

ZerH2O waterless toilet

ZerH₂O Waste Management Pty Ltd



Product Description

The ZerH₂O toilet is a urine-diverting dehydrating toilet. Faeces drop down onto a disk, which is rotated after each use by a user operated manual advance mechanism. While on the disk, the faeces are dried out by a combination of heat from the sun and ventilation through the vent pipe supplied. The faeces spend approximately 2 weeks on the disk before being dumped into the sump basket in the center of the disk. The dried product is removed when the basket is approximately half full and transferred to a compost pile for further treatment and reuse. After the faeces have been around one rotation of the disk, a wall constructed of flexible plastic directs the faeces into a slotted sump basket inside a sealed container. The sealed container prevents any leaching of effluent into the surrounding soil. However, in the case where excess water or other liquid builds up in the sealed container, adjustments must be made to remove the liquid and maintain the drying process.

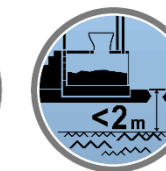
Operation & Maintenance

Removal of the sump basket after two weeks is relatively simple, with an accessible handle in the centre of the unit. After removal, the basket can easily be carried by one person to a compost trench or added to a vermicompost pile with a small amount of water to produce nutrient-rich compost.

Sump basket needs to be emptied every two weeks under normal loading.

Health and Hygiene Benefits

The ZerH₂O has a number of health benefits, including: reduction in flies, reduction in faecal pathogens due to the drying process; isolation of faeces from human contact.



First Installation

June 2011

Total Number of Units

12 (to July 2015)

Location

Gauteng

Limpopo

Product Materials

Rotomoulded polyethylene

PVC vent pipe

Budget Cost

R8000 per unit

excluding top structure
and floor covering

Supplier Contact Details

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Functionality Assessment

The large surface area provided by the plastic tank is expected to assist effective drying. Potential operational issues revolve mostly around user behaviour. Not advancing faeces after use can cause odour in the toilet units. Additionally, improper use of the urine-diverting toilet pan can cause urine to enter the faeces drying unit, increasing time necessary for drying and causing odours. Furthermore, as noted in one of the visited toilets, faeces can get stuck onto the urine-diversion pan, bringing it close to the user. Additional loading will increase the rate that faeces passes through the desiccation system which could result in wetter faeces entering the collection basket. In the case where excess water or other liquid builds up in the sealed container, adjustments can be made to remove the liquid and maintain the drying process.

Site Verification

The discs for the two toilets were facing north. There was no smell in the women's toilet, which did not seem to be used often because the basket and the turn-table were almost empty. There was also a small amount of faeces on the urine section of the pedestal, which demonstrates the potential for misuse of the UD toilet. Users had not properly advanced their faeces after use in the men's toilet, which caused the smell inside the superstructure and the rubber wall on the turn-table had been dislocated, such that it blocked removal of the basket. The inspectors had to move the rubber wall in order to remove the basket, which made it slightly non-ideal to remove. However, the overall removal process appeared to be very simple and easy. The compost pile on the site appeared to be very active with worms, further breaking down the faecal matter. Although the faeces were dry and hard in texture upon collection, the *E.coli* count was above authorisation limits.

Parameter	Unit	Target	Observed Effluent
<i>E.coli</i>	No./100mℓ	<1000	965 to 4600
pH		5.5 – 9.5	8.11 to 8.38
Electrical Conductivity	mS/m	<150	416 to 568
Moisture Content	%		19.5 to 20.4
Volatile Solids	g/g dry		0.80 to 0.84
Fixed Solids (Ash)	g/g dry		0.16 to 0.20

Recommendations

The liquid collected in the urine diversion system is likely to be contaminated with faeces and should be handled with caution. Excess liquid could possibly wash through the drying system which in turn would contaminate the faeces in the collection basket. This liquid would also build up over time below the collection basket. In light of the above, and the above lab results, the dried faecal waste will require the subsequent composting step before it can be considered sterile. Careful consideration of this manual handling process is required to minimise the potential health risk. The lab results indicate that the decomposition of the waste is not complete, (indicated by the low ash:volatile solids ratio). This results from the rapid dry process. Improved design of the urine diversion component should be considered to prevent risk of blockage and contamination of collected urine.