



ECOSAN WATERLESS TOILET

Patent numbers: 99/4945 and ZA/9900060



The ECOSAN waterless toilet is a facility that safely separates human waste from human contact using the principles of ecological sanitation.

It provides a low-tech, affordable alternative to water-based sanitation in the form of a hygienic, safe and sustainable, closed-loop system.

This chemical-free, self-contained unit utilizes the natural biological processes of ventilation and time to break down human waste into a desiccated, odourless material that can be incorporated into the compost heap for nutrient recycling or disposed of in a designated compost trench.

It is an excellent alternative to composting, chemical or pit toilets which require more maintenance.



The patented ECOSAN waterless toilet, has been a market leader in dry sanitation for almost 2 decades. Designed over 20 years ago and launched in December 2000, it is still one of our most obvious solutions to the sanitation crisis.

It offers a standard of respectability and convenience comparable to a waterborne system, yet without the prohibitive costs and strain on precious water resources.

Manufactured in South Africa from high quality virgin and recycled LDPE, these robust, durable, factory-assembled toilets contribute considerably towards the health and safety of communities. When a household has its own toilet, people do not need to put themselves in danger by using communal toilets. Children cannot fall into the ECOSAN toilet and drown, nor can they access the fecal matter in the containment drum.

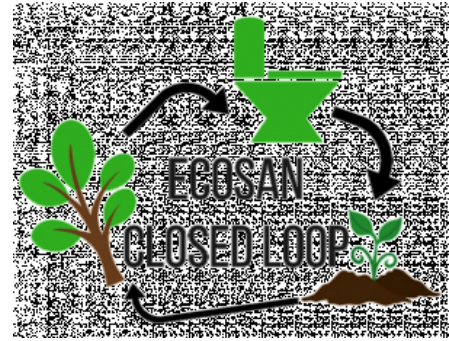
Due to the design and the non-stick surface of the chute, the human waste falls directly into the processing drum and into the area where the air is extracted. The helical screw conveyor proceeds to move the waste away from the chute every time the toilet seat is lifted and shut.

Temporary storage of the waste takes place inside the processing drum while it is being tumbled and dried, until the waste is dropped into the removal bag approximately 25 days later, roughly 5-10% of its original mass.

This reusable bag usually needs to be emptied once every few months.

With correct use, the human excreta are completely dried out resulting in a pathogen-free, inert material, dry enough to recycle as fertilizer in the soil.

There is no water or electricity required, no plumbing involved, no pipes and no need to access a sewer system, so it cancels out the need for any infrastructure or municipal approval. It is a once-off capital investment and brings the costs down dramatically of providing safe, hygienic sanitation facilities to rural areas.



An added advantage of the ECOSAN that is seldom considered is that, unlike flushing toilets, it does not release what is known as a toilet plume. This is the dispersal of microscopic particles as a result of flushing a toilet. These microparticles rise approximately 30-50 cm into the air if the toilet seat is left open and may contain fecal matter and other pathogens which transmit disease.

As it is also completely sealed it does not leach any contaminants into the ground thereby protecting the precious groundwater sources.

The unit is free-standing and can be installed indoors or outdoors. If needs be, it can be moved at any time to wherever it needs to be relocated.

As the technology requires no water it is important to educate the user to ensure that no excess liquid other than body fluids should be introduced into the system.

The cleaning of the bowl can however be done using a toilet brush, a biodegradable toilet cleaner and a maximum of 100ml of water, once a day.

The unit is designed to work most effectively with normal use by 8 to 10 persons per day, and is designed to handle normal amounts of urine, which in fact assists with the removal of odours due to the additional ventilation it causes because of evaporation.



As with all dry toilets however, if the urine : feces ratio is not balanced the dehydrating process is hampered so, to accommodate more people in a controlled environment such as a school, the ECOSAN system can be converted.

The conversion of the ECOSAN involves a small modification to the unit and either a septic tank installation, or a soak away where appropriate, to handle the excess urine.

One unit would then be able to handle up to 24 primary school learners or 20 high school learners/adults daily.

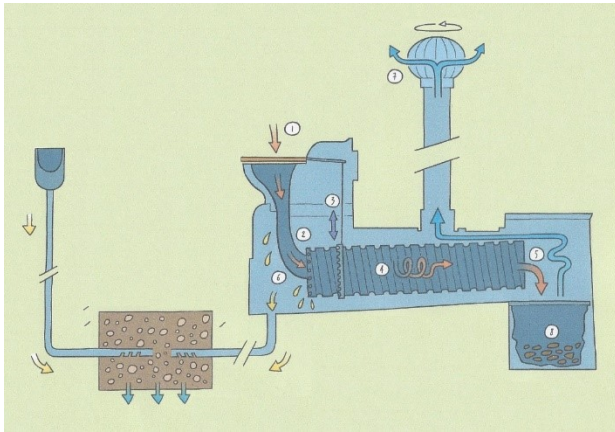


Diagram of Urine being diverted to the Soak Away in the converted ECOSAN toilet

Through this method of conversion, we are able to raise the capacity that each ECOSAN toilet can manage and we can work around the restrictions of the basic system without compromising the efficiency of the drying process.

It is a simple method that has already been successfully employed at schools, churches & clinics in rural areas across South Africa.

The system has been tried, tested and evaluated in the field since 1997. The evaluation period involved scientific, health as well as community tests and feedback. Widespread experience with the system in South Africa and neighbouring countries has demonstrated that it is a cost-effective, respectable, hygienic and environmentally friendly system that satisfies the dignity of all users.

Since then a vast number of the units have been installed and used successfully in many parts of the world, including South Africa, Namibia, Mozambique, Malawi, Botswana, the Caribbean, France, Australia and India.



The toilet has also been tested and certified by the following institutions; South African Bureau of Standards (SABS) for their mechanical functioning, Council for Scientific and Industrial Research (CSIR) for the safety of the organic waste, Department of Health - Western Australia and Caribbean Environmental Health Institute (CEHI).

The ECOSAN toilet design is such that, apart from the periodic emptying of the waste bag, it does not require ongoing maintenance or scheduled replacement of parts. The SABS tests included a 6-week

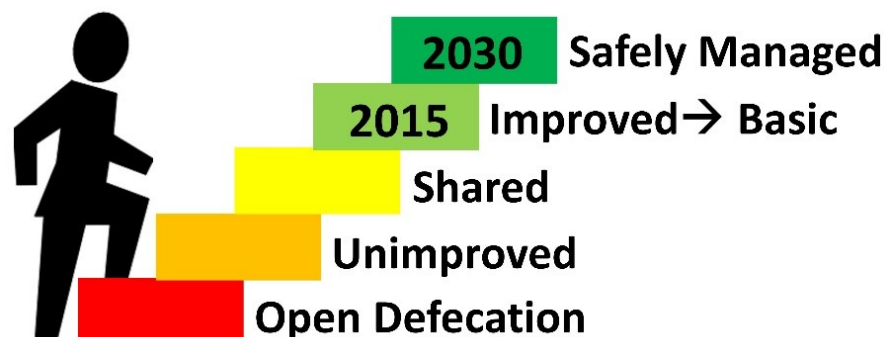
stress test that was equal to normal use over 6 years. The SABS report stated that they could not find any significant wear in the components of the system.

Emptying of the waste bag is a simple procedure. The re-usable waste bag is accessible through the lid at the back (outside) of the toilet. The waste bag contains dry waste and can be lifted out using the two handles. The waste can then be disposed of or recycled.

This process can be performed by the users of the system or alternatively by a person or company offering this type of service from the local community. Installations can also be performed by unskilled labour, presenting massive job creation potential with communities taking ownership of the systems themselves and becoming invested in the solution.

A summary of the ECOSAN Product Features:

- ✓ Affordable
- ✓ Low odours
- ✓ Minimal servicing
- ✓ High quality LDPE
- ✓ Safe and sustainable
- ✓ No electricity required
- ✓ Weight of the unit is 95kg's
- ✓ Manufactured in South Africa
- ✓ SABS tested and CSIR certified
- ✓ Locally and internationally patented
- ✓ Potential for job creation is extensive
- ✓ Robust and durable factory assembled unit
- ✓ Can be installed anywhere, completely mobile
- ✓ Size of the unit is 245cm L x 65cm W x 120cm H
- ✓ Low maintenance, a once-off capital investment
- ✓ Produces a pathogen free, compost-like material
- ✓ 20 years on the market with widespread experience
- ✓ Completely sealed, does not contaminate groundwater
- ✓ Bowl can be easily cleaned with half a cup of water and soap
- ✓ Self-contained, with no plumbing, pipes or need for infrastructure
- ✓ Waterless, saves precious water resources and eliminates toilet plumes
- ✓ Provides a standard of respectability, convenience, hygiene and dignity
- ✓ Chemical-free, uses natural biological processes to desiccate human waste



The following table lists the general sanitation system requirements as well as comments how the ECOSAN toilet can satisfy them:

	Requirement	Ecosan comments
1	Must be an environmentally friendly system	The Ecosan toilet does not require any water, plumbing or electricity to function. Apart for a small amount of water required for cleaning, no other water is required.
2	Must not contaminate water resources	The Ecosan toilet is a completely sealed unit that prevents any leakage of hazardous waste into the ground.
3	Must be easy to install	The Ecosan toilet is completely assembled at the factory and installation can be done by semi and unskilled laborers
4	Must be easy to operate	Operation of the toilet is very simple. The toilet is “flushed” every time the lid is lifted and closed.
5	Must be suitable for installation inside a house	The Ecosan toilet can be installed in homes, schools and also in a toilet hut outside. The toilet is suitable for normal use by 8 to 10 persons per day.
6	Must be easy to maintain	The toilet has very few moving parts and apart from normal cleaning and periodic removal of the waste (3–6 months) requires no ongoing maintenance. Unlike other type of systems, the Ecosan toilet does not require “de-sludging”, or emptying of underground tanks
7	Must be able to re-use urine	The toilet is supplied with a small male urinal as standard. Female urine will still go through the toilet system because a certain amount of liquid is required to assist with the evaporation process. The male urinals can be linked to a central collection tank for irrigation use.
8	The organic waste must be safe and re-usable	The Ecosan is not a “composting toilet” as such. It goes one step further by drying out the organic waste completely. The end product is completely dry when it ends up in the waste bag and it can then be used as compost.
9	The project must create jobs for the unemployed	There are many job creation opportunities when implementing an Ecosan toilet system. <ul style="list-style-type: none"> ● Orientation Teams will be required to train users in the waterless toilet concepts, maintenance and operation of the toilets. ● Installation requires relatively low skilled workers which can all be from the local community. ● Maintenance and waste removal teams also require low skilled workers which can also be from the local community.
10	Capacity building	Our company will provide personnel to train all persons involved in the project to a level that it can be self-sustainable.
11	Must be sustainable	Sustainability of a sanitation system is very important. Our project approach and continuous post implementation involvement assures that users can have access to proper sanitation for many years.

Advantages over other dry sanitation systems on the market:

ECOSAN does not need to be installed in the sun, it can be installed anywhere as we do not rely on composting speed and the need for heat in the system.

ECOSAN moves the waste mechanically and does not need manual raking to move the waste along, radically removing the risk of contamination by wet feces.

ECOSAN does not require any type of flushing mechanism, eliminating the risk of mechanical failure.

ECOSAN is not designed like a UDD toilet with a urine receptacle, so it is more comfortable to sit on.

ECOSAN uses high quality Low Density Poly Ethylene bowls not ceramic or porcelain, so they are very robust and virtually unbreakable, especially in a school or a more rural environment.

Large objects like beverage cans, disposable nappies or other objects accidentally dropped down the chute will not block the system. It is however not advisable to do this as whatever is placed in the system needs to be retrieved on the other end.

ECOSAN has a long lifespan due to its durability and robust design. Our spares department is therefore very small as we only ever replace the wooden toilet seats that have been vandalized. We do however guarantee our product for 2 years.

Installations:

Although installations are not difficult and can be accomplished by unskilled labour, each project is case specific and will need to be approached as a unique situation. Ecosan Cape offers an installation service especially for the more challenging operations and essentially where conversions need to happen.



Installation methods include but are not limited to:

Below Ground – ECOSAN unit excavated completely in hard ground or soft earth with modular ablution facility with flame retardant 40mm EPS structural insulated wall panels.

Above Ground – ECOSAN unit within 1100mm high blockwork surround to entire unit, with modular ablution facility with flame retardant 40mm EPS structural insulated wall panels and galvanized steel double tier steps on entrances. Units built up can be back-filled with topsoil to create boxes for future planting.

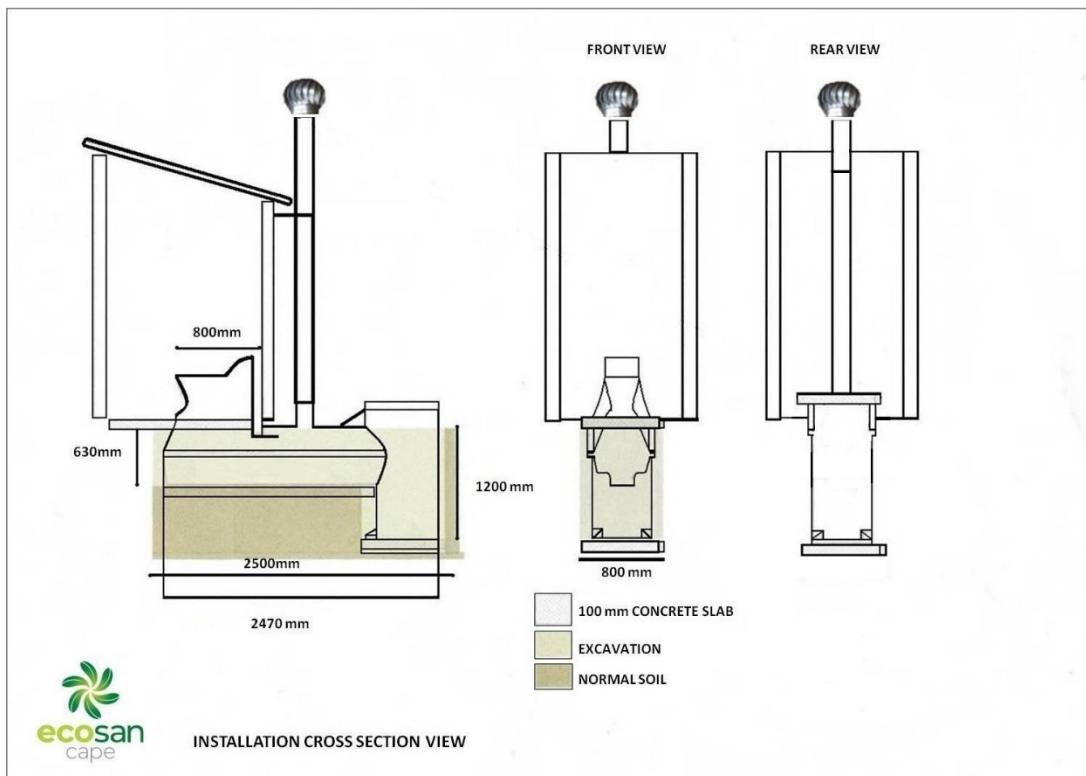
*Mobile*** – ECOSAN unit within modular ablation facility on a mobile galvanized steel base frame with flame retardant 40mm EPS structural insulated wall panels and galvanized steel double tier steps on entrances. Unit is above ground and mobile, can be placed wherever required.

** PLEASE NOTE – The mobile installation option is only compatible with a system conversion if a mobile storage tank is fitted instead of the septic tank below ground.



Every ECOSAN Waterless Toilet System includes the complete toilet unit (as pictured in image on page 1) as well as 4m of ventilation pipe, a waterless urinal, a wind turbine and a waste bag.

If, after a 6-week observation period, there is found to be an odour or the waste is not drying adequately and it is determined that additional ventilation is required, a 220 Volt A.C. fan is available for retro-fitting into the extractor pipe. It is seldom however that the fans need to be installed over and above the wind turbines.



It is not all about flushing

“We must introduce new technologies that appreciate that water is a scarce resource and as such provide solutions to dispose of effluent via alternative methods. It’s not all about flushing”“We must begin by challenging the property development sector through regulation and licensing requirements to invest itself in developing properties less reliant on water for sanitation in order to ensure we introduce the alternative solutions to low, middle and high income areas”

The Minister of Water and Sanitation, Ms. Nomvula Mokonyane, National Sanitation Indaba (DWS, 2015)