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It is not all about flushing

Sanitation Technology Evaluation and Assessment

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water & sanitation

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Water and Sanitation
REPUBLIC OF SOUTH AFRICA

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Overview

- Sanitation technology developments
- What are the key issues and challenges
- Why the need for technical/functionality assessment
- A framework in development

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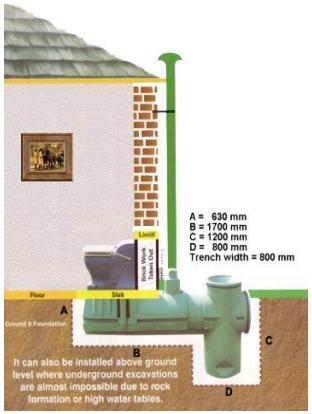
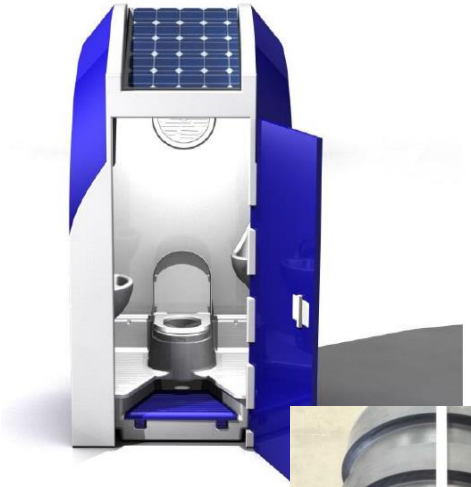
Introduction to sanitation technology development

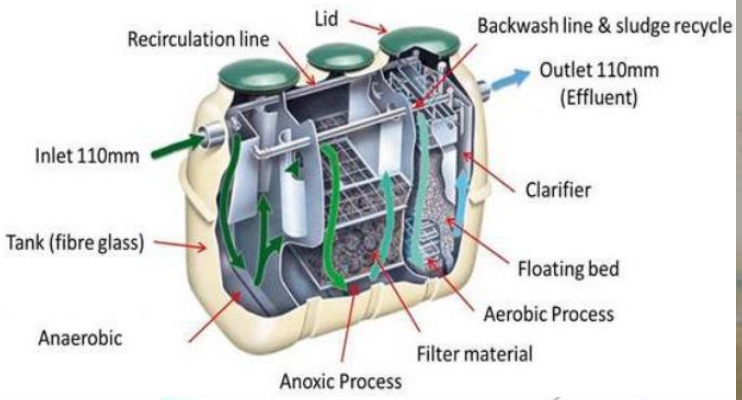
- Front end vs back end
- Complete onsite and offsite
- Dry vs wet (flushing)
- Low flush, micro flush
- Beneficiation toilets
- UD





Processes involved

- Biological digestion and degradation
- Drying
- Dehydrating
- Composting
- Dessicating
- Catalytic
- Chemical
- Pyrolysis
- Carbonisation
- Combustion
- Solar treatment
- Thermal

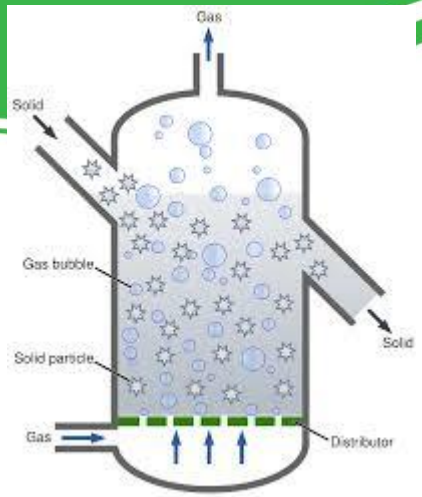


Issues and challenges

- Many of the technologies have potential, however the scientific and evidence based understanding of the technology is not well established.
- Costs of many of the technologies are unknown.
- Operational and design characteristics not well presented.
- Many aimed at user convenience
- Lack of standards and regulation
- Lack of certification and quality control
- Performance of systems not well provided

Wastewater vs Faecal Sludges

Species	Unit	Sewerage	Public toilet or latrine	Septage	WRC Faecal Sludge
Total solids	[%]	< 1[a]	3.5[a]	< 3[a]	20 – 30
CODt	[mg O_2/litre]	500 -1,200[b]	20,000 – 50,000[b]	6,000 – 90,000[b]	6,000 – 600,000
Total Nitrogen	[mg N/g wet sample]	30- 100[b]		200 – 1,500[b]	
Ammonia	[mg NH_3/litre]	20 – 75[b]		50 -150[b]	110 - 150
pH		6 – 9			6 – 9
Biodegradability	%	40 – 70			8 – 60 (layered effect)

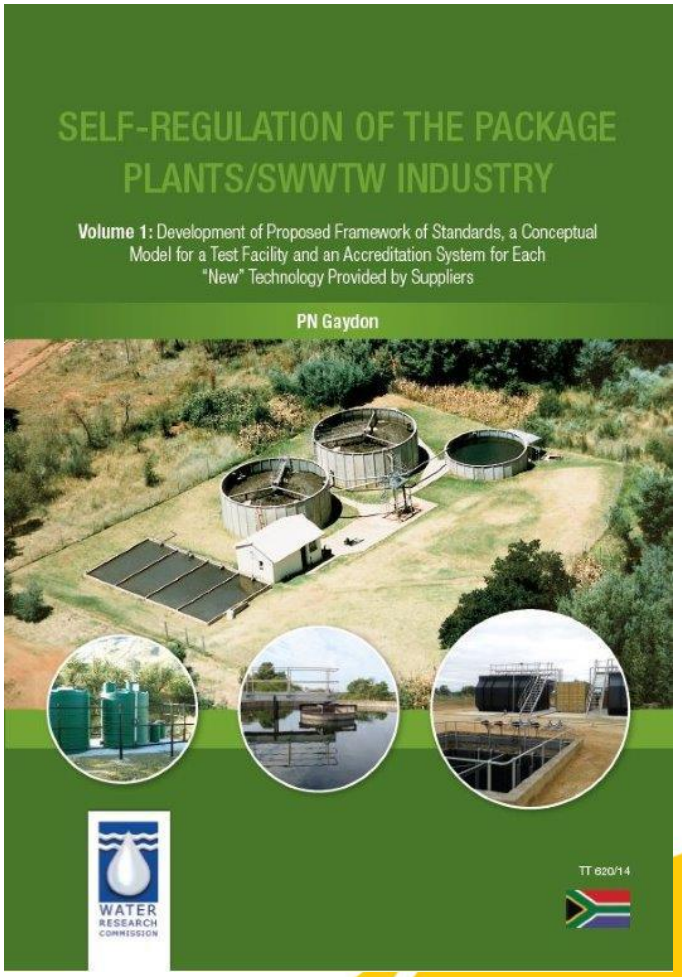


So what's the solution?

Strong regulation and enforcement
- Standards
- Certification

OR

Self regulation



SANIC REVIEW

- Phase 1A: Quick Desktop Review
- Compendium of Sanitation Technologies Available
- Assessment of Technologies based on info supplied by private companies
- Main Findings:
  - Lack of evidence on performance
  - Lack of process functionality information
  - Financial requirements
  - Lack of user acceptability
  - We do not know limitations of technologies →
  - uncertainties of conditions under which toilets best operate.
  - Lack of an assessment framework

The need for an assessment tool

- Since there is no functionality assessment tool or protocol in existence.
- This is not the same as DSS tools
- Helps with regulating products and setting standards
- Eliminates the ‘chancers’
- Builds a trusted sanitation industry
- Accelerates the uptake on good technologies
- Helps with investment and decision making

Draft Protocol for assessment– Standardisation of sanitation

- The sanitation protocol **must align with existing legislation and guidelines**

1. The expertise of the individual undertaking the assessment is considered for two parts:

- **Sanitation functionality Assessment** undertaken by an individual with suitable expertise in wastewater treatment design. Other aspects of assessment can be undertaken by materials scientist or appropriate laboratory.

- **Sanitation Suitability Evaluation:** undertaken by an experienced sanitation practitioner
    - physical environment
    - the institutional structure
    - supporting infrastructure.

2. **Standard design parameters** apply to onsite, household sanitation.

- The sanitation protocol **must align with existing legislation and guidelines**
- Standard design parameters and loading rates to apply to onsite, **household** sanitation.
- The expertise of the individual undertaking the assessment is considered for two parts:
- **1) Sanitation Functionality Assessment**
    - Review of process design
    - Visual inspection
    - Field verification
    - Scientific testing
- **2) Sanitation Suitability Evaluation:** undertaken by an experienced sanitation practitioner
    - Physical environment
    - Institutional structure
    - Supporting infrastructure

Functionality Assessment

Figure 4.2: Process Design Assessment Criteria

	IDENTIFY TREATMENT PROCESS					
Process	**CHEMICAL**		**PHYSICAL**	**BIOLOGICAL**		**MECHANICAL**
Category	**CHEMICAL**	**DRY SANITATION**		**WATERBORNE**		
Example Technologies	Chemical Toilets Porta Potty	Pyrolysis Hydrothermal Carbonisation	Dehydration Desiccation Urine Diversion Bag Separation	**AEROBIC** Leach Pits Compost Toilets Activated Sludge Biofilm	**ANAEROBIC** Septic Tanks Biodigestor ABR Bio-Augmentation	Membrane Ultrafiltration
Process Tests	Loading Rates *(Form B.1)* & Sludge Accumulation Rates *(Form B.2)*					
	Water tightness *(B.3)*	Temperature *(Form B.5)*		Water tightness *(Form B.3)* Air tightness (Form B.4)		Water tightness *(B.3)* Filter Integrity *(B.6)*
Effluent Tests	Moisture content *(Form B.7)* Faecal Coliforms *(Form B.8)*			Determinant identified in Table 2.3 *(Form B.9)* (COD, TSS, *E.coli*, N, P etc.)		
	Protozoa and Helminths (Where supplier claims waste is sanitised) (Form B.10)					

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THANK YOU

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Human Excreta

Faeces and urine

The **major global environmental pollutant**

And…….KILLER

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