG shall be carefully selected to allow it to cool and provide sufficient residence time; the respective GRU shall also not receive any FOG laden discharge from any other devices.

Biological / bacterial based dosing systems:

Bioremediation is the use of micro-organism metabolism to remove pollutants in the wastewater. Biological or bacteria-based dosing systems use cultures designed to biologically break down the FOG in the drainage system into carbon dioxide and water.

The use of this type of system as a primary source of FOG treatment is not permitted by the Landlord. The reason being that it is based around treating the FOG which has already been discharged into the Landlord's drainage system. In addition, the effectiveness of the rate at which the micro-organisms can act on FOG are affected by the temperature, pH, detergent, wastewater flow rate and subsequent level of micro-organisms in the wastewater and the amount of time that they get to act on the FOG and in practice the biocide typically emulsifies the grease which then reforms in the drain line.

However, the use of biological dosing in a multiple equipment configuration shall be permitted, where they are utilised as the secondary component of FOG treatment to grease separators and removal units. Used in this manner the potential to prevent FOG from entering the Landlord's drainage is improved.

In all cases specialist advice must be sought on the correct sizing and location of all FOG recovery devices to suit the wastewater discharge volumes, temperatures, types and locations.

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Service & Maintenance

Service and maintenance shall be carried out by licensed contractors as the waste products are regarded as a hazardous waste. FOG recovery devices will only work efficiently if they are correctly serviced and maintained.

To ensure the units are easily maintainable, the location and accessibility of the units shall be carefully selected to ensure that full access for cleaning and maintenance can be afforded.

If kitchen staff are part of the routine daily maintenance schedule, with emptying containers and cleaning wheels on a GRUs for example, then this process will need to be included in the kitchen manuals and working procedures of the nominated staff together with appropriate training.

Kitchen Good Practice

All kitchen staff should be provided with training to understand the requirements for preventing FOG from entering the Landlord's drainage system, including the company, Landlord and legal policies for disposal of FOG.

In addition, nominated staff should be responsible for ensuring the FOG removal equipment is operational and not full or blocked with grease and food waste particulate.

Plates should be scraped with a spatula, then dry wiped to remove and residual food waste and FOG prior to being placed in the dishwasher.

Tenant Types Summary

The following summary detail the various Tenant food service/retailer types and the subsequent FOG recovery device recommended for installation:

<u>Type A</u>

Cafés (serving only hot drinks and precooked foods) – provider should seek professional guidance and must ensure:

- Drains exposed to coffee grinds are protected with coffee sediment traps
- The main wash areas must include adequately sized grease separators to collect fat, oil and grease arising from the production of hot drinks.

<u>Type B</u>

Smoothie Bars (including Yogurts/Milkshakes/Fruit Juices/Salads) – provider should seek professional guidance and must ensure:

- Drains exposed to fruit pulp or solid waste i.e food waste have in-line food filter traps installed to prevent this waste entering the Landlord's drainage
- Drains that are exposed to coffee grinds are protected with coffee sediment traps
- Where milk, yogurt and ice creams are used in the preparation of smoothies or juices adequately sized grease separators must be installed to protect the Landlord's drainage.

Type C

Bakery's (including Cookie Stands/Cake Stands) – provider should seek professional guidance and must ensure:

- Drains that are exposed to coffee grinds are protected with coffee sediment traps
- All utensil/equipment wash sinks have suitably sized grease separator/grease removal units installed

Type D

Restaurants (Grills/Diners/Fast Food/Cafes (serving hot food)/Staff Canteen (serving hot food)) – provider should seek professional guidance and ensure:

- Preparation sinks have in-line food filter traps installed to prevent solid waste entering the Landlord's drainage
- All equipment/utensil wash sinks must have adequately sized grease separators/grease removal units installed
- Where dishwashers are installed and waste effluent laden with fat, oil and grease is discharged to drain, suitably sized grease removal units must be installed (serving only the respective equipment) to ensure the FOG does not enter the Landlord's drainage
- Drains that are exposed to coffee grinds are protected with coffee sediment traps.

Other Equipment Requiring FOG Management Review

Combination Ovens

Where combination ovens are connected to drain:

- Tenant must install suitably sized grease recovery/grease removal units to protect Landlord's drainage system
- Staff training shall be advised on best management practices to ensure staff are well trained in how to manage FOG produced during the cooking process

WOK Cooking Stations

Where WOK Cooking Stations are connected to drain:

- Tenant shall install suitably sized grease separator/grease removal units to protect Landlord's drainage system
- Staff training shall be advised on best management practices to ensure staff are well trained in how to manage FOG produced during the cooking process

Dishwashers & Washing Machines

Where dishwashers and/or washing machines are connected to drain:

- Tenant shall install suitably sized grease removal units to protect Landlord's drainage system. The GRU shall serve only the associated dishwasher machine and not be connected to discharges from other appliances or sinks. This shall be subject to manufactures guidance and demonstration of sizing that the GRU can handle the flow from the sink and dishwasher.

- Staff training shall be advised on best management practices to ensure staff are well trained in how to manage FOG produced during the cooking process

Rotisserie Ovens

Where rotisserie ovens are connected to drain:

- Tenant shall install suitably sized grease separator/grease removal units to protect Landlord's drainage system
- Staff training shall be advised on best management practices to ensure staff are well trained in how to manage FOG produced during the cooking process

Floor Gulleys/Floor Drains

Floor gulleys/floor drains within the unit shall not be permitted for drainage of any FOG laden wastewater, unless by prior agreement with the Landlord and the following criteria are adhered to:

- Floor gulleys/floor drains used to dispose of mop water laden with FOG or used to dispose of any other FOG contaminated effluent shall only be permitted where a grease separator/removal unit can be installed below the floor level; this shall be by prior agreement with the Landlord only.
- Floor gulleys/floor drains shall not be used to dispose of waste FOG from the food preparation process.
- Discharge into floor gulleys from any equipment in the kitchen shall not be permitted unless by prior agreement with the Landlord. Where permitted a grease separator/removal unit shall be installed.
- Floor gulley/floor drains shall be fitted with security gratings to prevent unauthorised access to the gulley and fitted with a cover to capture food particulate and debris.
- Where the grease separator/removal unit is permitted and located away from the tenants' demise, the Tenant-owned interconnecting pipework between the floor gulleys/floor drains shall be provided with a biological dosing system.

Extraction Canopies

Where ventilation extract canopies are fitted, the tenant shall ensure:

- Where extraction canopy filters have removable front screen filters that allow in-house maintenance/cleaning, the Tenant shall ensure this practice is carried out in areas where adequate grease management equipment is in place
- If filters are cleaned in a dishwasher the Tenant shall ensure suitably sized grease removal units are installed.
- Where water wash hoods are connected to drain (ie for soot and spark arrestor removal), the Tenant shall install suitably sized grease recovery/grease removal units to protect Landlord's drainage system

Preparation Sinks

- All preparation sinks shall have in-line food waste filters installed to prevent solid waste entering the Landlord's drainage.

Food Waste Disposal Units/Macerators

Food Waste Disposal Units/Macerators systems to dispose of food waste or other to Landlord's drainage will not be permitted.

Sugar/Syrup (Carbonated drinks)

Where syrups are entering the drain from the production of carbonated drinks, a localised stream of constant running water must be evident to ensure adequate dilution and prevent the sugar corroding the infrastructure drainage.

Sizing, Performance & Maintenance

All grease separators installed shall have a 98% efficiency rating (98% FOG removal rate). The Landlord will if necessary, take effluent samples for laboratory analysis to monitor contamination levels if the performance of the installed equipment is found to be a problem in use.

Equipment selections shall be submitted to the Landlord for review during the design phase. This shall include sizing calculations, manufacturer's test certification, independent test certification (demonstrating 98% efficiency), PDI-G101 certificate of performance and EN1825 compliance.

The discharge/outlet pipe from each FOG trap shall include an easily accessible access point within the Tenant's demise to provide a visual inspection of the pipe to check for signs of any FOG bypassing the FOG trap.

<u>Grease Separators – Sizing, Performance & Maintenance</u>

Sizing:

For single bowl sinks, size grease separator to minimum of 75% capacity of bowl volume

For multiple sinks connecting to a grease separator, apply a 2/3rds equation as a minimum – capacity of the grease separator should be no smaller than 66% (2/3rds) of combined sinks volume.

Plans for sizing, including supporting calculations shall be submitted for Landlord approval.

Maintenance:

Maintenance shall be in line with manufactures' guidelines; but be no less than quarterly by a licensed contractor. Service records detailing contractor name, date of visit, waste removed and details of where the waste is being disposed of must be left on site for inspection after each visit.

Weekly in-house skimming shall be carried out, with a log of times and dates kept

<u>Grease Removal Units (GRU's) – Sizing, Performance & Maintenance</u>

Sizing:

Grease Removal Units should be sized by the provider/manufacturer ensuring all equipment connecting in to the GRU is taken into consideration (including dishwashers where applicable).

Plans for sizing, including supporting calculations shall be submitted for Landlord approval.

Maintenance:

Maintenance shall be in line with manufactures' guidelines; but no less than quarterly maintenance by a licensed contractor. Service records detailing contractor name, date of visit, waste removed and details of where the waste is being disposed of must be left on site for inspection after each visit.

Daily in-house maintenance in line with the manufacturer's recommendations shall be carried out, with a log of times and dates kept.

User Training

Tenants must ensure that operators of FOG management equipment have been trained on the daily/weekly/monthly requirements of the system in-place. Tenants must ensure that the disposal of any waste FOG is conducted in accordance with waste management guidelines see below. Evidence of training must be recorded and kept on site for inspection.

Waste Disposal

Material removed from grease management equipment is considered to be hazardous waste and must be disposed of correctly. There are additional legal requirements that govern the disposal of FOG waste and the Tenant has a responsibility to ensure that their licensed contractor is acting in compliance of the law and the site requirements.

Service records shall be ready for inspection at all times and detail time & date of service visit along with details of how much (litres) waste was removed and where the waste was taken.

Non-compliance

It is the responsibility of the Tenant to ensure that all sources of contamination are prevented at source and before entering the Landlord's drainage system. Where there is not one common drain connection it may be a requirement to install multiple systems to protect the drainage.

The Landlord shall carry out regular FOG audits to identify any sources of contamination, the Tenants grease management equipment in-place and maintenance procedures.

The routine inspections will involve:

- Checking correctly sized and certified equipment is installed
- Checking daily / routine maintenance is carried out and at the correct frequency including for seasonal variations in the number of covers served
- Checking contractor maintenance records
- Checking the condition of the FOG traps
- Checking the FOG trap discharge pipe condition for signs of FOG bypassing the trap.

The Landlord will be working with all tenants to ensure that compliance with the above specification can be met. If during a routine inspection it is identified that the Tenant is operating out of the Landlord's designated specification, Tenants will be notified in writing informing them of the actions required to bring the site into specification. A time frame for these additional measures will be agreed, however this must be completed in a time frame less than 60 days.

Recommended Products

Grease Separators

Subject to receiving EN1825 certification the following equipment is recommended:

- GreaseMaster
- FOGtrap
- Grease Management UK
- Goodflo Ltd

Grease Removal Units

PDI-G101 certified

Subject to an independent assessment of the PDI-G101 certification to demonstrate the achievement of 98% removal as per Sizing, Performance & Maintenance above, the following equipment is recommended:

- Big Dipper GRU models W-200-IS, W-250-IS, W350-IS
- Grease Inceptor - Trapzilla TZ-1828
- Grease Guardian – GGX-15, GGX20, GGX25, GGX35
- GreaseShield – All models

Sediment Traps

Recommended sediment traps are as follows:

- FilterShield
- SSGT1 - Fresh Mesh

Floor gulleys/drains

Not permitted for FOG waste.

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Example FOG audit checklist:

Below is an example checklist of the Tenant's management system/process requirements for review as part of the initial design stage FOG audit by the appointed FOG audit consultant.

Item No.	Item.	Confirmation/Detail.
1.0.	Kitchen layout and drainage drawing attached?	Yes/No
1.1.	Area usage highlighted/labelled *i.e. preparation area, dishwash area*	Yes/No
1.2.	Sink bowl dimensions (on 3 axis) labelled/included	Yes/No
2.0.	Are there any combi ovens with drainage connections for discharge	Yes/No
2.1.	Are details provided in the kitchen layout drawing	Yes/No
3.0.	Are food waste disposal units /macerators being proposed	Yes/No
3.1.	Are details provided in the kitchen layout drawing	Yes/No
3.2.	Has the operation/usage of this equipment been approved by the landlord	Yes/No
4.0.	Are there coffee machines with connection to drain	Yes/No
4.1.	Are details provided in the kitchen layout drawing	Yes/No
4.2.	Are in-line filters proposed to filter coffee grind from the discharge	Yes/No
4.4.	Full technical specification of coffee grind filter(s) attached	Yes/No
5.0.	Fat, oil and grease (FOG) management equipment/maintenance proposal attached including index for relating proposed equipment to the correct area	Yes/No
5.1.	Are all equipment(s)/areas detailed in the Landsec Technical Guide detailed as requiring protection covered by the FOG management proposal	Yes/No
5.2.	Are details of incoming connections to the proposed FOG management equipment included/detailed	Yes/No
5.2.	Full technical specification documents of FOG management equipment attached, including manufacturer's test certification	Yes/No
5.3.	Details of proposed maintenance (both in-house and specialist) attached	Yes/No
5.4.	Calculations provided for the FOG trap sizing	Yes/No