Waterless composting toilets

Words by Kym Mogridge

The original toilet was probably a hole in the ground – a waterless composting toilet. Human excrement left lying on the ground will decompose (compost) the same as any other animal excrement, and any other way of dealing with it is a refinement of the basic process. The main reason we have to deal with human waste in more sophisticated ways is population density. The level of complexity of a waste management system is generally directly related to the volume of waste needing to be treated. In a small rural dwelling on acres, a simple system will suffice; whereas a multi-story apartment block, housing up to hundreds of people, needs a complex system to ensure a healthy environment.

The basic principle of minimum impact treatment is to keep liquid separate from excrement. This is important, as it is the excrement that is the major source of bacteria, germs and viruses; if liquid is mixed with excrement the pollution factor is multiplied many times.

The development of the flush toilet was possibly the greatest factor in creating the massive problems currently experienced with sewage outfalls in our waterways. Avoiding the flush toilet is the best step that can be taken to solving sewage-based pollution.

There are various commercial suppliers of composting toilets, and most models supplied are approved by NSW and Victorian health authorities. Or you can build your own composting toilet; you would need to talk to your local council about their requirements. In NSW the Department of Health's regulations enable councils to approve 'home built' systems. Victoria has less flexible rules, and generally all toilets require Environment Protection Authority approval.

TYPES OF COMPOSTING TOILETS

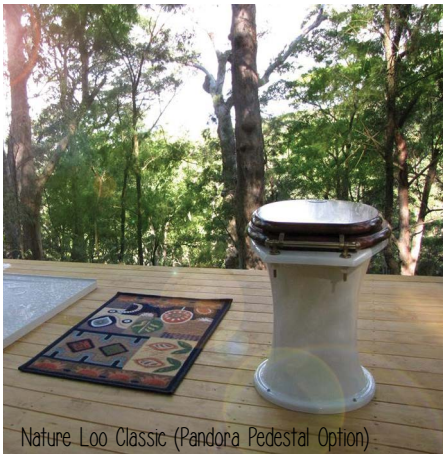
There are basically two types of waterless composting toilets:

- 'batch cycle system', multi-chamber The easiest 'home built' system to construct, this uses two or more chambers, of a size suitable for manual handling. Once the first chamber is full it is removed and another chamber is put in its place. The full chamber is set aside to compost, while the next chamber fills. The cycle usually takes four to nine months, depending on loading and climatic conditions. A significant feature of this system is that its capacity can easily be increased by adding extra chambers. The main suppliers of the batch cycle systems are Nature Loo and Rota-Loo.

- continuous cycle system, single chamber. This system uses a single large chamber where the waste is

Clivus Multrum - EcoLet_NE

Sun-Mar Excel NE



Nature Loo Classic (Pandora Pedestal Option)

deposited on the top, and is regularly removed from an access door at the base. The top of the pile is raked regularly to level it out. The waste composts as it accumulates and compost is removed every three to six months, depending on use. The main supplier in Australia is Clivus Multrum.

A hybrid form of composting toilet incorporates elements of both a batch and continuous cycle composting toilet. These are increasing in popularity for existing cement slab floor applications, or where there is insufficient space under a timber floor. The toilets do not need any underfloor space, and just sit on the floor. These are the Sunmar and EcoLet on-floor models described later.

HOW A WATERLESS COMPOSTING TOILET WORKS

A composting toilet works on exactly the same principle as your kitchen compost bin, only faster. The waste is collected in a chamber directly beneath the toilet pedestal. In addition, air is circulated continuously through the chamber, evaporating liquids, speeding the composting process and eliminating odours. The way a composting toilet works is incredibly simple. The interesting part is why it works, and this relates to the following factors.

MOISTURE

The moisture content of compost is important and closely linked to ventilation. Below forty per cent organic matter will become too dry to decompose properly. Over around sixty per cent insufficient air creates an anaerobic (no air) environment, and odours develop. Best conditions are controlled by a liquid waste (urine) drain via a false floor, with holes in it at the base of the chamber. This minimises the chances of the compost becoming anaerobic. Also the partly sealed construction of the chamber keeps the humidity higher, which ensures the correct level of moisture for the compost pile.

VENTILATION

Organic materials are decomposed most rapidly by aerobic (with air) bacteria; in contrast to anaerobic breakdown used in septic systems. A low power (twelve volt) ventilation fan circulates enough air to maintain the aerobic process. This ventilation also ensures that no odours remain in the toilet room as is often experienced with a flushing toilet.

TEMPERATURE

Composting is most rapid in the thermophilic stage, above 40o C. The compost pile will generate its own heat and the temperature can be further controlled by ventilating the toilet room, insulating the chamber or solar heating the chamber.

PATHOGENS

The composting process removes pathogens during the thermophilic (>40° C) stage, after thirty to forty days.

WORMS

Worms aren't a necessity, but can perform an important role in the function of a composting toilet.

FREQUENTLY ASKED QUESTIONS

Does it smell? No. The fan ensures that odours are drawn down through the toilet pedestal, not into the toilet room. The aerobic breakdown process creates mainly carbon dioxide and water, in contrast to the anaerobic process in septic tanks which produces foul smelling gases like hydrogen sulphide and methane.

Is it easy to clean? Yes. Composting toilet pedestals have larger bowls than standard flush toilets, which means less soiling. The air flow dries soiling, which then flakes into the chamber. A toilet brush with environmentally friendly detergent or 'nature flush' enzymes can be used to clean the bowl when needed.

Does it look like a normal toilet? Yes. The pedestals can look quite stylish and look similar to a standard toilet. Your visitors may not notice any difference until they lift the toilet seat lid. The main difference is the lack of a cistern.

Can I see the compost pile? It is hard to see waste in natural light because of the dark chute and chamber. You need to check the level of the compost in the chamber periodically, and this is best done with a torch. As the contents start to breakdown immediately, and with regular addition of compost bulking material, this visual inspection is not as bad as may be imagined.

Can a waterlesss composting toilet be installed in a slab house? Yes. Most composting toilets can be installed with a cement slab floor, and are best incorporated into the initial design. If you have an existing slab, one of the Compact, Excelet, Excel or EcoLet on-floor models may be suitable.

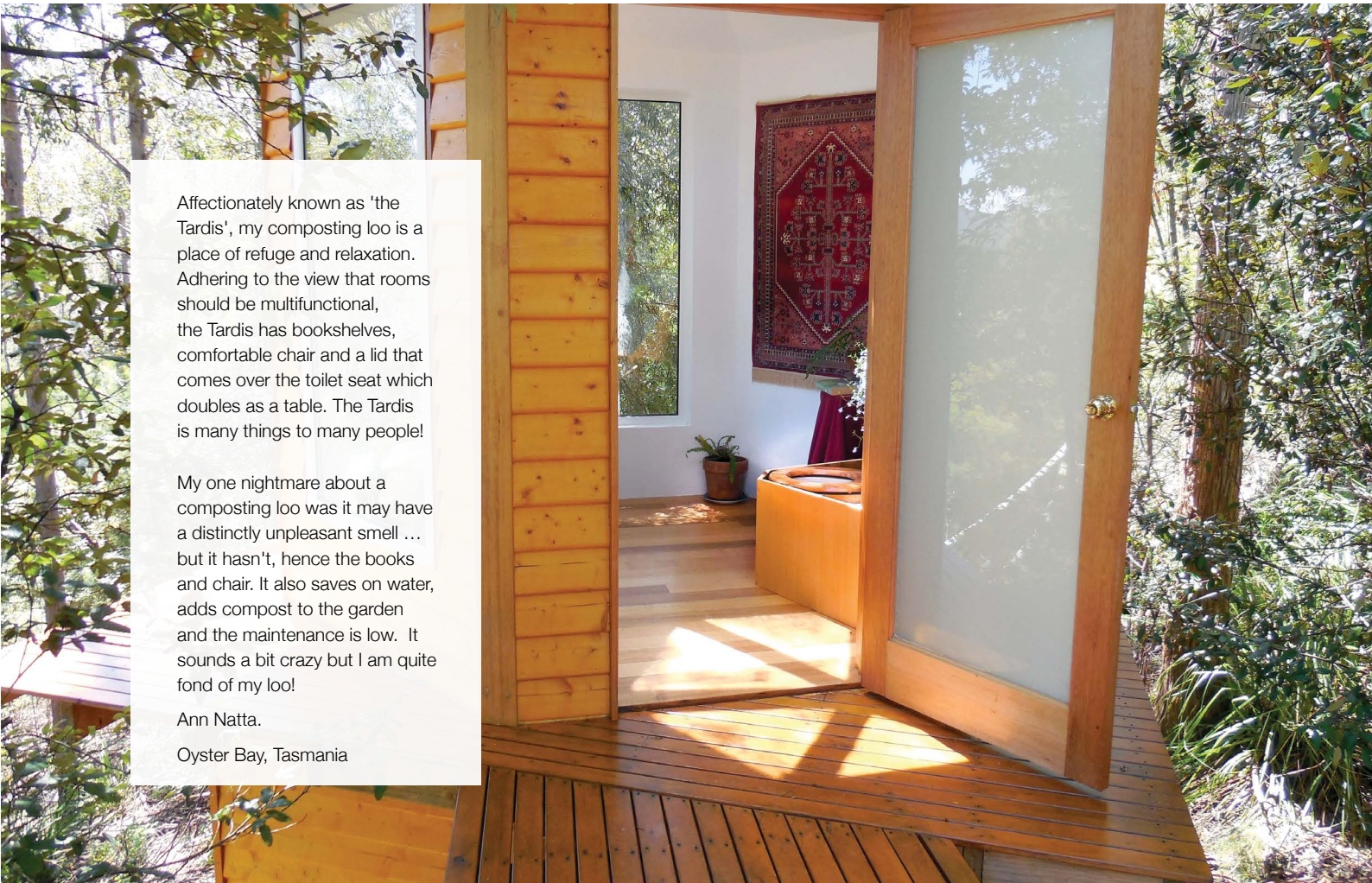
Can I have an upstairs toilet? Yes. As many as you want, wherever you want them, providing the chamber can be located directly below the pedestal or you use an on-floor model.

Does it use much power? Very little. The exhaust fan uses less than three watts of electricity; around as little as a sixty watt light bulb uses for one hour each day. For people on solar, or other alternative power systems, a waterlesss composting toilet is a good option.

How long does it take to compost? The compost needs to sit for about six to nine months before it's ready to be used as an addition to your garden soil.

Kym Mogridge has spent the last seventeen years committed to working towards developing sustainable lifestyles, through waterless composting toilets, greywater reuse systems and worm farms – see www.wormsloos.com.au

Nature Loo Classic - Sal Salis Resort



Affectionately known as 'the Tardis', my composting loo is a place of refuge and relaxation. Adhering to the view that rooms should be multifunctional, the Tardis has bookshelves, comfortable chair and a lid that comes over the toilet seat which doubles as a table. The Tardis is many things to many people!

My one nightmare about a composting loo was it may have a distinctly unpleasant smell … but it hasn't, hence the books and chair. It also saves on water, adds compost to the garden and the maintenance is low. It sounds a bit crazy but I am quite fond of my loo!

Ann Natta.

Oyster Bay, Tasmania

Waterless composting toilet options

Model	Chambers	Capacity	Approval	Type/needs	Price range
Batch cycle systems					
Nature Loo Compact from Ecoflo	Minimum of two, up to four	1 to 3 persons	None	On-floor toilet, needs no underfloor space	$745–1045
Nature Loo Classic range from Ecoflo (four models)	Minimum of two	1 to 6 persons	Certified to AS1546.2 & approved in all states (depending on model)	Underfloor system – clearance needed is 65–100 cm	$1795–3375
Nature Loo Excelet range from Ecoflo	Minimum of two, up to four	1 to 3 persons	Certified to AS1546.2 & approved in all states (depending on model)	On-floor toilet, needs no underfloor space; non-electric option	$1525–2100
EcoLet NE (non-electric) and new CM2 from Clivus Multrum	Minimum of two	2 persons	Limited NSW approval	On-floor toilet, needs no underfloor space	from $750
Rota-Loo	Two models, 6 either 39 L or 87 L bins		NSW, VIC, NT, SA & QLD (depending on model)	Under-floor system; removable compost bins housed on a turntable (manually rotated when full)	$4500–5000
DIY			Case by case basis in NSW depending on the design	Source plastic drums as chambers or use old wheelie bins; needs good drainage and adequate ventilation	
Continuous cycle system					
CM range from Clivus Multrum (three domestic models)	Single, large	5 to 9 persons	NSW, VIC, NT, SA, TAS & QLD (depending on model)	Underfloor system – clearance needed is 75–100 cm	$3500–5197
DIY (big, challenging project)			Case by case basis in NSW depending on the design	Use besser block or bricks and/or concrete; needs good drainage, adequate ventilation and waterproof sealing of chamber walls/floor	
Hybrid Systems incorporating features of both of the above					
Sun-Mar Excel range from Ecoflo	Single rotating chamber	1 to 4 persons	Certified to AS1546.2 & approved in all states (depending on model) except VIC	On-floor toilet, needs no underfloor space. Various models including non-electric	$2200-2549
Sun-Mar Centrex range from Ecoflo	Single rotating chamber	1 to 7 persons	Certified to AS1546.2 & approved in all states (depending on model) except VIC	Various models including 'microflush', non-electric and multi-pedestal installations that do not need to be directly above the collection drum. Underfloor clearance required is 80–103 cm	$3395–3945.
EcoLet range from Clivus Multrum	Single rotating chamber	2 to 4 perons	NSW, VIC, NT, SA, TAS & QLD (depending on model)	Smaller capacity for low use.	$2295–2950