Transformative Sanitation Technology Portfolio

First Edition

July 2024

Disclaimer

Transformative Sanitation Technology Portfolio

PREPARED FOR

Asian Institute of Technology (AIT) – Global Water and Sanitation Center
58 Moo 9, Km. 42, Paholyothin Highway, Klong Luang, Pathumthani 12120
Thailand

PREPARED BY

UPM Umwelt-Projekt-Management GmbH
Lamontstrasse 11, Munich 81679
Germany

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Introduction

Unsafe sanitation, exacerbated by climate change, population growth, water scarcity, and rapid urbanization, remains a significant global challenge. Currently, nearly half of the global population, around 3.5 billion people[1], lack access to safe sanitation facilities, leading to fecal-oral diseases that claim over 400,000 children's lives annually, or 1,000 daily[2]. Investment in sanitation yields considerable economic returns, with every dollar spent generating at least five dollars globally.

Developing inclusive and environmentally sustainable sanitation infrastructure poses considerable challenges, especially in economically disadvantaged areas and regions impacted by climate change. Incumbent systems, such as pit latrines, do not provide safe access to sanitation, while systems like sewer and centralized treatment plants require extensive resources and are costly to implement.

The First Edition of the Transformative Sanitation Technology Portfolio focuses on Reinvented Toilets (RT) Solutions. These innovative answers to onsite treatment are designed to tackle global challenges of inadequate infrastructure, aligning with the ISO 30500 standard to ensure both efficacy and reliability. They employ various well-established processes to produce clean water and stabilized solids, ensuring no risk to people or the environment in the most effective way. The RT commercial offerings presented here are already benefiting tens of thousands across Asia and Africa.

This data-centric catalogue aims to serve as a valuable resource for those involved in global sanitation infrastructure and service delivery and to guide informed decision-making at the funding and project planning levels.

ABOUT ISO 30500:2018[3]

ISO 30500 sets safety, performance, and sustainability standards for Non-Sewered Sanitation Systems (NSSS). It covers the design, testing, and integration of prefabricated units treating specific inputs for safe reuse or disposal (integrated or back-end only).

The standard applies to systems not connected to sewer networks, defining input types and output quality requirements. It also covers system functionality, reliability, and environmental compatibility.

(1) https://cdn.who.int/media/docs/default-source/wash-documents/jmp-2023_layout_v3launch_5july_low-reswhowebsite.pdf
(2) https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease
(3) The standard can be downloaded for free after registration at: https://sanitation.ansi.org/Download.

Contents

Reinvented Toilet

Reinvented Toilets (RTs) represent a new generation of sanitation technology designed to autonomously process waste and eliminate harmful pathogens, without relying on sewer connections, centralized treatment plants, water supply, or continuous electricity.

Designed to ISO 30500 standard, these innovative solutions employ various technologies that can produce clean water and stabilized solids, ensuring no risk to people or the environment.

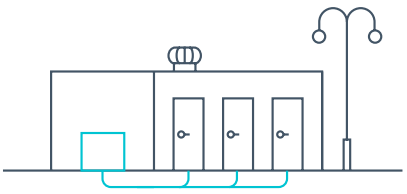
Application Scope

Household RTs (HRTs) cater to individual households, while Community RTs (CRTs) serve larger entities such as local communities, schools, apartment buildings, and commercial facilities:

✓ **Community Toilets**
Refugee camps, slums or informal settlements.

✓ **Public and Private Facilities**
Educational, healthcare, and institutional facilities.

✓ **Multiple Households**
Groups of houses or other buildings.



✓ **Public Toilets**
At recreational or religious sites, and transportation hubs.

✓ **Individual Households**
Single-family dwellings.

✓ **Multi-story Buildings**
Multi-story and multipurpose facilities.

REINVENTED TOILET

Value Propositions

Safe

- Protecting public health and reducing disease burden by eliminating harmful pathogens.
- Enhancing environmental safety through the removal or recovery of nutrients and the elimination of organic pollutants.

Effective

- Effective treatment process that meets the ISO 30500 standards for discharge.

Aspirational

- Providing clean and dignified environment.
- Compatible with water-borne toilet systems.
- Odorless.

Moveable

- Easily relocatable.

Resources Efficient

- Maximizing water savings through the recovery and recycling of the water.

Off-Grid Compatible

- No sewer connection is required.
- No water connection is required for operation of the treatment process.
- Solar compatibility guarantees an autonomous and sustainable energy source.

Resilient

- Adaptable to climate change, suitable for water scarcity, and flood-prone regions.

Scalable

- Prefabricated modular systems that can be easily adapted to meet growing needs.

Simple

- Easy to transport.
- Easy and quick to install.
- Simple day-to-day operation.

Adaptable

- Adaptable to both existing and new front-end facilities.
- Compatible with various toilet interfaces, including squat and seated toilets.
- Compatible with various flush systems, including low-flush.

Cost Effective

- Reducing infrastructure costs and enhancing cost-effectiveness with water recovery and low emptying frequency.

Compact

- Small footprint.

53 Projects use Reinvented Toilet Solutions, serving 20,186 Beneficiaries in 9 Countries, and counting.*

*Based on self-reported data provided by the six suppliers included in the portfolio as of June 2024.

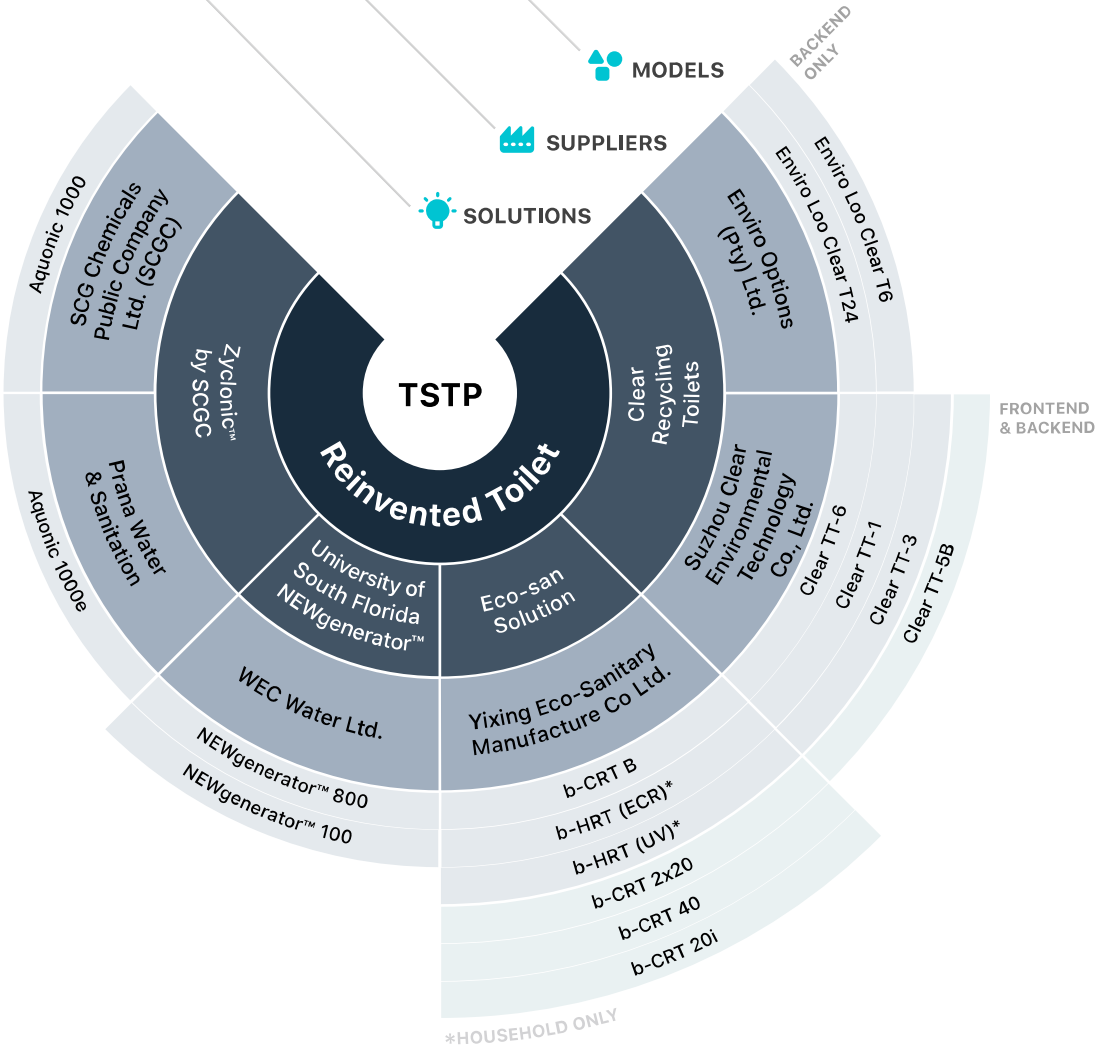
REINVENTED TOILET

Portfolio Infographic

RT Solutions are innovative answers that employ various well-established processes to produce clean water and stabilized solids, ensuring no risk to people or the environment in the most effective way.

Several companies are providing commercial offerings based on RT Solutions. These commercial offerings include the delivery of specific models and services that cater to the needs of their markets.

Designed to ISO 30500 standard, RT Models are prefabricated modular products based on RT Solutions available for various household-, community- and public-scale applications.



REINVENTED TOILET

Suitability Matrix

		Aquonic 1000 FGL	Aquonic 1000 HDPE	b-CRT 20i	b-CRT 20x20	b-CRT 40	b-CRT B	b-HRT (ECR)	b-HRT (UV)	Clear TT-1	Clear TT-3	Clear TT-5B	Clear TT-6	Enviro Loo Clear T24	Enviro Loo Clear T6	NEWgenerator™ 100	NEWgenerator™ 800
OVERVIEW																	
Components	Backend Only	●	●	—	—	—	●	●	●	—	—	—	●	●	●	●	●
	Frontend + Backend	—	—	●	●	●	—	—	—	●	●	●	—	—	—	—	—
Input	Blackwater (1)	—	—	●	●	●	●	—	—	●	●	●	●	●	●	●	●
	Greywater	—	—	—	—	—	—	—	—	—	—	—	—	—	—	○	○
	Septic Effluent (2)	●	●	—	—	—	—	●	●	—	—	—	—	—	—	—	—
ISO 30500	Effluent Conformity	n/a	n/a	●	●	●	●	●	●	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Certification	—	—	—	—	—	—	—	—	n/a	n/a	n/a	n/a	—	—	—	—
CAPACITY / USERS																	
Treatment Capacity (m^3/d)		1.8	1.8	1	1	1	1	0.1	0.1	0.6	0.3	0.6	6	24	6	1	8
Scale Compatibility	Household	—	—	—	—	—	—	●	●	—	—	—	—	—	—	—	—
	Community	●	●	●	●	●	●	—	—	●	●	●	●	●	●	●	●
	Public	●	●	●	●	●	●	—	—	●	●	●	●	●	●	●	●
Nº of Users	Household (3)	n/a	n/a	n/a	n/a	n/a	n/a	5	5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Community (3)	90	90	50	50	50	50	n/a	n/a	30	15	30	300	1,2K	300	50	400
	Public (4)	360	360	200	200	200	200	n/a	n/a	120	60	120	1,2K	4,8K	1,2K	200	1,6K
Suitable for Wipers		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Suitable for Washers		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Suitable for Low Flush ≤ 3 L		●	●	○	○	○	○	●	●	○	○	○	○	○	○	●	●
Suitable for High Flush > 3 L		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
KEY FEATURES																	
Close Water Loop System		○	○	●	●	●	○	○	○	●	●	●	●	●	●	●	●
Irrigation Water Recovery		○	○	○	○	○	○	○	○	—	—	—	—	—	—	○	○
Energy Recovery		—	—	—	—	—	—	—	—	—	—	—	—	—	—	○	○
Nutrient Recovery		—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	●
Scalable		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Movable		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
INFRASTRUCTURE / SITE CONDITIONS																	
Footprint Area (m^2)		4	3	15	30	30	15	1.2	1.2	16	6	22	60	120	80	14.4	55
Includes Pre-Treatment		—	—	●	●	●	●	○	○	●	●	●	●	●	●	○	○
Requires Power		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Solar Power Supply		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Requires Desludging		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Suitable for Retrofitting		●	●	—	—	—	●	●	●	—	—	—	●	●	●	●	●
ENVIRONMENTAL CONTEXT																	
Suitable for Rocky Ground		●	●	○	○	○	○	●	●	●	●	●	●	●	●	●	●
Suitable for Water Scarce Area		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Suitable for Flood Prone Area		●	●	○	○	○	○	●	●	●	●	●	●	●	●	●	●
Suitable for High Groundwater Tables		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Min. Ambient Temperature (°C)		10	10	-5	-5	-5	-5	-5	-5	5	5	5	5	5	5	5	5
Max. Ambient Temperature (°C)		45	45	40	40	40	40	40	40	50	50	50	50	50	50	45	45

(1) Treats handwashing water. (2) It refers to Blackwater and/or Greywater pre-treated by septic tank. (3) Assuming 20 L/user/day. (4) Assuming 5 L/user/day.

● Yes ○ Optional — No n/a Not Available

REINVENTED TOILET

Clear Recycling Toilets

Clear solution offers a prefabricated, modular closed-loop blackwater treatment system for recycling of pathogen-free water for flushing without external water supply. It prioritizes off-grid compatibility, while integrating into new or existing infrastructure.

Key Features

- SAFE
- CLOSE LOOP WATER SYSTEM
- SCALABLE
- MOVABLE

Process

1. **Reduction of organic pollutants** via physical precipitation and anaerobic digestion.
2. **Further reduction of organic pollutants** via aerobic digestion.
3. **Removal of remaining organic pollutants & nutrients, as well as pathogens reduction** via filtration and aerobic digestion.
4. **Elimination of remaining pathogens** via ozone disinfection.
5. **Storage of treated water,** available for the next flush.

Step is part of the solution.
Step is required and available as an option.

Environmental Context

SUITABLE FOR
- ✓ Water Scarce Areas
- ✓ Rocky Ground
- ✓ Flood Prone Areas
- ✓ High Groundwater Tables

AMBIENT TEMPERATURE RANGE
5 to 50°C

Scale / Users

SUITABLE FOR
- ✓ Community Scale
- ✓ Public Scale
- ✓ Wipers & Washers
- ✓ Low Flush ≤ 3 L Optional
- ✓ High Flush > 3 L
- ✓ Retrofitting Optional

Statistics

15 active Projects already use Clear Recycling Toilets serving 11,893 Beneficiaries in 1 Country, and counting.*

*Based on self-reported data provided by the relevant supplier(s) as of June 2024.

Application Scope

✓ **Community Toilets**
Refugee camps, slums or informal settlements.

✓ **Multiple Households**
Groups of houses or other buildings.

✓ **Public and private facilities**
Educational, healthcare, and institutional facilities.

✓ **Public Toilets**
At recreational or religious sites, and transportation hubs.

✓ **Multi-story Buildings**
Multipurpose facilities.

Expected Effluent Quality

	This RT Solution	ISO 30500 Standards RUU*	UUU**
pH	6 – 9	6 – 9	
BOD	≤ 9 mg/L		
COD	≤ 41 mg/L	≤ 150 mg/L	≤ 50 mg/L
TSS	≤ 5 mg/L	≤ 30 mg/L	≤ 10 mg/L
TN	≤ 51 mg/L		
TP	≤ 3 mg/L		
E.Coli	≤ 100 CFU/L	≤ 100 CFU/L	
MS2 Coliphage (Virus)	—	≤ 10 PFU/L	
Helminths	—	≤ 1 Egg/L	
Protozoa	—	≤ 1 CFU/L	

*RUU: Restricted Urban Uses; **UUU: Unrestricted Urban Uses

Expected Removal Rates

	This RT Solution	ISO 30500 Standards Minimum Load Reduction
BOD	~ 97%	
COD	~ 91%	
TSS	~ 99%	
TN	~ 74%	≥ 70% Reduction
TP	~ 83%	≥ 80% Reduction
E.Coli	~ 99.99%	

Commercial Offering

Enviro Options (Pty) Ltd.

WEBSITE
enviro-loo.com

EMAIL
mark.latrobe@enviro-loo.com

PHONE
+(27) 11 762 1624
+(27) 082 567 8654

REPRESENTATIVE
Mr. Mark La Trobe

Enviro Loo Clear T24

Backend Only
Blackwater
24 m³/d

Enviro Loo Clear T6

Backend Only
Blackwater
6 m³/d

Suzhou Clear Environmental Technology Co., Ltd.

WEBSITE
clearet.com

EMAIL
tim@clearet.com

PHONE
+(86) 512 666 59 660

REPRESENTATIVE
Mr. Cao Jun

Clear TT-1

Frontend + Backend
Blackwater
0.6 m³/d

Clear TT-3

Frontend + Backend
Blackwater
0.3 m³/d

Clear TT-5B

Frontend + Backend
Blackwater
0.6 m³/d

Clear TT-6

Backend Only
Blackwater
6 m³/d

Enviro Options (Pty) Ltd.

Manufacturing and marketing of dry Enviro Loo toilet systems and Enviro Loo Clear Non-Sewered Sanitation Systems (NSSS).

Company Profile

ESTABLISHED IN
1993

COMPANY SIZE
~ 60 employees

WEBSITE
enviro-loo.com

EMAIL
mark.latrobe@enviro-loo.com

PHONE
+(27) 11 762 1624
+(27) 082 567 8654

REPRESENTATIVE
Mr. Mark La Trobe

Global Presence

HEADQUARTERS
27 Pillans Street, Unit 1, Chamdor, Mogale City, 1754, South Africa.

PRODUCTION COUNTRY
South Africa

DISTRIBUTION NETWORK
Australia, Brazil, Canada, Chile, Namibia, South Africa.

MARKET (ALL PRODUCT PORTFOLIO)
Afghanistan, Angola, Australia, Botswana, Cameroon, Canada, Chile, France, Gabon, Ghana, Greece, Haiti, Israel, Jordan, Kenya, Mozambique, Namibia, Nigeria, Saudi Arabia, Sierra Leone, South Africa, UAE – Dubai, USA, Zambia.

Awards & Certifications

2021	National winner of Energy Globe Award.
2019	Eco-Logic Gold Award, Water Conservation.
2017	ISO 9001:2015 Compliance.
2017	Frost & Sullivan Best Practice Award, SA Dry Sanitation, Company of the Year.
2015	My World of Tomorrow SA, SMME Innovation Winner.
2005	Laureate, United States Tech Award for Innovation.
2010	Gold Award for Sanitation, South Africa.
1998	Gold Award for Best Innovation & Contribution to Health Care in Africa.
1997	Top Technology 100 Award, South Africa.

RT Commercial Offering

Solution

Clear Recycling Toilets

LICENSE OWNER

Enviro Options (Pty) Ltd. has successfully implemented 14 Projects, serving 11,518 Beneficiaries in 1 Country, and counting.*

*Based on self-reported data provided by the supplier as of June 2024.

Production

LEAD TIME
20 working days

PRODUCTION CAPACITY
4 units per week

PROJECT DELIVERY METHOD

1. Built Operate Transfer (South Africa).
2. Built and Transfer (Africa).

CUSTOMER SERVICES

1. Training of technicians and operators, without additional fees.
2. Remote monitoring and service hotline.
3. Full O&M servicing packages in South Africa.

Models

Enviro Loo Clear T24

Backend Only
Blackwater
24 m^3/d

Enviro Loo Clear T6

Backend Only
Blackwater
6 m^3/d

VCard

Enviro Loo Clear T24

ISO 30500 Certification
UNDER PREPARATION

Configuration

SOLUTION
Clear Recycling Toilets

COMPONENTS
Backend Only

INPUT
Blackwater

CAPACITY
24 m^3/d

Nº OF USERS:
COMMUNITY 1,200
PUBLIC 4,800

Water

Water Scarce Areas

Up to 24 m^3/d
SAVING POTENTIAL

Power

Solar Power Supply

n/a kWh/day
CONSUMPTION

Pre-Treatment

8 Anaerobic Settling Tanks
INCLUDED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
120 m^2

INITIAL WATER (NON-POTABLE) LOAD
~ 120 m^3

DURATION
8 days, without site preparation.

STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M

	D	M	8M	18M	2-4Y	≥ 4Y
Contractor						● Desludging
Technician		● Onsite Inspection; Refill Additives	● Clean Parts	● Clean System	● Replace Parts	
Caretaker	● Remote Monitoring; Inspect					
FREQUENCY						

Commercial

SUPPLIER
Enviro Options (Pty) Ltd.

PRODUCT LIFE
Up to 20 years.

WARRANTIES
- 2 Years: electrical equipment, pumps, and motors.
- 10 Years: treatment tanks and steel frames (also under coastal conditions).

PROJECT DELIVERY METHOD
1. Built Operate Transfer (South Africa).
2. Built and Transfer (Africa).

CUSTOMER SERVICES
1. Training of technicians and operators, without additional fees.
2. Remote monitoring and service hotline.
3. Full O&M servicing packages in South Africa.

V–CARD SUPPLIER

Enviro Loo Clear T6

ISO 30500 Certification
UNDER PREPARATION

Configuration

SOLUTION
Clear Recycling Toilets

COMPONENTS
Backend Only

INPUT
Blackwater

CAPACITY
6 m³/d

Nº OF USERS:
COMMUNITY
300

PUBLIC
1,200

Water

Water Scarce Areas

Up to 6 m³/d
SAVING POTENTIAL

Power

Solar Power Supply

~ 82 kWh/day
CONSUMPTION

Pre-Treatment

3 Anaerobic Settling Tanks
INCLUDED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
80 m²

INITIAL WATER (NON-POTABLE) LOAD
~ 48 m³

DURATION
~ 8 days, without site preparation.

STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M

	D	M	8M	18M	2-4Y	≥ 4Y
Contractor						● Desludging
Technician		● Onsite Inspection; Refill Additives	● Clean Parts	● Clean System	● Replace Parts	
Caretaker	● Remote Monitoring; Inspect					
FREQUENCY						

Commercial

SUPPLIER
Enviro Options (Pty) Ltd.

PRODUCT LIFE
Up to 20 years.

WARRANTIES
- 2 Years: electrical equipment, pumps, and motors.
- 10 Years: treatment tanks and steel frames (also under coastal conditions).

PROJECT DELIVERY METHOD
1. Built Operate Transfer (South Africa).
2. Built and Transfer (Africa).

CUSTOMER SERVICES
1. Training of technicians and operators, without additional fees.
2. Remote monitoring and service hotline.
3. Full O&M servicing packages in South Africa.

V–CARD SUPPLIER

RT Models Overview 1/2

Enviro Loo Clear T24

Enviro Loo Clear T6

OVERVIEW	Components		Backend Only	
	Treatment Capacity		24 m^3/d	6 m^3/d
	Input		Blackwater (1)	
	Nº of Users	Community (2)	1,200	300
		Public (3)	4,800	1,200
	Footprint Area		120 m^2	80 m^2
ISO 30500	Effluent Conformity		...	
	Certification		Under Preparation	
PRE-TREATMENT	Includes		8 x Anaerobic Settling Tanks	3 x Anaerobic Settling Tanks
	Total Volume		120 m^3	18 m^3
MEASURES (W:L:H)	Pre-Treatment		2.3 : 2.8 : 1.7 m	
	Backend		4.9 : 10.7 : 2.2 m	4.9 : 5.8 : 2.2 m
OPERATIONAL MODES	Closed Water Loop System		Yes	
	Energy Recovery		No	
	Nutrient Recovery		No	
	Irrigation Water Recovery		No	
OPERATIONAL LIMITATIONS	Ambient Temperature		5 to 50°C	
	Peak Time Usage		3 hours	
	Downtime		≤ 48 hours	
	Max. Organic Load (COD)		...	...
	Max. Organic Load (BOD)		...	...
CONTROL	System Control		Automated from start-up to running.	
	Remote Monitoring		Yes	
POWER	Connection		220 V, 60 A, Single-Phase.	
	Solar Supply		Optional	
	Outage		System will pause and resume based on parameters when power returns.	
			Or switch to solar if applicable.	
POWER CONSUMPTION	Normal Operation		...	~ 82 kWh/d
TREATMENT PERFORMANCE	BOD Removal		~ 97%	
	COD Removal		~ 91%	
	TSS Removal		~ 99%	
	TN Removal		~ 74%	
	TP Removal		~ 83%	
	E.Coli Removal		~ 99.99%	

(1) Treats handwashing water. (2) Assuming 20L/user/day. (3) Assuming 5L/user/day.

RT Models Overview 2/2

Enviro Loo Clear T24

Enviro Loo Clear T6

INSTALLATION & COMMISSIONING	Duration	~ 8 days without site preparation.	
		~ 14 days without adverse ground.	
	Structure	Below ground: pre-treatment units.	
		Above ground: backend unit.	
	Site Preparation	Site clearance and construction of concrete foundation.	
		Excavation and installation of Anaerobic Settling Tanks.	
	Scalable	Yes, they are modular and pre-fabricated units which can be installed in parallel.	
	Movable	Yes, except for Anaerobic Settling Tanks.	
	Transportation / Placement	Truck and crane are required.	
	Start Up Time	~ 2 weeks at ~ 20°C	
		~ 4 weeks at ~ 10°C.	
	Start Up Requirements	~ 120 m^3	~ 48 m^3
		of non-potable water needs to be loaded into the treatment system.	
OPERATION & MAINTENANCE	Daily	Trained Caretaker: Inspection, ~ 15 minutes.	
		Trained Technician: Remote monitoring, ~ 5 minutes.	
	Monthly	Trained Technician: Onsite inspection and additives refiling, ~ 2 hours.	
	8 Months Interval	Trained Technician: 6-hour shutdown for cleaning of the membrane reactor, ~ 6 hours.	
	18 Months Interval	Trained Technician: 48-hour shutdown for desludging the treatment unit, by pumping sludge into an anaerobic settler, ~ 6 hours.	
	28-48 Months Interval	Trained Technician: 6-hour shutdown for replacing of the membrane, ~ 6 hours.	
	≥ 48 Months Interval	Contractor: Desludging of the Anaerobic Settling Tank.	
	Recommended Parts on Site	Membrane reactor sleeves 0.1 µm.	
		Pumps.	
		Solar inverter fuses (if applicable).	
	Consumables	~ 8 L/year	~ 4 L/year
		of hypochlorite (i.e. bleach),for membrane cleaning.	
		~ 10 kg/year	~ 5 kg/year
		of sodium hydroxide (i.e. caustic soda) for membrane cleaning.	
		8 m^3	3.5 m^3
		of replenish water (non-potable) every 8 month interval, after cleaning the membrane.	
		48 m^3	15 m^3
		of replenish water (non-potable) every 18 month interval, after desludging the system.	
	Additives	~ 14 kg/month	~ 3.5 kg/month
		of glucose (i.e. sugar), for aerobic treatment.	
		~ 14 kg/month	~ 3.5 kg/month
		of poly-aluminum chloride (PAC), as a flocculant and for phosphor removal.	

Suzhou Clear Environmental Technology Co., Ltd.

A company that has been specializing in sewage treatment for over 20 years. With a professional track record in China and abroad, Clear offers a wide range of products for wastewater treatment. These products include the Clear Reinvented Toilet, Rotating Biological Contactor, Oil Grease Trap, and Sewage Treatment for hospitals, among other solutions.

Company Profile

ESTABLISHED IN
2001

COMPANY SIZE
~ 70 employees

WEBSITE
clearet.com

EMAIL
tim@clearet.com

PHONE
+(86) 512 666 59 660

REPRESENTATIVE
Mr. Cao Jun

Global Presence

HEADQUARTERS
Building 32, Muqiao Street
Hi Tech Park, Suzhou, China

PRODUCTION COUNTRY
China

MARKET
Export to 50+ countries worldwide.

Awards & Certifications

2016 Best Practice Award, Reinvent the Toilet Competition

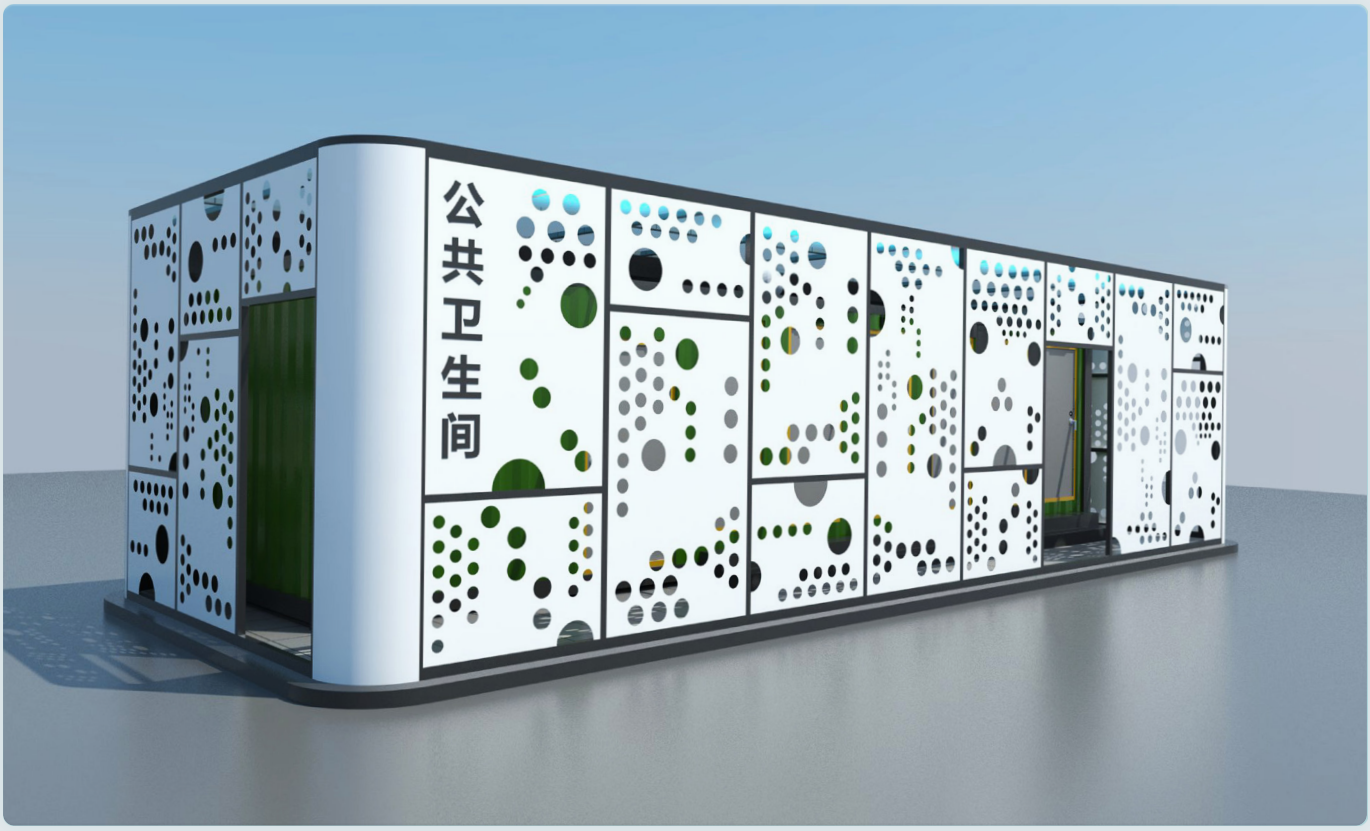
10 patents for inventions

18 core patent technologies

ISO 9001

ISO 14001

OHSAS 18001



RT Commercial Offering

Solution

Clear Recycling Toilets

PATENT OWNER

Suzhou Clear Environmental Technology Co., Ltd. has successfully implemented 1 Project, serving 375 Beneficiaries in 1 Country, and counting.*

*Based on self-reported data provided by the supplier as of June 2024.

Production

LEAD TIME

1,000 units/year

PROJECT DELIVERY METHOD

1. Selling.
2. Built and Transfer.
3. Built Operate Transfer.
4. Licensing.

CUSTOMER SERVICES

1. Trainings of technicians and operators, without additional fees.
2. Technical support.
3. Remote monitoring.

Models

Clear TT-1

Frontend + Backend
Blackwater
0.6 m³/d

Clear TT-3

Frontend + Backend
Blackwater
0.3 m³/d

Clear TT-5B

Frontend + Backend
Blackwater
0.6 m³/d

Clear TT-6

Backend Only
Blackwater
6 m³/d

VCard

Clear TT-1

Configuration

SOLUTION
Clear Recycling Toilets

COMPONENTS
Frontend & Backend

INPUT
Blackwater

CAPACITY
0.6 m³/d

Nº OF USERS: COMMUNITY
30

PUBLIC
120

FRONTEND: TOILETS
4

URINALS
3

WATER INPUT
✓ Water for flushing is recovered by the treatment process.

Water

Water Scarce Areas

Up to 0.6 m³/d
SAVING POTENTIAL

Power

Solar Power Supply

~ 16.5 kWh/day
CONSUMPTION

Pre-Treatment

1 Anaerobic Settling Tank
INCLUDED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
16 m²

INITIAL WATER (NON-POTABLE) LOAD
~ 12 m³

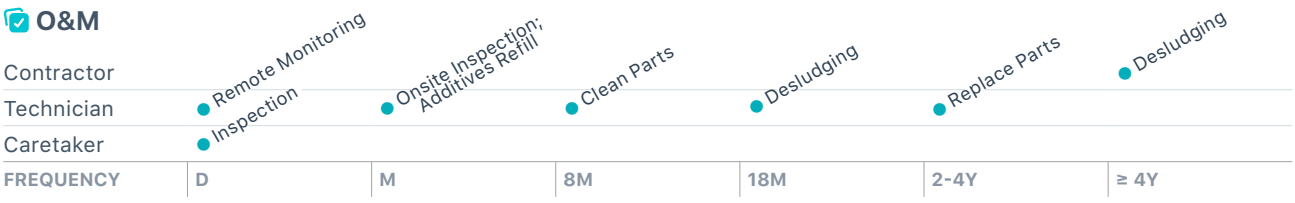
DURATION
~ 3 to 24 days

STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
✓ Community
✓ Public
✓ Wipers
✓ Washers
✓ Low Flush ≤ 3 L
✓ High Flush > 3 L

O&M



Commercial

SUPPLIER
Suzhou Clear Environmental Technology Co., Ltd.

PRODUCT LIFE
Up to 10 years.

PROJECT DELIVERY METHOD
1. Selling
2. Built and Transfer
3. Built Operate Transfer
4. Licensing.

WARRANTY
1 year: All parts.

CUSTOMER SERVICES
1. Trainings of technicians and operators, without additional fees.
2. Technical support.
3. Remote monitoring.

V-CARD SUPPLIER

Clear TT-3

Configuration

SOLUTION
Clear Recycling Toilets

COMPONENTS
Frontend & Backend

INPUT
Blackwater

CAPACITY
0.3 m^3/d

Nº OF USERS: COMMUNITY
15

PUBLIC
60

FRONTEND: TOILETS
2

WATER INPUT
✓ Water for flushing is recovered by the treatment process.

Water

Water Scarce Areas

Up to 0.3 m^3/d
SAVING POTENTIAL

Power

Solar Power Supply

~ 6.2 kWh/day
CONSUMPTION

Pre-Treatment

1 Anaerobic Settling Tank
INCLUDED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
6 m^2

INITIAL WATER (NON-POTABLE) LOAD
~ 4 m^3

DURATION
~ 3 to 24 days

STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M

	D	M	8M	18M	2-4Y	≥ 4Y
Contractor						● Desludging
Technician		● Onsite Inspection; Additives Refill	● Clean Parts	● Desludging	● Replace Parts	
Caretaker	● Remote Monitoring Inspection					
FREQUENCY	D	M	8M	18M	2-4Y	≥ 4Y

Commercial

SUPPLIER
Suzhou Clear Environmental Technology Co., Ltd.

PRODUCT LIFE
Up to 10 years.

PROJECT DELIVERY METHOD
1. Selling
2. Built and Transfer
3. Built Operate Transfer
4. Licensing.

WARRANTY
1 year: All parts.

CUSTOMER SERVICES
1. Trainings of technicians and operators, without additional fees.
2. Technical support.
3. Remote monitoring.

V-CARD SUPPLIER

Clear TT-5B

Configuration

SOLUTION
Clear Recycling Toilets

COMPONENTS
Frontend & Backend

INPUT
Blackwater

CAPACITY
0.6 m^3/d

Nº OF USERS: COMMUNITY
30

PUBLIC
120

FRONTEND: TOILETS
4

URINALS
3

WATER INPUT
✓ Water for flushing is recovered by the treatment process.

Water

Water Scarce Areas

Up to 0.6 m^3/d
SAVING POTENTIAL

Power

Solar Power Supply

~ 8.5 kWh/day
CONSUMPTION

Pre-Treatment

1 Anaerobic Settling Tank
INCLUDED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
22 m^2

INITIAL WATER (NON-POTABLE) LOAD
~ 16 m^3

DURATION
~ 3 to 24 days

STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M

	D	M	8M	18M	2-4Y	≥ 4Y
Contractor						Desludging
Technician		Onsite Inspection; Additives Refill	Clean Parts	Desludging	Replace Parts	
Caretaker	Remote Monitoring Inspection					
FREQUENCY						

Commercial

SUPPLIER
Suzhou Clear Environmental Technology Co., Ltd.

PRODUCT LIFE
Up to 10 years.

PROJECT DELIVERY METHOD
1. Selling
2. Built and Transfer
3. Built Operate Transfer
4. Licensing.

WARRANTY
1 year: All parts.

CUSTOMER SERVICES
1. Trainings of technicians and operators, without additional fees.
2. Technical support.
3. Remote monitoring.

V-CARD SUPPLIER

Clear TT-6

Configuration

SOLUTION
Clear Recycling Toilets

COMPONENTS
Backend Only

INPUT
Blackwater

CAPACITY
6 m³/d

Nº OF USERS:
COMMUNITY: 300
PUBLIC: 1,200

Water

Water Scarce Areas

Up to 6 m³/d
SAVING POTENTIAL

Power

Solar Power Supply

~ 64 kWh/day
CONSUMPTION

Pre-Treatment

1 Anaerobic Settling Tank
INCLUDED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
60 m²

INITIAL WATER (NON-POTABLE) LOAD
~ 26 m³

DURATION
~ 3 to 24 days

STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M

	D	M	8M	18M	2-4Y	≥ 4Y
Contractor						Desludging
Technician		Onsite Inspection; Additives Refill	Clean Parts	Desludging	Replace Parts	
Caretaker	Remote Monitoring Inspection					
FREQUENCY						

Commercial

SUPPLIER
Suzhou Clear Environmental Technology Co., Ltd.

PRODUCT LIFE
Up to 10 years.

PROJECT DELIVERY METHOD
1. Selling
2. Built and Transfer
3. Built Operate Transfer
4. Licensing.

WARRANTY
1 year: All parts.

CUSTOMER SERVICES
1. Trainings of technicians and operators, without additional fees.
2. Technical support.
3. Remote monitoring.

V-CARD SUPPLIER

RT Models Overview 1/4

Clear TT-1

Clear TT-5B

OVERVIEW	Components		Frontend + Backend	
	Treatment Capacity		0.6 m^3/d	
	Input		Blackwater (1)	
	Nº of Users	Community (2)	30	
		Public (3)	120	
	Footprint Area		16 m^2	22 m^2
ISO 30500	Effluent Conformity		...	
	Certification		...	
FRONTEND	Nº of Toilets		4	
	Nº of Urinals		3	
	Water Input		Water for flushing is recovered by the treatment process.	
PRE-TREATMENT	Includes		Anaerobic Settling Tank	Anaerobic Settling Tank
	Total Volume		4.5 m^3	
MEASURES (W:L:H)	Pre-Treatment		... : ... : ... m	
	Frontend + Backend		2.4 : 6 : 2.6 m	2.3 : 8.3 : 2.9 m
	Backend			
OPERATIONAL MODES	Closed Water Loop System		Yes	
	Energy Recovery		No	
	Nutrient Recovery		No	
	Irrigation Water Recovery		No	
OPERATIONAL LIMITATIONS	Ambient Temperature		5 to 50°C	
	Peak Time Usage		3 hours	
	Downtime		≤ 48 hours	
	Max. Organic Load (COD)		...	...
	Max. Organic Load (BOD)		...	...
CONTROL	System Control		Automated from start-up to running.	
	Remote Monitoring		Yes	
POWER	Connection		380 V, 25 A, Three-Phase.	
	Solar Supply		Optional	
	Outage		System will pause and resume based on parameters when power returns.	
			Or switch to solar power if applicable.	
POWER CONSUMPTION	Normal Operation		~ 16.5 kWh/d	~ 8.5 kWh/d
	If Additional Heating is Required ≤ 0°C		~ 22.5 kWh/d	~ 16.5 kWh/d
TREATMENT PERFORMANCE	BOD Removal		~ 97%	
	COD Removal		~ 91%	
	TSS Removal		~ 99%	
	TN Removal		~ 74%	
	TP Removal		~ 83%	
	E.Coli Removal		~ 99.99%	

(1) Treats handwashing water. (2) Assuming 20L/user/day. (3) Assuming 5L/user/day.

RT Models Overview 2/4

Clear TT-1

Clear TT-5B

INSTALLATION & COMMISSIONING	Duration	~ 3 to 24 days.	
	Structure	Below ground: pre-treatment units.	
		Above ground: backend unit.	
	Site Preparation	Site clearance and construction of concrete foundation, bearing requirements: ≥ 15 KN/m².	≥ 20 KN/m².
		Excavation and installation of anaerobic settling tanks.	
	Scalable	Yes, they are modular and pre-fabricated units which can be installed in parallel.	
	Movable	Yes, except for Anaerobic Settling Tank.	
	Transportation / Placement	Truck and crane are required.	
	Start Up Time	~ 2 weeks at ~ 20°C	
		~ 4 weeks at ~ 10°C.	
	Start Up Requirements	~ 12 m³ of non-potable water needs to be loaded into the treatment system.	~ 16 m³
OPERATION & MAINTENANCE	Daily	Trained Caretaker: Inspection, ~ 15 minutes.	
		Trained Technician: Remote monitoring, ~ 5 minutes.	
	Monthly	Trained Technician: Onsite inspection and additives refiling, ~ 2 hours.	
	8 Months Interval	Trained Technician: 6-hour shutdown for cleaning of the membrane reactor, ~ 6 hours.	
	18 Months Interval	Trained Technician: 48-hour shutdown for desludging the treatment unit, by pumping sludge into an anaerobic settler, ~ 6 hours.	
	28-48 Months Interval	Trained Technician: 6-hour shutdown for replacing of the membrane, ~ 6 hours.	
	≥ 48 Months Interval	Contractor: Desludging of the Anaerobic Settling Tank.	
	Recommended Parts on Site	Membrane reactor sleeves 0.1 µm.	
		Pumps.	
		Solar inverter (if applicable).	
	Consumables	~ 2,5 L/year of hypochlorite (i.e. bleach), for membrane cleaning.	
		~ 3 kg/year of sodium hydroxide (i.e. caustic soda) for membrane cleaning.	
		~ 2 m³ of replenish water (non-potable) every 8 month interval, after desludging the system.	
		~ 7 m³ of replenish water (non-potable) every 18 month interval, after desludging the system	~ 9 m³
	Additives	~ 2 kg/month of glucose (i.e. sugar), for aerobic treatment.	
		~ 2 kg/month of poly-aluminum chloride (PAC), as a flocculant and for phosphor removal.	

RT Models Overview 3/4

Clear TT-3

Clear TT-6

OVERVIEW	Components		Frontend + Backend	Backend Only
	Treatment Capacity		0.3 m^3/d	6 m^3/d
	Input		Blackwater [1]	
	N° of Users	Community [2]	15	300
		Public [3]	60	1,200
	Footprint Area		6 m^2	60 m^2
ISO 30500	Effluent Conformity		...	
	Certification		...	
FRONTEND	N° of Toilets		2	
	N° of Urinals		0	
	Water Input		Water for flushing is recovered by the treatment process.	
PRE-TREATMENT	Includes		Anaerobic Settling Tank	Anaerobic Settling Tank
	Total Volume		0.9 m^3	18 m^3
MEASURES (W:L:H)	Pre-Treatment		... : ... : ... m	2 : 6 : 2 m
	Frontend + Backend		2.4 : 2.5 : 2.6 m	
	Backend			5.2 : 5.8 : 2.3 m
OPERATIONAL MODES	Closed Water Loop System		Yes	
	Energy Recovery		No	
	Nutrient Recovery		No	
	Irrigation Water Recovery		No	
OPERATIONAL LIMITATIONS	Ambient Temperature		5 to 50°C	
	Peak Time Usage		3 hours	
	Downtime		≤ 48 hours	
	Max. Organic Load (COD)		...	...
	Max. Organic Load (BOD)		...	...
CONTROL	System Control		Automated from start-up to running.	
	Remote Monitoring		Yes	
POWER	Connection		220 V, 5 A, Single-Phase.	380 V, 25 A, Three-Phase.
	Solar Supply		Optional	
	Outage		System will pause and resume based on parameters when power returns. Or switch to solar if applicable.	
POWER CONSUMPTION	Normal Operation		~ 6.2 kWh/d	~ 64 kWh/d
	If Additional Heating is Required ≤ 0°C		~ 16.5 kWh/d	~ 80 kWh/d
TREATMENT PERFORMANCE	BOD Removal		~ 97%	
	COD Removal		~ 91%	
	TSS Removal		~ 99%	
	TN Removal		~ 74%	
	TP Removal		~ 83%	
	E.Coli Removal		~ 99.99%	

(1) Treats handwashing water. (2) Assuming 20L/user/day. (3) Assuming 5L/user/day.

RT Models Overview 4/4

Clear TT-3

Clear TT-6

INSTALLATION & COMMISSIONING	Duration	~ 3 to 24 days	
	Structure	Below ground: pre-treatment units.	
		Above ground: backend unit.	
	Site Preparation	Site clearance and construction of concrete foundation, bearing requirements: ≥ 10 KN/m².	≥ 16 KN/m².
		Excavation and installation of anaerobic settling tanks.	
	Scalable	Yes, they are modular and pre-fabricated units which can be installed in parallel.	
	Movable	Yes, except for Anaerobic Settling Tanks.	
	Transportation / Placement	Truck and crane are required.	
	Start Up Time	~ 2 weeks at ~ 20°C	
		~ 4 weeks at ~ 10°C.	
	Start Up Requirements	~ 4 m³	~ 26 m³
		of non-potable water needs to be loaded into the treatment system.	
OPERATION & MAINTENANCE	Daily	Trained Caretaker: Inspection, ~ 15 minutes.	
		Trained Technician: Remote monitoring, ~ 5 minutes.	
	Monthly	Trained Technician: Onsite inspection and additives refiling, ~ 2 hours.	
	8 Months Interval	Trained Technician: 6-hour shutdown for cleaning of the membrane reactor, ~ 6 hours.	
	18 Months Interval	Trained Technician: 48-hour shutdown for desludging the treatment unit, by pumping sludge into an anaerobic settler, ~ 6 hours.	
	28-48 Months Interval	Trained Technician: 6-hour shutdown for replacing of the membrane, ~ 6 hours.	
	≥ 48 Months Interval	Contractor: Desludging of the Anaerobic Settling Tank.	
	Recommended Parts on Site	Membrane reactor sleeves 0.1 µm.	
		Pumps.	
		Solar inverter (if applicable).	
	Consumables	~ 1 L/year	~ 4 L/year
		of hypochlorite (i.e. bleach), for membrane cleaning.	
		~ 1.5 kg/year	~ 5 kg/year
		of sodium hydroxide (i.e. caustic soda) for membrane cleaning.	
		~ 1 m³	~ 3.5 m³
		of replenish water (non-potable) every 8 month interval, after desludging the system.	
		~ 2 m³	~ 15 m³
		of replenish water (non-potable) every 18 month interval, after desludging the system.	
	Additives	~ 0.5 kg/month	~ 3.5 kg/month
		of glucose (i.e. sugar), for aerobic treatment.	
		~ 0.5 kg/month	~ 3.5 kg/month
		of poly-aluminum chloride (PAC), as a flocculant and for phosphor removal.	

REINVENTED TOILET

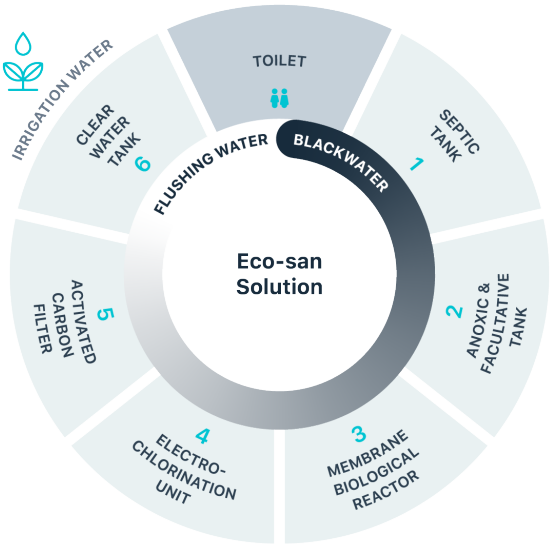
Eco-san Solution

Eco-san's wastewater treatment reclaims pathogen-free water for flushing. The modular and pre-fabricated system integrates with water-borne toilets, emphasizing off-grid compatibility and eliminating water consumption during flushing.

Key Features

- SAFE
- CLOSE LOOP WATER SYSTEM
- IRRIGATION WATER RECOVERY
- SCALABLE
- MOVABLE

Process



Step is part of the solution.

Step is required and available as an option.

1. **Reduction of organic pollutants** via anaerobic digestion, **as well mitigation of flow rate and load variations.**
2. **Further reduction of organic pollutants and nutrients, especially nitrogen,** via anoxic (environment devoid of oxygen) and facultative (environment with varying oxygen levels) treatments.
3. **Removal of remaining organic pollutant, suspended solids & pathogens** via membrane filtration and aerobic digestion.
4. **Elimination of remaining pathogens** via electrochemical chlorination.
5. **Removal of remaining organic pollutants** via adsorption by granular activated carbon.
6. **Storage of treated water** avaliable for the next flush.

Environmental Context

SUITABLE FOR
- ✓ Water Scarce Areas
- ✓ Rocky Ground Optional
- ✓ Flood Prone Areas Optional
- ✓ High Groundwater Tables

AMBIENT TEMPERATURE RANGE
-5 to 40°C

Scale / Users

SUITABLE FOR
- ✓ Household Scale
- ✓ Community Scale
- ✓ Public Scale
- ✓ Wipers & Washers
- ✓ Low Flush ≤ 3 L Optional
- ✓ High Flush > 3 L
- ✓ Retrofitting Optional

Statistics

16 active Projects already use Eco-san Solution serving 3,200 Beneficiaries in 2 Countries, and counting.*

*Based on self-reported data provided by the relevant supplier(s) as of June 2024.

Application Scope

Community Toilets
Refugee camps, slums or informal settlements.

Multiple Households
Groups of houses or other buildings.

Public and private facilities
Educational, healthcare, and institutional facilities.

Public Toilets
At recreational or religious sites, and transportation hubs.

Multi-story Buildings
Multipurpose facilities.

Expected Effluent Quality

	This RT Solution	ISO 30500 Standards RUU*	UUU**
pH	6 – 9	6 – 9	
BOD	≤ 10 mg/L		
COD	≤ 50 mg/L	≤ 150 mg/L	≤ 50 mg/L
TSS	≤ 10 mg/L	≤ 30 mg/L	≤ 10 mg/L
TN	≤ 23 mg/L		
TP	≤ 3.5 mg/L		
E.Coli	≤ 1 CFU/L	≤ 100 CFU/L	
MS2 Coliphage (Virus)	0 PFU/L	≤ 10 PFU/L	
Helminths	0 Eggs/L	≤ 1 Egg/L	
Protozoa	0 CFU/L	≤ 1 CFU/L	

*RUU: Restricted Urban Uses; **UUU: Unrestricted Urban Uses

Expected Removal Rates

	This RT Solution	ISO 30500 Standards Minimum Load Reduction
BOD	≥ 95%	
COD	≥ 95%	
TSS	≥ 95%	
TN	≥ 70%	≥ 70% Reduction
TP	≥ 70%	≥ 80% Reduction
E.Coli	≥ 99.99%	

Commercial Offering

Yixing Eco-Sanitary Manufacture Co. Ltd.

WEBSITE
eco-san.cn

EMAIL
zhouxiaokang@hotmail.com

PHONE
+(86) 510 871 95188

REPRESENTATIVE
Mr. Xiaokang Zhou

b-CRT 20i

Frontend + Backend
Blackwater
1 m³/d

b-CRT 2x20

Frontend + Backend
Blackwater
1 m³/d

b-CRT 40

Frontend + Backend
Blackwater
1 m³/d

b-CRT B

Backend Only
Blackwater
1 m³/d

b-HRT (ECR)

Backend Only
Septic Effluent
0.1 m³/d

b-HRT (UV)

Backend Only
Septic Effluent
0.1 m³/d

Yixing Eco-Sanitary Manufacture Co., Ltd.

Eco-San is an R&D and manufacturing enterprise dedicated to providing eco-friendly, secure, and reliable ecological toilets and wastewater treatment solutions.

Eco–san

Company Profile

ESTABLISHED IN
2016

COMPANY SIZE
30 employees

WEBSITE
eco-san.cn

EMAIL
zhouxiaokang@hotmail.com

PHONE
+(86) 510 871 95188

REPRESENTATIVE
Mr. Xiaokang Zhou

Global Presence

HEADQUARTERS
Yixing City, Jiangsu Province, China

PRODUCTION COUNTRY
China

DISTRIBUTION NETWORK
China

MARKET
Canada, China, Bahrain, India, South Africa, USA.

Awards & Certifications

TODAY	Ongoing ISO 30500 certification.
2017	Awarded “Advanced Enterprise of International Technology Transfer”
2016	First price “The National Toilet Technology Innovation Contest”

RT Commercial Offering

Solution

Eco-san Solution

PATENT OWNER

Yixing Eco-Sanitary Manufacture Co., Ltd. has successfully implemented 16 Projects, serving 3,200 Beneficiaries in 2 Countries, and counting.*

*Based on self-reported data provided by the supplier as of June 2024.

Models

b-CRT 20i

Frontend + Backend
Blackwater
1 m³/d

b-CRT 2x20

Frontend + Backend
Blackwater
1 m³/d

b-CRT 40

Frontend + Backend
Blackwater
1 m³/d

b-CRT B

Backend Only
Blackwater
1 m³/d

b-HRT (ECR)

Backend Only
Septic Effluent
0.1 m³/d

b-HRT (UV)

Backend Only
Septic Effluent
0.1 m³/d

Production

PRODUCTION CAPACITY
10 units/month (b-CRT)
100 units/month (b-HRT)

LEAD TIME
30 days

PROJECT DELIVERY METHOD
1. Built and transfer.
2. Selling units.
3. Licensing.
4. Support local production for international customers.

CUSTOMER SERVICES
1. Operator training.
2. Hotline (Worldwide).
3. Global after-sales maintenance management platform.

VCard

b-CRT 20i

ISO 30500 Certification
IN PROGRESS

Configuration

SOLUTION
Eco-san Solution

COMPONENTS
Frontend & Backend

INPUT
Blackwater

CAPACITY
1 m³/d

Nº OF USERS:
COMMUNITY: 50
PUBLIC: 200

FRONTEND:
TOILETS: 2
URINALS: 2
BASINS: 2

WATER INPUT
- ✓ The treatment process recovers water for flushing.
- ✓ The water for handwashing can be supplied by water connection, groundwater, or water trucks.

Water

Water Scarce Areas

Up to 1 m³/d
SAVING POTENTIAL

Power

Solar Power Supply

≤ 15 kWh/day
CONSUMPTION

Pre-Treatment

1 Septic Tank (3 Chambers)
INCLUDED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
15 m²

INITIAL WATER (NON-POTABLE) LOAD
15 m³

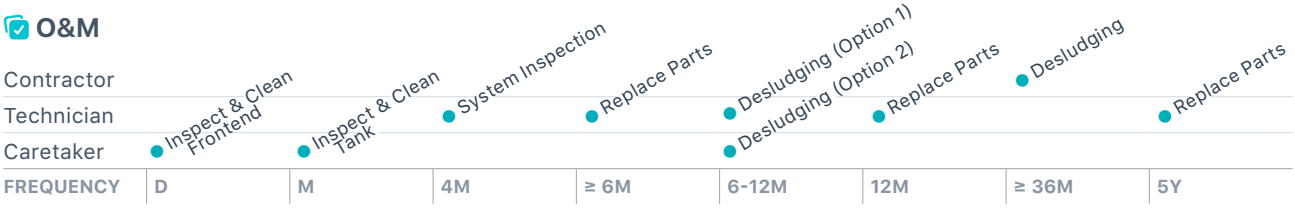
DURATION
14 days

STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M



Commercial

SUPPLIER
Yixing Eco-Sanitary Manufacture Co., Ltd.

PRODUCT LIFE
Up to 10 years.

PROJECT DELIVERY METHOD
1. Built and transfer.
2. Selling units.
3. Licensing.
4. Support local production for international customers.

WARRANTY
1 year: All parts.

CUSTOMER SERVICES
1. Operator training.
2. Hotline (Worldwide).
3. Global after-sales maintenance management platform.

V-CARD SUPPLIER

b-CRT 2x20

ISO 30500 Certification
IN PROGRESS

Configuration

SOLUTION
Eco-san Solution

COMPONENTS
Frontend & Backend

INPUT
Blackwater

CAPACITY
1 m³/d

Nº OF USERS:

COMMUNITY	PUBLIC
50	200

FRONTEND:

TOILETS	URINALS	BASINS
5	2	6

WATER INPUT
- ✓ The treatment process recovers water for flushing.
- ✓ The water for handwashing can be supplied by water connection, groundwater, or water trucks.

Water

Water Scarce Areas

Up to 1 m³/d
SAVING POTENTIAL

Power

Solar Power Supply

≤ 16 kWh/day
CONSUMPTION

Pre-Treatment

1 Septic Tank (3 Chambers)
INCLUDED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
30 m²

INITIAL WATER (NON-POTABLE) LOAD
15 m³

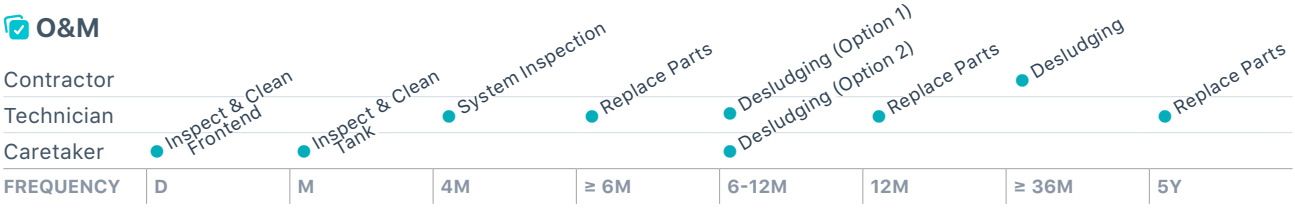
DURATION
14 days with/out site preparation.

STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M



Commercial

SUPPLIER
Yixing Eco-Sanitary Manufacture Co., Ltd.

PRODUCT LIFE
Up to 10 years

PROJECT DELIVERY METHOD
1. Built and transfer.
2. Selling units.
3. Licensing.
4. Support local production for international customers.

WARRANTY
1 year: All parts.

CUSTOMER SERVICES
1. Operator training.
2. Hotline (Worldwide).
3. Global after-sales maintenance management platform.

V-CARD SUPPLIER

b-CRT 40

ISO 30500 Certification
IN PROGRESS

Configuration

SOLUTION
Eco-san Solution

COMPONENTS
Frontend & Backend

INPUT
Blackwater

CAPACITY
1 m³/d

Nº OF USERS:
COMMUNITY: 50
PUBLIC: 200

FRONTEND:
TOILETS: 3
URINALS: 3
BASINS: 3

WATER INPUT
- ✓ The treatment process recovers water for flushing.
- ✓ The water for handwashing can be supplied by water connection, groundwater, or water trucks.

Water

Water Scarce Areas

Up to 1 m³/d
SAVING POTENTIAL

Power

Solar Power Supply

≤ 16 kWh/day
CONSUMPTION

Pre-Treatment

1 Septic Tank (3 Chambers)
INCLUDED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
30 m²

DURATION
14 days

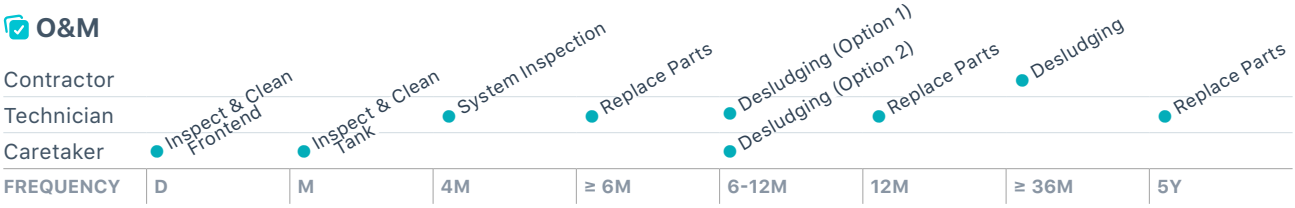
STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

INITIAL WATER (NON-POTABLE) LOAD
15 m³

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M



Commercial

SUPPLIER
Yixing Eco-Sanitary Manufacture Co., Ltd.

PROJECT DELIVERY METHOD
1. Built and transfer.
2. Selling units.
3. Licensing.
4. Support local production for international customers.

CUSTOMER SERVICES
1. Operator training.
2. Hotline (Worldwide).
3. Global after-sales maintenance management platform.

V-CARD SUPPLIER

PRODUCT LIFE
Up to 10 years.

WARRANTY
1 year: All parts.

b-CRT B

ISO 30500 Certification
IN PROGRESS

Configuration

SOLUTION
Eco-san Solution

COMPONENTS
Backend Only

INPUT
Blackwater

CAPACITY
1 m³/d

Nº OF USERS:
COMMUNITY: 50
PUBLIC: 200

Water

Water Scarce Areas

Up to 1 m³/d
SAVING POTENTIAL

Power

Solar Power Supply

≤ 14 kWh/day
CONSUMPTION

Pre-Treatment

1 Septic Tank (3 Chambers)
INCLUDED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
15 m²

INITIAL WATER (NON-POTABLE) LOAD
15 m³

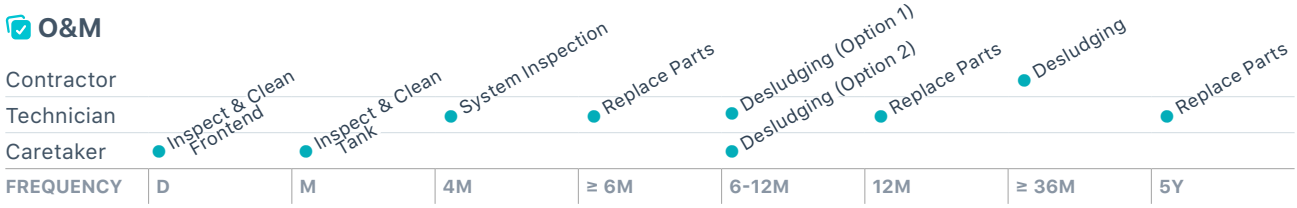
DURATION
14 days

STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M



Commercial

SUPPLIER
Yixing Eco-Sanitary Manufacture Co., Ltd.

PRODUCT LIFE
Up to 10 years.

PROJECT DELIVERY METHOD
1. Built and transfer.
2. Selling units.
3. Licensing.
4. Support local production for international customers.

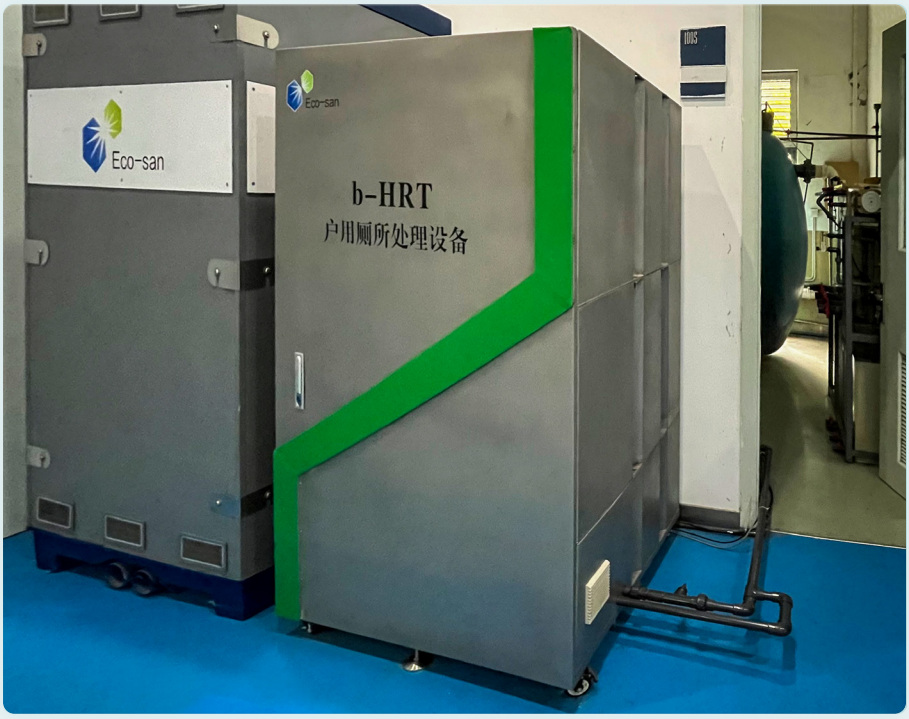
WARRANTY
1 year: All parts.

CUSTOMER SERVICES
1. Operator training.
2. Hotline (Worldwide).
3. Global after-sales maintenance management platform.

V-CARD SUPPLIER

b-HRT (ECR)

ISO 30500 Certification
UNDER PREPARATION



Configuration

SOLUTION
Eco-san Solution

COMPONENTS
Backend Only

INPUT
Septic Effluent

CAPACITY
0.1 m^3/d

Nº OF USERS: HOUSEHOLD
5

Water

Water Scarce Areas

Up to 0.1 m^3/d
SAVING POTENTIAL

Power

Solar Power Supply

~ 2.5 kWh/day
CONSUMPTION

Pre-Treatment

1 Septic Tank (3 Chambers)
REQUIRED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
1.2 m^2

INITIAL WATER (NON-POTABLE) LOAD
0.5 m^3

DURATION
7 days, with site preparation.

STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Household
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M

Commercial

SUPPLIER
Yixing Eco-Sanitary Manufacture Co., Ltd.

PRODUCT LIFE
Up to 10 years.

PROJECT DELIVERY METHOD
1. Built and transfer.
2. Selling units.
3. Licensing.
4. Support local production for international customers.

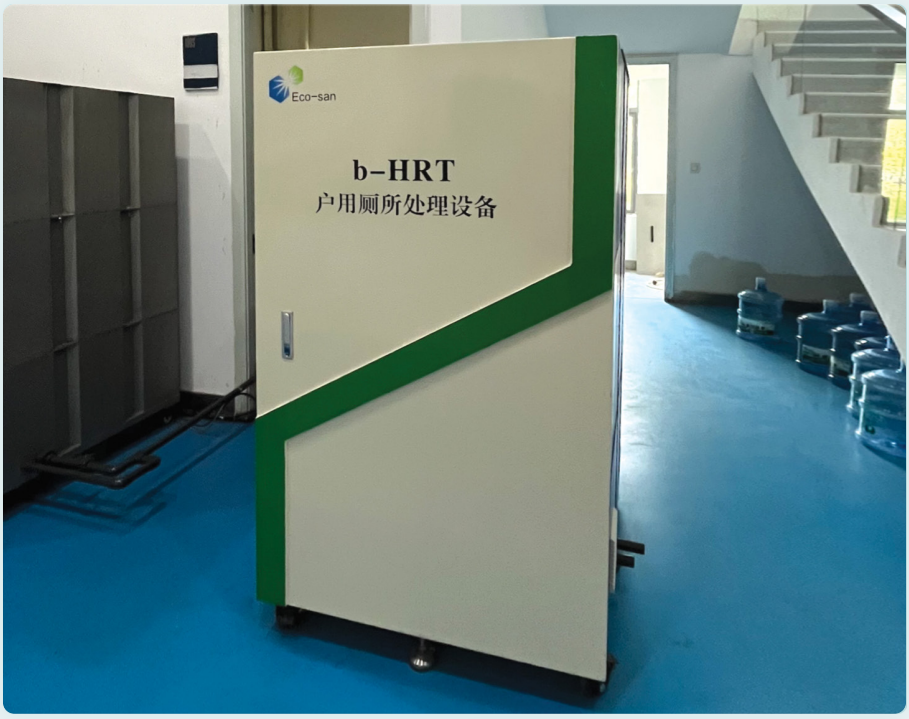
WARRANTY
1 year: All parts.

CUSTOMER SERVICES
1. Operator training.
2. Hotline (Worldwide).
3. Global after-sales maintenance management platform.

V-CARD SUPPLIER

b-HRT (UV)

ISO 30500 Certification
UNDER PREPARATION



Configuration

SOLUTION
Eco-san Solution

COMPONENTS
Backend Only

INPUT
Septic Effluent

CAPACITY
0.1 m^3/d

Nº OF USERS: HOUSEHOLD
5

Water

Water Scarce Areas

Up to 0.1 m^3/d
SAVING POTENTIAL

Power

Solar Power Supply

~ 1.2 kWh/day
CONSUMPTION

Pre-Treatment

1 Septic Tank (3 Chambers)
OPTIONAL

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
1.2 m^2

INITIAL WATER (NON-POTABLE) LOAD
0.5 m^3

DURATION
7 days, with site preparation.

STRUCTURE
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Household
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M

Commercial

SUPPLIER
Yixing Eco-Sanitary Manufacture Co., Ltd.

PRODUCT LIFE
Up to 10 years.

PROJECT DELIVERY METHOD
1. Built and transfer.
2. Selling units.
3. Licensing.
4. Support local production for international customers.

WARRANTY
1 year: All parts.

CUSTOMER SERVICES
1. Operator training.
2. Hotline (Worldwide).
3. Global after-sales maintenance management platform.

V-CARD SUPPLIER

RT Models Overview 1/6

b-CRT 20i

b-CRT 2x20

OVERVIEW	Components		Frontend + Backend	
	Treatment Capacity		1 m^3/d	
	Input		Blackwater [1]	
	Nº of Users	Community [2]	50	
		Public [3]	200	
	Footprint Area		15 m^2	30 m^2
ISO 30500	Effluent Conformity		Yes	
	Certification		In Progress	
FRONTEND	Nº of Toilets		2	5
	Nº of Urinals		2	2
	Nº of Handwash Basins		2	6
	Water Input		The treatment process recovers water for flushing. Handwashing water can be supplied by water connection, groundwater, or water trucks.	
PRE-TREATMENT	Includes		1 Septic Tank (3 Chambers)	
	Total Volume		2.4 m^3	
MEASURES (W:L:H)	Pre-Treatment		1.1 : 1.9 : 1.2 m	
	Frontend		n/a	2.4 : 6.1 : 2.9 m
	Backend		n/a	2.4 : 6.1 : 2.9 m
	Frontend + Backend		2.4 : 6.1 : 2.9 m	n/a
OPERATIONAL MODES	Closed Water Loop System		Yes	
	Energy Recovery		No	
	Nutrient Recovery		No	
	Irrigation Water Recovery		Optional	
OPERATIONAL LIMITATIONS	Ambient Temperature		-5 to 40°C	
	Peak Time Usage		4 hours	
	Downtime		≤ 60 days	
	Max. Organic Load (COD)		≤ 0.3 kg_{BOD}/d	
	Max. Organic Load (BOD)		≤ 1.2 kg_{COD}/d	
CONTROL	System Control		Automated from start-up to running.	
	Remote Monitoring		Yes	
POWER	Connection		220 V ±10% / 50~60 Hz	
	Solar Supply		Optional	
	Outage		System will pause and resume based on parameters when power returns. Or switch to solar power if applicable.	
POWER CONSUMPTION	Normal Operation		≤ 15 kWh/d	≤ 16 kWh/d
	Non-Usage Mode		~ 1.5 kWh/d	
TREATMENT PERFORMANCE	BOD Removal		≥ 95%	
	COD Removal		≥ 95%	
	TSS Removal		≥ 95%	
	TN Removal		≥ 70%	
	TP Removal		≥ 70%	
	E.Coli Removal		≥ 99.99%	

(1) Treats handwashing water. (2) Assuming 20L/user/day. (3) Assuming 5L/user/day.

RT Models Overview 2/6

b-CRT
20i

b-CRT
2x20

INSTALLATION & COMMISSIONING	**Duration**	14 days.
	Structure	Below ground: pre-treatment units.
		Above ground: backend unit.
	Site Preparation	Site clearance and construction of concrete foundation.
		Excavation and installation of anaerobic settling tanks.
		If applicable, connecting to electricity and water supply.
	Scalable	Yes, they are modular and pre-fabricated units which can be installed in parallel.
	Movable	Yes, except for the septic tank when installed underground.
	Transportation / Placement	Truck and crane are required.
	Start Up Time	14 days
	Start Up Requirements	15 m^3 of non-potable water needs to be loaded into the treatment system.
		3 kg of salt needs to be added to the system, to reach a chloride ion concentration of 10mmol/L.
OPERATION & MAINTENANCE	**Daily**	Trained Caretaker: Inspection and cleaning of the toilet facilities (front-end), ~ 1 hour.
	Monthly	Trained Caretaker: Inspection and removal of sundries in the toilet collection tank, including items such as toilet paper and sanitary napkins that cannot be dissolved, ~ 30 minutes.
	4-Months Interval	Trained Technician: Inspection of the system's operation, including pipelines, fans, pump valves, and control cabinets, 30 to 60 minutes.
	≥ 6-Months Interval	Trained Technician: Replacement of the UV lamps, ~ 30 minutes
	6 to 12-Months Interval	Option 1 – with sludge sterilization unit by Trained Technician: Desludging of the main treatment unit by sludge pump into sludge sterilization unit (optional add-on), ~30 minutes.
		Option 2 – without sludge sterilization unit by Trained Caretaker: Desludging of the main treatment into via gravity discharge into septic tank, ~30 minutes.
	12-Months Interval	Trained Technician: Replacing the activated carbon media, ~120 minutes.
	≥ 36-Months intervals	Contractor: Desludging of the septic tank.
	≥ 5-years intervals	Trained Technician: Replacement of electrodes, ~120 minutes.
	Recommended Parts on Site	Level gauge.
	Consumables	50 kg/year of activated carbon.
		2 x UV lamps/year.
		Electrodes

RT Models Overview 3/6

			b-CRT 40	b-CRT B
OVERVIEW	Components		Frontend + Backend	Backend Only
	Treatment Capacity		1 m^3/d	
	Input		Blackwater [1]	
	Nº of Users	Community [2]	50	
		Public [3]	200	
	Footprint Area		30 m^2	15 m^2
ISO 30500	Effluent Conformity		Yes	
	Certification		In Progress	
FRONTEND	Nº of Toilets		3	n/a
	Nº of Urinals		3	n/a
	Nº of Handwash Basins		3	n/a
	Water Input		The treatment process recovers water for flushing. Handwashing water can be supplied by water connection, groundwater, or water trucks.	n/a
PRE-TREATMENT	Includes		1 Septic Tank (3 Chambers)	
	Total Volume		2.4 m^3	
MEASURES (W:L:H)	Pre-Treatment		1.1 : 1.9 : 1.2 m	
	Backend		n/a	2.4 : 6.1 : 2.9 m
	Frontend + Backend		2.4 : 12.2 : 2.9 m	n/a
OPERATIONAL MODES	Closed Water Loop System		Yes	Optional
	Energy Recovery		No	
	Nutrient Recovery		No	
	Irrigation Water Recovery		Optional	
OPERATIONAL LIMITATIONS	Ambient Temperature		-5 to 40°C	
	Peak Time Usage		4 hours	
	Downtime		≤ 60 days	
	Max. Organic Load (COD)		≤ 0.3 kg_{BOD}/d	
	Max. Organic Load (BOD)		≤ 1.2 kg_{COD}/d	
CONTROL	System Control		Automated from start-up to running.	
	Remote Monitoring		Yes	
POWER	Connection		220 V ±10% / 50~60 Hz	
	Solar Supply		Optional	
	Outage		System will pause and resume based on parameters when power returns. Or switch to solar power if applicable.	
POWER CONSUMPTION	Normal Operation		≤ 16 kWh/d	≤ 14 kWh/d
	Non-Usage Mode		~ 1.5 kWh/d	
TREATMENT PERFORMANCE	BOD Removal		≥ 95%	
	COD Removal		≥ 95%	
	TSS Removal		≥ 95%	
	TN Removal		≥ 70%	
	TP Removal		≥ 70%	
	E.Coli Removal		≥ 99.99%	

(1) Treats handwashing water. (2) Assuming 20L/user/day. (3) Assuming 5L/user/day.

RT Models Overview 4/6

b-CRT 40

b-CRT B

INSTALLATION & COMMISSIONING	**Duration**	14 days.
	Structure	Below ground: pre-treatment units.
		Above ground: backend unit.
	Site Preparation	Site clearance and construction of concrete foundation.
		Excavation and installation of anaerobic settling tanks.
		If applicable, connecting to electricity and water supply.
	Scalable	Yes, they are modular and pre-fabricated units which can be installed in parallel.
	Movable	Yes, except for the septic tank when installed underground.
	Transportation / Placement	Truck and crane are required.
	Start Up Time	14 days
	Start Up Requirements	15 m^3 of non-potable water needs to be loaded into the treatment system.
		3 kg of salt needs to be added to the system, to reach a chloride ion concentration of 10mmol/L.
OPERATION & MAINTENANCE	**Daily**	Trained Caretaker: Inspection and cleaning of the toilet facilities (front-end), ~ 1 hour.
	Monthly	Trained Caretaker: Inspection and removal of sundries in the toilet collection tank, including items such as toilet paper and sanitary napkins that cannot be dissolved, ~ 30 minutes.
	4-Months Interval	Trained Technician: Inspection of the system's operation, including pipelines, fans, pump valves, and control cabinets, 30 to 60 minutes.
	≥ 6-Months Interval	Trained Technician: Replacement of the UV lamps, ~ 30 minutes
	6 to 12-Months Interval	Option 1 – with sludge sterilization unit by Trained Technician: Desludging of the main treatment unit by sludge pump into sludge sterilization unit (optional add-on), ~30 minutes.
		Option 2 – without sludge sterilization unit by Trained Caretaker: Desludging of the main treatment into via gravity discharge into septic tank, ~30 minutes.
	12-Months Interval	Trained Technician: Replacing the activated carbon media, ~120 minutes.
	≥ 36-Months intervals	Contractor: Desludging of the septic tank.
	≥ 5-years intervals	Trained Technician: Replacement of electrodes, ~120 minutes.
	Recommended Parts on Site	Level gauge.
	Consumables	50 kg/year of activated carbon.
		2 x UV lamps/year.
		Electrodes

RT Models Overview 5/6

b-HRT (ECR)

b-HRT (UV)

OVERVIEW	Components		Backend Only	
	Treatment Capacity		0.1 m^3/d	
	Input		Septic Effluent (1)	
	Nº of Users	Household (2)	5	
		Community (2)	n/a	
		Public (3)	n/a	
	Footprint Area		1.2 m^2	
ISO 30500	Effluent Conformity		Yes	
	Certification		Under Preparation	
PRE-TREATMENT	Requires		1 Septic Tank (3 Chambers), available as optional.	
	Total Volume		0.5 m^3	
MEASURES (W:L:H)	Pre-Treatment		...	
	Backend		1.0 : 1.2 : 1.74 m	
OPERATIONAL MODES	Closed Water Loop System		Optional	
	Energy Recovery		No	
	Nutrient Recovery		No	
	Irrigation Water Recovery		Optional	
OPERATIONAL LIMITATIONS	Ambient Temperature		-5 to 40°C	
	Peak Time Usage		4 hours	
	Downtime		≤ 60 days	
	Max. Organic Load (COD)		≤ 0.3 kg_{BOD}/d	
	Max. Organic Load (BOD)		≤ 1.2 kg_{COD}/d	
CONTROL	System Control		Automated from start-up to running.	
	Remote Monitoring		Yes	
POWER	Connection		220 V ±10% / 50~60 Hz	
	Solar Supply		Optional	
	Outage		System will pause and resume based on parameters when power returns.	
			Or switch to solar power if applicable.	
POWER CONSUMPTION	Normal Operation		~ 2.5 kWh/d	~ 1.2 kWh/d
	Non-Usage Mode		~ 0.4 kWh/d	
TREATMENT PERFORMANCE	BOD Removal		≥ 95%	
	COD Removal		≥ 95%	
	TSS Removal		≥ 95%	
	TN Removal		≥ 70%	
	TP Removal		≥ 70%	
	E.Coli Removal		≥ 99.99%	

(1) It refers to Blackwater and/or Greywater pre-treated by septic tank. (2) Assuming 20L/user/day. (3) Assuming 5L/user/day.

RT Models Overview 6/6

b-HRT (ECR)

b-HRT (UV)

INSTALLATION & COMMISSIONING	**Duration**	7 days with site preparation.
	Structure	...
		Above ground: backend unit.
	Site Preparation	Site clearance and construction of concrete foundation.
		Excavation and installation of anaerobic settling tanks.
		If applicable, connecting to electricity and water supply.
	Scalable	Yes, they are modular and pre-fabricated units which can be installed in parallel.
	Movable	Yes
	Transportation / Placement	Truck and crane are required.
	Start Up Time	14 days
	Start Up Requirements	0.5 m^3 of non-potable water needs to be loaded into the treatment system.
		300 g of salt needs to be added to the system, to reach a chloride ion concentration of 10mmol/L.
OPERATION & MAINTENANCE	**Monthly**	Trained Household Member: Inspection and removal of sundries in the collection tank, ~ 15 minutes.
	4-Months Interval	Trained Technician: Inspection of the system, including pipelines, fans, pump valves, control cabinets, etc., ~ 30 minutes.
	6 to 12-Months Interval	Desludging of the main treatment into via gravity discharge into septic tank, ~ 15 minutes.
	12-Months Interval	Trained Household Member: Replacing the activated carbon media, ~ 30 minutes.
	≥ 36-Months intervals	Contractor: Desludging of the septic tank.
	≥ 5-years intervals	Trained Household Member: Replacement of electrodes, ~ 60 minutes.
	Recommended Parts on Site	Level gauge.
	Consumables	5 kg/year of activated carbon.
		Electrodes
		2 x UV lamps/year.

REINVENTED TOILET

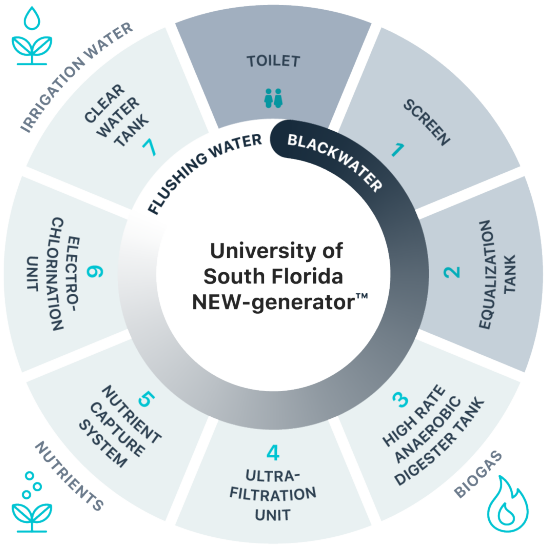
University of South Florida NEWgenerator™

The NEWgenerator™ (Nutrient, Energy, & Water) is a compact, modular, pre-fabricated, off-grid blackwater treatment solution. While providing an alternative to traditional sanitation, the system recovers pathogen-free reusable water, nutrients, and energy.

Key Features

- SAFE
- CLOSE LOOP WATER SYSTEM
- IRRIGATION WATER RECOVERY
- ENERGY RECOVERY
- NUTRIENT RECOVERY
- SCALABLE
- MOVABLE

Process



1. **Removal of large materials & debris** via coarse screen.
2. **Mitigation of flow rate and load variations** via equalization tank.
3. **Reduction of organic pollutants** via anaerobic digestion.
4. **Removal of suspended solids & pathogens** via membrane filtration.
5. **Removal and capture of nutrients such as ammonia and phosphate, achieved** by ion exchange within the zeolite bed. **Removal of remaining organic pollutants** via adsorption by granular activated carbon.
6. **Elimination of remaining pathogens** via electrochemical chlorination.
7. **Storage of treated water** avaliable for the next flush.

Step is part of the solution.
Step is required and available as an option.
Step is not part of the solution.

Environmental Context

SUITABLE FOR
- ✓ Water Scarce Areas
- ✓ Rocky Ground
- ✓ Flood Prone Areas
- ✓ High Groundwater Tables

AMBIENT TEMPERATURE RANGE
5 to 50°C

Scale / Users

SUITABLE FOR
- ✓ Community Scale
- ✓ Public Scale
- ✓ Wipers & Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L
- ✓ Retrofitting

Statistics

3 active Projects already use USF NEWgenerator™ serving 686 Beneficiaries in 1 Country, and counting.*

*Based on self-reported data provided by the relevant supplier(s) as of June 2024.

Application Scope

✓ **Community Toilets**
Refugee camps, slums or informal settlements.

✓ **Multiple Households**
Groups of houses or other buildings.

✓ **Public and private facilities**
Educational, healthcare, and institutional facilities.

✓ **Public Toilets**
At recreational or religious sites, and transportation hubs.

✓ **Multi-story Buildings**
Multipurpose facilities.

Expected Effluent Quality

	This RT Solution	ISO 30500 Standards RUU*	UUU**
pH	7.5 ± 0.8	6 – 9	
BOD	–		
COD	117.7 ± 90.8 mg/L	≤ 150 mg/L	≤ 50 mg/L
TSS	10.3 ± 10.2 mg/L	≤ 30 mg/L	≤ 10 mg/L
TN	68.9 ± 90.1 mg/L		
TP	41.1 ± 19.3 mg/L		
E.Coli	0 CFU/L	≤ 100 CFU/L	
MS2 Coliphage (Virus)	–	≤ 10 PFU/L	
Helminths	0 Eggs/L	≤ 1 Egg/L	
Protozoa	–	≤ 1 CFU/L	

*RUU: Restricted Urban Uses; **UUU: Unrestricted Urban Uses

Expected Removal Rates

	This RT Solution	ISO 30500 Standards Minimum Load Reduction
BOD	–	
COD	94%	
TSS	99%	
TN	82%	≥ 70% Reduction
TP	36%	≥ 80% Reduction
E.Coli	≥ 99.5%	

Commercial Offering

WEC Water Ltd.

WEBSITE
wecprojects.com

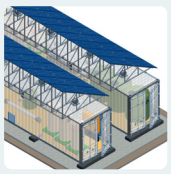
EMAIL
info@wecprojects.com

PHONE
+(27) 11 745 5500

NEWgenerator™ 100

Backend Only
Blackwater, Greywater Optional
1 m³/d

NEWgenerator™ 800



Backend Only
Blackwater, Greywater Optional
8 m³/d

WEC Water Ltd.

WEC Projects is a leading EPC (Engineering, Procurement, and Construction) contractor specializing in the provision of engineered solutions in the water and wastewater treatment industry. Based in Johannesburg, South Africa, WEC Projects is active throughout the African continent.

The core focus areas include water treatment, sewage treatment, and renewable energies. The engineered solutions extend beyond conventional offerings to encompass innovation, including biogas-to-energy projects and sludge beneficiation solutions.

Company Profile

ESTABLISHED IN
2002

COMPANY SIZE
~ 50 employees

WEBSITE
wecprojects.com

EMAIL
info@wecprojects.com

PHONE
+(27) 11 745 5500

Global Presence

HEADQUARTERS
Johannesburg, South Africa.

PRODUCTION COUNTRY
South Africa.

MARKET
Primarily SADC (Southern African Development Community): Eswatini (formerly Swaziland), Lesotho, Malawi, Mozambique, Namibia, South Africa, Tanzania, Zambia & Zimbabwe. Angola, Australia, Burkina Faso, Congo (Democratic Republic of the Congo), Congo (Republic of the Congo), Cote d'Ivoire (Ivory Coast), Eritrea, Gabon, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Nigeria, Oman, and Togo.

RT Commercial Offering

Solution

University of South Florida
NEWgenerator™
LICENSE OWNER

WEC Water Ltd. has successfully implemented 3 Projects, serving 686 Beneficiaries in 1 Country, and counting.*

*Based on self-reported data provided by the supplier as of June 2024.

Production

LEAD TIME
8–10 weeks

PRODUCTION CAPACITY
8 units per week

PROJECT DELIVERY METHOD
1. Built Operate & Transfer.

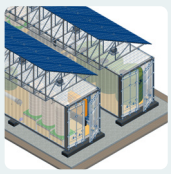
CUSTOMER SERVICES
1. Hotline
2. Operator Training

Models

NEWgenerator™ 100

Backend Only
Blackwater, Greywater Optional
1 m³/d

NEWgenerator™ 800



Backend Only
Blackwater, Greywater Optional
8 m³/d

VCard

NEWgenerator™ 100

Configuration

SOLUTION
University of South Florida NEWgenerator™

COMPONENTS
Backend Only

INPUT
Blackwater, Greywater Optional

CAPACITY
1 m^3/d

Nº OF USERS:

COMMUNITY	PUBLIC
50	200

Water

Water Scarce Areas

Up to 1 m^3/d
SAVING POTENTIAL

Power

Solar Power Supply

~ 1.1 kWh/day
CONSUMPTION

Pre-Treatment

Coarse Screen & Buffer Tank
REQUIRED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
14.4 m^2

INITIAL WATER (NON-POTABLE) LOAD
1 m^3

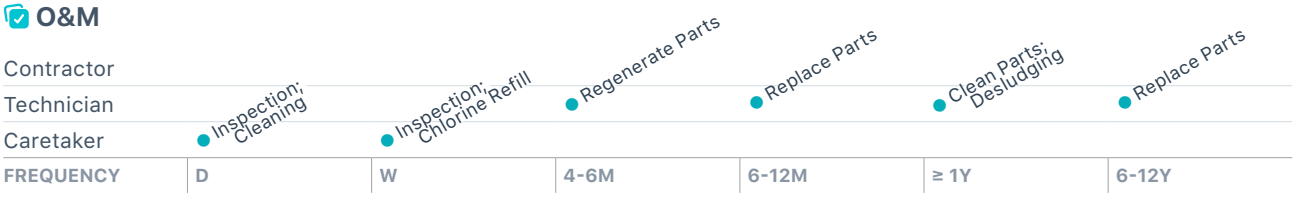
DURATION
~ 15 days, with site preparation.

STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M



Commercial

SUPPLIER
WEC Water Ltd.

PROJECT DELIVERY METHOD
1. Built Operate Transfer.

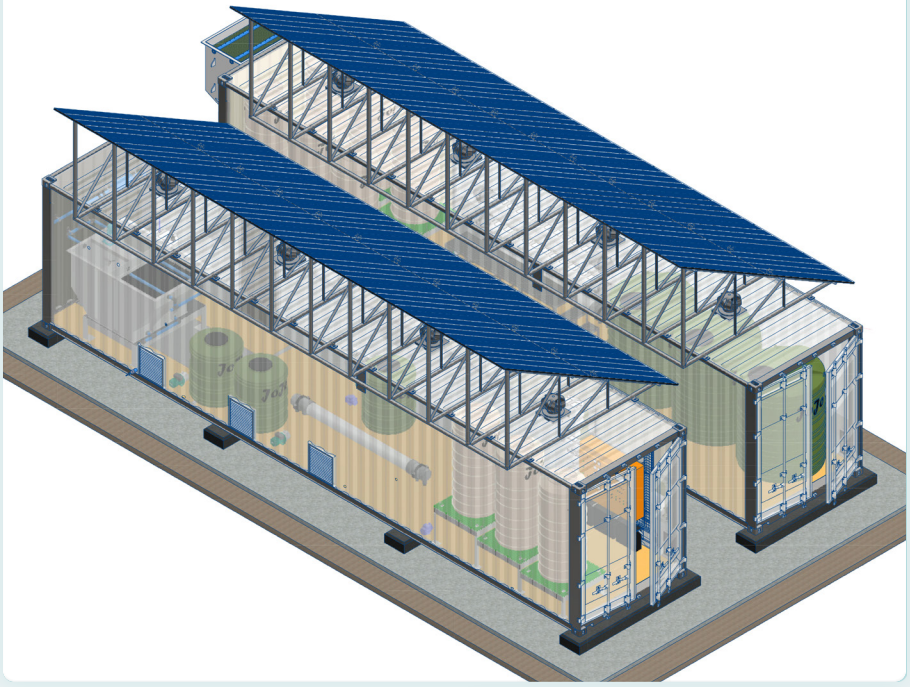
CUSTOMER SERVICES
1. Hotline
2. Operator Training

V-CARD SUPPLIER

PRODUCT LIFE
Up to 20 years.

WARRANTY
1 year: All parts.

NEWgenerator™ 800



Configuration

SOLUTION
University of South Florida NEWgenerator™

COMPONENTS
Backend Only

INPUT
Blackwater, Greywater Optional

CAPACITY
8 m^3/d

Nº OF USERS:

COMMUNITY	PUBLIC
400	1,600

Water

Water Scarce Areas

Up to 8 m^3/d
SAVING POTENTIAL

Power

Solar Power Supply

~ 8.8 kWh/day
CONSUMPTION

Pre-Treatment

Coarse Screen & Buffer Tank
REQUIRED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
55 m^2

INITIAL WATER (NON-POTABLE) LOAD
8 m^3

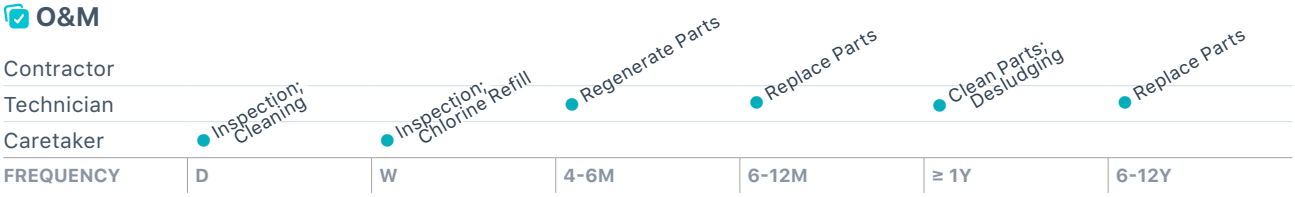
DURATION
~ 15 days, with site preparation.

STRUCTURE
- Below ground: pre-treatment units.
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M



Commercial

SUPPLIER
WEC Water Ltd.

PROJECT DELIVERY METHOD
1. Built Operate Transfer.

CUSTOMER SERVICES
1. Hotline
2. Operator Training

V-CARD SUPPLIER

PRODUCT LIFE
Up to 20 years.

WARRANTY
1 year: All parts.

RT Models Overview 1/2

NEWgenerator™ 100

NEWgenerator™ 800

OVERVIEW	Components		Backend Only	
	Treatment Capacity		1 m^3/d	8 m^3/d
	Input		Blackwater [1], Greywater Optional	
	Nº of Users	Community [2]	50	400
		Public [3]	200	1,600
	Footprint Area		14.4 m^2	55 m^2
ISO 30500	Effluent Conformity		...	
	Certification		Not Considered	
PRE-TREATMENT	Requires		Coarse Screen & Buffer Tank[4]	
	Total Volume		1 m^3	8 m^3
DIMENSIONS	Backend Unit (W:L:H)		2.4 : 6.0 : 2.4 m	4.8 : 12.0 : 2.4 m
	Nº of Units		1	2
OPERATIONAL MODES	Closed Water Loop System		Yes	
	Energy Recovery		Optional	
	Nutrient Recovery		Yes	
	Irrigation Water Recovery		Optional	
OPERATIONAL LIMITATIONS	Ambient Temperature		5 to 45°C	
	Peak Time Usage		...	
	Downtime		≤ 7 days	
	Max. Organic Load (COD)		...	...
	Max. Organic Load (BOD)		≤ 6 kg_{COD}/d	
CONTROL	System Control		Automated from start-up to running.	
	Remote Monitoring		Yes	
POWER	Connection		220 V, 20 A, single-phase + neutral + earth.	
	Solar Supply		Optional	
	Outage		System will pause and resume based on parameters when power returns. Or switch to solar if applicable.	
POWER CONSUMPTION	Normal Operation		~ 1.1 kWh/d	~ 8.8 kWh/d
	Non-Usage / Holiday Mode		~0.5 kWh/d	
TREATMENT PERFORMANCE	BOD Removal		...	
	COD Removal		94%	
	TSS Removal		99%	
	TN Removal		82%	
	TP Removal		36%	
	E.Coli Removal		≥ 99.5%	

(1) Treats handwashing water. (2) Assuming 20L/user/day. (3) Assuming 5L/user/day. (4) Available as Optional.

RT Models Overview 2/2

NEWgenerator™ 100

NEWgenerator™ 800

INSTALLATION & COMMISSIONING	Duration	~ 15 days including site preparation.	
		~ 5 days without site preparation.	
	Structure	Below ground: pre-treatment units.	
		Above ground: backend unit.	
	Site Preparation	Site clearance and construction of concrete foundation.	
		Excavation and installation of equalization tanks.	
	Scalable	Yes, they are modular and pre-fabricated units which can be installed in parallel.	
	Movable	Yes, except for equalization tank.	
	Transportation / Placement	Truck and crane are required.	
	Start Up Time	60 days	
	Start Up Requirements	1 m^3	8 m^3
		of non-potable water needs to be loaded into the treatment system.	
OPERATION & MAINTENANCE	Daily	Trained Caretaker: Inspection of product water for free chlorine and the screen, including cleaning if required, ~ 10 minutes.	
	Weekly	Trained Caretaker: Routine inspection and troubleshooting, refilling chlorine disinfectant if required, ~ 15 minutes.	
	4 to 6-Months Interval	Trained Technician: Regeneration of media beds, ~ 6 hours.	
	6 to 12-Months Interval	Trained Technician: Replacing activated carbon media, ~ 3 hours.	
	≥ 12-Month Interval	Trained Technician: Onsite cleaning of the ultrafiltration membrane, ~ 4 hours.	
		Trained Technician: Desludging of treatment unit into equalization tank, ~ 15 minutes.	
	6 to 12-Year Intervals	Trained Technician: Replacing the ultrafiltration membrane, ~ 2 hours.	
	Recommended Parts on Site	Replacement pump	
		Level switches	
		Fittings	
		Electrical ancillaries	
		Thermo-polypore fixed film media for ABR.	
	Consumables	Ultrafiltration membrane.	
		~ 2 kg/year of NaOH.	
		~ 6 m^3/year	~ 8 m^3/year
		of non-potable water, following membrane cleaning.	
		~ 5 L/year	~ 40 L/year
		of NaOCl for membrane cleaning.	
		~ 15 kg/year	~ 120 kg/year
		of NaCl for regeneration of zeolite – ammonia.	
		~ 20 kg/year	~ 160 kg/year
		of $CaCl_2$ for regeneration of zeolite – phosphorus.	
		~ 100 kg/year	~ 400 kg/year
		of activated carbon.	

REINVENTED TOILET

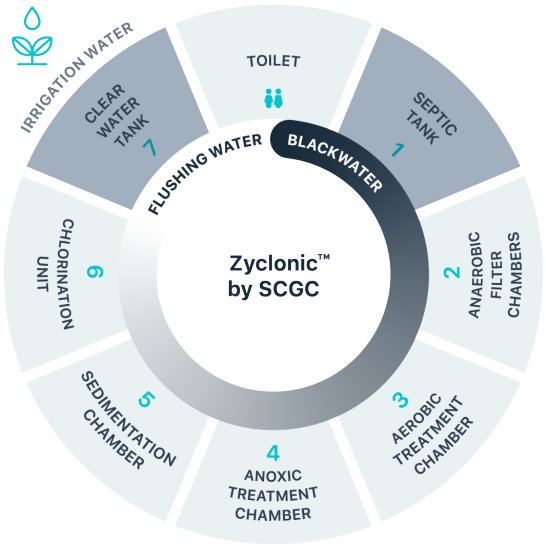
Zyclonic™ by SCGC

Zyclonic™ offers an off-grid, prefabricated wastewater treatment system, that transforms pre-treated black/greywater into pathogen-free effluent. It integrates into new or existing infrastructure, supplying water for flushing and irrigation.

Key Features

- SAFE
- CLOSE LOOP WATER SYSTEM
- IRRIGATION WATER RECOVERY
- SCALABLE
- MOVABLE

Process



Step is part of the solution.

Step is not part of the solution.

1. **Reduction of organic pollutants** via anaerobic digestion, as well mitigation of flow rate and load variations.
2. **Further reduction of organic pollutants** via aerobic digestion.
3. **Removal of organic pollutants, as well as partial removal of pathogens and nitrogen** via aerobic treatment.
4. **Further removal of nutrients, especially nitrogen,** via anoxic (environment devoid of oxygen) treatment.
5. **Facilitate the separation and removal of settled solids** via gravity.
6. **Elimination of remaining pathogens** via chemical chlorination.
7. **Storage of treated water** avaliable for the next flush.

Environmental Context

SUITABLE FOR
- ✓ Water Scarce Areas
- ✓ Rocky Ground
- ✓ Flood Prone Areas
- ✓ High Groundwater Tables

AMBIENT TEMPERATURE RANGE
10 to 45°C

Scale / Users

SUITABLE FOR
- ✓ Community Scale
- ✓ Public Scale
- ✓ Wipers & Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L
- ✓ Retrofitting

Statistics

19 active Projects already use Zyclonic™ by SCGC serving 4,407 Beneficiaries in 7 Countries, and counting.*

*Based on self-reported data provided by the relevant supplier(s) as of June 2024.

Application Scope

- **Community Toilets** Refugee camps, slums or informal settlements.
- **Individual Households** Single-family dwellings.
- **Multiple Households** Groups of houses or other buildings.

- **Public and private facilities** Educational, healthcare, and institutional facilities.

- **Public Toilets** At recreational or religious sites, and transportation hubs.

- **Multi-story Buildings** Multipurpose facilities.

Expected Effluent Quality

	This RT Solution	ISO 30500 Standards RUU*	UUU**
pH	7 – 8	6 – 9	
BOD	≤ 10 mg/L		
COD	≤ 125 mg/L	≤ 150 mg/L	≤ 50 mg/L
TSS	≤ 15 mg/L	≤ 30 mg/L	≤ 10 mg/L
TN	≤ 65 mg/L		
TP	≤ 5 mg/L		
E.Coli	≤ 1 CFU/L	≤ 100 CFU/L	
MS2 Coliphage (Virus)	≤ 1 PFU/L	≤ 10 PFU/L	
Helminths	≤ 1 Egg/L	≤ 1 Egg/L	
Protozoa	≤ 1,500 CFU/L	≤ 1 CFU/L	

*RUU: Restricted Urban Uses; **UUU: Unrestricted Urban Uses

Expected Removal Rates

	This RT Solution	ISO 30500 Standards Minimum Load Reduction
BOD	≤ 95%	
COD	≤ 95%	
TSS	≤ 98%	
TN	≤ 82%	≥ 70% Reduction
TP	≤ 85%	≥ 80% Reduction
E.Coli	≤ 99.99%	

Commercial Offering

Prana Water & Sanitation

WEBSITE
prana-ws.co.za

EMAIL
info@prana-ws.co.za

PHONE
+(27) 87 114 1820

REPRESENTATIVE
Letsatsi Lesufi

Aquonic 1000 HDPE

Backend Only
Septic Effluent
1.8 m³/d

SCG Chemicals Public Company Ltd. (SCGC)

WEBSITE
scgchemicals.com

EMAIL
zyclonic@scg.com

REPRESENTATIVE
Mr. Attawut Kumkrong

Aquonic 1000 FGL

Backend Only
Septic Effluent
1.8 m³/d

Prana Water & Sanitation

Prana is a water and sanitation solutions provider, offering comprehensive design, installation, and commissioning services. Their holistic and integrated solutions address the unique water and sanitation challenges across Sub-Saharan Africa.

In addition, Prana offers operational, maintenance, and training services to ensure the sustained success and efficiency of the implemented systems.

Company Profile

ESTABLISHED IN
2019

COMPANY SIZE
15 employees

WEBSITE
prana-ws.co.za

EMAIL
info@prana-ws.co.za

PHONE
+(27) 87 114 1820

REPRESENTATIVE
Letsatsi Lesufi

Global Presence

HEADQUARTERS
Midrand, Johannesburg, South Africa.

PRODUCTION COUNTRY
South Africa.

MARKET
Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe.

RT Commercial Offering

Solution

Zyclonic™ by SCGC
TOLLING AGREEMENT

Prana Water & Sanitation has successfully implemented 9 Projects, serving 487 Beneficiaries in 2 Countries, and counting.*

*Based on self-reported data provided by the supplier as of June 2024.

Production

LEAD TIME
14 days

PRODUCTION CAPACITY
15 units per month

PROJECT DELIVERY METHOD
1. Built and Transfer.
2. Built, Operate and Transfer.

CUSTOMER SERVICES
1. 1-year warranty.
2. Maintenance and Service packages.

Models

Aquonic 1000 HDPE

Backend Only
Septic Effluent
1.8 m^3/d

VCard

Aquonic 1000 HDPE

ISO 30500 Certification
UNDER PREPARATION

Configuration

SOLUTION
Zyclonic™ by SCGC

COMPONENTS
Backend Only

INPUT
Septic Effluent

CAPACITY
1.8 m³/d

Nº OF USERS:
COMMUNITY: 90
PUBLIC: 360

Water

Water Scarce Areas

Up to 1.8 m³/d
SAVING POTENTIAL

Power

Solar Power Supply

6 kWh/day
CONSUMPTION

Pre-Treatment

1 Septic Tank (3 Chambers)
REQUIRED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
3 m²

INITIAL WATER (NON-POTABLE) LOAD
2.6 m³

DURATION
~ 10 days, without site preparation.

STRUCTURE
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M

	2M	12M	≥ 48M
Contractor			Desludging, Replace Parts
Technician		Clean Parts	Replace Parts
Caretaker	Chlorination		
FREQUENCY	2M	12M	≥ 48M

Commercial

SUPPLIER
Prana Water & Sanitation

PROJECT DELIVERY METHOD
1. Purchase orders.
2. Tolling agreement.
3. Build and transfer.

CUSTOMER SERVICES
1. Trainings for operators and technicians.
2. Service packages.
3. Local partner network.

V-CARD SUPPLIER

PRODUCT LIFE
Up to 10 years.

WARRANTY
1 Year: All parts.

RT Model Overview 1/2

Aquonic 1000 HDPE

OVERVIEW	Components		Backend Only
	Treatment Capacity		1.8 m^3/d
	Input		Septic Effluent
	Nº of Users	Community (1)	90
		Public (2)	360
	Footprint Area		3 m^2
ISO 30500	Effluent Conformity		...
	Certification		Under Preparation
PRE-TREATMENT	Requires		Septic Tank
	Total Volume		4.5 m^3
MEASURES	Height		1.5 m
	Outer Diameter		1.95 m
OPERATIONAL MODES	Closed Water Loop System		Optional
	Energy Recovery		No
	Nutrient Recovery		No
	Irrigation Water Recovery		Optional
OPERATIONAL LIMITATIONS	Ambient Temperature		10 to 45ºC
	Peak Time Usage		...
	Downtime		≤ 12 hours/day
	Max. Organic Load (COD)		≤ 0.36 kg_{BOD}/d
	Max. Organic Load (BOD)		≤ 0.45 kg_{COD}/d
CONTROL	System Control		Automated from start-up to running.
	Remote Monitoring		Yes
POWER	Connection		220V AC / 40 A, Single-Phase.
	Solar Supply		Optional
	Outage		System will pause and resume based on parameters when power returns.
			Or switch to solar if applicable.
POWER CONSUMPTION	Normal Operation		6 kWh/d
TREATMENT PERFORMANCE	BOD Removal		≤ 95%
	COD Removal		≤ 95%
	TSS Removal		≤ 98%
	TN Removal		≤ 82%
	TP Removal		≤ 85%
	E.Coli Removal		≤ 99.99%

(1) Assuming 20L/user/day. (2) Assuming 5L/user/day.

RT Model Overview 2/2

Aquonic 1000 HDPE

INSTALLATION & COMMISSIONING	**Duration**	~ 10 days without site preparation, for above the ground installation.
		~ 18 days for below ground installations, depending on the site conditions (soft vs rocky ground)
	Structure	Above or below ground: backend unit.
	Site Preparation	Site clearance and construction of concrete foundation.
		For underground installation of the Aquonic system, a shelter house is essential to safeguard against tank flooding during heavy rainfall.
		If required, civil work related to the septic tank installation.
	Scalable	Yes, they are modular and pre-fabricated units which can be installed in parallel.
	Movable	Yes, if installed above the ground.
	Transportation / Placement	Pickup or Truck is required.
	Start Up Time	~ 2 weeks at ~ 20°C
		~ 4 weeks at ~ 10°C.
	Start Up Requirements	~ 2.6 m^3 of non-potable water needs to be loaded into the treatment system.
OPERATION & MAINTENANCE	**2-Months Interval**	Trained Technician: Addition of chlorination tab, ~ 5 minutes.
	12-Months Interval	Trained Technician: Cleaning of filter and bio media by flushing with a high-pressure hose, ~ 3 hours.
	≥ 48 Months Interval	Trained Technician: If required, replacement of bio-media, ~ 3 hours.
		Contractor: Desludging of a septic tank.
	Recommended Parts on Site	2 x DAB Verty Nova 200M Pumps: 0.2kW, 280V (Submersible Pump)
		1 x Orbis Data Log 2 (Digital Timer)
		1 x 20A 2 Pole MCB (Miniature Circuit Breaker)
		1 x 10A 1 Pole MCB (Miniature Circuit Breaker)
	Consumables	200 to 250 kg of bio-media top-up every 4 years.
	Additives	6 tablets/year of slow released calcium hypochlorite, ca 20 x 80 mm.

SCG Chemicals Public Company Ltd. (SCGC)

The main business is the production of plastic resins or polymers molded into products used in our everyday lives, ranging from food packaging, automotive parts, medical equipment, electrical appliances to infrastructures, such as pressure-resistant pipes and telecommunication cables, among others.

Company Profile

ESTABLISHED IN
1913

COMPANY SIZE
54,000 employees

WEBSITE
scgchemicals.com

EMAIL
zyclonic@scg.com

REPRESENTATIVE
Mr. Attawut Kumkrong

Global Presence

HEADQUARTERS
Bangkok, Thailand

PRODUCTION COUNTRY
Thailand

DISTRIBUTION NETWORK
International

MARKET
Global

RT Commercial Offering

Solution

Zyclonic™ by SCGC

PATENT OWNER.

SCG Chemicals Public Company Ltd. (SCGC) has successfully implemented 19 Projects, serving 4,407 Beneficiaries in 7 Countries, and counting.*

*Based on self-reported data provided by the supplier as of June 2024.

Production

LEAD TIME

2 weeks

PRODUCTION CAPACITY

Local manufacturers in each global market.

PROJECT DELIVERY METHOD

1. Purchase orders.
2. Tolling agreement.
3. Build and transfer.

CUSTOMER SERVICES

1. Trainings for operators and technicians.
2. Service packages.
3. Local partner network.

Models

Aquonic 1000 FGL

Backend Only
Septic Effluent
1.8 m^3/d

VCard

Aquonic 1000 FGL

ISO 30500 Certification
UNDER PREPARATION

Configuration

SOLUTION
Zyclonic™ by SCGC

COMPONENTS
Backend Only

INPUT
Septic Effluent

CAPACITY
1.8 m^3/d

Nº OF USERS:
COMMUNITY: 90
PUBLIC: 360

Water

Water Scarce Areas

Up to 1.8 m^3/d
SAVING POTENTIAL

Power

Solar Power Supply

4 kWh/day
CONSUMPTION

Pre-Treatment

1 Septic Tank (3 Chambers)
REQUIRED

Installation

Rocky Ground | Flood Prone Area | High Groundwater Tables

FOOTPRINT AREA
4 m^2

INITIAL WATER (NON-POTABLE) LOAD
1.5 m^3

DURATION
~ 10 days without site preparation.

STRUCTURE
- Above ground: backend unit.

Scale / Users

SUITABLE FOR
- ✓ Community
- ✓ Public
- ✓ Wipers
- ✓ Washers
- ✓ Low Flush ≤ 3 L
- ✓ High Flush > 3 L

O&M

	4-6M	6M	12M	≥ 48M
Contractor				Desludging, Replace Parts
Technician		General Inspection; Servicing	Clean Parts	Replace Parts
Caretaker	Chlorination			
FREQUENCY	4-6M	6M	12M	≥ 48M

Commercial

SUPPLIER
SCG Chemicals Public Company Ltd. (SCGC)

PROJECT DELIVERY METHOD
1. Purchase orders.
2. Tolling agreement.
3. Build and transfer.

CUSTOMER SERVICES
1. Trainings for operators and technicians.
2. Service packages.
3. Local partner network.

V-CARD SUPPLIER

PRODUCT LIFE
Up to 10 years.

WARRANTY
- 1 Year: All parts.

RT Model Overview 1/2

Aquonic 1000 FGL

OVERVIEW	Components		Backend Only
	Treatment Capacity		1.8 m^3/d
	Input		Septic Effluent
	N° of Users	Community (1)	90
		Public (2)	360
	Footprint Area		4 m^2
ISO 30500	Effluent Conformity		...
	Certification		Under Preparation
PRE-TREATMENT	Requires		1 x Septic Tank (3 Chambers)
	Total Volume		3 m^3
MEASURES	W:H		2.3 : 1.1 m
	Diameter		2 m
OPERATIONAL MODES	Closed Water Loop System		Optional
	Energy Recovery		No
	Nutrient Recovery		No
	Irrigation Water Recovery		Optional
OPERATIONAL LIMITATIONS	Ambient Temperature		10 to 45°C
	Peak Time Usage		...
	Downtime		≤ 2 weeks
	Max. Organic Load (COD)		≤ 0.3 kg_{BOD}/d
	Max. Organic Load (BOD)		≤ 0.375 kg_{COD}/d
CONTROL	System Control		Automated from start-up to running.
	Remote Monitoring		Yes
POWER	Connection		220V AC or 24 V DC / 40 A, single-phase.
	Solar Supply		Optional
	Outage		System will pause and resume based on parameters when power returns.
			Or switch to solar if applicable.
POWER CONSUMPTION	Normal Operation		4 kWh/d
TREATMENT PERFORMANCE	BOD Removal		≤ 95%
	COD Removal		≤ 95%
	TSS Removal		≤ 98%
	TN Removal		≤ 82%
	TP Removal		≤ 85%
	E.Coli Removal		≤ 99.99%

(1) Assuming 20L/user/day. (2) Assuming 5L/user/day.

RT Model Overview 2/2

Aquonic 1000 FGL

INSTALLATION & COMMISSIONING	**Duration**	~ 10 days without site preparation, for above the ground installation.
		~ 18 days for below ground installations, depending on the site conditions (soft vs rocky ground)
	Structure	Above or below ground: backend unit.
	Site Preparation	Site clearance and construction of concrete foundation.
		For underground installation of the Aquonic system, a shelter house is essential to safeguard against tank flooding during heavy rainfall.
		If required, civil work related to the septic tank installation.
	Scalable	Yes, they are modular and pre-fabricated units which can be installed in parallel.
	Movable	Yes, if installed above the ground.
	Transportation / Placement	Pickup or Truck is required.
	Start Up Time	1 day
	Start Up Requirements	~ 1.5 m^3 of non-potable water needs to be loaded into the treatment system.
		10g of Microbial Inoculate, dissolved in 20L of water.
OPERATION & MAINTENANCE	**4 to 6-Month Interval**	Caretaker: Addition of chlorination tab, ~ 5 minutes.
	6-Months Interval	Trained Technician: General inspection and servicing, ~ 4 hours.
	12-Months Interval	Trained Technician: Cleaning of filter and bio media by flushing with a high-pressure hose, ~ 4 hours.
	≥ 48 Months Interval	Trained Technician: Replacement if required of bio-media, ~ 4 hours.
		Contractor: Desludging of a septic tank.
	Recommended Parts on Site	2 x Pumps: 180V Submersible Pump (1 with float switch valve)
		2 x Omron Timer
		2 x Fuse
		2 x Omron -230AC – Relay
	Consumables	200 to 250 kg of bio-media top-up once every 5 years.
	Additives	2 to 3 chlorine tablets (80mm x 20mm) per year.

Case Studies

Case Studies offer an in-depth exploration of specific projects employing various RT Solutions, offering insights into their application across diverse scenarios and their impacts.

b-CRT Fangshan

6 CLEAN WATER AND SANITATION

Demonstrating the Eco-San RT solutions while providing additional toilet capacity and improving toilet accessibility for residents and tourists

b-CRT Fangshan

Project Description

Fangshan, one of the four “satellite cities” of Beijing, is an area known for its tourist attractions, and it is a very popular tourist destination in summer. The eco-friendly public toilets have been constructed to serve neighboring residents and tourists. These toilets are designed to accommodate approximately 200 users per day and treat blackwater for reuse in flushing.

Case Overview

APPLICATION CASE
Public Toilet

AREA
Peri-Urban

CONTEXT
Public

CATEGORY
Tourism

200 Daily Beneficiaries since February 2022

Project Profile

COUNTRY
China

LOCATION
Fangshan, Beijing

PROJECT TYPE
Demonstration

PROJECT OWNER
Planning and Design Institute of the Ministry of Agriculture and Rural Development.

PROJECT SPONSOR & FUNDING
BMGF

Baseline Sanitation

The parking lot was without a public toilet, with the nearest one being approximately 500 meters away.

b-CRT Fangshan

Configuration

COMPONENTS
Frontend + Backend

TREATMENT CAPACITY
1 m^3/d

Nº OF USERS / DAY
200

INPUT
Blackwater, including handwashing water.

Nº OF UNITS
1

FOOTPRINT AREA
30 m^2

EFFLUENT USAGE
Recirculation for toilet flushing

POWER CONSUMPTION
12 kWh/d

Case Frontend

Nº OF UNISEX TOILETS
2

Nº OF URINALS
3

AVERAGE FLUSH CAPACITY
3 to 6 L/flush

Nº OF HANDWASH BASINS
3

DISPOSAL GREYWATER FROM HANDWASH
Co-treated by the backend unit

Solution

Eco-san Solution

Supplier

Eco–san

Yixing Eco-Sanitary Manufacture Co., Ltd.

Site Conditions

CLIMATE
Humid continental climate, bordering on a cold semi-arid climate.

AMBIENT TEMPERATURE
-5 to 40°C

TOPOGRAPHY
Hilly

GROUND CONDITION
Sandy soil

GROUNDWATER TABLE
2 to 2.5 m

WATER SUPPLY
Yes, for handwashing supplied by municipal water network.

SEWAGE CONNECTION
No

POWER SUPPLY
Solar & Grid

Model

b-CRT 40

O&M

PROVIDERS
- Caretaker
- Yixing Eco-Sanitary Manufacture Co., Ltd.

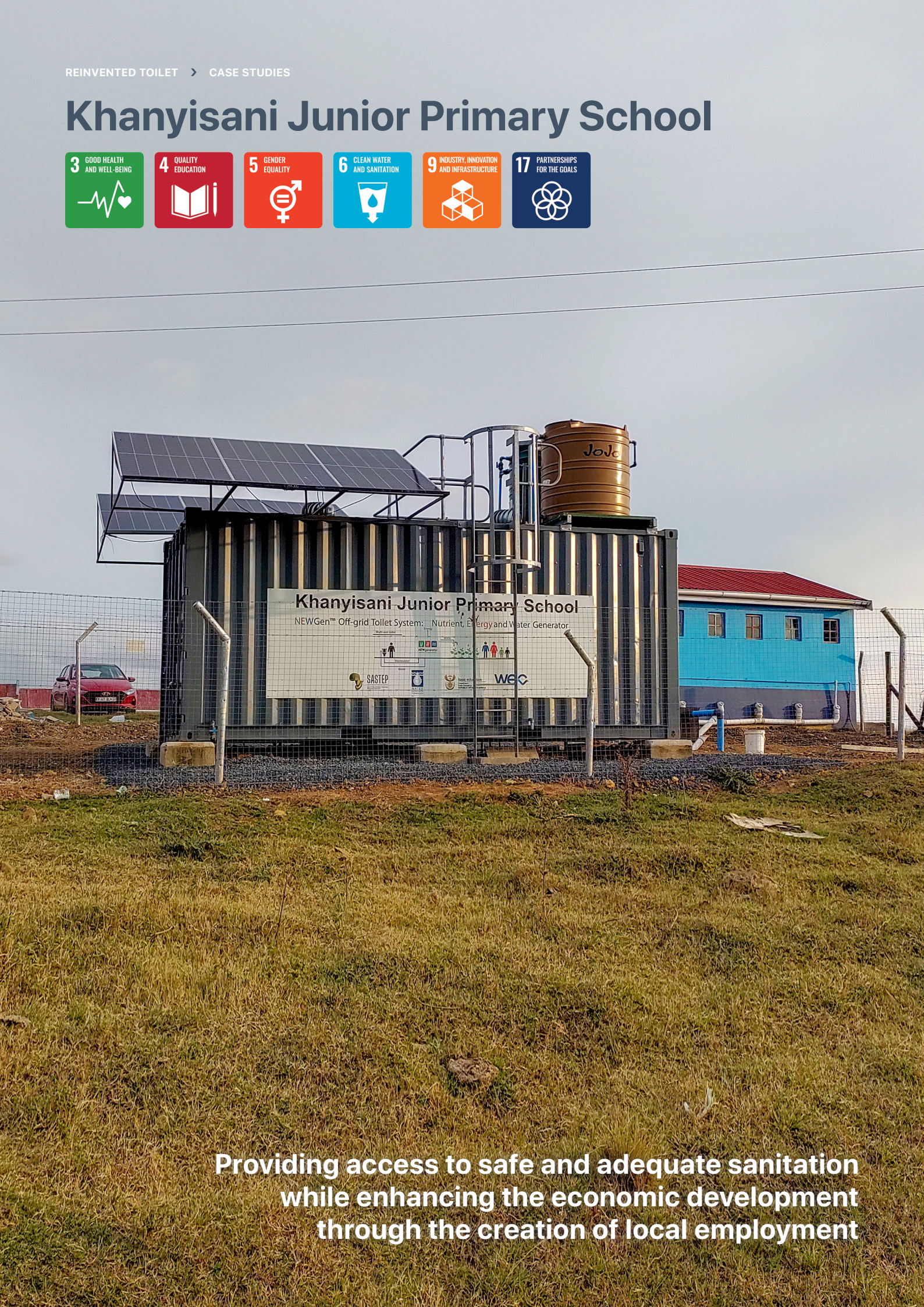
SERVICE FRAMEWORK
- ✓ The village committee hired a caretaker for cleaning activities.
- ✓ Yixing Eco-Sanitary Manufacture Co., Ltd. is responsible for maintenance of the unit.

Resource Recovery

More than 1,000 L/d
WATER SAVING

Khanyisani Junior Primary School

3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
17 PARTNERSHIPS FOR THE GOALS



Providing access to safe and adequate sanitation while enhancing the economic development through the creation of local employment

Khanyisani Junior Primary School

Project Description

The NEWgenerator™ 100 system was set up at Khanyisani Junior Primary School in Bizana, Eastern Cape, SA in a rural setting as a solution to address the two main issues faced: (1) intermittent water supply (sole reliance on rainwater, scarcity of water in the area, lack of a permanent water supply); and (2) inadequate sanitation (lack of disinfection, spread of disease, lower student attendance rates). The project was designed, and built by WEC Projects in South Africa.

Case Overview

APPLICATION CASE
School Toilet

AREA
Rural

CONTEXT
Public

CATEGORY
Educational

192 Daily Beneficiaries since January 2023

Project Profile

COUNTRY
South Africa

LOCATION
Bizana, Eastern Cape Province

PROJECT TYPE
Commercial

PROJECT OWNER
Department of Basic Education

PROJECT SPONSOR
Water Research Commission (WRC) – South African Sanitation Technology Enterprise Programme (SASTEP)

FUNDING
BMGF

Baseline Sanitation

Inadequate sanitation facilities presented a pressing concern, especially evident during the dry season when pit toilets were in use. This arrangement lacked proper disinfection measures and posed a serious risk of disease transmission, contributing to a decline in student attendance rates. When rainwater was available for flushing, the effluent from the toilets was directed to a septic tank for partial treatment and disposal.

Impact

Health

- ✓ Before the project, the situation concerning sanitary facilities was extremely poor. Pit toilets were being used during the dry season. These pit latrines were demolished as part of the project and the existing toilet block was upgraded.
- ✓ With the NEWgenerator system, the effluent from the toilets which was previously routed to a septic tank for partial treatment and disposal, is now treated using a combination of anaerobic digestion, ultra-filtration, adsorption, and chlorination and finally recirculated to be used for toilet flushing. This has greatly reduced the risk of disease and provides a stable water supply in a water-scarce environment.

Resource Recovery

More than 1,000 L/d
WATER SAVING

Social

- ✓ The implementation of the project has led to job creation, education on safe sanitation, and community involvement. The quality of life concerning sanitation of the students and staff has greatly improved.

Environmental

- ✓ As the NEWgenerator system treats the effluent meeting most of ISO 30500 discharge standards with a reduction of pathogens, environmental risks are substantially decreased in comparison to the previous scenario of the effluent from the toilets being partially treated in a septic tank and disposed of which posed both health and environmental risks. The school's fresh water consumption is also significantly reduced due to the re-circulation of the treated water, which is fed back to flush the toilets.

Economical

- ✓ To enhance the quality of life by offering an alternative to pit latrines, the high investment required for sewer and water connections could be bypassed, along with avoiding the water expenses to be incurred from toilet flushing.

Khanyisani Junior Primary School

Configuration

COMPONENTS
Backend Only

TREATMENT CAPACITY
1 m^3/d

Nº OF USERS / DAY
192

INPUT
Blackwater

Nº OF UNITS
1

FOOTPRINT AREA
14.4 m^2

EFFLUENT USAGE
Recirculation for toilet flushing.

POWER CONSUMPTION
1.12 kWh/d

Case Frontend

Nº OF TOILETS: FEMALE
6

MALE
6

Nº OF URINALS: FEMALE
2

MALE
2

AVERAGE FLUSH CAPACITY
4 to 6 L/flush

Nº OF HANDWASH BASINS
7

DISPOSAL GREYWATER FROM HANDWASH
Treated by NEWgenerator

Solution

University of South Florida NEWgenerator™

Supplier

WEC Water Ltd.

Site Conditions

CLIMATE
Temperate

AMBIENT TEMPERATURE
15 to 35°C

TOPOGRAPHY
Hilly-terrain

GROUND CONDITION
Loamy soil

GROUNDWATER TABLE
Low

WATER SUPPLY
Rainwater capture

SEWAGE CONNECTION
None

POWER SUPPLY
Solar

Model

NEWgenerator™ 100

O&M

PROVIDER
WEC Water Ltd.

SERVICE FRAMEWORK
- ✓ 18-month contract with SASTEP
- ✓ WEC Projects Ltd. appointed a technician who visits the plant every month to carry out O&M tasks while also collects and delivers samples to the laboratory.
- ✓ The technician is also available remotely to support the caretaker or janitor helping with troubleshooting in case of any problem.

Costs

PROJECT COST	94,800 USD*
MONITORING, SERVICING & MAINTENANCE Includes remote monitoring and support, janitor salary, toilet paper, soap, toilet cleaning material, sampling, routine maintenance, media replacement, membrane cleaning, and ultimate membrane replacement, travel and time cost for technicians.	1,500 USD/month

*Value as per 2024; VAT not included.

Project Video

Tsholetsega Primary School

Addressing water scarcity challenges while meeting the government's commitment to deliver dignified and safe sanitation facilities

Tsholetsega Primary School

Project Description

Addressing sanitation challenges at sites such as Tsholetsega Primary School, benefiting over 1,300 learners. Through the restoration of collapsed ablution blocks and seamless integration with existing infrastructure, the project has earned widespread acceptance and ownership from stakeholders, representing a substantial advancement towards delivering dignified sanitation solutions.

Case Overview

APPLICATION CASE
School Toilet

AREA
Peri-Urban

CONTEXT
Public

CATEGORY
Educational

1,335 Daily Beneficiaries since August 2020

Project Profile

COUNTRY
South Africa

LOCATION
Mogale City, Johannesburg

PROJECT TYPE
Demonstration

PROJECT OWNER
Department of Basic Education

PROJECT SPONSOR
Water Research Commission (WRC)
Primary Education Board

FUNDING
South African Sanitation Technology Enterprise Programme (SASTEP)

Baseline Sanitation

Two out of the three available ablution facilities suffered a collapse as a result of a connection failure to the municipal sewer system. This led to the frequent escape of raw sewage through inspection covers, causing the school quadrangle to be flooded and necessitating the closure of the school until a cleanup could be completed. The sole remaining ablution facility was in a dilapidated and unhygienic condition, experiencing leaks in its potable water system, incurring an estimated cost of 30,000 ZAR per month.

Impact

Health

- ✓ Raw sewage is prevented from escaping and posing a risk to public health.
- ✓ Safe treatment facility is provided.

Social

- ✓ Equitable access to safe and dignified toilet facilities for boys and girls residing in neighboring informal settlements.
- ✓ The treatment system reduced absenteeism at the school by 80%.
- ✓ Job creation and training of janitors (positions occupied by women) for daily monitoring of the toilet blocks and back-end system.

Environmental

- ✓ Raw sewage is prevented from escaping regularly, reducing environmental pollution.
- ✓ Water resource recovery.

Economical

- ✓ Usage of potable water for flushing, with an estimated 30,000 ZAR per month, is prevented.

> You can see my kids are bright, beautiful, wonderful because their dignity is being restored. Once the dignity has grown, you make wonders in class.

Nozi Rajuile
Principal,
Tsholetsega Primary School

> I was so surprised that we are reusing the very same thing that you have used before!

Matapelo Mpomela
Student,
Tsholetsega Primary School

> This school uses anything between 6 to 9 litres per flush. And that's a lot of water. In a closed-loop system, once you have filled the tank up, you don't need to fill it again, it just keeps recycling. If any one of us decide to go into this closed-loop environment, we will be able to secure water into the future.

Jay Bhagwan
Executive Manager,
Water Research Commission

Resource Recovery

More than 6,000 L/d
WATER SAVING

Tsholetsega Primary School

Configuration

COMPONENTS
Backend Only

TREATMENT CAPACITY
6 m³/d

Nº OF USERS / DAY
1,335

INPUT
Blackwater

Nº OF UNITS
1

FOOTPRINT AREA
156 m²

EFFLUENT USAGE
Recirculation for toilet flushing.

POWER CONSUMPTION
90 to 110 kWh/d

Case Frontend

Nº OF TOILETS
25

FEMALE
16

MALE
9

Nº OF URINALS
3

AVERAGE FLUSH CAPACITY
6 to 9 L/flush

Nº OF HANDWASH BASINS
14

DISPOSAL GREYWATER FROM HANDWASH
Sewer

Solution

Clear Recycling Toilets

Supplier

Enviro Loo

Enviro Options (Pty) Ltd.

Site Conditions

CLIMATE
Subtropical highlands with dry winters.

AMBIENT TEMPERATURE
11 to 20°C

TOPOGRAPHY
Flat

GROUND CONDITION
Rocky

GROUNDWATER TABLE
Deep

WATER SUPPLY
Yes, for handwashing supplied by municipal water network.

SEWAGE CONNECTION
Yes, used only for greywater discharge.

POWER SUPPLY
Yes, grid connection

Model

Enviro Loo Clear T6

O&M

PROVIDER
Enviro Options (Pty) Ltd.

SERVICE FRAMEWORK
✓ 5 years service agreement.
✓ Full component replacement warranty, monitoring, additives & all service events.

Costs

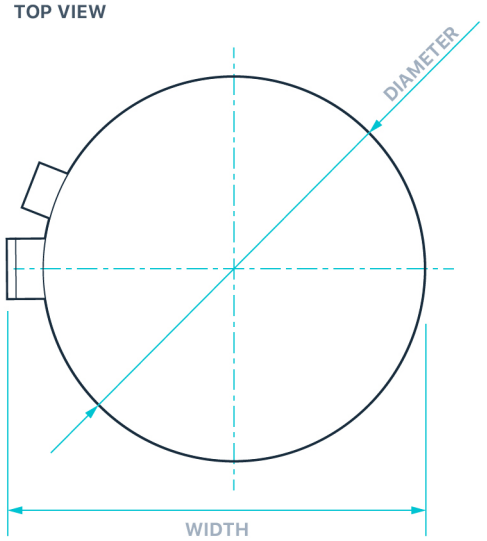
PROJECT COST	897,000 ZAR
CIVIL WORKS, COMMISSION & INSTALLATION	897,000 ZAR
PROFESSIONAL FEES BY THIRD PARTY	405,000 ZAR
MONITORING, SERVICING & MAINTENANCE	60,000 ZAR/year

Project Video

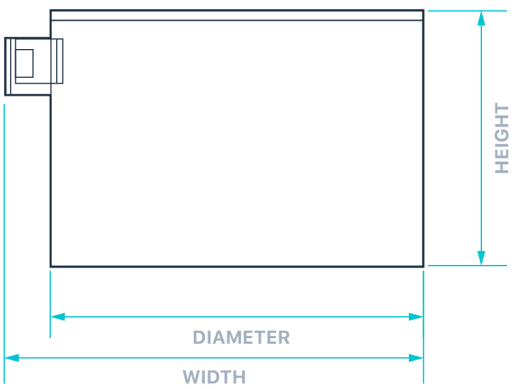
Models Dimensions

Aquonic 1000 FGL: Model Dimensions

TOP VIEW



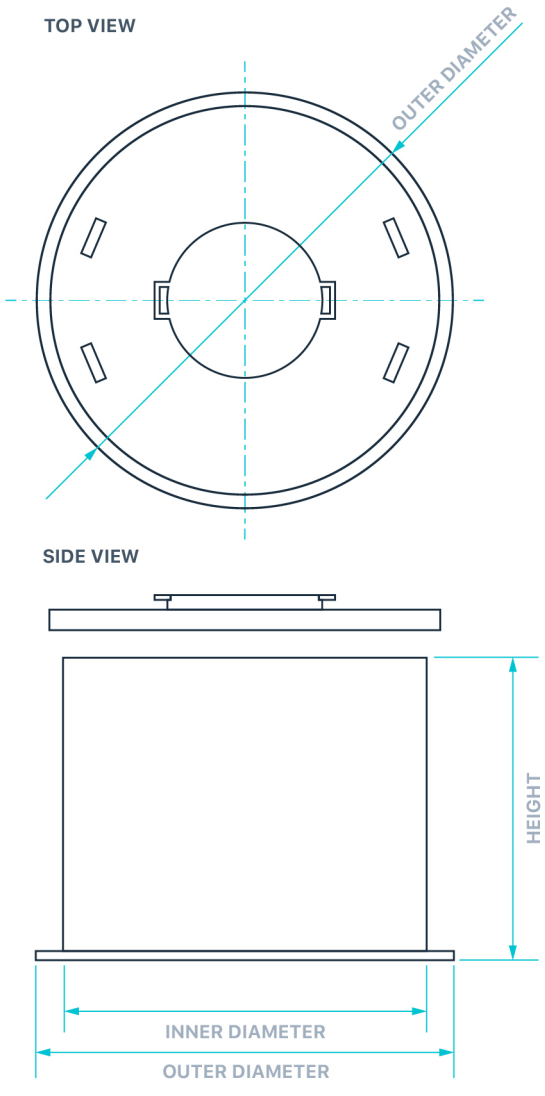
SIDE VIEW



Backend Unit

WIDTH	2.3 m
HEIGHT	1.1 m
DIAMETER	2.m
WEIGHT EMPTY	0.35 t
WEIGHT FULL	1.85 t

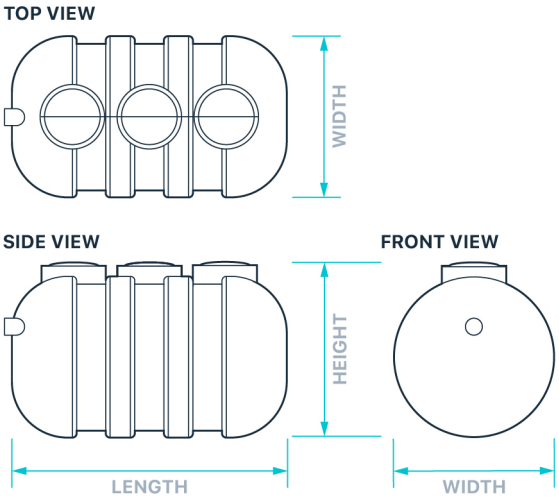
Aquonic 1000 HDPE: Model Dimensions



Backend Unit

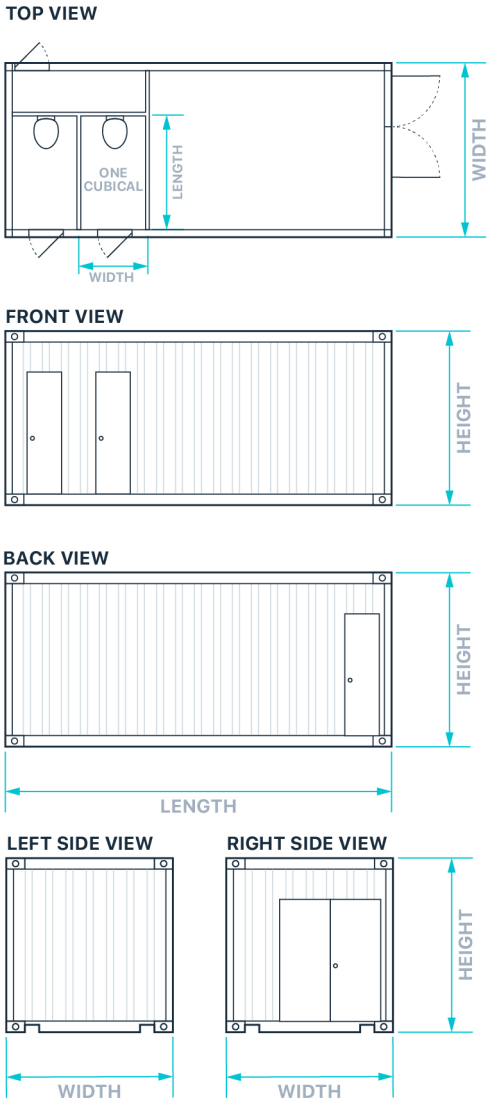
HEIGHT	1.5 m
INNER DIAMETER	1.80 m
OUTER DIAMETER	1.95 m
WEIGHT EMPTY	0.79 t
WEIGHT FULL	3.84 t

b-CRT 20i: Model Dimensions



Pre-Treatment Unit

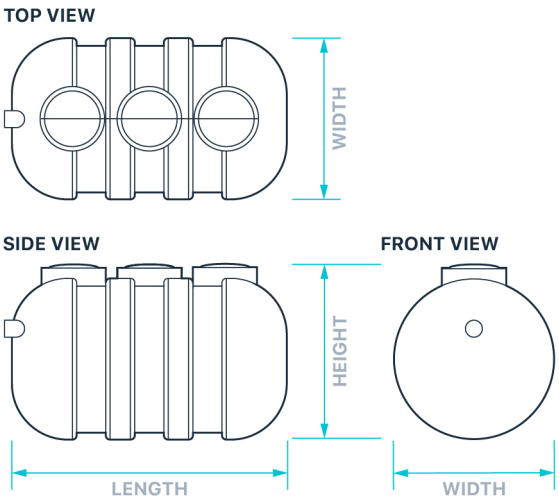
WIDTH	1.1 m
LENGTH	1.9 m
HEIGHT	1.2 m
WEIGHT EMPTY	0.2 t
WEIGHT FULL	2.6 t
Nº OF UNITS	1



Frontend & Backend Unit

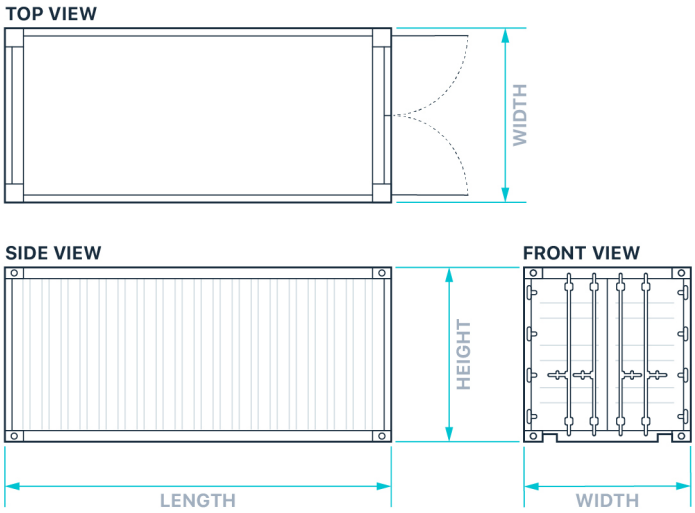
WIDTH	2.4 m
LENGTH	6.1 m
HEIGHT	2.9 m
WIDTH (ONE CUBICAL)	1.2 m
LENGTH (ONE CUBICAL)	1.5 m
WEIGHT EMPTY	5.0 t
WEIGHT FULL	20.0 t

b-CRT 2x20: Model Dimensions



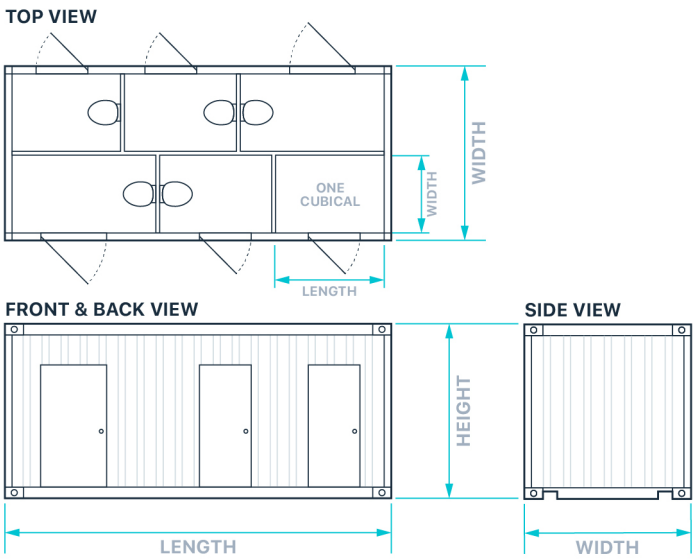
Pre-Treatment Unit

WIDTH	1.1 m
LENGTH	1.9 m
HEIGHT	1.2 m
WEIGHT EMPTY	0.2 t
WEIGHT FULL	2.6 t
Nº OF UNITS	1



Backend Unit

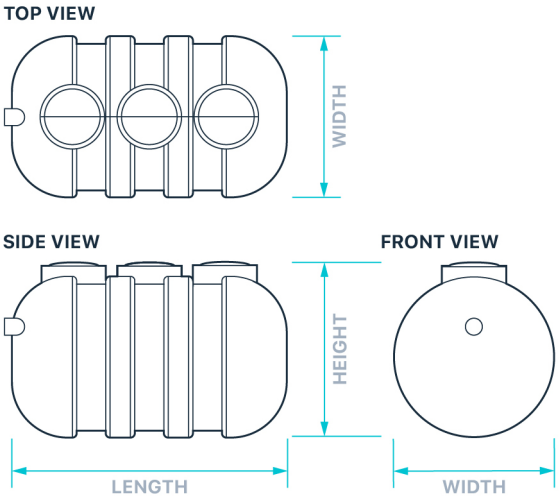
WIDTH	2.4 m
LENGTH	6.1 m
HEIGHT	2.9 m
WEIGHT EMPTY	5.0 t
WEIGHT FULL	20.0 t



Frontend Unit

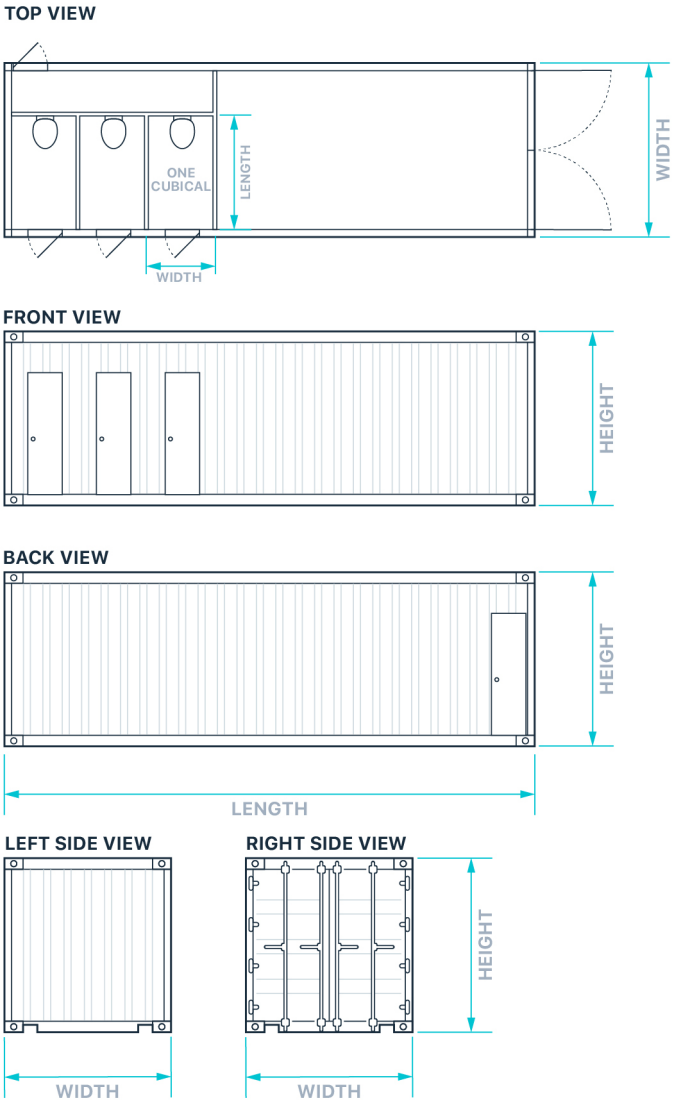
WIDTH	2.4 m
LENGTH	6.1 m
HEIGHT	2.9 m
WIDTH (ONE CUBICAL)	1.1 m
LENGTH (ONE CUBICAL)	1.9 m 1.8 m 2.4 m
WEIGHT	5.0 t

b-CRT 40: Model Dimensions



Pre-Treatment Unit

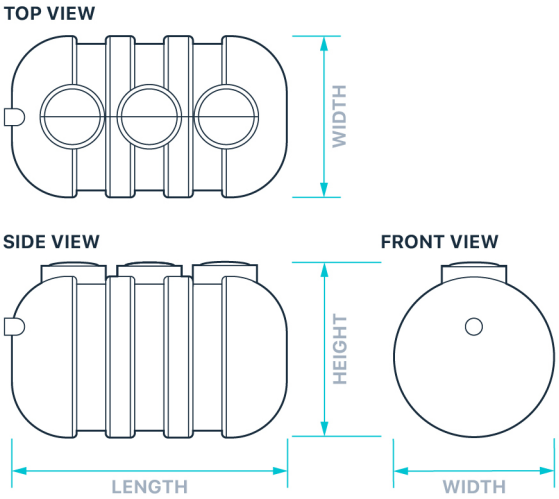
WIDTH	1.1 m
LENGTH	1.9 m
HEIGHT	1.2 m
WEIGHT EMPTY	0.2 t
WEIGHT FULL	2.6 t
Nº OF UNITS	1



Frontend & Backend Unit

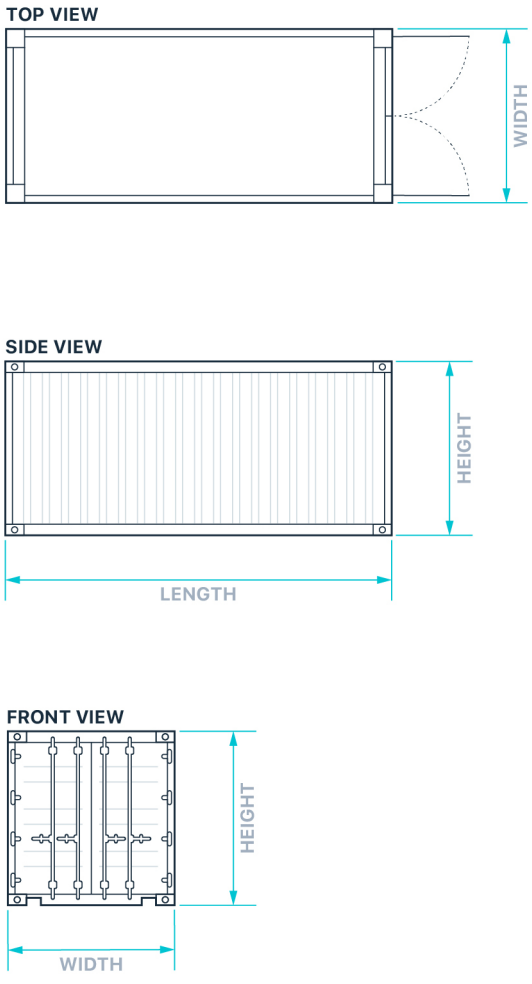
WIDTH	2.4 m
LENGTH	12.2 m
HEIGHT	2.9 m
WIDTH (ONE CUBICAL)	1.6 m
LENGTH (ONE CUBICAL)	1.7 m
WEIGHT EMPTY	8.0 t
WEIGHT FULL	23.0 t

b-CRT B: Model Dimensions



Pre-Treatment Unit

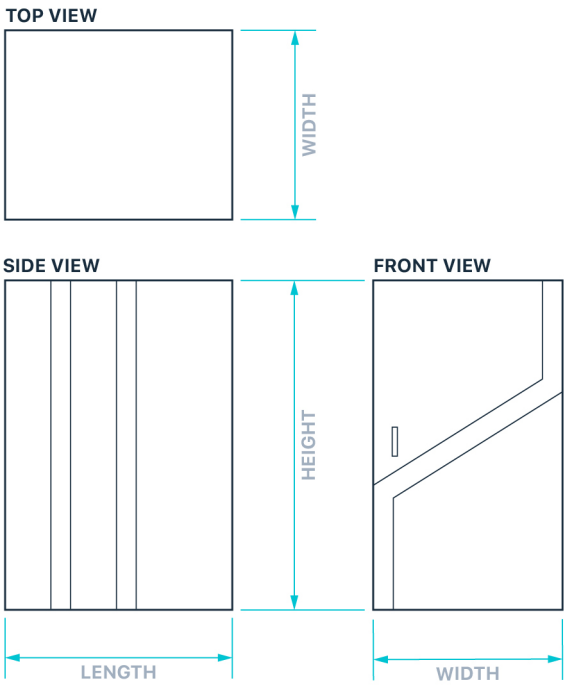
WIDTH	1.1 m
LENGTH	1.9 m
HEIGHT	1.2 m
WEIGHT EMPTY	0.2 t
WEIGHT FULL	2.6 t
Nº OF UNITS	1



Backend Unit

WIDTH	2.4 m
LENGTH	6.1 m
HEIGHT	2.9 m
WEIGHT EMPTY	3.5 t
WEIGHT FULL	18.5 t

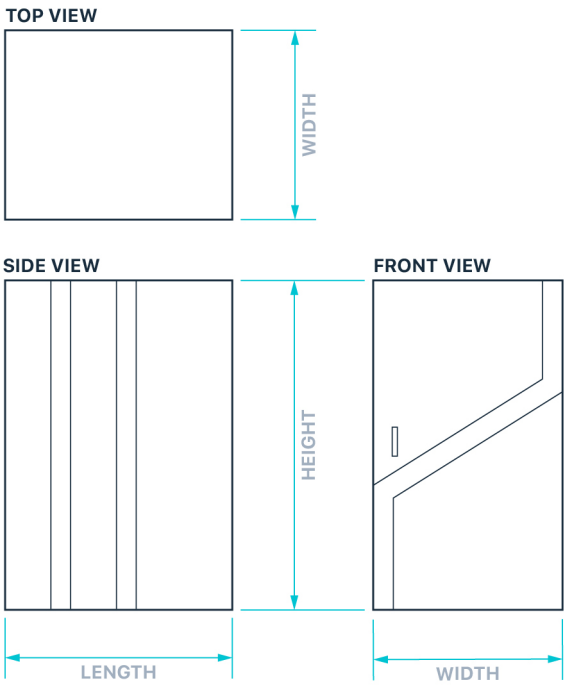
b-HRT (ECR): Model Dimensions



Backend Unit

WIDTH	1.0 m
LENGTH	1.2 m
HEIGHT	1.74 m
WEIGHT EMPTY	0.55 t
WEIGHT FULL	1.05 t

b-HRT (UV): Model Dimensions

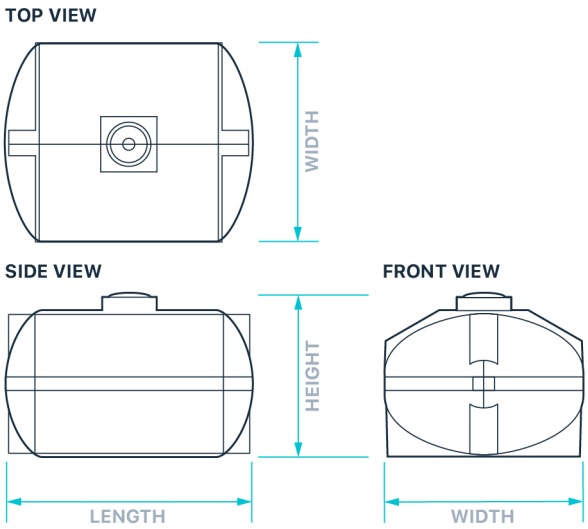


Backend Unit

WIDTH	1.0 m
LENGTH	1.2 m
HEIGHT	1.74 m
WEIGHT EMPTY	0.5 t
WEIGHT FULL	1.0 t

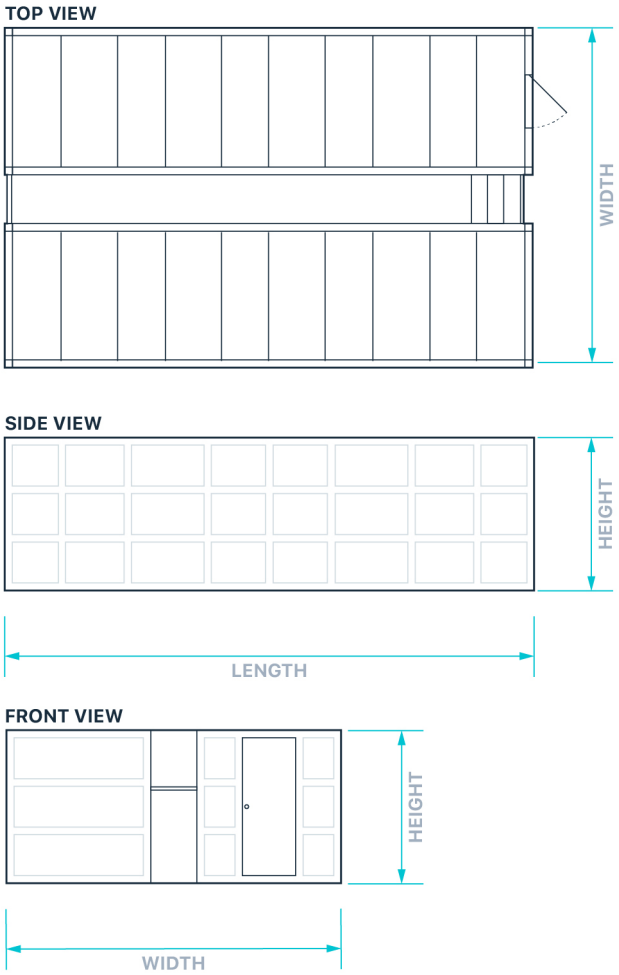
Enviro Loo Clear T24: Model Dimensions

Pre-Treatment Unit



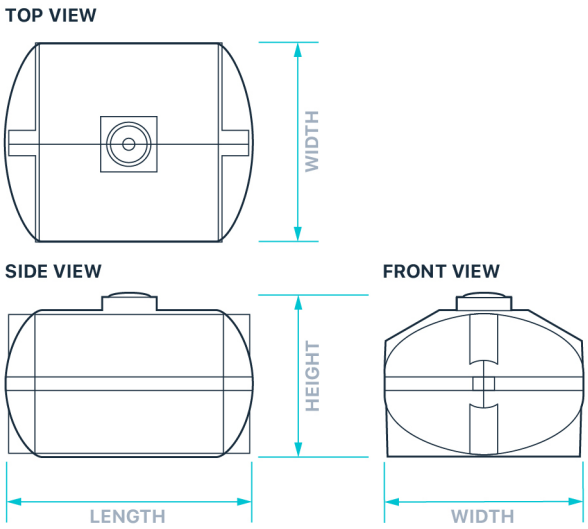
WIDTH	2.3 m
LENGTH	2.8 m
HEIGHT	1.7 m
WEIGHT EMPTY	0.3 t
WEIGHT FULL	6.3 t
Nº OF UNITS	8

Backend Unit



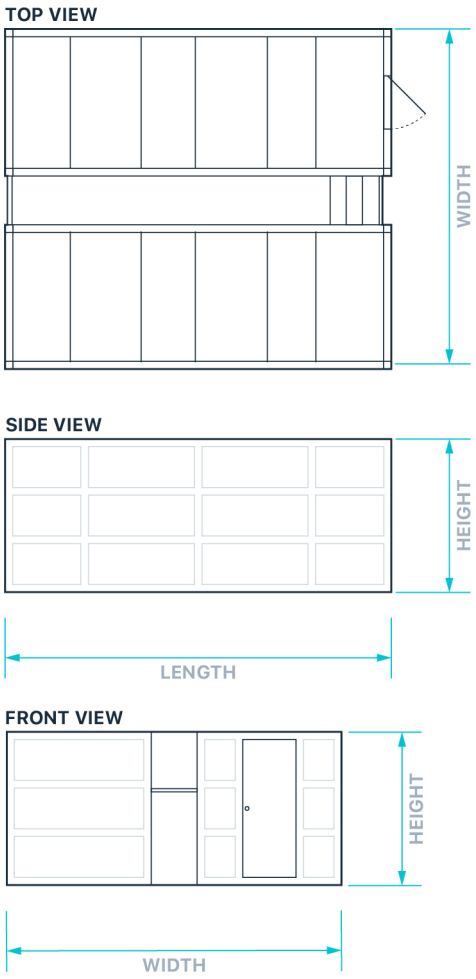
WIDTH	4.9 m
LENGTH	10.7 m
HEIGHT	2.2 m
WEIGHT EMPTY	6 t
WEIGHT FULL	75 t

Enviro Loo Clear T6: Model Dimensions



Pre-Treatment Unit

WIDTH	2.3 m
LENGTH	2.8 m
HEIGHT	1.7 m
WEIGHT EMPTY	0.3 t
WEIGHT FULL	6.3 t
Nº OF UNITS	3



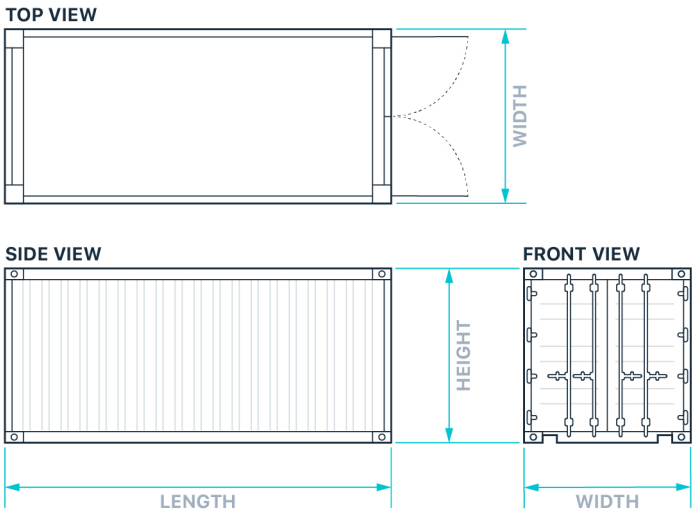
Backend Unit

WIDTH	4.9 m
LENGTH	5.8 m
HEIGHT	2.2 m
WEIGHT EMPTY	3.5 t
WEIGHT FULL	35 t

Clear TT-1: Model Dimensions

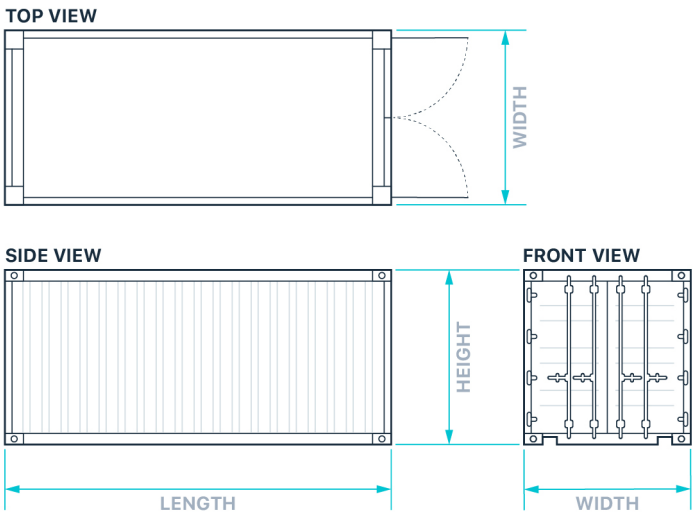
Pre-Treatment Unit

WIDTH	n/a
LENGTH	n/a
HEIGHT	n/a
WEIGHT EMPTY	n/a
WEIGHT FULL	n/a
Nº OF UNITS	1



Backend Unit

WIDTH	2.4 m
LENGTH	6.0 m
HEIGHT	2.6 m
WEIGHT EMPTY	~ 5 t
WEIGHT FULL	~ 17 t



Frontend Unit

WIDTH	2.4 m
LENGTH	6.0 m
HEIGHT	2.6 m
WIDTH (ONE CUBICAL)	n/a
LENGTH (ONE CUBICAL)	n/a
WEIGHT	~ 5 t

Clear TT-3: Model Dimensions

Pre-Treatment Unit

WIDTH	n/a
LENGTH	n/a
HEIGHT	n/a
WEIGHT EMPTY	n/a
WEIGHT FULL	n/a
Nº OF UNITS	n/a

Frontend & Backend Unit

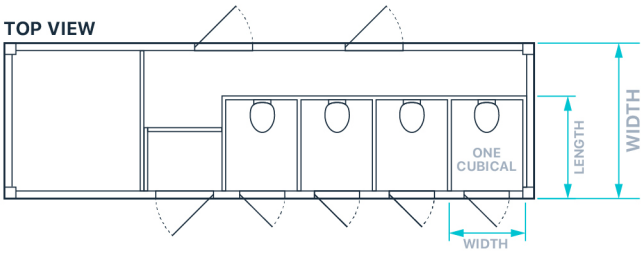
WIDTH	2.4 m
LENGTH	2.5 m
HEIGHT	2.6 m
WIDTH (ONE CUBICAL)	n/a
LENGTH (ONE CUBICAL)	n/a
WEIGHT EMPTY	~ 1.5 t
WEIGHT FULL	~ 5.5 t

Clear TT-5B: Model Dimensions

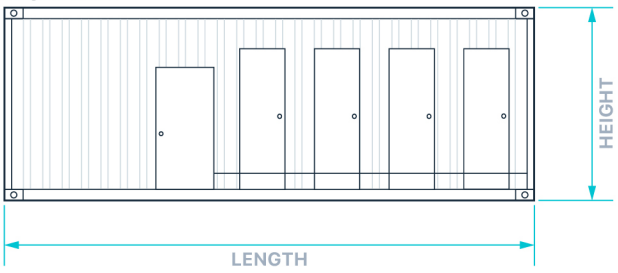
Pre-Treatment Unit

WIDTH	n/a
LENGTH	n/a
HEIGHT	n/a
WEIGHT EMPTY	n/a
WEIGHT FULL	n/a
Nº OF UNITS	1

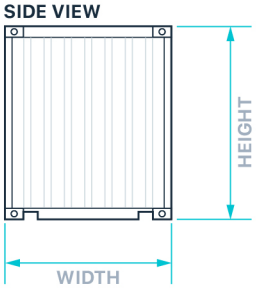
TOP VIEW



FRONT VIEW



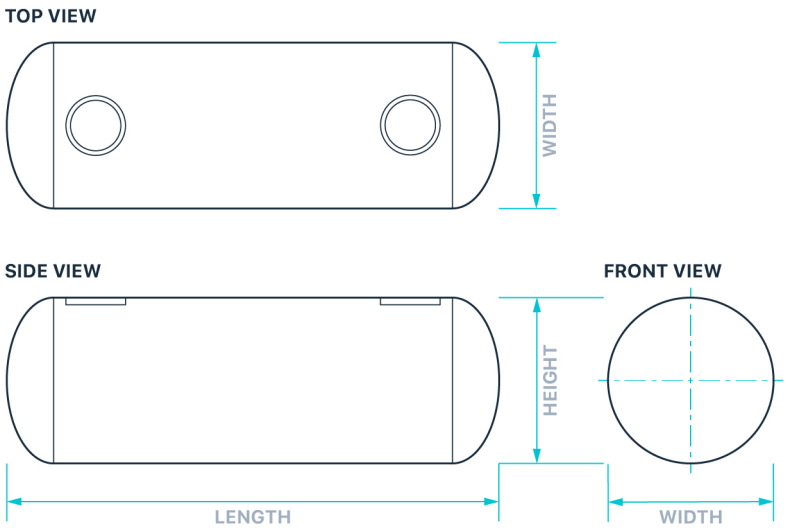
SIDE VIEW



Frontend & Backend Unit

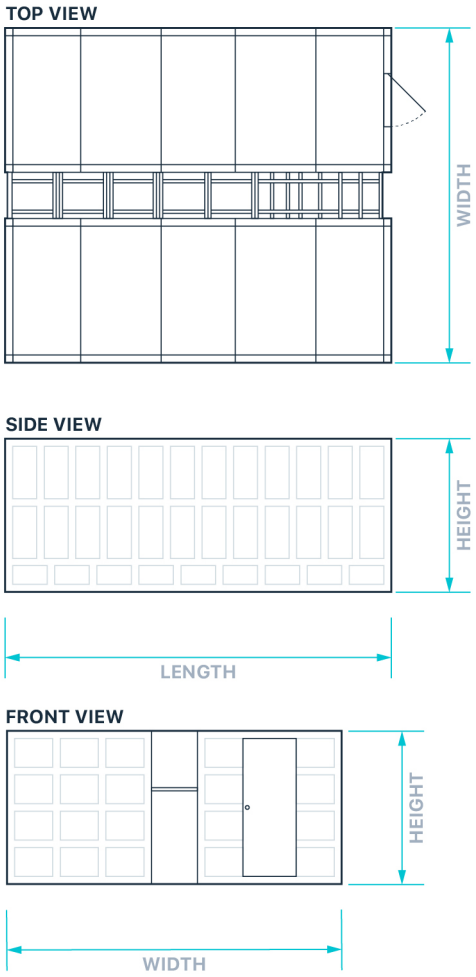
WIDTH	2.3 m
LENGTH	8.3 m
HEIGHT	2.9 m
WIDTH (ONE CUBICAL)	1.1 m
LENGTH (ONE CUBICAL)	1.5 m
WEIGHT EMPTY	~ 8.0 t
WEIGHT FULL	~ 14.0 t

Clear TT-6: Model Dimensions



Pre-Treatment Unit

WIDTH	2.0 m
LENGTH	6.0 m
HEIGHT	2.0 m
WEIGHT EMPTY	~ 3 t
WEIGHT FULL	~ 11 t
Nº OF UNITS	1



Backend Unit

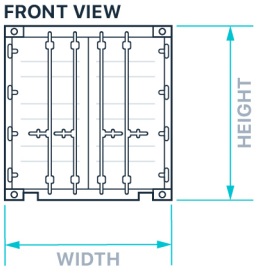
WIDTH	5.2 m
LENGTH	5.8 m
HEIGHT	2.3 m
WEIGHT EMPTY	~ 4 t
WEIGHT FULL	~ 22 t

NEWgenerator™ 100: Model Dimensions

TOP VIEW

SIDE VIEW

FRONT VIEW



Backend Unit

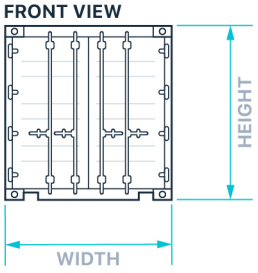
WIDTH	2.4 m
LENGTH	6.0 m
HEIGHT	2.4 m
WEIGHT EMPTY	2 t
WEIGHT FULL	4.5 t

NEWgenerator™ 800: Model Dimensions

TOP VIEW

SIDE VIEW

FRONT VIEW



Backend Unit

WIDTH	4.8 m
LENGTH	12.0 m
HEIGHT	2.4 m
WEIGHT EMPTY	4.0 t
WEIGHT FULL	15.0 t
Nº OF UNITS	2

List of Abbreviations

A	Ampere
ABR	Anaerobic Baffled Reactor
AC	Alternates Current
BMGF	Bill & Melinda Gates Foundation
BOD	Biological Oxygen Demand
CaCl2	Calcium Chloride
CFU /L	Colony-Forming Unit per Liter
Co., Ltd	Company Limited
COD	Chemical Oxygen Demand
CRTs	Community Reinvented Toilets
DC	Direct Current
E.coli	Escherichia Coli
ECR	Electrochemical Chlorination
g	Gram
HRTs	Household Reinvent Toilets
Hz	Herz
ISO	Internation Standard Organisation
K	Thousand
kg	Kilogram
kg/month	Kilogram per Month
kg/year	Kilogram per Year
kg_{BOD}/d	Kilogram of Biological Oxygen Demand per Day
kg_{COD}/d	Kilogram of Chemical Oxygen Demand per Day
KN/m^2	Kilonewtons per Square Meter
kW	Kilo Watt
kWh/d	Kilo Watt Hours per Day
L	Liters
L/year	Liters per Year
m	Meters
m^2	Square Meters

m^3	Cubic Meters
m^3/d	Cubic Meters per Day
MCB	Miniature Circuit Breaker.
mg/L	Milligrams per Liter
mm	Millimetre
mmol/L	Millimole per Liter
n/a	Not Available
N°	Number
NaCl	Sodium Chloride
NaOCl	Sodium Hypochlorite
NaOH	Sodium Hydroxide
OHSAS	Occupational Health and Safety Assessment Specification
OP	Omni-Processor
PFU /L	Plaque-Forming Units per Liter
pH	Potential of Hydrogen
RTs	Reinvent Toilets
SASTEP	South African Sanitation Technology Enterprise Programme
t	Tones
TM	Trademark
TN	Total Nitrogen
TP	Total Phosphate
TSS	Total Suspended Solids
USA	United States of America
USD	United States Dollars
UV	Ultraviolet
V	Volt
ZAR	South African Rand
µm	Micrometeor
°C	Degree Celsius