

# Low Impact Toilets

Toilets that use no water for flushing can have lower environmental impacts even compared to water efficient toilets and recycling wastewater. 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.



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Low impact toilets 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.

Low impact toilets still contain a very small amount of moisture that has to be drained away and council or health department regulations will require appropriate drainage and disposal for this residual moisture. But to all intents and purposes low impact toilets have a lower overall impact and use no additional water to operate.

They are often preferable to conventional toilets in environmentally fragile or water-scarce areas. In the mid-north coast region of New South Wales,

Council staff recommend home owners install low impact toilets rather than conventional septic tank systems.

Low impact toilets can produce fertiliser if sufficient time is allowed and correct treatment conditions have been maintained. However advice should be sought as to its use, industrial application such as fruit trees may be ok.

The most common type of low impact 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.

**A composting toilet that is working well and is correctly maintained does not smell. Diverting urine away from the compost can aid the composting process by reducing moisture levels and potential odours.**

The original low impact 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.

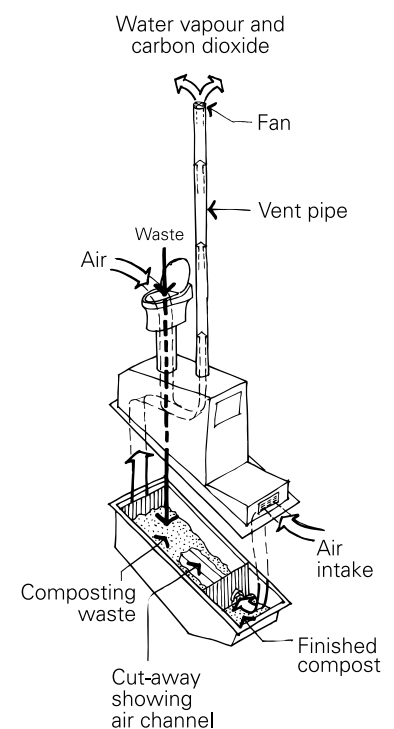
All composting toilets require a volume of space under the toilet floor which may necessitate the construction of either a pit or an elevated platform. Composting toilets generally work best when kept warm so it can be important to locate them in places that do not get too cold, ideally on the solar side of a house.

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 CTs 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. There are well known designs with health department approval in most parts of Australia that consist of prefabricated models available for installation; which may also be constructed by owner-builders.

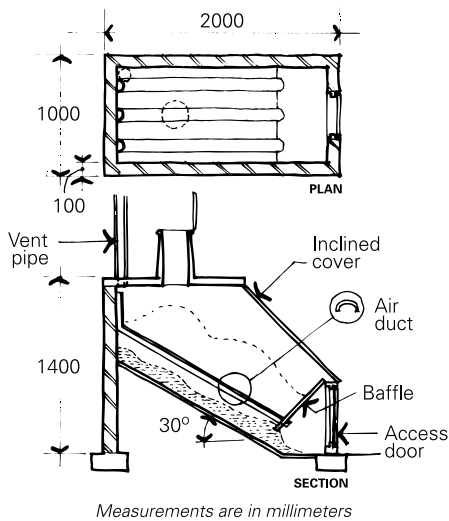


**A commercially available continuous composting toilet.**

## 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.



Measurements are in millimeters

Plans for a small continuous CT.

### Disadvantages of continuous CTs

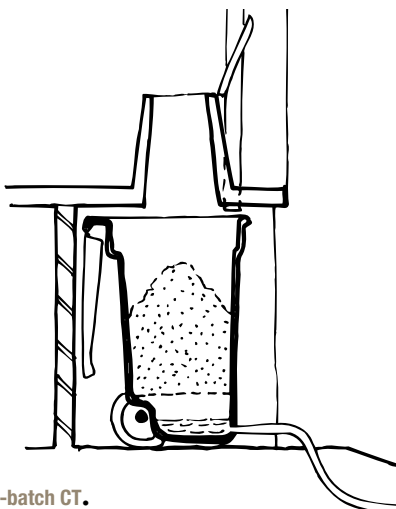
The continuous system may allow fresh material and pathogens (disease causing organisms) deposited on the top of the pile to contaminate the successfully decomposed end-product at the bottom of the pile.

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.

An example of an owner-built batch CT is the 'wheelie-batch' where containers are alternated underneath the toilet seat.



Wheelie-batch CT.

The Fixed Chamber Batch is another example of a batch CT where the two containers are permanently in place and the seat is moved when the time comes to change containers.

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.

There are commercially available batch CTs including Australian-made system with approval for use in most parts of Australia. It has six removable containers mounted on a turntable beneath the toilet for collecting waste, which saves space and simplifies changing over to a new container.

### 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 trouble-shooting 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 to aid ventilation and minimise odours. 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 your garden or disposed of according to local Council regulations.

CTs do not deal with greywater from showers, kitchen and laundry so a separate greywater collection and treatment system needs to be provided. [See: 7.4 Wastewater Re-use]

### Some safety precautions

It is safest to assume that the composted end-product contains residual disease-causing pathogens. The degree of decomposition and pathogen destruction is sensitive to a range of ambient conditions in the composting mass (such as temperature, moisture and pH levels) that are difficult for the toilet owner to monitor and control.

- > Always use protective clothing such as gloves and mask when handling the composted end-product.
- > Bury the compost under at least 10cm of soil.
- > Do not use the compost for cultivating vegetables.

## 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 vary significantly depending on the design and features. 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.

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.

There are many types and applications of CTs. Refer to published literature and manufacturers' websites for more information and contacts for commercial units and owner-built designs.

### ADDITIONAL READING

Brooker, N. (2001) 'Greywater and Blackwater Treatment Strategies' *Environment Design Guide*. Technologies Note No. 11. RAI, Canberra.

Del Porto D and Steinfield C (1999), *The Composting Toilet System Book*, The Center for Ecological Pollution Prevention, Massachusetts.

Van der Yn, Sim (1999), *The Toilet Paper*, Chelsea Green, Vermont, USA.

Windblad U and Simpson-Hebert M (2004), *Ecological Sanitation*, Stockholm Environment Institute, Sweden.  
[www.ecosanres.org](http://www.ecosanres.org)

Composting Toilet  
[www.compostingtoilet.org](http://www.compostingtoilet.org)

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