

Waterless toilets or 'dry sanitation' systems are systems that do not use water to treat or transport human excreta. If appropriately designed, they conserve precious water resources and avoid disposal of effluent and pollutants into waterways and the general environment. They can also save you money on your water bill.



They are an important, minimum energy, on-site alternative to centralised reticulated systems that transport the problem 'downstream'. They can also reduce the site restrictions and pollution and nutrient problems that can be encountered in the use of systems such as septic tanks.

Waterless toilets can produce a quality fertiliser that is hygienic to use, if sufficient time is allowed and correct treatment conditions have been maintained.

A Composting Toilet that is working well and is correctly maintained does not smell.

The most common type of waterless toilet is referred to as a 'composting toilet' (CT) although the treatment often involves more than the process that occurs in your garden compost heap.

The original 'waterless toilet' was the pit latrine and sometimes people fear that the composting toilet will look and smell like a pit toilet. But composting toilets can be an elegant addition to a modern bathroom.

Decomposition in the holding tank or container of a CT occurs through a complex bio-chemical interaction of factors such as temperature, pH, desiccation, and digestion by invertebrates, all taking place over an extended time period.

There are many designs of CT but they can be divided into two main types with characteristic advantages and disadvantages. The designs include commercial off-the-shelf units and owner-built systems that can be constructed using readily available materials.

CONTINUOUS COMPOSTING TOILETS

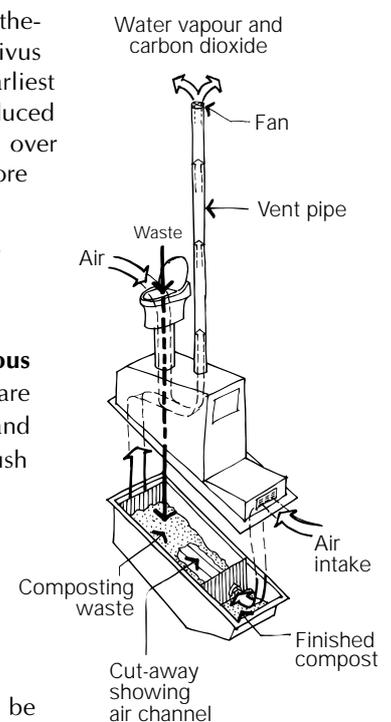
These consist of a single container in which excrement is deposited, and decomposes as it moves slowly through the container. It is then removed as compost from the end-product chamber.

An example of the off-the-shelf system is the Clivus Multrum, one of the earliest CT designs. It has produced many different models over the years, some being more successful than others.

An owner-built example of the continuous system is the Clivus Minimus.

Advantages of Continuous CTs: Single containers are fitted under a bathroom and can easily replicate a flush toilet with little physical or social adjustment.

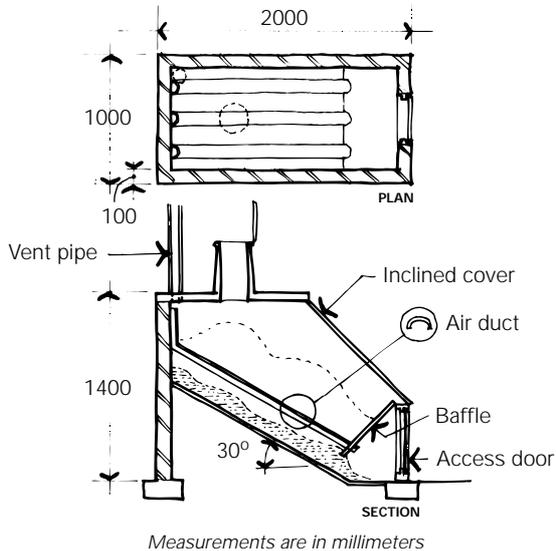
The container is permanently fitted under the toilet seat, and never has to be fully emptied as the compost can be gradually removed when it reaches the end-product chamber.



Clivus Minimus

Disadvantages of Continuous CTs:

The continuous system may allow fresh material and pathogens (disease causing organisms) deposited on the top of the pile to contaminate the successfully decomposed end-product at the bottom of the pile.



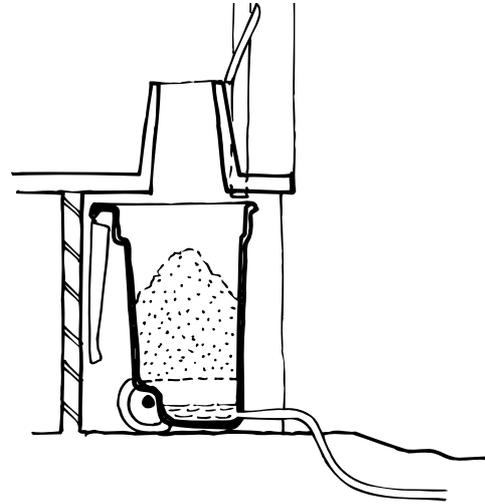
Plans for Clivus Minimus

If a problem occurs with the toilet, the system can be out of order until the problem is fixed because there is only one container. Sometimes the pile does not actually move down the slope of the container and can become compacted and very difficult to remove.

BATCH COMPOSTING TOILETS



Batch CTs consist of two or more containers that are alternated so that the 'active' container is being used while the pile in the 'fallow' container has time to compost without the addition of fresh excrement and the potential for re-contamination.

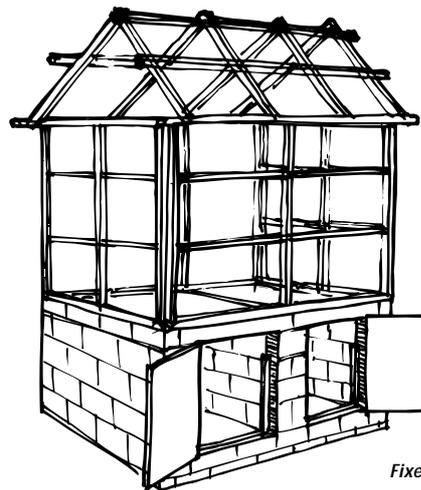


Wheelie-batch Composting Toilet

An example of owner-built Batch CTs is the 'Wheelie-batch' where containers are alternated underneath the toilet seat.

Another example of the alternating Batch system is:

The Fixed Chamber Batch where the two containers are permanently in place and the seat is moved when the time comes to change containers.



Fixed Chamber Batch

It is possible to keep using the toilet and still be sure that the pile is fully decomposed before removing the end-product.

Disadvantages of Batch CTs:

The full containers in the Batch system need to be replaced by an empty container. This involves disconnecting the container fitted under a toilet seat or moving the seat over a new container. Batch systems can therefore take up more space in the bathroom or under the house.

MAINTENANCE OF COMPOSTING TOILETS

The Composting Toilet is relatively simple technically but requires more attention than a flush toilet.

Some carbon based material or 'bulking agent', such as dry leaves or softwood shavings, should be regularly added to the container, preferably daily or with each use. This provides the proper carbon-nitrogen mix, helps aerate the pile and prevents compacting. Some commercial suppliers say this is not necessary for their design and their directions should be followed, but experience indicates the addition of bulking agent is desirable in most designs to produce good compost.

A CT that is working well does not smell. Offensive odours usually indicate that something is wrong and troubleshooting directions need to be followed. Often adding bulking agent in greater quantities or more regularly will remove the smell.

The pile in a CT needs to be well drained. The liquid run-off is often treated in a sealed evapotranspiration trench or a solar evaporating tray.

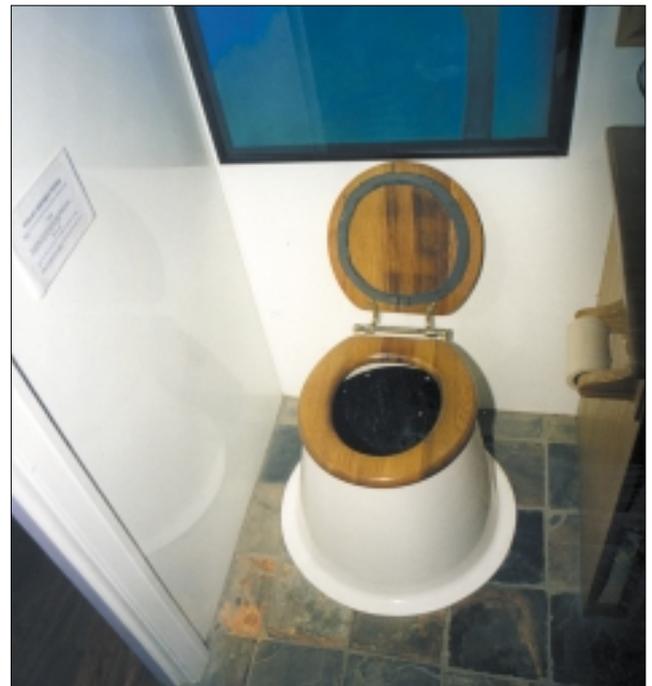
Vent pipes provide aeration to the pile and can work passively using convection. Fans are not essential but are often included in off-the-shelf systems. Fans should be checked occasionally to ensure they are not choked with dust or insects.



The end-product or compost needs to be removed from the CT container when it is sufficiently decomposed. The frequency of removal depends on the size of container, how often the system is used and local climatic conditions. The minimum 'fallow' period should be six months. Depending on the design and usage, the container usually needs to be emptied every six months to three years.

The compost can be used as fertiliser dug into in your garden or disposed of according to local Council regulations.

CTs do not deal with greywater from showers, kitchen and laundry so a separate collection and treatment system needs to be provided. [See: [Wastewater Reuse](#)]



CHOOSING A COMPOSTING TOILET

For an off-the-shelf unit contact several suppliers. Tell them about the building, where the toilet will be located, how many people will be using the toilet and whether it will be on a continuous basis or only occasionally, such as in a holiday house. Ask them to recommend a suitable system for your needs and provide a quote. The cost can range from \$1500 to \$5000. Some suppliers will also assist with Greywater treatment systems.

Check if the supplier will give you after sales support. Ask if they have any customers with whom you could meet and discuss their experience with the CT. The cycle of usage and production of compost or end-product can take a couple of years. It is important to know that all stages of the process work satisfactorily.

Check with your local Council and/or the supplier to confirm that CT design has approval in your area. Council attitudes and regulations vary, but the common off-the-shelf units have Health Department approval. The owner-built designs are usually cheaper to install but often have not gone through the required approval process, even though they have been used widely for many years.

Sometimes Council staff will be open to a new system being trialed in your home, with supervision and monitoring. They are often more receptive if they have had a lot of trouble with septic tanks in their area.

For example, in the mid-north coast region of New South Wales, Council staff recommend home owners install composting toilets rather than septic tank systems.

Avoid complicated designs. Simple passive systems with minimum moving parts are usually easier and cheaper to build, monitor and maintain. Some people prefer the designs that have more moving parts because they think it will mean they have less to do with maintaining the system. If the system is working well this can be true, but if there is a problem, the more complicated designs can be more difficult to fix.

As there are many different types and applications of CTs, they cannot be detailed here so please refer to the website at www.compostingtoilet.org This has extensive information on CTs and worldwide contacts for commercial units and owner-built designs. Also investigate the literature below.

ADDITIONAL KEY REFERENCES

The Composting Toilet System Book – A Practical Guide to Choosing, Planning and Maintaining Composting Toilet Systems, a Water Saving, Pollution-Preventing Alternative (1999) by David Del Porto and Carol Steinfield. Published by The Center for Ecological Pollution Prevention (CEPP), P.O Box 1330, Concord, Massachusetts 01742-1330. USA

The Composting Toilet System Book also has useful information on greywater treatment systems.

Ecological Sanitation (1998) by Steve Esrey et al. Edited by Uno Windblad. Published by the Department of Natural Resources and the Environment, Sida, S-105 25 Stockholm, Sweden. Purchase by e-mail: order@special.lagerhus.se