

BETTER MANAGEMENT OF FATS, OILS AND GREASES IN THE CATERING SECTOR





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SUMMARY

All catering outlets use fats and oils, spending significant amounts of money on their use and disposal. Fats, oils and greases also have a major impact on the environment. They block sewers when put down sinks, and pollute any streams and rivers when put down building drains and gullies.

People now eat out more often than they did in the past and the number of food outlets is increasing. Problems associated with fats, oils and greases in the sewer system are also on the increase. Any catering outlet disposing of fats, oils and greases down sinks and drains can potentially cause damaging and costly drainage problems, which may affect their reputation or even restrict their operations.

This Good Practice Guide is intended to help catering premises of all sizes and types to save money and avoid drain blockages by improving their management of fats, oils and greases (also known as FOG). The Guide describes:

- the costs and issues associated with fats, oils and greases in catering;
- ways in which restaurants, canteens, etc can reduce their use of fats and oils;
- treatment methods in the kitchen;
- recovery and disposal of waste fats, oils and greases;
- the importance of staff training, including a checklist for you to copy;
- legal requirements affecting the use and disposal of fats, oils and greases.

Industry examples throughout the Guide illustrate the cost savings and other benefits that catering outlets have already achieved by adopting best practice.

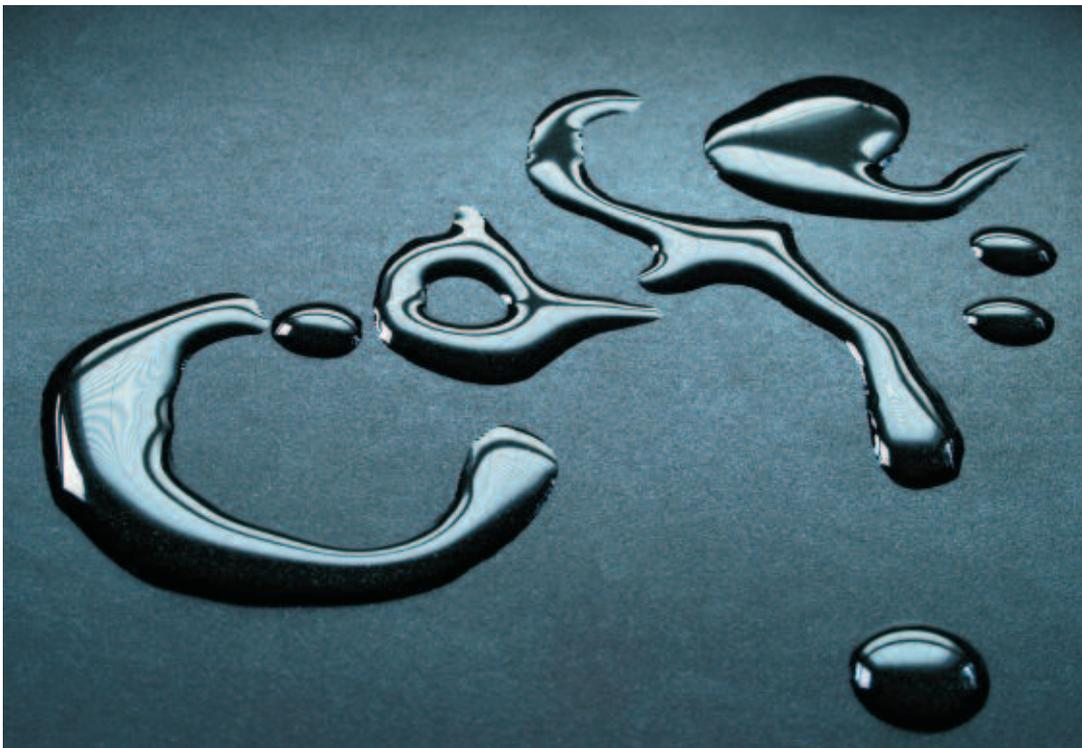
The Guide includes an action plan for the better management of fats, oils and greases in the catering sector. It also gives details of the free advice and information available from Envirowise and other organisations.

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1 INTRODUCTION

Fats and oils are used by numerous catering businesses and services in the preparation and cooking of food. However, fats, oils and greases (sometimes known as FOG) are putting an increasing burden on drainage systems as they can build up and cause blockages when washed down sinks. If they are put into surface water drainage, they can pollute local streams and rivers. Where premises are not on mains drainage systems, fats, oils and greases must be removed from wastewater to allow septic tanks or the local sewage treatment system to work properly.



There are considerable costs involved in the purchase and disposal of fats, oils and greases and in the cleaning necessary to combat them in a kitchen. If they are disposed of carelessly and drain blockages occur, then the costs to a business in terms of both money and disruption can be significant. There are also increasing legal requirements to comply with.

This Good Practice Guide is intended to help businesses and other organisations¹ that use fats and oils to save money and reduce their impact on the environment by managing these materials better.

¹ The scope of this Guide is indicated in section 1.3.

1.1 BENEFITS OF BETTER MANAGEMENT OF FATS, OILS AND GREASES

Although the effects of fats, oils and greases are more or less unavoidable, action can be taken to minimise their impacts and associated costs.

Even small reductions in the amount of fats and oils used can result in quite significant savings, reflecting the reduced cost of buying in and disposing of fats and oils (and reduced cleaning costs).

All commercial hot food kitchens are likely to use sufficient quantities of fats and oils in their cooking to make it worthwhile to take precautions to prevent the discharge of fats, oils and greases to the drains. The cost of measures to prevent fats, oils and greases from entering the drainage system can be offset against the potentially high costs of blockages and legal action.

Examples of key areas where savings can be made are summarised in Table 1. The Guide also contains short industry examples to illustrate the benefits achieved by catering businesses that have taken action.

Indian restaurant saves money through changes to menus and cooking methods

A city-centre Indian restaurant serves some 1,200 covers/week and has an annual turnover of £2.6 million. It uses mainly vegetable oil (around 3,640 litres/year), some coconut oil, and a small amount of ghee and cream. Fats and oils are used for:

- frying/stewing using coconut oil - 64%;
- shallow frying in vegetable oil (onion-based dishes) - 30%;
- deep frying in oil - 6%.

In addition to the oil purchase costs, the restaurant spends £2,600/year on cleaning chemicals. A biological dosing system costing £936/year is used to treat grease.

The restaurant made changes to its menu and cooking methods in order to reduce the number of fried items on the menu (reflecting healthier eating trends). This, in turn, reduced the quantity of fats and oils used by 40%, saving nearly £2,000/year in purchase and disposal costs.

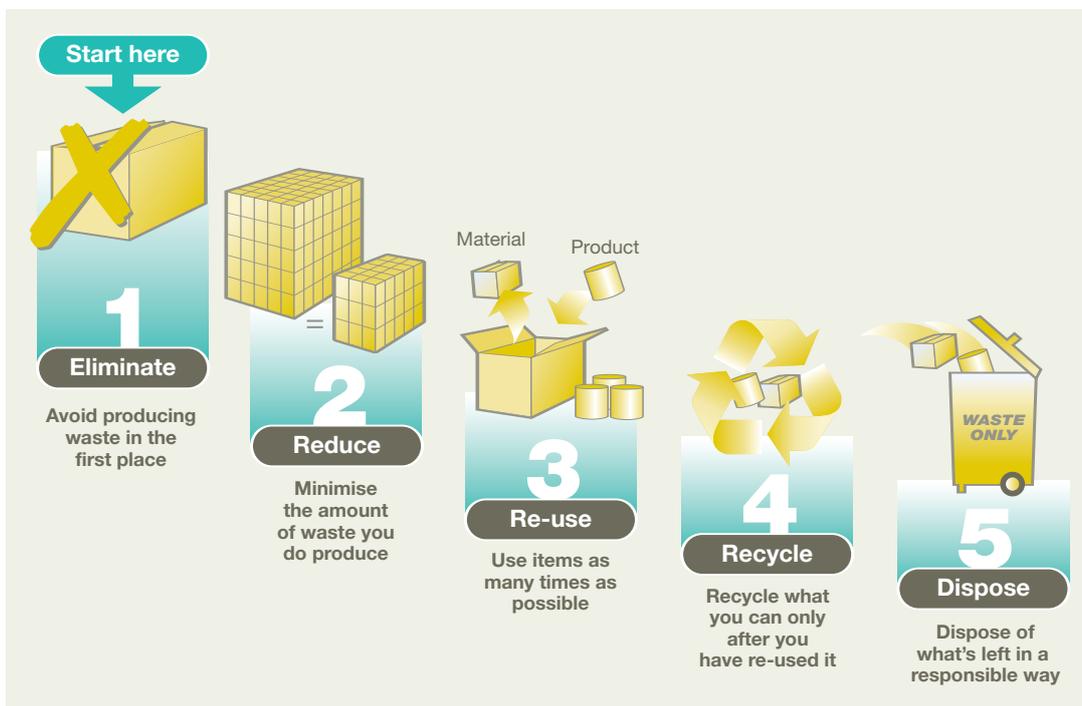
Table 1 Summary of FOG costs and savings

Aspect	Cost	Actions to reduce cost	Potential savings
Cooking	Around £4,000/year typically spent on oil by a small to medium-sized catering business with 50 covers.	Changes to menu and cooking methods to reduce amount of fried foods.	40 - 50% reduction in amount of oil purchased.
Disposal	Typically £2,000 - £3,000/year.	Control of frying methods and temperature to maximise re-use of oil. Reduced use of oil through changes to menu and cooking methods will reduce disposal costs.	Potentially 100% saving through careful oil control. 40 - 50% saving through changes in menu design.
Cleaning	Around £5,000/year spent on average on cleaning chemicals and contracts.	Reducing the amount of FOG used will help to reduce the frequency of cleaning necessary and the amount of detergent used.	Estimated 20% saving.
Blocked drains	Typically £100 - 200 per clearance (significantly more if sewer flooding occurs).	No disposal of FOG down drains. Use of sink strainers, grease traps/separators, biological dosing systems, etc.	Can eliminate costs associated with drain blockages.

1.2 THE WASTE HIERARCHY

The practical measures described in this Guide to reduce the costs associated with fats, oils and greases are based on the waste hierarchy (see Fig 1); the higher up the waste hierarchy action is taken, the greater the potential to save money. Following the waste hierarchy will also help you to make your business more resource efficient.

Fig 1 The waste hierarchy



1.3 THE CATERING SECTOR AND ITS USE OF FATS AND OILS

There are now over half a million food businesses in England and Wales, around two-thirds of which are restaurants and other catering businesses.

The catering sector contains a diverse range of establishments. It includes commercial businesses such as:

- public houses serving food;
- cafés/bars;
- hotels;
- restaurants;
- fast food/takeaways.

In addition, there are cost service organisations such as:

- canteens and other in-house catering services;
- schools, colleges and universities;
- hospitals;
- prisons;
- the armed services.

There is also a considerable variation in the size of catering outlets (see Table 2).

Table 2 Range of sizes of catering outlets

Scale	Features
Micro	Sole trader A business run from a single premises Restaurant with fewer than 50 covers
Medium	Manager on site One or more premises Restaurant with more than 50 covers
Large	Corporate structure Large premises Chain of outlets

Deep frying uses large quantities of oil and is the most frequent use of fats and oils by catering establishments. The many other ways in which they are used include:

- shallow frying;
- stir-frying;
- griddle cooking;
- roasting;
- in dressings and sauces.

Fats and oils are used:

- as liquid oils such as sunflower, vegetable, corn, rapeseed, groundnut and olive;
- as solid and semi-solid fats such as butter, margarine, ghee, dripping, lard and palm oil;
- incorporated into other foods (eg the fat from meat and oils used in preservation).

1.4 STRUCTURE OF THIS GUIDE

The next section outlines some of the many costs and issues associated with the use of fats and oils in the catering sector.

Practical measures to reduce the associated purchase, cleaning and disposal costs (including sewer problems) are described in sections 3 to 5.

Section 6 stresses the importance of staff training and section 7 outlines some of the increasingly tough legislation governing the use and disposal of fats, oils and greases.

Section 8 presents a summary of the best practice examples given in the Guide. An action plan is given in section 9, together with contact details for sources of further information and advice.

COSTS OF FATS, OILS AND GREASES IN CATERING

The costs associated with using and disposing of fats, oils and greases will vary according to the type and size of the catering outlet and the practices it adopts. Possible costs include:

- purchase costs;
- cost of cleaning materials (eg washing-up liquid, dishwasher detergent, sanitiser);
- disposing of used fats, oils and greases;
- cost of clearing blockages in pipes and drains resulting from a build-up of fats, oils and greases;
- costs from accidents involving slipping on or spilling fats, oils and greases.

The use of fats and oils in cooking also adds to the risk of fire in catering premises.

2.1 PURCHASE AND DISPOSAL COSTS

The amount of cooking oil bought and disposed of by a catering outlet (and the associated cost) will depend on its size and the type of cooking carried out.

For example, a medium-sized restaurant or takeaway business typically spends £3,000 - £4,000/year on buying cooking oils. Once the cost of disposing of used oil is added, this can rise to £6,000 or more.

2.2 CLEANING COSTS

Fats, oils and greases have other cost impacts on food businesses.

- They help food debris and dirt to stick to surfaces.
- If allowed to build up, they encourage the growth of bacteria and other microbes.
- They can attract pests such as cockroaches, mice and rats.

Each cooking style creates different types of residue and may require different types of cleaning chemicals and techniques to remove them. For example, oriental cooking creates a thick, syrupy grease which sticks to metal surfaces such as cooker hoods and ventilation ducting. Fried frozen foods, which have a high water content, deposit a shiny layer of grease on kitchen surfaces and within ventilation systems.

A catering establishment typically has to buy a variety of different cleaning chemicals to tackle fats, oils and greases in various situations. In addition, cleaning and maintenance contracts are needed for equipment such as ventilation ducting and deep fryers.

Although the amount spent on cleaning depends on the size of the catering outlet, a medium-sized hot food business typically spends £1,000 - £3,000/year on cleaning chemicals. Contracts for the cleaning and maintenance of extraction systems typically add between £1,000 and £4,000 to costs. Even for a fairly modest sized

business, the costs associated with cleaning chemicals and contracts can amount to several thousands of pounds a year.

2.3 SEWER BLOCKAGES

Every year there are around 200,000 sewer blockages in the UK, of which up to 75% are caused by fats, oils and greases.² In turn, blockages are responsible for approximately 55% of sewer flooding and account for over 3,000 property flooding incidents. Even when the fats, oils and greases put down the sink cause few problems in the local sewer system, they can lead to serious difficulties at sewage pumping stations and the inlets to sewage treatment works.

Fats, oils and greases poured down the sink in liquid form may flow away easily (especially if washed down with hot water) and appear harmless but, as they cool, they congeal and harden within the drainage system. Using detergents to break up the fats has only a temporary effect and the mixture soon reverts back to thick or solid fat in the drains. Once this happens, the fats stick to the inner surface of the drainage pipes and restrict the water flow, causing the pipe to block. The result is overflowing sewers, odour problems and a greater risk of rats and other vermin.

The rate at which fats, oils and greases solidify in drains or sewers depends on:

- the temperature at which they are washed down;
- whether they have been treated with detergent;
- the outside temperature.

Blockages may build up over a period of time. They may also occur further down the drainage run, affecting neighbouring premises.

Apart from the inconvenience and hygiene risks associated with drain and sewer blockages (and the financial cost to the business of unblocking and cleaning them), any such incidents can damage the reputation of a food business - particularly because any blockages are likely to affect neighbouring premises.

The total cost of dealing with sewer problems in the UK is significant and is often the largest single item of expenditure spent by a water company on the operation of the sewer system. An estimated £15 million is spent each year on clearing blockages nationwide, with further costs for cleaning up after sewer flooding incidents.

² *Disposal of Fats, Oils, Grease and Food Waste: Best Management Practice for Catering Outlets.* Water UK, October 2007.

No drain blockages reported since grease trap fitted at Chinese restaurant

A town centre Chinese restaurant serves 900 covers/week and has an annual turnover of £1 million. Fats and oils are used for:

- stir-frying - 80%;
- deep frying - 20%.

The restaurant uses 10,400 litres/year of vegetable oil. The supply of oil and collection of waste oil costs it £6,240/year. In addition, it spends £1,050/year on general-purpose detergent and heavy-duty degreaser.

The business is in an area with a history of repeated drain blockages associated with fats, oils and greases. On one occasion, the work to clear the drain meant the restaurant was closed over the busy lunchtime period. To help overcome this recurring problem, a replaceable grease trap has been fitted to the wok range. The grease trap is replaced weekly and there have been no reported problems since it has been in place.

2.4 ACCIDENTS

People working in kitchens and food service are more likely to be injured through slips and trips than by any other hazard. The presence of fats, oils and greases contributes significantly to this risk.

Apart from making floors more slippery, the presence of hot oil in a kitchen poses a very significant risk in itself. There have been many accidents where kitchen staff have slipped and suffered serious injuries from falling into hot oil or spilling it over themselves.

Some kitchens with a problem with grease and oil on the floors resort to using cardboard to absorb it. This, in turn, can lead to people tripping on the edge of the cardboard. In addition, cardboard cannot be readily cleaned and, as such, is illegal under food hygiene legislation. Non-slip mats are a possible alternative but add to costs; a large heavy-duty hygiene mat costs over £1,000.

2.5 RISK OF FIRE

If oil is allowed to overheat, fires may occur. Safe cooking with oils and fats is usually carried out at temperatures below 200°C, flammable vapours are given off at 200 - 300°C and spontaneous ignition occurs at 310 - 360°C.

There is also an increased risk of fire if grease is allowed to build up in ventilation systems.

A fire can have a major impact ranging from the cost of replacing equipment, loss of business while the kitchen is closed and damage to premises, to potential injury and loss of life, and possibly business closure. A fire may also affect neighbouring properties and businesses.

REDUCING THE USE OF FATS AND OILS IN CATERING

The significant costs associated with using and disposing of fats and oils in kitchens make it good business practice to reduce the amount used. This will not only reduce purchase costs but also decrease cleaning and disposal costs.

Reducing the amount of fats, oils and greases entering the drains will also lessen their impact on drainage systems and reduce the costs of clearing blockages and associated sewer flooding.

3.1 CUT DOWN THE AMOUNT OF OILS AND FATS USED

Changes to menus and cooking techniques can help to reduce the quantities of oils and fats used. Even small changes can have a significant impact.

- Reduce the number of fried items on the menu.
- Pan frying instead of deep frying uses significantly less oil or fat.
- Grilling, baking, poaching or steaming instead of frying or roasting can make it unnecessary to use additional oils or fats.

Even with small changes to menus and cooking methods, catering outlets can reduce the amount of oil used by 40 - 50%. Such a reduction means large savings in oil purchase, disposal and cleaning costs.

Changes to cooking methods reduce costs at Chinese restaurant

A city centre Chinese restaurant has an annual turnover of £1 million and serves 1,200 covers/week. It uses 4,000 litres/year of vegetable oil for:

- stir-frying - 85%;
- deep frying (in wok) - 15%.

The restaurant spends £1,000/year on detergents, while cleaning and maintenance of the ventilation system costs a further £4,000/year.

Changes to cooking practices at the restaurant have reduced the amount of oil used by 30 - 50%, saving nearly £6,000/year in oil purchase and disposal costs.

3.2 RE-USE OF OILS AND FATS IN DEEP FRYING

Fats and oils deteriorate as they absorb oxygen from the air and come into contact with water from the food. Cooking temperatures that are too high or too low also damage them.

If particles of carbon (ie burnt food) are allowed to build up in the frying medium (oil or fat), they cause hot spots and lead to burning. Regular sieving is therefore an important precaution if cooking oils and fats are re-used. How often you need to sieve will depend on the type and scale of your cooking process, and the rate of carbon build-up.

The following actions help to prolong the life of fats and oils used in deep frying:

- regulate the temperature;
- use the minimum amount of oils or fats for safe frying;
- keep food as dry as possible;
- sieve/filter the frying medium regularly to minimise build-up of carbon particles;
- empty and clean pans regularly (at least once a month);
- replace the proportion of the fats or oils lost each day through usage;
- heat the fat or oil to the frying temperature gradually over at least a 15 minute period to prevent burning at the bottom of the pan;
- when trade is slow or during quiet periods, reduce the temperature of the oil to 100°C.

With proper controls it is possible to re-use fats and oils safely, particularly where the cooking method requires a high throughput of the frying medium.

Where deep frying is used for a large amount of cooking (eg in a fish and chip shop), careful control of the frying process can significantly reduce the amount of fats or oils used and disposed of.

- Keep the level of oil low such that around a third is used up each day in cooking.
- Top up the oil each day.
- Control the cooking temperature at the correct level.
- Sieve the oil regularly (eg add this task to your weekly maintenance routine).

This approach means that the oil is effectively replaced every three days with no disposal costs (ie there is no need to dispose of the complete contents of a pan/vat/vessel of oil). It also helps to maintain oil quality and stop it deteriorating.

Fish and chip shop eliminates the need to dispose of used cooking oil

A village fish and chip shop uses 3,940 litres/year of groundnut oil for deep frying. The shop serves around 500 customers/week and has an annual turnover of £100,000.

The shop saves up to £3,000/year through careful control of the frying temperature, regular and thorough filtering, and daily topping up of oil. It has no need to dispose of used cooking oil.



3.3 REDUCING CLEANING COSTS

Detergents and other cleaning chemicals need to be used regularly to combat the build-up of grease in the kitchen. Ventilation systems also need to be cleaned and serviced regularly.

Reducing the amount of fats and oils used will also reduce the effort and cost involved in cleaning. It is estimated that catering outlets could save up to 20% of the cost of cleaning by reducing the amounts of fats and oils used and by making the best use of the chemicals themselves.

- Work out how much you spend on detergents and cleaning chemicals each year. Could you reduce this cost by switching to different chemicals or methods (eg more environmentally friendly), or by ordering a different size of container?
- Try to use only as much cleaning agent (eg detergent) as you need. If necessary, measure out the amount used.
- Keep a record of how much cleaning agent you are using. Do you actually need to use that much? Does usage vary depending on who is working in the kitchen? If so, try to find out why. If cleaning performance is acceptable when less cleaning agent is used, encourage everyone to adopt the same practices.
- Could you reduce cost and packaging waste by buying in bulk? Talk to your supplier about the best size of container for your kitchen's requirements.
- Remove any obvious food debris and dirt first so that cleaning chemicals can work correctly.
- Wipe oven trays (particularly those from combi ovens or rotisseries) thoroughly to remove excess fats, oils and greases before washing-up to minimise the quantities discharged to the drain via the washing-up water.
- If your kitchen uses less fats and oils and thus requires less cleaning, you may also be able to save money on your cleaning contract, or negotiate a cheaper one.

TREATMENT METHODS IN THE KITCHEN

There are various actions you can take in your premises to treat waste fats, oils and greases and thus reduce their impact on the environment.

4.1 WHAT HAPPENS TO FATS, OILS AND GREASES?

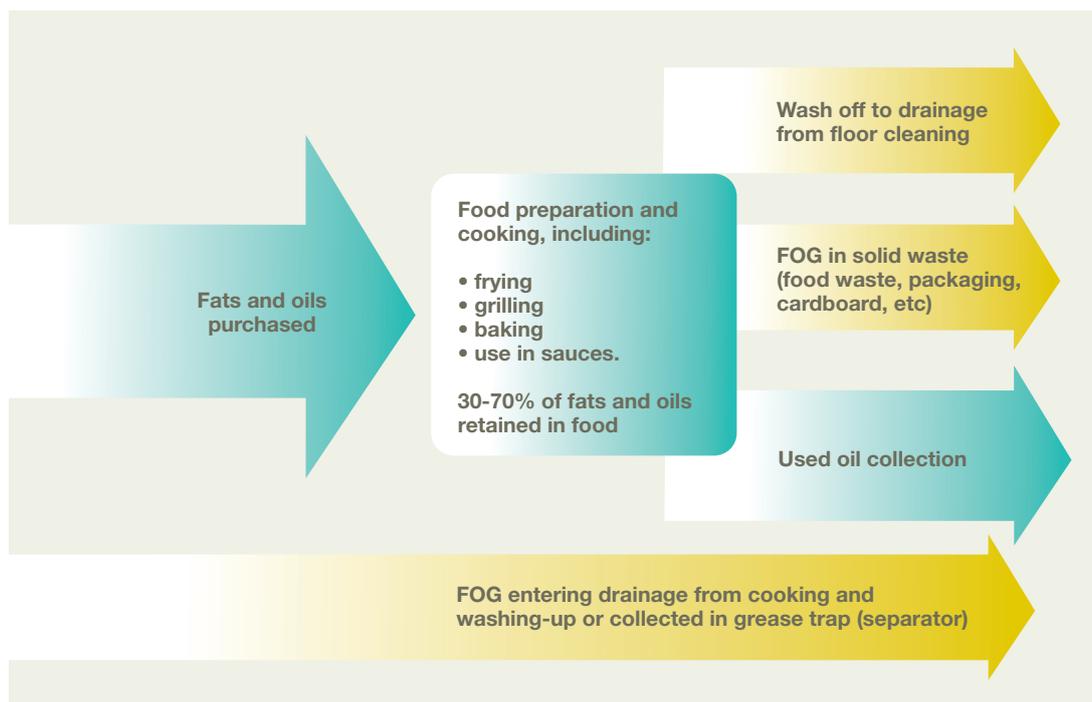
Depending on the cooking method and type of food, 30 - 70% of the fats and oils used in food preparation and cooking stays in the food. The remainder is disposed of in various ways including:

- in food scraps and plate scrapings;
- washed into drains with floor washings;
- with solid waste;
- on packaging;
- soaked into cardboard used on floors;
- entering the drainage system via washing-up water;
- poured directly into the drainage system.

Water from pressure washing and deep cleaning processes will also contain fats, oils and greases removed from the cleaned surfaces.

Fig 2 shows where the fats and oils you buy end up.

Fig 2 Fate of purchased fats and oils



4.2 USED OIL COLLECTION

Collect used cooking oils separately in suitable containers and arrange for the oil to be collected by a commercial recycling service (see section 5).

4.3 DEALING WITH FATS, OILS AND GREASES IN 'LEFTOVERS'

- Do not dispose of food waste, fats, oils and greases down the sink or the drain.
- Scrape plates, pots, pans and utensils and wipe them dry with disposable kitchen towel. Put the waste food and paper towels in a separate bin for commercial food waste collection, if applicable in your area.
- Place a strainer in the plug hole of all sinks to prevent waste food being washed down. Dispose of the material collected in the strainer in the food waste bin.

4.3.1 Macerators

Some catering outlets use food macerators as a convenient way of disposing of leftover food scraps. Macerators are designed to chop or grind food into small pieces before washing them into the drainage system. But once in the drain, fats recombine with the food particles and solidify, building up in the drainage system and causing blockages. Such devices encourage bad practice and their use is not recommended.

4.4 USE OF GREASE TRAPS (GREASE SEPARATORS)

Grease traps can be fitted to the kitchen drainage system to remove fats, oils and greases from wastewater and thus prevent their build-up in drains and sewers leading to blockages.

Grease traps are designed to separate out the fats, oils and greases, which remain in the trap, while the clarified wastewater flows out to the sewerage system. 'Grease separator' is the term used in the British Standards,³ though many manufacturers and others use the term 'grease trap'. This guide uses 'grease trap'.

³ BS EN 1825-1: 2004 Grease separators. Principles of design, performance and testing, marking and quality control. BS EN 1825-2: 2002 Grease separators. Selection of nominal size, installation, operation and maintenance.

Chinese takeaway no longer causes its neighbours' drains to block up

A high street Chinese takeaway has an annual turnover of £120,000 and uses 1,200 litres/year of vegetable oil to prepare 150 orders/week. The oil is used for:

- wok frying (meat and vegetables) - 65%;
- deep frying (spring rolls, chicken and pork balls, etc) - 35%.



The business spent around £350/year on cleaning chemicals. However, it had a history of problems with blocked drains, causing problems to domestic premises further down the drainage run. Two replaceable grease traps were fitted - one to a dishwashing sink and one to the wok range. These traps are collected and replaced every two weeks at a cost of £1,350/year including the collection of waste oil. Since the grease traps have been in place, there have been no further blockages and the reputation of the business has benefited.

There is a limit to the amount of waste material that grease traps can remove from wastewater. To ensure they work effectively:

- keep fats, oils, greases and solid material to a minimum;
- even if a grease trap is fitted, scrape serving dishes and cooking utensils before washing;
- never pour used cooking oil down the drain;
- maintain them regularly.

Most grease traps are either fixed in place in the kitchen area or installed outside. There are also portable grease traps that can be removed and replaced on a regular basis (eg every week or two weeks).

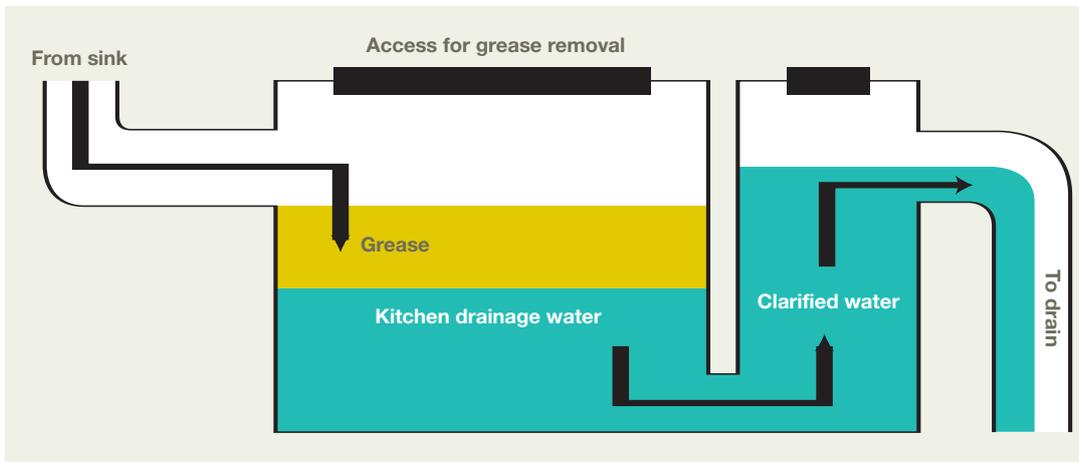
- Grease traps for installation inside kitchens are typically small units that often include a mechanical oil skimming device.
- Grease traps designed for external installation are much larger and are often installed below ground. They can only be installed where there is adequate space.

The location of any grease trap is important as it should be sited to collect all kitchen flows that contain fats, oils and greases.

The smaller internal units are not generally connected to dishwashers whereas the larger external units should be.

A schematic diagram of an under-sink grease trap is shown in Fig 3.

Fig 3 Schematic diagram of an under-sink grease trap



Source: Water UK

Grease trap at town centre hotel prevents drain blockages

A town centre hotel restaurant has an annual turnover of £1.3 million and approximately 600 customers/week. Pan frying accounts for 80 - 90% of its cooking. Fats and oils are used as follows:

- pure vegetable oil (7,200 litres/year) for deep frying;
- olive oil (72 litres/year) for pan frying and dressings;
- unsalted butter (~1,050 kg/year) for pan frying, baking and sauces;
- individual 2 g butter portions (10,400/year) for customers;
- flavoured oils and truffle oils (3 - 4 litres/year) in dressings, sauces and flavourings;
- cream in sauces and for customers' use.

The restaurant spends £9,390/year on a variety of cleaning chemicals including general-purpose detergents and degreasers. The ventilation system is cleaned twice a year at a cost of £2,200.

The hotel is situated in an area affected by repeated drain blockages associated with fats, oils and greases. Since a replaceable grease trap was fitted to the pot wash sink, there have been no reported problems. The trap is replaced every two weeks.

4.4.1 Requirements for effective design and use

Grease traps can be very effective provided they are designed, installed, serviced and maintained properly.

- Make sure the unit is of sufficient size to handle the amount of wastewater from the premises. If it is not large enough, the wastewater will not stay in it long enough to allow the fats, oils and greases to separate out.

- Ensure the collected fats, oils and greases are emptied out regularly and disposed of correctly. If the trap is not emptied regularly, it may block and overflow.
- Keep a written record of maintenance.

Successful operation of a grease trap requires the correct combination of the following.

- **Time.** Fats, oils and greases need time to settle and thereby effectively separate from water. Most fats, oils and greases are held in suspension in the water, helped by a combination of the detergents and hot water used in cleaning. For grease to separate from the wastewater created in the kitchen, it needs adequate residence time in the trap. If a grease trap is not selected properly, this is not achieved owing to the insufficient size of the trap and high effluent throughput, which effectively flushes through the grease trap.
- **Temperature.** Grease solids form most successfully at low temperatures. The water discharged from a dishwasher is generally at 50 - 80°C and the average pot wash water temperature is around 40 - 50°C. At these temperatures, fats and greases stay in solution and may be flushed through a trap if it is installed too close to the hot water/washing source, causing problems in the drainage system once the effluent cools. This is why many kitchens do not experience problems with drains blocking from fats, oils and greases; the effluent temperature is high enough to carry them further into the drainage system before cooling and solidifying. Sewer blockages caused by fats, oils and greases are often experienced only by those further down the drainage run and not by the premises that discharged them.
- **Volume.** For any grease trap to collect grease efficiently, it needs sufficient volume to handle the amount of wastewater leaving the premises. This is to minimise the effect of effluent surge and displacement, which can force fats and greases through the trap. If larger volumes of effluent can be held, this allows the hot wastewater laden with fats, oils and greases to cool through mixing with the cooler liquid already in the grease trap.

4.4.2 Maintenance

Proper maintenance of grease traps is essential for their effective operation.

Although grease traps can be cleaned and maintained in-house, this is an unpleasant job and is often neglected. The result is that the trap fills with grease, which then overflows to the drainage system, or back out into the kitchen, causing possible hygiene and health & safety problems, if employees slip on the overflow, for example.

Many catering outlets find it more convenient to buy in services on contract to ensure their traps are emptied regularly and the contents disposed of properly.

4.4.3 Cost

The cost of a grease trap depends on its size and how it is installed (within the kitchen or underground). It can range from £400 - £500 for a small trap to £3,000 - £5,000 for a large underground trap. Running costs will also vary; an under-sink unit will need to

be maintained daily, whereas an underground external unit will be maintained fortnightly or monthly. In addition, there is the cost of a maintenance contract.

Portable grease traps cost around £700/year including collection and replacement.

4.5 BIOLOGICAL DOSING SYSTEMS

Biological treatment typically involves the use of a bacterial culture that produces the enzyme lipase, which is able to break down fats, oils and greases so that the bacteria present can use them as a source of food. This, in turn, enables the bacteria to continue to grow and multiply. A mixture of different types of bacteria may be included in the culture, which produce other enzymes to act upon other constituents of the fats, oils and greases.

Installation of a grease trap should be considered before biological dosing systems. Such systems are generally installed where fitting a grease trap is impractical, eg owing to lack of space or for hygiene reasons. They can be used either on their own or in conjunction with a grease trap.

The most effective systems introduce a large initial dose of bacteria into the drainage system. The bacteria are allowed to establish and colonise the drain, forming a biological film lining the drain. A dosing unit is installed to release measured quantities of the bacteria, along with nutrients, into the drainage system at regular intervals to maintain the bacterial colonies. The dosing rate depends on the size of the catering outlet and the amount of FOG waste it typically produces.

Biological dosing systems require the correct balance of bacteria to digest the specific mix of fats, oils and greases present in the water. Where they are used appropriately and according to the supplier's recommendations, these systems can be an effective way of controlling fat, oil and grease accumulation.

- Specialist advice is recommended to ensure the correct choice of bacterial culture and dosing rate for your kitchen's requirements.
- Biological dosing systems are not intended as a means of clearing drain blockages. It is important that any blockage is removed by rodding or jetting the drains before a biological dosing system is installed.
- Strict controls on the use of bleach, sanitisers or other chemical cleaners are necessary where biological dosing systems are installed to avoid inhibiting or killing the bacteria.

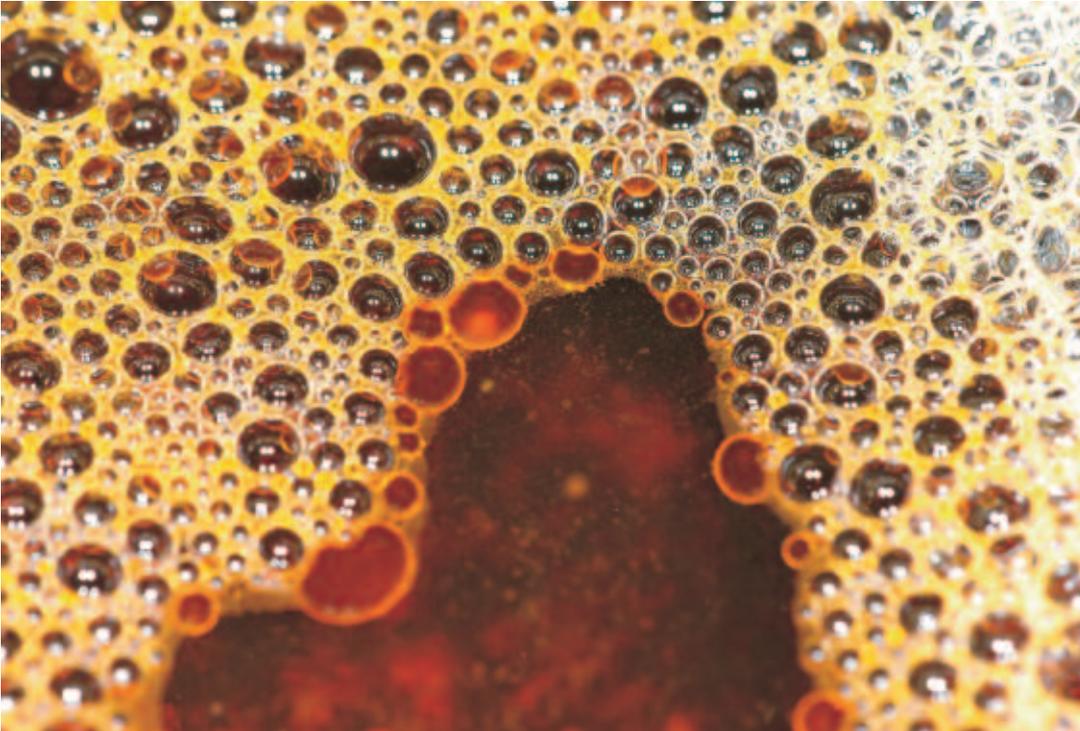
4.5.1 Cost

A typical dosing system costs around £500 for initial installation and then £40 - £60/month for the dosing depending on the amount of fats, oils and greases entering the drainage system. Maintenance of the dosing system costs around £50/year.

4.6 CLEANING TIPS

- Wash surfaces with hot, soapy water (diluted detergent) to remove any grease and other food and dirt. Then rinse with clean water without detergent. Finally, apply a disinfectant. Allow it to remain in contact with the surface/item for sufficient time (consult the manufacturer's instructions) before rinsing and allowing to dry. Alternatively, use a sanitiser that combines both detergent and disinfectant properties.
- Clean cooking ranges, ovens, etc with heavy-duty degreasing products (typically a detergent based on caustic soda in a gel or foam formulation). Follow the safety precautions when handling these products, which can cause corrosion damage to equipment.
- Clean floors at least at the end of each service to prevent a build-up of grease and food debris. A heavy-duty detergent (based on a solvent or caustic soda) may be needed in hot food premises to remove greasy deposits effectively.
- Clean walls and ceilings properly to remove any build-up of grease.
- Clean filters on cooker hoods and ventilation systems every two to three days.
- Arrange for ventilation systems to be cleaned thoroughly, usually twice a year, to prevent bacterial growth and the risk of fire. Proper cleaning and maintenance also helps to maintain ventilation efficiency and to avoid damage to the ducting materials. Ducting and fans require professional cleaning and maintenance.
- Clean drains periodically to help keep them flowing freely and to prevent odours.
- Do not use harsh caustic chemicals to clear or clean drains. These chemicals are dangerous to use and damage the pipe material. In severe cases, the premises owner will be liable for the costs of any repair work. These chemicals also affect the performance of septic tanks and local sewage treatment works. They will also render any biological dosing products ineffective.

RECOVERY AND DISPOSAL OF WASTE FATS, OILS AND GREASES



- Collect waste fats, oils and greases in air-tight, sealed (leak-proof) containers to prevent odours and to avoid attracting vermin.
- Store containers holding used cooking oils in a secure area away from all drains to prevent spills and leakages. Arrange for the containers to be collected by a commercial waste contractor for recycling (see overleaf) or correct disposal.
- Do not pour waste fats, oils and greases down drains or sewers. This inevitably leads to blockages and odour and/or vermin problems. It may also lead to the pollution of local rivers and streams, leading to problems for wildlife and fines from the Environment Agency (in England and Wales), SEPA (in Scotland) and the Environment and Heritage Service (in Northern Ireland).
- Do not dispose of used cooking oils and fats with the general waste stream or with the rest of your catering or kitchen waste. Waste contractors may refuse to remove it, and there may be odour or pollution problems.
- Do not take used cooking oil to household waste recycling centres (also known as civic amenity sites) for disposal in engine oil banks. These sites are not for commercial waste and placing cooking oil in an oil bank will render the entire contents unsuitable for recycling.
- By law, used cooking oils from catering premises must not be used as an ingredient in animal feed.

Although used cooking oils and fats are not classified as hazardous or special waste, those disposing of them still have a legal duty of care to ensure that they are

disposed of properly. This means that any catering outlet producing used cooking oils or fats must ensure:

- it is stored properly;
- none is allowed to spill;
- it is collected by an authorised waste carrier for transport to a licensed waste management site for recovery or safe disposal;
- they keep records of waste transfers from their premises for two years.

See section 7 for legal requirements affecting the storage, collection and disposal of waste fats, oils and greases. Alternatively, contact the environmental health department of your local council for advice.

See section 9 for sources of further help and information.

5.1 USE OF USED COOKING OIL AS A BIOFUEL

Used cooking oil can be used either for conversion to bio-diesel or for incineration with energy recovery (ie electricity generation). The Government backs the recovery of used cooking oil for use as a biofuel because this reduces the use of fossil fuels and thus carbon dioxide emissions.

A growing number of companies offer commercial collection services for these purposes. Before using a collection service, check with your local regulator (Environment Agency, SEPA or Environment and Heritage Service) that the company is registered as a waste carrier. You can do this online or by phone (see section 9 for contact details).

5.2 COMPOSTING

Composting is another alternative method of disposing of your waste. However, any composting must be undertaken in a licensed waste facility carrying out the composting process in a sealed unit (ie in-vessel composting) and thus able to guarantee the temperatures necessary to kill off any harmful micro-organisms present.

Free advice from Envirowise

More information can be found in Envirowise guide GG808 Cost-effective management of organic waste from the food & drink and hospitality sectors.

Contact the Envirowise Advice Line (0800 585794) or visit the Envirowise website (www.envirowise.gov.uk) for free advice and more information on options for dealing with waste fats, oils and greases from catering outlets.

THE IMPORTANCE OF TRAINING

Training of kitchen staff is essential to ensure the proper management of fats, oils and greases.



- Make the correct management of fats, oils and greases part of the induction programme for all kitchen staff.
- Reinforce initial training with supervision and refresher sessions as necessary.
- Put up posters to remind staff what they need to do.

During training, emphasise:

- the need to dispose of waste fats, oils and greases in designated containers and not down the sink or the drain;
- that putting waste fats and cooking oils down the sink or drains can result in:
 - costly work to unblock drains and sewers;
 - public health problems such as pest infestations;
 - overflowing drains and bad smells;
 - negative publicity and disruption to business;
 - potential prosecution and fines.

Use the checklist shown in Fig 4 to help you remind your staff of the do's and don'ts. You could photocopy and laminate it, and put copies around kitchens, especially near sinks and bins, to remind staff of best practice.

Fig 4 Checklist for better management of fats, oils and greases in kitchens

Stop and think

– not down the sink

Checklist for managing fats, oils and greases in your kitchen

DOs



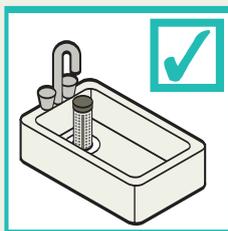
Do wipe and scrape plates, pans and utensils before washing (and put the waste into the bin).



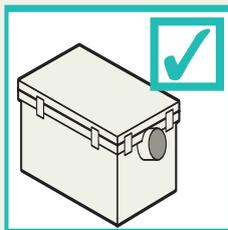
Do collect waste oil in a suitable secure container.



Do arrange for oil to be collected by a licensed waste contractor.



Do use strainers in sink plug holes (and empty contents into the bin).

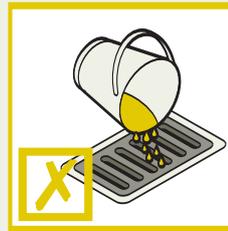


Do maintain grease traps and enzyme dosing equipment regularly.

DON'Ts



Do not put cooking oils, fats or greases down the sink.



Do not pour waste oils, fats or greases down the drain.



Do not put food scrapings into the sink (place in the rubbish bin).



Do not sweep waste into floor drains (place in the rubbish bin).



Do not pour boiling water down the sink to try to dissolve fats and greases. It does not work!

Source: Water UK

The above simple guidelines will significantly help to maintain free flowing water both within the drains of the premises and in the sewerage system.

LEGAL EAGLE

This section outlines the main legal requirements associated with fats, oils and greases. Note that this summary applies only to England and that different rules may apply in Scotland, Wales and Northern Ireland.

For further advice and information:

- call the Envirowise Advice Line (0800 585794) or visit the website (www.envirowise.gov.uk);
- visit the NetRegs website (www.netregs.gov.uk);
- contact your local council;
- contact the local office:
 - Environment Agency in England and Wales (www.environment-agency.gov.uk);
 - Scottish Environment Protection Agency (SEPA) in Scotland (www.sepa.org.uk);
 - Environment and Heritage Service (EHS) in Northern Ireland (www.ehsni.gov.uk).

7.1 FOOD HYGIENE

The Food Hygiene (England) Regulations 2006⁴ and European Regulation (EC) No. 852/2004⁵ place responsibilities on food business operators to keep food premises clean, hygienic and free from pests. This includes ensuring that:

- grease is not allowed to build up;
- premises and equipment are cleaned regularly to remove grease and dirt.

Local authorities have the power to inspect premises under the Food Safety Act 1990. Problems arising from the effect of fats, oils and greases on drains, resulting in a failure to comply with the Food Hygiene Regulations, could result in prosecution or an emergency prohibition order preventing trading from the premises.

For advice and information on all aspects of food hygiene:

- contact the environmental health department of your local council;
- visit the Food Standards Agency website (www.food.gov.uk).

7.2 STORAGE

Incorrect storage and disposal of fats, oils and greases can lead to nuisance. Section 79 of the Environmental Protection Act 1990 gives local authorities the power to investigate and take action to remedy statutory nuisances such as smells, effluents and the accumulation of refuse. The environmental health department of your local council deals with complaints relating to 'statutory nuisance' and can serve a legal notice that imposes restrictions on a business or even closes it down. Failure to comply with such notices can result in fines or imprisonment.

⁴ Statutory Instruments 2006 No. 14 (www.opsi.gov.uk/si/si2006/20060014.htm)

⁵ See www.food.gov.uk/foodindustry/regulation/europeleg/eufoodhygieneleg/

Storage of oil in containers with a capacity >200 litres is subject to the Oil Storage Regulations.⁶

7.3 SAFE DISPOSAL

As part of their routine checks on hygiene standards, environmental health inspectors may ask how you are disposing of your waste cooking oil.

7.3.1 Animal By-Products Regulations 2005

These Regulations (known as ABPR) implement a European Commission Directive which banned the use of used cooking oil from catering premises as an ingredient in animal feed from 1 November 2004. This ban was introduced as a measure to safeguard animal health and the subsequent food chain. All used cooking oil must now be collected by a licensed waste carrier.

Visit the website of the Department for Environment, Food and Rural Affairs (Defra) (www.defra.gov.uk/animalH/by-prods/default.htm) for more information and guidance about the rules governing animal by-products.

7.3.2 Duty of Care

Section 34 of the Environmental Protection Act 1990 and the Environmental Protection (Duty of Care) Regulations 1991 impose responsibilities on commercial organisations in relation to the waste that they generate. This includes any used cooking oils, fats and greases.

All businesses have a duty to ensure that their waste is managed correctly from the point at which it is produced to the point of final disposal. They must ensure:

- the waste is collected by a properly licensed contractor;
- it is taken to a suitable site for recovery, treatment or disposal;
- a record is kept of all collections.

You can check that your chosen waste carrier is properly registered by searching the Environment Agency's online public register (www.environment-agency.gov.uk/publicregisters).

For more information on the Duty of Care see:

- NetRegs website (www.netregs.gov.uk/netregs/275207/275430/);
- Defra website (www.defra.gov.uk/environment/waste/legislation/duty.htm).

7.3.3 Water Industry Act 1991

Under Section 111 of the Water Industry Act 1991, it is a criminal offence to discharge into a public sewer any matter that may interfere with the free flow of the contents of the sewerage system. Prosecution can result in substantial fines or even imprisonment. Section 109 allows water and sewerage companies dealing with

⁶ See www.netregs.gov.uk/netregs/275207/275441/



problems caused by the discharge of unsuitable matter into sewers (eg removing blockages, cleaning sewers or investigating and remedying flooding or pollution incidents) to take legal action to recover their costs.

7.3.4 Landfill Regulations

Since 30 October 2007, liquid wastes are banned from landfills and other waste must be 'treated' before it can be landfilled.⁷ 'Treatment' can include the segregation of waste streams. Waste oils should be collected separately from other waste for collection by a licensed collector. They should not be sent to landfill.

7.4 HEALTH AND SAFETY

For information and advice on health and safety matters, call the HSE Infoline on 0845 345 0055 or visit the Health and Safety Executive (HSE) website (www.hse.gov.uk).

7.4.1 Health and Safety at Work etc. Act 1974

This Act requires employers to take all reasonable precautions to provide for their employees' safety at work and to protect anyone visiting their premises from harm. Employees and the self-employed also have responsibilities to act safely. This includes:

- setting out and following safe systems of work to ensure that fryers are emptied and cleaned safely;
- ensuring any spillages of oils, etc are cleaned away as quickly as possible to help prevent slipping accidents.

⁷ See www.environment-agency.gov.uk/business/1745440/444663/landfill/

7.4.2 Management of Health and Safety at Work Regulations 1999

These Regulations require risk assessments to be carried out to identify hazards in the workplace, evaluate the risks and implement suitable controls to minimise these risks.

Risk assessments in catering premises need to address the risk of:

- burns from hot oils;
- fire posed by cooking with fats and oils;
- potential build-up of grease in ventilation systems;
- slipping on greasy floors.

7.5 DESIGN OF CATERING PREMISES

The Building Regulations 2000 Approved Document H requires drainage serving kitchens in commercial hot food premises to be fitted with a suitably designed and installed grease trap or other effective means of grease removal. Although this requirement applies only to new and converted premises, it is good practice for all hot food premises to adopt such measures.

Please note that the legislation mentioned within this publication was checked for accuracy before going to press. However, legislation is constantly changing and being updated. For information on current environmental legislation, please contact the Envirowise Advice Line free on 0800 585794.

SUMMARY OF BEST PRACTICE EXAMPLES



Table 3 summarises the key features of the industry examples presented in this Guide. As illustrated in the table, all sizes of catering outlets can benefit from better management of their fats, oils and greases.

Table 3 Examples of catering businesses benefiting from reducing FOG

Type	Size	Amount of FOG purchased/year	Action taken	Benefits
Fish and chip shop	~500 customers/week Annual turnover £100,000	Groundnut oil: 3,940 litres	Use of groundnut oil for frying Better control of frying temperature Filtering and daily topping up of oil	Eliminated disposal of cooking oil, saving an estimated £3,000/year.
Chinese takeaway	150 orders/week Annual turnover £120,000	Vegetable oil: 1,200 litres	Fitting grease traps to washing-up sink and wok range	Prosecution avoided as previous sewer blockages affecting neighbouring premises no longer occurring.
Chinese restaurant	900 covers/week Annual turnover £1 million	Vegetable oil: 10,400 litres	Fitting grease trap to wok range	Prosecution avoided as previous sewer blockages affecting neighbouring premises no longer occurring.
Chinese restaurant	1,200 covers/week Annual turnover £1 million	Vegetable oil: 4,000 litres	Changes to menu and cooking methods	30 - 50% reduction in use of oil, saving nearly £6,000/year in purchase and disposal costs.
Hotel and restaurant	~600 customers/week Annual turnover £1.3 million	Vegetable oil: 7,200 litres Olive oil: 72 litres Flavoured oils and truffle oils: 3-4 litres Butter: ~1,050 kg + 10,400 individual portions	Fitting grease trap to pot wash sink	Prosecution avoided as previous sewer blockages affecting neighbouring premises no longer occurring.
Indian restaurant	1,200 covers/week Annual turnover £2.6 million	Vegetable oil: 3,640 litres	Changes to menu (fewer fried items to reflect healthy eating trends)	40% reduction in use of fats and oils, saving nearly £2,000/year in purchase and disposal costs.

9 ACTION PLAN



Follow this action plan to save money and prevent blocked drains by improving the management of fats, oils and greases in your kitchen.

- Find out how much fats, oils cost you each year.
 - How much oil and fat does your kitchen use each year? How much does this cost?
 - How much do you spend on cleaning chemicals and cleaning contracts?
 - How much do you pay to dispose of your used fats and oils?
 - How much does it cost you to clear blockages caused by fats, oils and greases?
- Review your menus to see if you can change them to reduce the use of fats and oils (eg fewer fried items).

- Examine your cooking methods to see if you can change them to use less oils and fats.
- Follow best practice to prolong the life of fats and oils used in deep frying.
- Collect used cooking oil in a separate container and arrange for it to be collected by a commercial recycling service.
- Make sure staff do not put waste fats, oils and greases and food debris down the sink or down the drain.
- Wipe and scrape plates, etc before washing. Put the waste in the bin.
- Make sure all sinks have a strainer in the plug hole.
- Fit a grease trap to sinks, etc. If impractical, consider a biological dosing system.
- Maintain grease traps and biological dosing systems regularly.
- Make sure all kitchen staff are trained to use and dispose of fats, oils and greases correctly.
- Examine your cleaning routines to check you are using materials efficiently.
- Buy cleaning chemicals in bulk to reduce purchase costs and packaging waste.
- Contact Envirowise to ask about its free services including advice and publications.
- If you have any questions about hygiene issues, contact the environmental health department of your local council.
- Work out how much you have saved and review progress regularly.

9.1 SOURCES OF FREE HELP AND ADVICE

9.1.1 Free help and advice from Envirowise

Envirowise offers independent, practical and proven guidance through:

- a dedicated free Advice Line (0800 585794);
- information resources from case studies to best practice guides;
- over 200 events a year, from seminars to major exhibitions;
- an informative website (www.envirowise.gov.uk).

Useful free publications include:

- *Check out recycling and waste* (EN626);
- *Check out utilities* (EN627);
- *Unpack those hidden savings - 120 tips on reducing packaging use and costs* (EN250).

9.1.2 Others

Table 4 lists useful sources of information about the various aspects of the management of fats, oils and greases.

Table 4 Other useful sources of information

Organisation	Contact details
Environment Agency	Tel: 08708 506 506 (general enquiries) www.environment-agency.gov.uk
Scottish Environment Protection Agency (SEPA)	Tel: 01786 457700 (Corporate Office) www.sepa.org.uk
Environment and Heritage Service Northern Ireland	Tel: 028 9056 9353 (general waste enquiries) www.ehsni.gov.uk
NetRegs (environmental legislation and management)	www.netregs.gov.uk
Food Standards Agency (food hygiene)	www.food.gov.uk
HSE (health and safety)	Tel: 0845 345 0055 (Infoline) www.hse.gov.uk
Water UK (represents UK water and sewerage companies)	www.water.org.uk
Waste & Resources Action Programme (WRAP) (for information on recycling and composting)	Tel: 0808 100 2040 www.wrap.org.uk

Envirowise - sustainable practices, sustainable profits. Envirowise is a Government-funded programme dedicated to putting the sustainable use of resources at the heart of business practice. It is managed by AEA Technology plc and Serco TTI. Envirowise is funded by Defra, the Scottish Government, the Welsh Assembly Government and Invest Northern Ireland.

Envirowise offers a range of free services including:

- **Free advice from Envirowise experts through the Envirowise Advice Line.**
- **A variety of publications that provide up-to-date information on resource efficiency issues, methods and successes.**
- **Best practice seminars and practical workshops that offer an ideal way to examine resource efficiency issues and discuss opportunities and methodologies.**