



KHANYISA PROJECTS CASE STUDY

Evaluation & Assessment of Dry
Sanitation Systems Using ISO 30500

AT A GLANCE

FUNDERS

This project was funded by the Water Research Commission (WRC) for the SASTEP programme.

TIMELINE

Testing began in September 2021 with completion in April 2022.

AREA

Mzinyathi, in the eThekweni Municipality

OBJECTIVES

Why: The project is one of the first of its kind in the world to apply the new ISO 30500 testing standards for onsite sanitation systems.

What: It involved the testing of two dry sanitation systems, the Ecosan and the ZerH2O System.

Where: The field-testing sites are located in Mzinyathi, in the eThekweni Municipality.

ADDITIONAL AIMS

- Assess whether the systems can consistently produce outputs that are fit for their end purpose and what the level of pathogen die-off is
- Clarify the parameters that end products need to meet in terms of regulations
- Identify the operation and maintenance requirements

KEY OUTCOMES

1

Development of Benchmark standards for dry sanitation outputs

2

Development of a testing and Quality Assurance protocol for dry sanitation systems

3

Establishment of a standard protocol for testing dry sanitation systems which includes a number of elements of ISO 30500



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PRELIMINARY FINDINGS

In the context of this project dry sanitation technologies refer to systems that collect human excrement and use a waterless conveyance system to move the waste through a treatment chamber where it is dried, desiccated or composted. This will exclude toilets such as Ventilated Improved Pit (VIP) toilets and Urine Diversion Drying (UDD) toilets as there is no conveyance mechanism as well as Container-Based Sanitation (CBS) systems where waste is containerised safely at the toilet and then transferred off-site for treatment. This definition includes systems that use electricity for the conveyance or drying mechanisms, but excludes systems which heat-treat waste either by combustion, pyrolysis, or other methods. Urine diversion may be employed to further reduce the water content of the waste that goes to treatment.

The treated waste, depending on its quality, may potentially be used in agriculture as a soil improver or fertiliser, or may have to be incinerated, buried or disposed of to landfill.

Dry sanitation systems, when functioning properly, have a number of benefits compared to water-flush toilets. These include no water source is required, there is a far lower volume of waste to treat, some technologies may be suitable for high groundwater areas (in contrast to conventional pit latrines) and; they can be installed at a much lower cost than water-flush toilets and the associated treatment systems.

There are however a number of possible shortcomings with dry sanitation systems.

These include:

- Uncertainty about the system's ability to consistently and over the long term produce properly treated outputs
- Lack of clarity on the parameters that end products need to meet in order to be fit for specific end uses and the regulations surrounding this;
- General user preference for conventional flush toilets
- Uncertainty over the long term prospects for dry sanitation systems, in the context of water-flush non-sewered sanitation systems coming onto the market which can recycle water for flushing or treat it to a standard suitable for discharge to the environment

The general goal of this project was to provide clarity on the above-mentioned issues.

The specific aim of the project was:

1. To scan and identify commercially available and developmental stage dry sanitation systems in South Africa and globally
2. To develop a testing and quality assurance protocol for dry sanitation systems
3. To evaluate and assess the performance of three dry sanitation technologies in the SASTEP portfolio, in accordance with the SASTEP field testing and demonstration guidelines. To include assessment against some of the requirements of SANS 30500.
4. To assess the relevance of dry sanitation technologies in view of the next generation of non-sewered sanitation systems (NSSS).
5. To develop a benchmark specification, based on existing sludge guidelines and requirements, for dried faecal output from dry sanitation systems for (i) use as compost and soil conditioner and ii) safe disposal



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This was achieved through:

- An independent testing and evaluation two of dry sanitation technologies on the market in South Africa based on SANS/ISO30500,
- Research and brief assessment of local and international dry sanitation systems
- Research into the sanitation market environment in South Africa
- Interviews with local and international sanitation experts and technology developers

The testing and evaluation of the dry sanitation systems was carried out by installing the systems at local households to use and evaluating how well the toilet performed in a real world scenario. Additionally, controlled tests were performed on the toilets in the field but without the households using the systems. The evaluations and tests carried out were based on SANS/ISO 30500. Samples of treated waste were collected from the toilets at regular intervals to verify how well the systems treated the waste.

The field-testing sites are located in Mzinyathi, in the eThekweni Municipality. The area is located approximately 40km north of Durban and is a peri-urban area. This area was selected to test the toilet as there is no sewerage service and most households in this area use some form of pit toilet. Dry sanitation systems are generally seen as an alternative to VIP and Urine Diverting toilets.

The specific households were selected after consultation with the local ward councillor. Testing began on 6 September 2021 and will be completed by April 2022. Surveys were conducted with members of households where the toilets are tested to assess their opinion of the system and how comfortable they were using it.

Controlled testing still needs to be completed where the performance and reliability will be assessed in order to provide clarity on the effectiveness of dry systems as an acceptable sanitation solution.

CASE STUDY UPDATE

The Case Study will be updated when the final evaluation and various reports are completed.