



go green pay less no mess

waterless composting toilet systems

Manufacturers of Australia's Leading
Commercial Environmental Toilet Systems

OPERATION & MAINTENANCE MANUAL

Commercial Use for Models:

CM8 | CM10 | CM14
CM20 | CM40 | CM60

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SERVICING QUICK GUIDE

DAILY OR WEEKLY

- » clean restroom & toilet fixtures using only bio-compatible cleaners
- » flush urinal piping using bacterial based cleaner
- » add bulking material via pedestals around 10 litres per 100 toilet uses

MONTHLY

- » remove non-biodegradables for proper disposal in trash
- » check pile moisture texture is moist and crumbly, not sodden or dry
- » check pumps and drains maintain proper operation and free flow
- » level pile and add bulking material when cone reaches 40 – 50 cm in height
- » remove liquid as needed keep standing liquid to no more than 5 cm
- » add compost enhancing bacteria if extreme usage has occurred or is expected
- » check user instruction signs replace as necessary to maximise user co-operation

ANNUALLY

- » clean vent system remove any obstructions inside ductwork
- » service fan clean and assure proper functioning
- » clean drain line remove debris and flush with clean water
- » service pump and float switch clean and assure proper functioning
- » remove compost if necessary only enough to make room for new material

OVERVIEW

Congratulations on purchasing a Clivus Multrum™ composting toilet.

This manual covers the full Clivus Multrum range of toilets when used in commercial or public use facilities.

The rated capacity of the units is designated by the number in the model.

For instance, in the CM8, the '8' stands for 8000 uses per year.

The other model numbers similarly relate to unit size.

GENERAL OPERATION AND MAINTENANCE

In normal use the Clivus Multrum toilet needs no chemicals, applied heat or water and has no polluting discharge. It is based on one of the oldest principles in nature – simple organic decomposition.

The operation and the care requirements of the composting toilet are much the same as a regular garden compost pile. It requires an adequate supply of air, sufficient moisture and moderate temperature to support a wide variety of composting micro organisms. Human waste is deposited on top of the pile in the compost processor and is a rich source of nitrogen for the micro organisms to feed on. In addition to this a carbon rich bulking material is required to obtain an appropriate carbon/nitrogen ratio and avoid the release of excess nitrogen as ammonia. As in the garden compost pile, micro organisms break the organic matter down into safe usable humus. The addition of organic bulking matter is needed firstly to absorb liquid, secondly to give the composting pile a friable texture that ensures sufficient aeration, and thirdly to maintain the carbon/nitrogen ratio at an optimum level for the micro organisms. This produces an environment that optimizes the decomposition process.

Under these conditions the composting process is aerobic (i.e. oxygen is present), generating heat and leading to an increase in temperature within the compost pile. It has been found that harmful pathogens present in human waste are destroyed when exposed to the unfavourable environment in the compost for a sufficient period of time. A sufficient holding time for human wastes within the compost processor is therefore an important operating factor, and Clivus Multrum units are designed to provide this when operated in accordance with this manual.

HOW THE CLIVUS WORKS

The composting process works on the same principle as an ordinary garden compost bin. Waste is collected into the composting chamber along with carbon rich material such as wood shavings and garden wastes. Here the materials gradually decompose in the ventilated environment.

Baffles and air channels in the tank distribute air flow, helping to aerate the pile, and this promotes the aerobic composting process.

As the organic material decomposes it will reduce in volume by up to 90%. The compost pile is

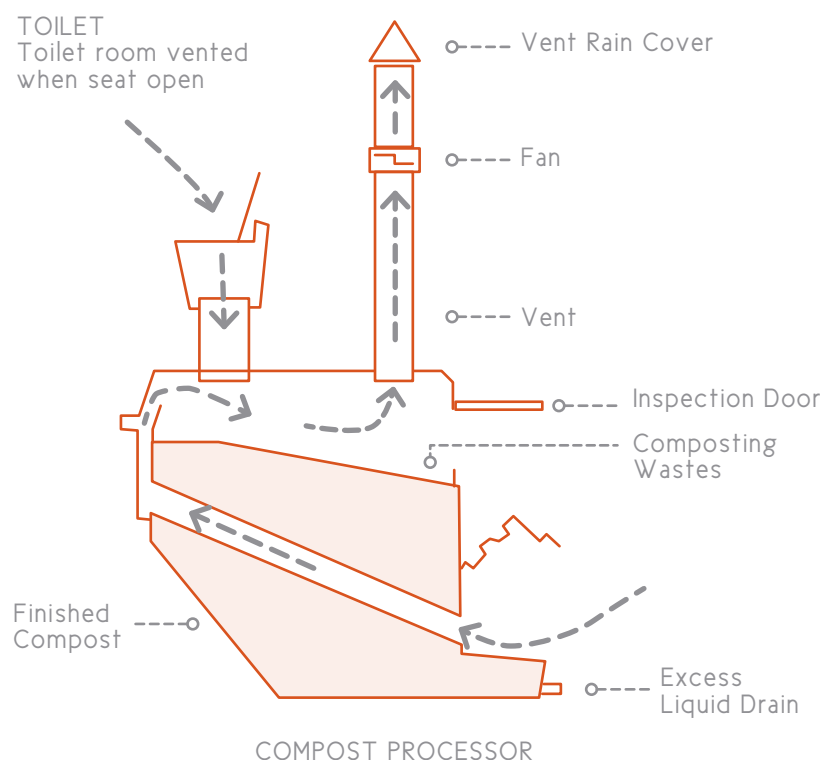
therefore always 'shrinking in the middle' whilst new material is being added to the top, and finished compost is removed from the bottom of the pile when appropriate. A small electric fan in the vent pipe creates airflow within the system and ensures that the toilet room is always kept clear of any odours from the processor.

CHOOSING A BULKING MATERIAL

Composting of human waste is a natural process and environmentally benign. In keeping with this, the best choice for a bulking material is one that is readily available in your local area as a waste product from some other activity.

Woodshavings have been found to be the ideal bulking material and provide consistent results. Woodshavings entrap air, are absorbent and do not become compacted as does other matter such as fine sawdust, newsprint or large quantities of grass clippings. A granular pine bark mulch is also suitable.

Woodshavings are the material recommended by Clivus Multrum, and are generally available from:



- » joinery workshops and some timber mills
- » commercial distributors that collect and package it
- » produce stores
- » pet shops
- » nursery and landscape suppliers

Please note: Woodshavings or sawdust must not be from treated timbers as the treatment process will hinder the growth of, or even poison, the micro organisms essential to the composting process.

If you will be using woodshavings in your Clivus Multrum system you can now skip to the Start Up Procedure.

However, if woodshavings are difficult to source in your area, read the following information to assist in choosing alternatives.

The key characteristics of a good bulking material are:

- » dry, but readily absorbs moisture.
- » has a high carbon/nitrogen ratio.
- » remains friable, traps air and does not form a mat or ball when damp.
- » is known to compost well, and has no chemical contaminants to affect the compost bacteria.
- » availability and cost.

Human waste has a carbon/nitrogen ratio less than 10, whereas the optimum C:N ratio for the compost pile is 20-30. A bulking agent with a high C:N ratio is therefore preferred, as this allows a smaller quantity of the agent to be used in comparison with other materials.

Representative ratios for commonly available bulking agents are shown below to indicate the relative ability of the materials to provide additional carbon.

BULKING AGENT (DRY)	CARBON/NITROGEN (C:N) RATIO
Softwood shavings	650
Hardwood shavings	550
Newsprint	500
Softwood bark	500
Sawdust	450
Wheat straw	130
Rice hulls	120
Straw – general	80
Leaves and shrub trimmings	60
Grass clippings	20) not
Hay	20) recommended
Vegetable scraps	20)

For example, to achieve the same C:N ratio in the compost pile around 10 kg of leaves would

need to be added if used in place of 1kg of woodshavings.

Mulched leaves and garden clippings can replace or supplement wood shavings as a bulking agent. Use material that has already started to compost, for example leaf matter that has fallen on the ground and started to decompose. Fully decomposed matter is also ideal as this matter contains useful compost bugs and micro organisms along with a high level of good bacteria.

Please note: Fresh gum leaves do not make a good bulking agent, however, those that are partly decomposed and mixed with other composting matter can be good for the system.

Material such as large woodchips, unshredded newspaper, grass clippings, straw, long grasses, treated wood shavings or highly resinous wood should be avoided as they take a longer time to break down or are unsuitable to compost.

Finely chopped vegetable scraps and peelings may be added to the process as long as they are not too wet and have been kept in an airtight container to prevent insect infestations. However, because of their high nitrogen content the addition of these scraps will require even more bulking agent, not less, unless earth worms are also used. Addition of these materials will reduce the working capacity of the tank available for processing human wastes.

OPERATING PROCEDURES

START UP PROCEDURE

This procedure should also be followed should the tank ever be completely emptied for any reason.

Please note: This is a crucial part of the installation process and must be completed before the unit is operational.

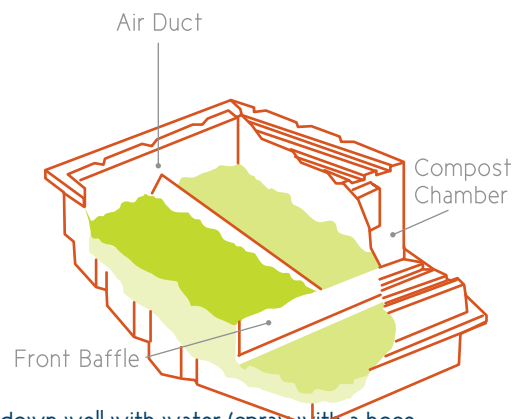
We recommend wood shavings as the starter-bed material or bulking agent as they are high in carbon and are of a good texture so as to trap oxygen and retain moisture. Alternative bulking agents are discussed in the previous section.

Unsatisfactory materials for the starter-bed include: large quantities of lawn clippings, fine sawdust, large wood chips and long stemmed grasses. These materials will decompose but in your Clivus may have a tendency to form solid "clumps".

Spread the bulking material evenly in the tank bottom and so as to cover the forward part of the air ducts as shown in the following diagram. Material must come 150mm up behind the bottom edge of the front stainless steel baffle to ensure a seal between the compartments.

Approximate volume required is

- » CM8 0.25 cubic metres
- » CM10 0.3 cubic metres
- » CM14 0.4 cubic metres
- » CM20 0.5 cubic metres
- » CM40 1.2 cubic metres
- » CM60 1.2 cubic metres



Once the woodshavings have been added, dampen down well with water (spray with a hose through the top inspection door). This breaks the surface tension and allows the bulking material to begin absorbing the urine that will enter the tank. If this is not done liquid can simply run off the organic material without slowly leaching through.

Clivus Multrum provide a packet of starter bacteria with your new system. For this to be effective it is necessary to have some waste in place to provide nutrients before the bacteria is added to your unit. We therefore suggest that the toilet is used in the normal way for say 7 – 10 days (depending on usage level) before the bacteria is added.

Hydrate the supplied Clivus compost starter bacteria in a bucket of warm water for 10 minutes or longer, then add the bacteria to the toilet. An alternative source of bacteria is to add several bucketful's of well composted garden material or commercial compost humus and mix into the top of the pile. This can be repeated as often as you wish.

TOILET USE

The toilet should be used in the same manner as conventional toilets, with paper disposed into the toilet. No special toilet paper or method of use is required.

When not in use, the toilet seat lid should be left closed to maintain the proper ventilation draft in the compost tank. Where multiple pedestals are installed on one tank this also ensures odour control in the restroom.

"Close Lid" stickers and signs should be maintained so as to gain co-operation from the patrons. To ensure an odour free restroom, the compost system ventilation fan must be run continuously to ensure a draft down into the pedestals.

FREQUENCY AND QUANTITY OF BULKING MATERIAL REQUIRED

Composting occurs more rapidly when there is a good mix of waste and bulking agent. This mix happens naturally if bulking agent is added at each toilet use, reducing the amount of

maintenance raking needed on the compost pile.

We recommend placing a receptacle of woodshavings in the toilet room and adding one handful (or a small cupful) of shavings down the pedestal after each use.

In public amenities this may not always be practical, and the addition of bulking agent may be made regularly when the toilets are cleaned. In this situation, about 10 litres of woodshavings (or equivalent) should be added for each 100 uses. This quantity may need to be adjusted depending on the climate and the nature of use. More mixing of the pile with the maintenance tool may be required to ensure even distribution and avoid 'layering' of the wastes if bulking agent is not added frequently.

If different bulking material to woodshavings is used, greater quantities will generally need to be added. Refer to the section on Choosing a Bulking Material for details.

TOILET CLEANING

Frequency of cleaning should be adequate to provide a pleasant and hygienic restroom that will encourage the respect and co-operation of users.

Other than adding of bulking agent, the frequency of cleaning does not impact on toilet operation.

PEDESTALS

The inside of the toilet bowl is easily cleaned with a small quantity of water and biodegradable cleaner, using a soft toilet brush. Suitable cleaners are generally labelled 'biodegradable' or 'safe for septic systems'. Chlorine based cleaners, bleaches and disinfectants must not be used as these will kill the compost bacteria.

The addition of a bucket or so of water during cleaning will present no problems to toilet operation, and in dry climates will even be beneficial.

If excessive ammonia type odours are being experienced in installations with a particularly high urine load, the use of a bacterial based cleaner with odour control properties is advisable.

Contact Clivus Multrum Australia for recommendations.

The seat and outside of the toilet can simply be wiped with some disinfectant applied to a damp cloth. Avoid using abrasive cleaners on the gloss finish of toilet and seat, as these surfaces will scuff. If required, the chute interior may be easily cleaned with a swivel-head brush and some biodegradable cleaner.

Scuff marks or slight scratches on the pedestal may be carefully polished out using a small quantity of fibreglass cutting polish, following the product instructions.

URINALS

Non-flush urinals require a regular clean to avoid build up of odorous deposits. Using a spray, thoroughly wet the surface then brush or wipe down. Also use a litre or so of water or cleaning solution to flush the piping and reduce long term scaling and blockages. Use of a suitable

bacterial based cleaner with odour control properties is recommended.

THINGS TO AVOID

Do not put the following items into the toilet.

- » Disinfectants or other harsh cleaning solutions e.g. bleach, caustic, chlorine, etc.
- » Chemical toilet wastes
- » Paints, solvents or any other chemicals
- » Plastic of any kind eg. disposable nappies, sanitary products
- » Cigarettes or hot ashes
- » Anything that is inorganic or non-biodegradable.

Kitchen food and vegetable scraps can be added as a means of disposing of these items, especially if earth worms are used in the processor. These wastes are high in nitrogen however, and may require additional use of bulking agent. Excessive amounts will lead to overload of the system. They have also repeatedly shown to be a source of unwanted insects in the compost tank.

OTHER CONSIDERATIONS

Provide proper receptacles for disposable nappies and feminine hygiene products. Trash cans and recycling bins should be available for cans, bottles, etc...

Provide receptacles for portable toilet waste if unauthorised disposal is a potential problem.

Keep loose objects such as extra toilet paper rolls out of the restroom or in a locked cabinet where they cannot be dropped down the toilet chute.

Avoid accidental fires in the compost tank. 'No Smoking' signs should be posted in conspicuous locations. Provide ashtrays outside the restroom building.

Assure user co-operation by maintaining clean, well lit and pleasant restrooms. For all toilets and urinals, affix Clivus Multrum '1-2-3' user plaques and 'Close Lid' stickers within easy view of the user. Provide signs explaining the system to users.

USE OF WORMS

While the Clivus Multrum system is based on microbiological decomposition, it is also perfectly suited to the use of worms, more so than most other compost toilet systems. However, we do not actively promote the Clivus as a worm-based system because our aim is to provide the most trouble free system we can. Being a higher life form, worms need more care, for instance ensuring correct carbon/nitrogen ratios and pH balance are maintained, that they have adequate moisture at all times and plenty of food. If this care is given then worms are a valid addition to

the Clivus system.

The use of worms increases the rate of volume reduction for the compost, and effectively increases the working capacity of a tank in a particular environment. This can be of real benefit in cold climates, or where additional waste material is being added to the compost tank.

Garden earthworms are not very suitable however, and advice should be obtained on the most suitable variety of compost worm for your location. Local worm farms or nurseries can assist with this.

The population of worms will be largely self-regulating in the presence of sufficient moisture. Additional moistening may be necessary to provide the worms with an adequate amount of water. Worms should not be introduced until the system has been in active operation for a period of at least six months. Open the maintenance access hatch and place the worms in a front corner of the tank, away from the waste cone. The worms will migrate on their own throughout the compost pile.

ROUTINE SERVICING PROCEDURES

The servicing described here will ensure the reliable operation of your Clivus Multrum system. If you have a particular problem, refer to the Troubleshooting Table at the end of the manual.

INSPECTION OF THE COMPOST CHAMBER

The ability to visually inspect the process is a significant design advantage of the Clivus Multrum system as it ensures the system can be managed to optimize performance. This process of checking the system and raking over the pile takes only a few minutes.

Approximately once a month (more frequently in heavily used units) open the inspection hatch (top door) and visually check the condition of the pile. This should not be an offensive task as the ventilation fan ensures that any odour is drawn away from the maintenance person and up the vent pipe. Remove large objects such as cans, bottles, plastic bags, disposable nappies and feminine hygiene products that can restrict compost aeration, that take up significant space or which may cause matting of the pile or slow the composting process. Small items such as tampon applicators or bottle caps are not large enough to need removing. Use the long-handled maintenance tool or other suitable means for removal and proper disposal.

If the pile is forming a cone 40–50cm in height this should be levelled using the supplied maintenance tool to ensure the full tank volume is utilised. Do not 'turn' the compost pile, as this may bring uncomposted material to the area of the removal hatch and result in its premature removal. If bulking agent was not added regularly, add the larger quantity at this time and mix it in as you level. A system getting 100 uses per day would likely need this done once every 2–4

weeks. When the proper amount of bulking material has been added regularly, a good consistency is likely to be achieved: porous and crumbly, with no large clumps of waste. For good composting the pile should have around 50% moisture content and appear moist, but not sodden. If the pile appears too wet simply add a generous amount of dry bulking agent through the toilet chute and rake through; also check the ventilation system is operating effectively. In dry climates, or where the toilet is not used for an extended period of time, a light spray of water will be required if the pile appears dry (hard or crusty on top, dry toilet paper). The frequency and/or volume for adding bulking material should be modified if the pile is consistently too wet or dry.

After inspecting the composting pile, open the bottom access hatch and check that liquid drain is clear of obstruction. If there is more than 3 – 4 cm of liquid or an offensive odour in this area this indicates all is not as it should be, so refer to the Troubleshooting section at the end of this manual.

If the tank has no drain, liquid should be pumped out regularly to keep the pile from becoming partially submerged and creating an anaerobic condition. As much as 5 cm of liquid in the bottom of the tank is of no concern. Check the drain line, manual pump or automatic pump and float switch for proper flow and operation. Rinse automatic pump with clean water and remove debris from inlet screen on the bottom of the pump.

THE MAINTENANCE TOOL

After servicing the top of the compost pile it is possible that the maintenance rake is contaminated with fresh faeces. The best way of cleaning the rake is to run it through loose soil or through composted humus in the bottom section of the tank. The rake should then be left in a safe place out of reach of children and can be labeled "For Clivus Use Only". Storing it in a bucket of dry woodshavings is a good method for storage.

CHECKING THE VENTILATION SYSTEM

If the vent system is kept clear and well maintained this reduces resistance to the airflow, ensures odours do not develop in the toilet room/s and that there is good dilution of odours in the vent system.

The presence of an adequate draft can be checked by simply holding a piece of cotton where the vent leaves the composting chamber. The cotton should be drawn toward the vent pipe. A similar draft should also be present when the lid is up on the toilet pedestal, and can be readily felt on a wet hand.

The same method can be used to ensure the system is drawing air in from the front air inlet grille

on the bottom access hatch. If a draft is not present check that the air inlet grille and the vent fan are free from any obstruction. Also check the front of the V-shaped air baffles inside the chamber to ensure that these too are free from obstruction.

The inlet air grille and the vent fan should both be checked regularly and cleaned every six months.

If the fan is turned off for long periods at a time, or run only intermittently, an insect screen on the vent pipe may be required. Regularly check this screen does not become blocked with dust and cobwebs – this is most important if the fan is not operating.

Ensure that there is no obstruction at the top of the vent pipe from overhanging trees or spider webs. Trim trees back to maintain clear air flow around the vent.

Keep the toilet lid closed when not in use. If the toilet lid remains open for extended periods of time the fan will pull air down the toilet chute rather than through the compost pile, slowing the decomposition process and the rate of evaporation.

FAN REMOVAL – (Standard Fan)

To remove the fan for cleaning first switch off the power supply, then remove the two screws holding the fan cover to the housing and withdraw the cover. The fan may then be slid out of the housing without disconnecting the wiring. When reinstalling the fan, check that it will blow in the correct direction before sliding it into the housing and replacing the cover. If the fan requires replacement, a genuine spare part from Clivus Multrum Australia is recommended to ensure the correct air flow rate and power consumption are maintained.

BOOST COMPOSTING PROCESS

Use extra bacteria if the system has experienced extremely high usage, a high usage cycle is about to begin, or if the facility is opening or closing for the season. Air-dried bacteria are manufactured for enhancing the aerobic composting process. Use it at the rate of one sachet (mixed with one bucket of warm water and rested for 20 minutes), sprinkled as evenly as possible over the pile, to keep the decomposition process fully functioning. Sachets of bacteria are available from Clivus Multrum.

REMOVING THE FINISHED COMPOST

The minimum retention time required for wastes to remain in the compost processor is generally 12 months, however this varies from State to State and there may also be specific requirements imposed by your local Council. Check with your Council to determine any requirements for your area..

It is not necessary to remove compost from the tank until the levelled waste mass has reached the

bottom of the inspection door. In some situations it may take up to 3 years before any finished compost needs to be removed to create more space in the tank. This is dependent upon climate, the rate of usage and what type of bulking material is being used. First compost removal will normally need to occur after about 18 months.

Once the finished compost is ready for removal, up to 1/3 of the compost should be removed per year. Material must be taken from the compost removal chamber at the bottom front of the tank. The amount removed will vary with the size of the tank, and the compost processor should always be left at least 1/3 full, with material up to the underside of the baffles. Once compost is removed ensure that the compost pile settles to the bottom of the compost chamber. If compost has 'bridged' and is reluctant to settle, the maintenance tool (or other blunt instrument) can be used to loosen the bottom of the pile or prod down from the top.

We recommend removal of at least some material on a yearly ongoing basis even if there is still plenty of working space available at the top of the pile. This prevents the compost continuing to consolidate under its own weight and becoming very solid in the base of the tank.

After removal the finished compost should be buried under at least a 100mm layer of soil in a designated area of the property, or otherwise disposed as required by your local Council.

PUBLIC HEALTH CONSIDERATIONS

SERVICING THE TOILET

The Clivus Multrum™ waterless toilet system has undergone extensive testing. This testing has shown consistently that when the toilet is operated correctly that the finished end-product is safe to handle. However, when servicing the toilet system or removing the end-product Health Regulations advise that safety precautions should be observed. For instance, rubber gloves should be worn as well as eye protection and a dust mask.

USE OF END PRODUCT

The Health Departments generally require that the end-product is to be buried under no less than 100 mm of top soil. This should be done in a designated area reserved for this purpose and away from where children play. Health Departments are still undecided about whether they should allow the final product to be used on crops intended for human consumption. Your local Council may have further specific requirements in your area.

COMPOST TOILETS AND INSECTS

A situation that encourages an insect problem within the compost tank is if the fan is off for extended periods. This allows insects to enter via the top of the vent pipe, or can attract them via the pedestal. If your system is running only on daytime solar power or if you want to turn the fan off from time to time, some fine insect mesh should be placed across the top of the vent pipe. In addition, you should consider installing a wind driven turbo-vent that will maintain a draft through the system when a breeze is blowing.

From our experience, only a small proportion of compost toilets seem to attract insects. In some cases insects like the Soldier Fly help with the break down of compost. Other insects such as the small Vinegar Fly are only a nuisance. The Vinegar Fly is a small black insect that is small enough to go through standard fly wire and has very small white larvae. This insect can get in through any small gaps in the compost tank lids or it may hatch from eggs in fruit skins that are thrown down the toilet. Only very rarely will the common housefly find its way into the compost tank.

Whilst spraying down the toilet chute with a pyrethrum based spray often helps control the vinegar fly, the best way we have found to eliminate them is to introduce their natural predators such as millipedes, earwigs, beetles of varying kinds and other invertebrates. This is easily done through the addition of damp decaying leaf litter and soil found naturally under trees. The addition of 3 or 4 buckets of this material should be sufficient. However, raking some additional material through the pile will also help.

Be careful that spraying down the chute will not kill off the freshly introduced creatures and their hatchlings.

Vinegar flies are usually only active in a young compost tank (up to the first six months) and often are a sign that the pile is too acidic. This may be due to insufficient or the wrong type of organic bulking material being added to the system. It may also be due to the fact that the added starter bacteria has not fully developed.

The following steps outlined below should establish the correct balance within the composting tank and eradicate your immediate problem:-

Step 1

Ensure the top inspection door and the bottom access door on the composting tank are sealing properly. Always make sure the inspection door is securely closed after checking the pile. Ensure that the toilet seat is always down when not in use.

Step 2

Turn off the fan and spray a pyrethrum based insect spray through the inspection door

onto the waste pile (this will not harm the compost bacteria) to kill airborne and surface insects. Leave the fan off for ½ hour to avoid drawing the insect spray away before the flies have been exposed. This should be repeated daily over the next week as remaining fly eggs continue to hatch. The vinegar fly has a seven day breeding cycle.

Step 3

If there is an acidic odour apply a generous quantity of garden lime (available from nurseries) to the top of the pile and agitate into the pile with the maintenance tool provided. This will help correct any acidity imbalance. Adding lime should be a once only job as it will tip the balance the other way if used regularly.

Step 4

Ensure adequate quantities of bulking material are being added frequently to the system. Add an extra two to three buckets of woodshavings and agitate into the top of the pile at the same time as the garden lime. It is less attracting and more difficult for insects to breed if fresh wastes are immediately covered.

Step 5

After doing all of the above and having stopped spraying the pile, leave for a few days and then add 2-3 buckets of naturally occurring, decayed leaf litter along with the top few centimetres of soil. This helps to introduce a wider number of micro and macro organisms which helps establish the correct mini "eco-system" inside the tank.

Step 6

Ensure the tank is not being re-infested by insects from a nearby breeding source such as garden compost piles, soakage areas, farm wastes, etc. It is strongly recommended that no kitchen scraps or fruit and vegetable peelings be added until the situation has corrected itself.

TROUBLESHOOTING

PROBLEM

Odour present in the toilet room.

A properly functioning Clivus Multrum system does not produce odours in the toilet room.

Occasionally, however, the draft of the system may become impaired or a leak may develop in a chute or a vent resulting in odour.

Note: You should never use a room exhaust fan where a Clivus is installed as the exhaust fan will draw up any odour from the toilet chute (particularly if the toilet seat is not closed). The fan in the toilet vent pipe will be sufficient to draw any lingering odour out of the toilet room.

RECOMMENDED COURSE OF ACTION

- » Check that the power source is connected and voltage is set to 12V, and that power point is switched on.
- » Check that ventilation fan is operating correctly and that vent pipe is free of blockages or dense cobwebs.

- » Ensure that the fan has been installed so as to draw air up from the bottom of the vent, not blow downwards.
- » Check that fan is not obstructed from turning by dust or cobwebs. Clean if necessary and replace into housing.
- » Check that open windows and doors are not 'sucking' air out of the toilet room due to outside air turbulence. This can overcome the suction of the vent fan.

PROBLEM

An odour is present outside the building but not inside.

Some odour from the top of the vent pipe may occur, but it will rarely if ever be detected at ground level.

This is obviously not a desired occurrence.

RECOMMENDED COURSE OF ACTION

- » Ensure that the vent pipe is installed correctly and that it clears the roof by at least 0.6mtr.
- » If the house is in a very windy area you could be getting a swirling effect which is pushing the ventilation gases back down towards the ground. In this case, the only thing that can be done is to extend the vent pipe into clear air flow above the highest point of the roof.
- » If the vent is in the wind shadow of nearby trees or buildings then odour may settle back to ground instead of being dispersed. Extend the vent pipe into clear air flow.
- » Check that all joins in the vent pipe are sealed and are not leaking. Also check for cracks in the vent pipe and seal with silicone sealant and duct tape.
- » A strong unpleasant odour is a sign the composting process is not operating in balance. This usually indicates the bulking material should be added more frequently or in greater quantities. Check the state of the compost pile and refer below for any corrections.

PROBLEM

Odour is associated with the end-product.

In a properly functioning system the final composted material should be virtually odourless, much like garden soil. However, if proper ventilation and oxygen are not provided during the composting process the pile may have become anaerobic.

RECOMMENDED COURSE OF ACTION

- » Check that vent fan is operating properly and ensure there is no significant build up of liquid in the removal area.
- » Shovel material from the removal area back in through the inspection door adding a substantial quantity of woodshavings and mixing through with the maintenance tool.
- » Increase the quantity of woodshavings that are regularly added after each use.

PROBLEM

Fan is making a lot of noise.

RECOMMENDED COURSE OF ACTION

- » Check fan for obstructions – has it been correctly installed in the fan housing and is not rattling.
- » Lower the transformer voltage to 7 or 8 volts.
- » The fan may be faulty, phone Clivus for a replacement.

PROBLEM

Some liquid present in removal access area of composting chamber.

With periods of very high use, especially when accompanied by low outside temperatures you may get a little liquid build up in the access area. However, if there is more than just a few centimetres and there is odour present ...

RECOMMENDED COURSE OF ACTION

- » Ensure that sufficient woodshavings and/or other organic bulking material has been added to the system according to the operation and maintenance instructions. If not...
- » Add several full buckets through the inspection door and toss through the top 30cm of the composting pile.
- » Ensure that adequate quantities of woodshavings are regularly added to the system.
- » Check that the liquid drain is clear from obstruction and has been correctly installed so as to slope away from the chamber.

PROBLEM

A significant liquid build up in the tank has occurred.

The Drain Line has become blocked

RECOMMENDED COURSE OF ACTION

- » Check the tank outlet fitting is not blocked by any solids or plastics.
- » Check the liquid drain and absorption trench are clear and not damaged, or affected by ground water.
- » If liquid is non offensive and a clear 'tea' colour, drain off excess liquid and dispose according to local requirements.
- » If liquid is more than 10cm deep, has an offensive odour or is contaminated with solids or scum, this indicates the lower part of the compost pile has become anaerobic (no oxygen). This situation is best remedied by emptying the tank and then restarting the compost process as described in the Operations Manual. Septic tank clean-out contractors can readily pump out the tank and dispose of the contents.

PROBLEM

Compost tank is getting too full

RECOMMENDED COURSE OF ACTION

- » Is the pile too dry, too wet or too cold? (Refer below).
- » Is the unit being overused, particularly in cooler months.
- » Is the composting process active (Refer below).

PROBLEM

The composting process does not seem to be working.

Note: the top part of the pile will not be composted unless it has had sufficient residence time in the tank.

RECOMMENDED COURSE OF ACTION

- » It is normal not to notice any composting for the first six months.
- » Check that the a suitable bulking agent is being used.
- » Check that disinfectant or antibacterial cleaners are not being used in the pedestal.
- » Is the pile too dry, too wet or too cold? (Refer below).
- » Adding a couple of buckets of damp decaying leaf litter and soil found naturally under trees or material from another compost pile will ensure that the correct microorganisms are present to break down the waste. A bacteria pack from Clivus Multrum will also stimulate the process.

PROBLEM

Composting pile appears too dry.

In normal circumstances there will be sufficient moisture entering the toilet to ensure adequate moisture levels. If however, there have been extended periods of little or no use or where outside temperatures have been very high, it may be necessary to periodically spray the pile with water via the inspection door.

RECOMMENDED COURSE OF ACTION

- » Use the maintenance tool to agitate as much of the compost pile as possible and moisten lightly via the inspection door.

Note: Pile should be made damp NOT sodden. Optimum moisture content is around 50%.

PROBLEM

Compost pile appears too wet.

Pile should be damp NOT sodden. Optimum moisture content is around 50%. Too wet is a sign that insufficient woodshavings are being added to the pile and/or that the toilet has received heavy use and insufficient maintenance.

RECOMMENDED COURSE OF ACTION

- » Add several buckets of dry bulking material (woodshavings in particular) through the inspection door and agitate thoroughly through the pile.
- » Increase the quantity of woodshavings added regularly. (Refer page x).
- » Check the vent fan is operating correctly and vent pipe is clear of obstructions. (Refer page x).

PROBLEM

There seems to be too much toilet paper visible on the top of the pile.

RECOMMENDED COURSE OF ACTION

- » Ensure sufficient woodshavings are being added regularly.
- » Some people use much more toilet paper than is really necessary. Simply dampen down if necessary and agitate top 100mm or so of the compost pile to mix with the woodshavings.

PROBLEM

Composting pile may be too cold for composting.

If the compost tank has been correctly sized for the usage and climate, this problem will rectify itself in the summer. Clivus Multrum systems operate successfully in very cold climates if properly sized and maintained.

RECOMMENDED COURSE OF ACTION

- » If the tank is in a cold location and is becoming full without sufficient composting occurring, the following measures can increase the rate of decomposition:
- » insulate the tank from a concrete floor.
- » insulate the sides and top of the tank to retain heat in the compost tank.
- » reduce the airflow through the inlet grille at the front of the tank, or duct it to draw air from a warmer location.
- » if tank is in a cellar, duct warmer air into the cellar.
- » introduce earthworms into the compost. A local worm farm or nursery can advise on a suitable variety for the conditions.

PROBLEM

Undesirable insects in the compost tank.

- » Refer to section on Compost Toilets and Insects in the Manual.

OWNER'S RECORD SHEET

Address:

.....

.....

Clivus Multrum Tank Model :

Serial Number:

Installed by:.....

Date installed.....

COMPOST TANK INSPECTION

MAINTENANCE EVENT
(raking of pile, compost, removal, vent, cleaning etc)

[illegible]