Oasis Clearwater

ENVIRONMENTAL SYSTEMS

A Fletcher Concrete and Infrastructure Ltd Business

OASIS CLEARWATER
SERIES 2000

AEROBIC WASTEWATER TREATMENT SYSTEMS

TECHNICAL SPECIFICATION

COMPLIANCE: NZS 3101-2006 | AS/NZS 1547:2012 | TP58 APPROVAL
OSET TRIAL TESTED AND INDEPENDENTLY VERIFIED

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SECTION 1 - SYSTEM PRINCIPLE

The principle of the system we use is not an AWTS (aerated wastewater treatment system) which is a general term for any system with air entrained into the unit. Our system principle is a SAFE system (submerged aeration filtered effluent). A major advantage of the SAFE system is its unique ability to handle significant fluctuations in flow and loading, without upsetting the performance of the system.

The system consists of a vessel packed with a media which provides a high surface area to volume ratio. The media is submerged in the liquid. Air diffusers below the media provide circulation of the waste to be treated by the media and provide oxygen to the liquid.

Consequently the bacteria, unlike conventional activated sludge suspended growth systems (AWTS) grow on the media. If the loading conditions in the SAFE system vary, the microbial mass will adjust to these conditions. Unlike a conventional active sludge system, the excess mass is not lost in the effluent, but remains in the system attached to the media.

SYSTEM ENGINEERING - Why this Technology is so effective

- The system comprises a pre-treatment chamber feeding to a secondary treatment chamber. Liquid then flows into the aeration chamber, where with the use of our exclusive fine air diffuser assembly, thousands of tiny air bubbles provide oxygen for the aerobic digestion and mix the contents of the aeration chamber.

- Wastewater is introduced to the clarification chamber by hydraulic dispersment, where settled sludge material is transferred back to the pre-treatment to further enhance treatment.

- The system is complete with a high quality alarm for system malfunction.

The Oasis Clearwater Series 2000 Treatment System is divided into five principal chambers.

[a] The Primary Pre-treatment Chamber

All wastes are received into this anaerobic chamber. The primary chamber also receives the returned activated sludge from the clarification chamber providing further breakdown of the influent load.

[b] Secondary Pre-treatment Chamber

The Series 2000 System is the only system to incorporate a secondary pre-treatment filter chamber (**Polylok/Zabel A100 – 1.6mm**) to allow further valuable breakdown of organic and inorganic waste, that require a longer period of breakdown.

[c] Aeration Chamber

The System incorporates the use of an 80-100 litre/minute air pump which feeds directly to a diffuser assembly producing thousands of tiny air bubbles for the aerobic digestion and mixing of the contents of the aeration chamber.

[d] Clarification Chamber

Activated sludge settles to the bottom of this chamber and is drawn via a venturi mechanism and fed back to the primary pre-treatment chamber.

[e] Pump well Chamber

The separate pump well is capable of receiving various sized pumps depending on output requirements.

SECTION 2 - TECHNICAL SPECIFICATIONS

- Primary Pre-Treatment Chamber 1,750 litres
- Secondary Filter Chamber w/ A100 (1.6mm) 1,750 litres
- Aeration Chamber 1,880 litres
- Clarification chamber 430 litres
- Pump Chamber 1050 litres
- Total Operating Capacity 6,860 litres
- Total Holding Capacity 9,400 litres
- Control Panel - Audio & Visual Alarm
- Aerator (Normal Operation = 24 hrs) 55 Watts
- Irrigation Pump (Normal Operation – 0.5-1hr/day) 600 Watts
- Tank Construction-All Concrete
- Tank Dimensions:
    - Height 2300 mm
    - Diameter 2500 mm
    - Weight 7.5 tonnes
- Maximum Rated Capacity 10 Persons (Domestic Situation.)
- Loading per day: 1,600 litres - average
2,000 litres - maximum intermittent

SECTION 3 - SYSTEM PERFORMANCE DETAILS

1. Expected Performance Figures

a. BOD	<20mg/l
b. Suspended solids (SS)	<20mg/l
c. Faecal coliforms @ 300mm below point of discharge	<1000/100ml

NOTE: please see appendix A for a copy of the latest OSET trial results from the Rotorua testing facility.

2. Minimum Hydraulic Loads

a. Average / capita flows	150 to 220 litres
b. Maximum / capita flow / 2 hrs	70 litres
c. Max. instantaneous flow rate / capita	12.5 litres/minute

3. Wetted surface area of chamber	80m²
4. Disinfection options	UV
5. Noise level	38 d/BA
6. Alarm monitoring system	Yes
7. Single or Three phase	Single

SECTION 4 - SYSTEM CONSTRUCTION

1. TANK

Oasis Clearwater concrete tanks are made of pre-cast concrete, with reinforcing mesh for strength and durability. The tank lids are pre-cast. The lids are able to support a live load of 200kg over an area of 0.5m^2. The lid is separate but sealed to the tank with epoxy grout. This prevents the escape of gases and ingress of ground water.

Oasis Clearwater Systems offer a tank of one piece continuous pour construction, offering the strongest system available. This is done by pouring the whole system upside down, the internal core being removed on stripping, with the complete construction then being rotated with base settling on ground. The system is externally vibrated during the pouring process with externally mounted wacker vibrators.

2. STEEL MESH

Steel reinforcement consists of 665 mesh and is centrally located in accordance with AS/NZS 1546:2008. The mesh supported with plastic bar chairs. All mesh overlaps at a rate of 2 times mesh pitch. The tank roof incorporates 665 steel mesh and H10 reinforcing bars.

3. CONCRETE

Concrete for the manufacture is supplied by Firth Industries and complies with NZS 3104 relating to special grades, plant and testing.
Concrete used in the manufacture of the system has minimum 28 day strength of 35 mpa.

Tank wall thickness	=	80mm
Tank roof thickness	=	90mm
Tank base thickness	=	100mm

SECTION 5 - SYSTEM COMPONENTRY

[a] Linear Air Pump

A Thomas AP 80 or equivalent diaphragm blower is used as standard equipment on the Oasis Clearwater Series 2000 System. The linear diaphragm mechanism is low in noise and vibration - features which are essential for small scale domestic and commercial aerobic treatment systems.

Operating Principle

The pump operates on a linear movement principle. The connecting rod, with magnets bonded to it, oscillates within an electromagnetic coil. Twin diaphragms are mounted on each end of the connecting rod and provide the pumping action inside twin chambers. The result is air flow of high volume relative to the size of the pump.

Model	Nominal Capacity L/min	Power Watts	Current AMPS	Rated Pressure kPa	Noise level (dB)-2m
AP80	**85**	**51**	**0.29**	**16**	**38**

[b] Irrigation Pump

The D42AB pump or equivalent is a multi-purpose submersible pump manufactured of high quality components, including all stainless steel and glassed filled polycarbonate.

Special Features:

- Twin glassed filled polycarbonate impellers for high pressure as required with pressure compensated driplines.
- Double mechanical seal, one in an oil bath.
- Cast stainless steel and polycarbonate pump housing/casing for outstanding corrosion resistance and long life.

NOTE: The model of pump *may* vary depending on elevation and head requirements.

[c] Control Panel

The electrical control panel is designed to perform the following tasks:

1. The high water level alarm will sound if the water level is set off by the hi-level float switch mounted in the pump out chamber. This would indicate the submersible pump is not operating or irrigation filter is blocked.

2. The air pressure alarm will sound if the air pump stops functioning.

Field Isolator

To comply with supply authorities requirements all Oasis Clearwater Series 2000 Systems incorporate a field isolator switch.

Wiring Circuit

Provide a 230 volt AC 2.5 TPS dedicated supply from mains board supply to the Oasis Clearwater 2000 Treatment System.

[d] Polylok/Zabel Filter

Oasis Clearwater Systems are the only manufacturer in New Zealand to install the **Zabel A100** commercial and residential filter in their aerated system. While the unit adds considerable cost to the overall unit, we are committed to achieving the highest possible treatment level in respect of BOD and suspended solids [ref. To Technical Information at back of Specification details].

SECTION 6 - EFFLUENT DISPOSAL / IRRIGATION SYSTEM

Due to the high quality of treated effluent, various disposal systems are available, depending on Engineer design and specifications.

There is however, a tendency to install subsurface or ground cover trickle irrigation for the following reasons:

1. No requirement to chlorinate or UV treat the outgoing effluent.

2. Final treatment is achieved in the top soil. Where subsurface trickle irrigation is recommended, Oasis Clearwater incorporates proprietary pressure compensated, non-drain, effluent dripline.

Description

The effluent dripline is a low volume drip-line with integral and evenly spaced pressure compensating emitters at specified intervals.

The emitters have the ability to independently regulate discharge rates with an inlet pressure of 50 - 350 kPa (8 - 50 psi) at a constant flow of 2.35 litres per hour. Non-drain capability to 15 Kpa

To complete the satisfactory operation of the system, a filter and various valves for flushing, vacuum release and non leakage are required as part of the complete system.

Each individual disposal field requires an engineer or suitably qualified person to carry out a design with consideration to the following:

1. Hydraulic flow (daily)
2. Site elevation and topography
3. Soil type