

WASTE MANAGEMENT WITHIN THE CATERING & FOOD SERVICE INDUSTRY WITH 2020 & CURRENT LEGISLATION IN MIND

Waste management is a core issue within the catering and food service industry which needs to be addressed as part of the design process, with the management of waste including food waste being considered in conjunction with the establishment's environmental policy. The standard rate of landfill tax is currently standing at £56 per tonne and will rise by £8 per tonne per year until April 2013. Not only is landfill becoming expensive there is no guarantee that it will remain an option for dealing with food waste for the period of most contracts, thus opening up a major risk to the caterer and/or facilities management provider.

The targets published by the UK Government for the government estate relating to waste requires a 25% reduction in the waste generated and a 75% reduction in the amount of waste sent to landfill by 2020. This means that any new or refurbished facility being designed at present will need to meet these targets as the infrastructure being proposed is guaranteed to still be in place in 2020. In addition to the UK Governments commitment to the Landfill Directive more and more Water Authorities are opposing the use of commercial food waste disposal units that macerate and send the food waste directly to drain. This is because food waste contains a high level of fat, oil and grease which the high maintenance drainage and sewage systems struggle to handle in the volumes that are discharged into their systems at peak times, therefore it is likely that this is not a solution moving forward as more and more areas are opposing their use. Water UK are on record as saying that drains and sewers should not be used for the disposal of food waste from waste disposal units as they encourage bad practice and should not be considered as a design solution.

Current legislation states that landfill is no longer able to accept untreated waste.

The requirement to treat waste is part of a package of measures, applied across the EU by the Landfill Directive.

The rules are designed to:

- Increase waste recycling and recovery
- Reduce potentially polluting emissions from landfill.

The legal definition of treatment requires three things:

1. It must be a physical, thermal, chemical or biological process including sorting.
2. It must change the characteristics of the waste.
3. It must reduce its volume, or reduce its hazardous nature, or facilitate its handling, or enhance its recovery.

Any design solution that is employed for dealing with waste from a catering facility should be to sort it at source and store it in a suitable designated area which is constructed to current legislation while it awaits collection by the appointed contractor.

At present the waste streams to be used should be as follows with the approximate allowances per meal served:

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- 150101 13.8% Cardboard and News (0.0616L)
- 150104 5.9% Metal Cans (crushed) (0.0264L)
- 150107 8.8% Glass (by colour) (0.0396L)
- 200108 45.2% Food Waste (0.2025L)
- 200301 24.5% General (black bag) waste including Plastics (0.1100L)
- 200125 1.8% Waste Cooking Oil (0.008L)

The non food waste should be collected in 60 or 80 litre internal waste bins, colour coded to the various waste streams at the point where the waste is generated, and then manually transported to the designated waste area located within or adjacent to the facility. These waste bins are then emptied into the larger colour coded 240 litre or 1100 litre bins, depending on weight for that particular waste stream, these bins are then emptied by the appointed contractor. In the case of cardboard and news the bins should be replaced by wire cages which are positioned in the waste area ready for the contents to be compacted and stored ready for collection by the appointed contractor.

When it comes to food waste if on site composting is not an option, or the compost generated cannot be used on site there are two major contenders, both using modern technology which has been tried and tested to tackle the problem in different ways.

OPTION ONE:

The first option for dealing with food waste is to collect it in colour coded 60 litre bins at the point of generation, then seal the bin with a lid which is put in place while it is manually transported to the designated waste area located within or adjacent to the facility. These bins are emptied into the food waste unit before being cleaned and disinfected.

The food waste will be disposed of by using a totally self-contained, continual fed waste disposal system designed to convert solid food waste material into liquid. The system uses a process perfected by nature, to decompose the food waste into a nutrient rich liquid that is virtually odour free and is safely disposed of through the existing drainage system. The system is known as the GohBio or Waste₂O system, depending on the daily amount of food waste generated, both these systems have been reviewed and appraised by CDIS ~ KARM before being specified and installed on the government estate. Both the GohBio and Waste₂O are available from Mechline Developments Ltd.

The GohBio / Waste₂O technology can safely and quickly decompose virtually anything that is acceptable for human consumption including; meat, poultry, fish, fruit, vegetables, rice, pasta, bread, noodles, grains, coffee and dairy products. A refined formula of enzyme and activator is used to breakdown organic waste into liquid which can be safely disposed of down the drain, completely eliminating the waste and ultimately allowing the treated food waste to return to our ecosystem as water.

1. The enzyme is mixed with its activator and added to the system during the setup of the machine. Once every week any foreign matter (estimated at a maximum of 2.5 litres) is removed from the chamber of the machine and the enzyme while its activator is topped up every month or three months depending on the system used.

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2. Food waste is added to the chamber of the machine.
3. Warm water is automatically added to the chamber of the machine and the food waste begins breaking down immediately.
4. As the waste breaks down it become a nutrient rich liquid, this is flushed down the drain allowing the food waste to return to the ecosystem as water, thus ending the process. The food waste is entirely eliminated in approximately 24 hours.

An analysis of the liquid discharged from the system is as follows:

• Chemical Oxygen Demand (settled) mg/l	1630
• BOD 5 Day ATU, settled mg/l	900
• Suspended solids (unsettled) mg/l	620
• Total Fats, Oil & Grease mg/l	49
• Ph	6.4

The system is designed for anyone who generates a high volume of food waste, in excess of 50kg per 24 hours. As it helps them to create an environmentally sound future for the generations of tomorrow while providing an economic solution for dealing with the problems of food waste disposal and its rising costs today.

Benefits:

The GohBio / Waste₂O system enables the facility to actively contribute to environmental sustainability and the preservation of resources, effortlessly and cost effectively for the following reasons:

- Reduces dependency on fossil fuels and foreign oil sources
- Reduces air pollution and harmful emissions ~ food waste in landfill gives rise to methane which is 20 times more damaging to the environment than CO₂
- Reduces lorry traffic ~ one service van visits site once every 13 weeks, while a collection lorry would need to visit site between 26 and 39 times if a conventional system is used.
- Preserves valuable landfill space. On the 14th September 2009 the UK Government announced that they do not want any food waste sent to landfill, however they didn't say when by, or how it is to be achieved.
- Food waste is returned to the ecosystem as water
- Reduces the potential for soil and groundwater contamination
- Food waste no longer has to be retained on site awaiting collection

- Hygienic drainage systems that do not become blocked by starch, fat, oil and grease with traps having to be emptied on a regular bases.
- Reduces the problems associated with vermin due to the lack of any food source, with recycling areas staying cleaner and dryer.
- Eliminates the cost of food waste storage, collection and transportation while reducing the cost of cleaning materials, utilities and labour.
- Allows for internal waste recycling areas to be located within the facility as part of the ergonomic work flow, greatly reducing the number of risks relating to cross contamination.

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- The system helps to encourage proper waste separation and in some cases record the volume of food waste being processed. Analysis can then be undertaken to allow for review of food storage, production and service to reduce the waste generated and increase the profitability of the operation.
- Easy installation
- Provides a low cost operation with low cost, hassle free maintenance, while de-risking the disposal of food waste and its associated costs as the future of landfill is debated and the tax increases that are likely to continue if it remains an option.
- Most systems will provide pay back within 2 to 3 years.

OPTION TWO

The second option designed for food waste is the latest Micro Vac handling system which is being brought into the UK by Meiko UK Ltd. This system was reviewed by CDIS-KARM on behalf of VT Flagship with Defence Catering at a school and hospital in Sweden. On the strength of this review it has been installed in the Junior Rates dining hall and galley at HMS Raleigh and HMS Collingwood. It provides one of the most hygienic and sustainable solutions available to the catering industry today from both an environmental and economic perspective. The payback period for this system is between five and seven years.

What is Micro Vac?

Micro Vac is a system designed for the handling, transport and storage of food waste produced in a wide variety of food service operations. Micro Vac uses a high velocity vacuum to transport food waste from point of generation to the point of storage. It consists of four main components: a food waste inlet, an inter-connecting pipe system, a food collection and storage vessel and a vacuum source with an incorporated control unit.

In principle, the system:

- Grinds and mixes the waste food within the inlet together with a small amount of hot water, which is then converted to a liquid mass that can be extracted within the system with ease.
- Transports this liquid mass by high velocity vacuum through a standard plastic sewer pipe network to a separator that is located within the storage vessel.
- Extracts the majority of the water from the food upon reaching the storage vessel via a filtering screen. The extracted water is then discharged into the main drainage system.
- Discharges the contents of the storage vessel into a sealed tanker that forms an integral part of a specialist waste collection vehicle. The food slurry can then be transported to a bio-gas or composting plant for processing or recycling.

Why, and when to use Micro Vac

- When the volume of waste food is less than 180 litres per hour through a maximum of two inlets per vacuum pump and control unit.
- When the highest food hygiene standards are required in the facility.
- When a long term cost efficient system of handling food waste is required.

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What are the advantages of the system?

- First class hygiene standards in all food preparation and service areas with no problems resulting from pests, rodents, wildlife and unacceptable odours.
- Considerable labour savings with reduced operating costs.
- Ergonomic handling of heavy waste.
- Environmentally friendly, organic waste becomes an asset when used to generate renewable energy.
- Reduced waste volume.
- Simple to install and maintain using tried and tested engineering solutions.

Where can the Micro Vac units be placed?

The inlet is designed as a workbench and can be placed in a variety of locations within the catering areas. The idea is that the inlet should be integrated into the working process and flow. It then becomes an automatic process to deposit the waste food items directly into the inlet adjacent to where the majority of the food waste is generated. Each individual Micro Vac system can have a maximum of up to two inlets placed at a distance of no more than 70 metres from the waste food storage vessel.

In principle, the pipe work system can be located and positioned almost anywhere within the facility. Micro Vac uses 50mm diameter standard plastic sewer pipe for transporting the liquid mass in either a vertical or horizontal position. The pipe work can be located within the false ceiling voids or adjacent to other waste water services.

The separator / storage vessel needs to be located in a suitably accessible location. As the vessel is fully ventilated, the location does not have to be temperature controlled or specially designed in any way. It is an advantage if the tank can be placed close to an outside wall, adjacent to where the waste is to be discharged into the waste collection vehicle, in order to minimize the length of the suction pipe required.

The vacuum unit with the system control panel can also be positioned in the same location as the storage vessel; however it can be placed in a separate location if required.

How does Micro Vac work?

The operator raises the inlet lid and fills the waste storage space located within the inlet with a maximum 5 litres (average 50 covers) of food waste or to the maximum level mark.

The operator closes the lid and starts the cycle by pressing the green start button. When the system has become activated, the lid is automatically locked and the grinder within the inlet starts the operation, cutting and mixing the waste with a measured amount of hot water. The liquid mass is then extracted by a high velocity vacuum, via a mixing valve where it is mixed with the transport air. The transport air is fed from a pipe which can then be directed, for example, into the ceiling void. When the waste has been ground and the inlet is emptied and the process is completed, the lid is unlocked and the inlet can then be refilled. If no further extraction has taken place within a 2 minute period, the vacuum pump closes down and the system is placed on "standby" mode.

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The separator that separates the waste from the transport air is located to the top of the storage vessel and is attached to the inlet by a 50mm plastic pipe. In the base of the separator a valve automatically closes when the vacuum is created. This valve also opens automatically when the vacuum has been exhausted.

The waste from the separator is collected in the storage vessel. Inside the tank is a perforated metal cylinder that serves as a filtering screen, the function of which is to extract free liquid in order to increase the dry substance content in the amassed waste. Within the cylinder is a pump that empties the extracted water directly into the drainage system. When the vessel is approximately 90% full, a signal is generated to enable the vessel emptying process to be ordered from the waste collection contractor. When the "full" signal is generated the system is automatically stopped in order to avoid overfilling of the storage vessel. The storage vessel is manufactured from glass fibre reinforced plastic and has a capacity between 2,000 and 10,000 litres.

The entire process is controlled by a completely new developed type of PLC module which makes contact with the inlet by means of a two-ribbon cable. The control unit is provided with control lamps that indicate the system status and vessel storage level.

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