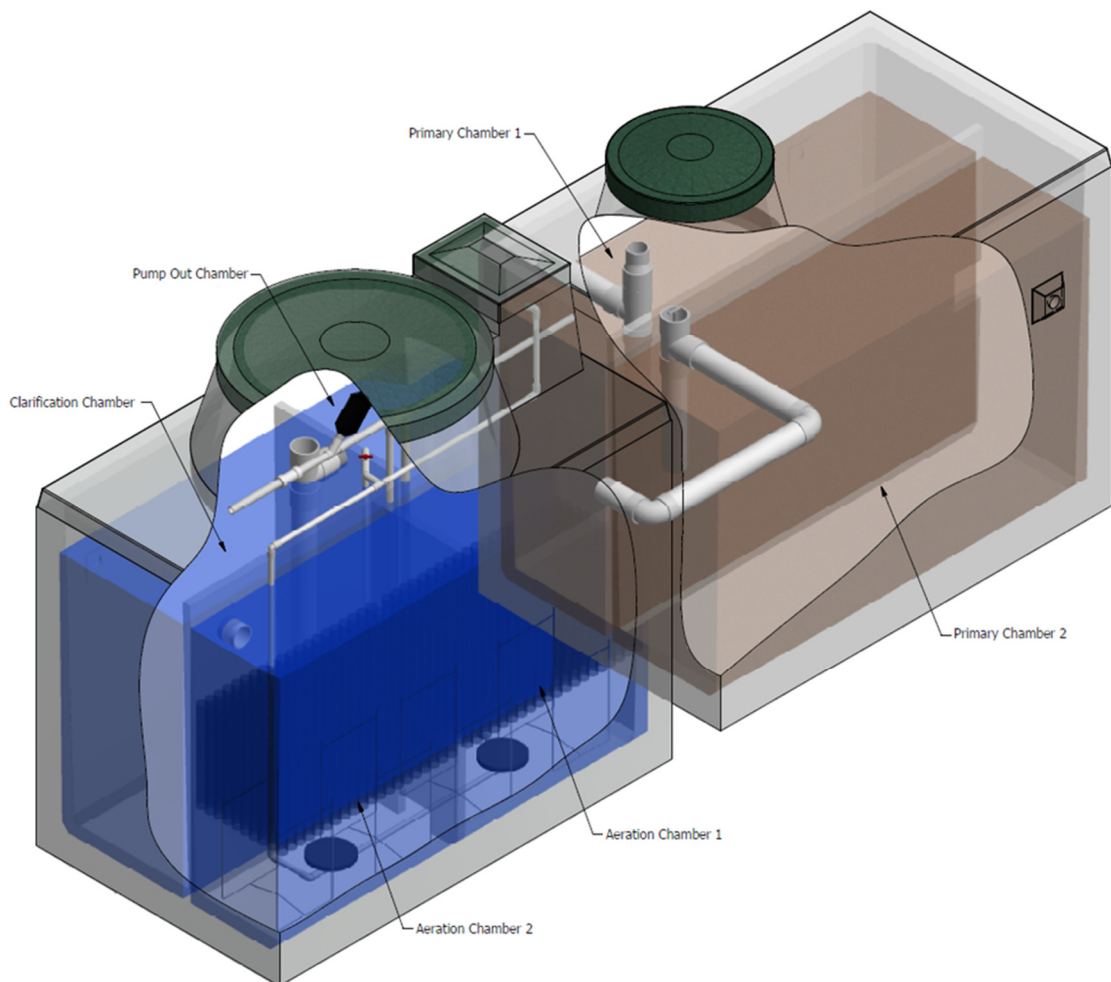


FINDLATER

CONSTRUCTION

Findlater A2000 Aerated Wastewater System Technical Booklet



Note: In June 2015, we changed the name of the system from PA 5x5 to A2000 to reflect that the system is designed to process a peak intermittent loading of up to 2,000 litres of residential application.

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1.0 Introduction

With the help of experienced process engineers, component suppliers and our own practical experience, we have carefully designed, developed and built the **Findlater A2000** wastewater system.

Utilising proven aerated wastewater system technologies, it treats household wastewater reliably and economically to a high standard.

This has been proven in results from independent testing at OSET 8 Trial and in practical daily use.

The **Findlater A2000** system uses only proven quality components and has been developed to stand the test of time.

The **Findlater A2000** system is housed in two robust 5,000 litre precast concrete tanks.

2.0 Key Features

- Two tank wastewater system, with a large working volume and long flow paths.
- Orenco Bio Tube outlet filter.
- Low noise level Nitto piston air pump.
- Quality disc type fine air diffusers.
- Superior Bio Blok media – Specifically engineered for aerated wastewater systems.
- Industry standard Davey D42A/B-3 pump-out chamber pump.
- Electrical controller
 - Programmable air pump timer - Run air pump as required.
 - Both audible and visual alarms are part of the controller mounted on top the tank.
 - Air and Pump-out chamber pumps plug into normal household sockets, so there is no need for an electrician when replacing either pump.
- Primary wastewater cannot overflow into other chambers as it is in its own separate tank.
- Easy to install - As tanks can be lifted by a 16 tonne digger - Handy on difficult or remote sites.
- Low invert level 1.625 m – Makes installation easy, great for high water table sites.
- Concrete tanks that won't rupture, tear, crush, warp or puncture like plastic or fibreglass tanks.
- Easily transportable on trucks 2.4 m long x 1.5 m wide.
- Two large access points which can be extended using standard concrete manholes and concrete pipes.

2.0 Key Features (Continued)

- A service person following correct *confined spaces safety practices* for wastewater tanks can easily enter all tank chambers, should this ever be required.
- All components can be removed and replaced through the access points.
- All chambers have large working volumes to ensure a robust waste water treatment process.
- Low long-term ownership costs – Not just short-term power saving costs.

3.0 How the System Works

3.1 Tank 1 - Primary Tank

This tank is divided into two chambers by a longitudinal division wall, which creates a long flow path two-sided primary treatment tank.

Household wastewater flows into the first half of this tank where under quiescent conditions the settle-able solids sink to the bottom of the tank to form a sludge layer. Oil, greases and other light materials float to the surface, where a scum layer forms as floating material accumulate. The organic material on the top and bottom of the tank undergoes facultative and anaerobic decomposition and is converted into more stable compounds and gases. While the sludge layer in the bottom of the tank will eventually decompose biologically, it will still need to be periodically emptied due to the gradual build up and very slow decomposition.

At the start of the primary tank, wastewater from the clarification chamber is mixed with the incoming wastewater, to reduce the nitrogen in the wastewater.

All wastewater leaves through the outlet filter.

3.2 Tank 2 - Secondary Tank

This tank is divided into four large chambers

- Aeration chambers 1 & 2
- Clarification chamber
- Pump-out chamber

Wastewater from the primary tank enters *aeration chamber 1*, it then flows down through the Bio Blok media and enters *aeration chamber 2*. Here in *aeration chamber 2* the wastewater then flows up through the Bio Blok media, before flowing into the *clarification chamber*. After this, the wastewater flows into the *pump-out chamber*.

3.3 Aeration Chamber 1 & 2

Each aeration chamber has a disc type fine air diffuser located centrally below the media. Air is pumped through the diffusers, creating fine air bubbles that rise through the media. This process mixes the wastewater and provides oxygen, whilst keeping the solids in suspension. Naturally occurring bacteria, which require oxygen to grow, form a biomass on the media. Through an aerobic biological oxidation process, these microorganisms consume the oxygen and wastewater pollutants, which reduce the levels of bio-chemical oxygen demand (BOD), suspended solids (SS) and ammonia (NH₃) in the wastewater. As the bacteria die they fall off the media and flow through to the clarification chamber.

3.4 Clarification Chamber

Here the wastewater settles and the solids collected at the bottom of the chamber are returned to second half of the primary tank to reduce nitrogen levels in the wastewater (through a process called denitrification). The wastewater finally flows up through a circular weir to the pump-out chamber.

3.5 Pump-out Chamber

Here the wastewater can settle out again before being pumped out, via a 130 µm (micron) disc filter to some form of land disposal system, usually in the form of effluent drip line.

4.0 Biological Performance and AS/NZS Standards

The Findlater A2000 waste water system has been designed to meet or exceed the following performance standards:

4.1 Biological

5-day Biological Oxygen Demand	BOD ₅	20 g/m ³
Total Suspended Solids	TSS	30 g/m ³
Total Nitrogen	TN	25 g/m ³

4.2 AS/NZS Standards

Tanks	AS/NZS 1546.1: 2008
On Site Domestic Wastewater Treatment Units	
Aerated Wastewater Treatment Systems	AS/NZS 1546.3: 2008
On-site Domestic Wastewater Management	AS/NZS 1547: 2012

5.0 Daily Loading Rates

Please contact us for further information if you have any questions regarding Daily Loading Rates.

5.1 Recommended Daily Loading Rates

- Up to 2,000 litres per day maximum intermittent peak loading.

6.0 Findlater A2000 Tank Volumes, Dimensions and Weights

Both primary and aeration tanks have internal volumes of 5,000 litres each.

6.1 Primary Tank

- Working volume 4,200 litres

6.2 Secondary Tank

- Aeration chamber 1 working volume 830
 - Aeration chamber 2 working volume 811
 - Clarification chamber 1,360
 - Pump-out chamber 960
- 8,161 litres

Emergency storage capacity in Tank 2 1,039 litres

6.3 Dimensions

Each tank has external dimensions of 2.4 m long x 1.485 m wide x 1.9m high (excluding access turrets which are usually another 0.5 m higher than the top of the tank lid).

6.4 Weight

Each tank weights approximately 4.5 Tonnes when empty

7.0 Key Component Specifications

- 5,000 litre reinforced 40 MPa concrete tanks and lids manufactured in our factory
- Orenco Bio Tube septic tank filter
- Nitto 80 litre/minute piston air pump
 - Model LA80B
 - Power 86 Watts
- 4 blocks of Bio Blok 200 media
- Environmental Dynamics International 9" disc fine air diffusers
- Programmable electrical controller from Taylex Industries
- Davey D42A/B S/S pump
 - Amps 4.0 A
 - Input 0.9 kW
 - Output 0.6 kW
 - Max. Flow 130 L/min.
 - Max. Head 30 m
- Azud 130-micron disc filter, 50mm outlet and inlet

8.0 System Power Usage

8.1 Nitto LA80B Air Pump - 86 Watts

Under normal operation this pump will run continuously, but the electrical controller can be programmed to run the Nitto air pump intermittently in holiday mode.

8.2 Davey D42 A/B Pump-Out Chamber Pump - 0.9 kW

This pump will run on demand, when the pump-out chamber requires emptying, and will not have a significant effect on the systems overall power usage.

9.0 Warranties

The electrical controls, air and pump-out chamber pumps each have a full two-year replacement warranty.

10.0 Maintenance

When a system is first installed it **must** be filled with fresh water and commissioned by a trained service person. They will check that the system is working correctly, adjust as required which will ensure the system gets off to the best possible start.

It is important that the system is maintained regularly at normally six-monthly intervals by a trained service person. The Local Regularity Authority will require the owner/occupier of the property to enter into a service contract with an experienced service provider.

When servicing the **Findlater A2000** system the service provider must follow our detailed check list to ensure it is operating correctly. They will also clean parts of the system, adjust and report on the overall condition of the system.

Normally three copies of the service check list are required:

- One for Findlater Construction's records.
- One is sent to the system owner along with the service invoice.
- Another is sent to the Local Regularity Authority, as this is often a condition of the consent issued by the Local Regularity Authority for the installation of the wastewater system.

It should be remembered that most consents to install wastewater systems run for a prescribed time, often 15 years, after which the wastewater system owner will need to renew the consent.

11.0 OSET NTP Trial 8 (2012-2013) Rotorua

The Findlater A2000 aerated wastewater system was tested at the 8th OSET NTP (On-Site Effluent Treatment National Testing Programme) which was held at Rotorua.

The system performed very well at the Trial and passed the testing programme.

Refer Findlater PA 5x5 system results at:

www.waternz.org.nz/Category?Action=View&Category_id=223

12.0 Contact Us

12.1 Office and Factory

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