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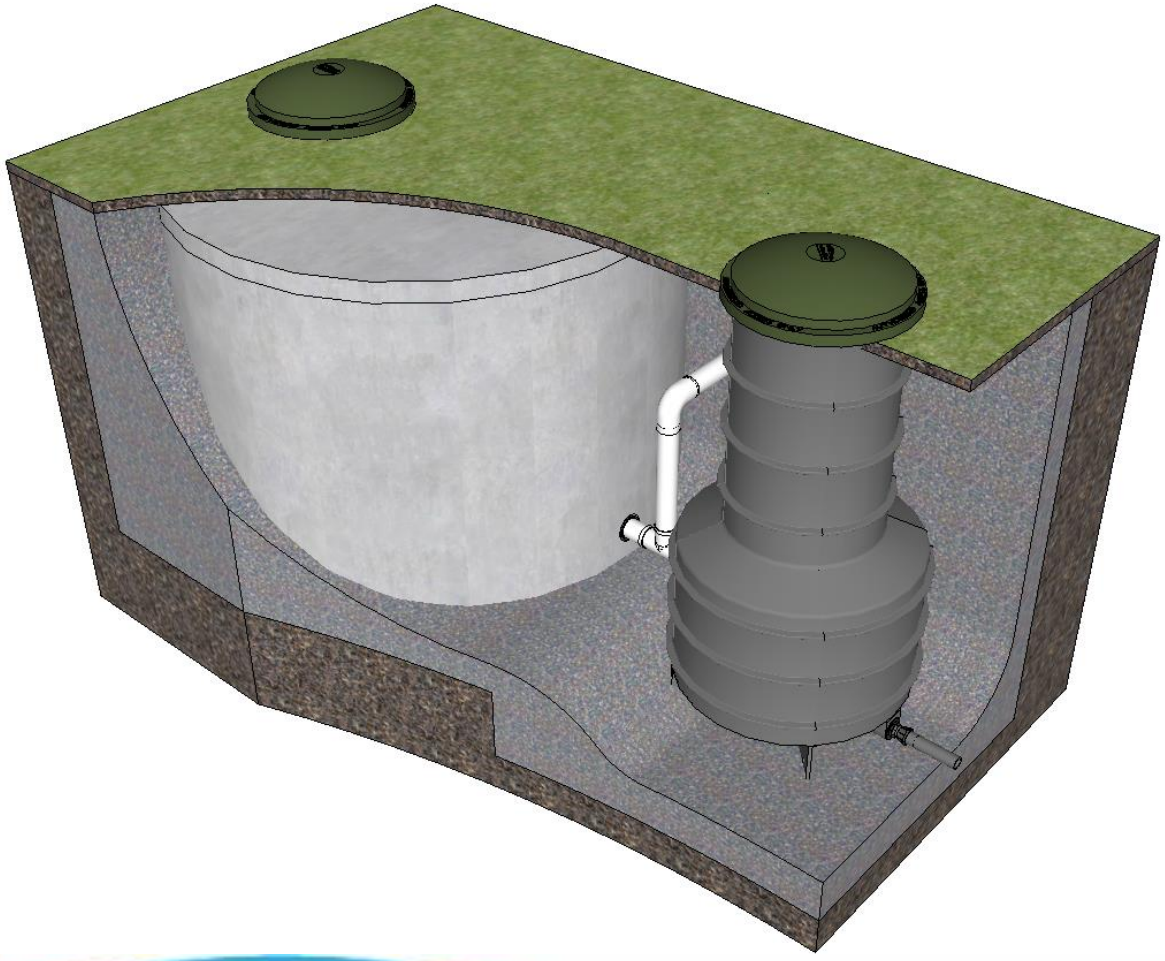
eco-wastewater & sewage systems
by Waterflow NZ Ltd

NaturalFlow Series CS50 Treatment System

System Specifications & Installation Instructions



Compliance Requirements

All NaturalFlow Treatment Systems meet the requirements of the NZ Building Code G13-VM4.

Section 9 of AS/NZS 1546.1:2008 state that tanks constructed to these Standards will meet the requirements of the Code for Clauses B1 and B2, structure and durability.

Compliance with Section 9 of AS/NZS 1546.1:2008 and also Clauses G13.3.4 relating to on-site treatment and disposal systems and G14.3.1 and 14.3.2 relating to the control of foul water as an industrial waste are covered in the 'NaturalFlow Compliance Requirements' document.

Please feel free to ask for a copy of this complete document, if required.

The Treatment Process

The NaturalFlow Advanced Primary Treatment Series CS50 Commercial System comprises of a 2.5m diameter x 1.8m high WORMORATOR® module and a 1.2m diameter x 2.1m high dose treatment chamber.

The black water (B/W), (which in the Natural Flow System includes the kitchen sink waste) in order to remove the solids, is directed onto a bed of natural medium lined with a textile cloth which is designed to retain maximum solids.

These residual solids are seeded with tiger worms which break down the solids and promote aerobic conditions to treat the liquid. Results of long term testing have shown that they reducing the solids by approximately 95%, leaving only residual vermicasts which are virtually free of harmful bacteria and other pollutants. The B/W then flows through a second media tray which further treats the water reducing the TSS & BOD and also reducing the particle size, in the TSS, to less than 1mm.

The G/W enters at the base of the Wormorator and the combined liquid then flows into the dose treatment chamber for settlement and filtration through the built in aerating matrix outlet filter as per AS/NZS 1546 1:2008 Clause D3.3.1.

It is then disposed of via a Dose Float or pump into the receiving environment, in accordance with AS/NZS 1547:2012 and the relevant local authority's requirements. The size and extent of the disposal system is determined by the receiving environment and the expected flow volumes. Factors such as soil types, slope and the proximity of potentially sensitive environments such as creeks, wells, bores and other water ways determine the extent, location and type of disposal system chosen.

The Wormorator® and dose treatment chamber has a 5000ltr reserve capacity where pump loading is necessary to allow for 24 hrs emergency storage should a pump fail. The Advanced Primary Treatment Series CS50 System is capable of treating 5000ltrs per day of the combined flow of Black and Grey water.

Because the Wormorator® is a dry vault system there is negligible sludge build up so it does not require any regular desludging. This specifically meets clause AS/NZS 1547:2012 4.2.2.1 as to desludging requirements.

Wormorator® & Dose Chamber Specifications

The Wormorator® module is constructed out of concrete and the Dose Chamber module is made of Cotene 9050 which is a linear medium density polyethylene, designed specifically for rotational molding of large tanks and products that require a high level of rigidity. It contains a fully formulated long term UV stabilization package (with a minimum UV8 rating) and is suitable material for wastewater treatment containment meeting all the requirements of Section 4.3.3 of AS/NZS 1547:2012 which cross references the structural performance requirements of its section 2.4.2.3 back to the relevant provisions of AS/NZS 1546.1, which for plastic septic tanks constructed via by rotational molding using thermoplastics (polyethylene) are set out in Section 9 of that Standard. These tanks have an expected lifespan of 50 years.

CW6000 Wormorator® Module
6000ltrs Nominal capacity
2500mm Diameter over main body
1800 mm O/A height

Dose Chamber
1500ltrs Nominal capacity
1200mm Diameter over main body
732mm Riser Diameter
2800mm O/A height

Installation Location and Certification

These tanks are not designed for vehicle loads and shall be located no closer than 1.5m to a driveway, road frontage or a building. If for any reason the tank is located where vehicle traffic may drive over the tank or approach closer than 1.5m, or where it may be trampled on by farm stock then the tank should be protected by a concrete slab designed to support these loads. Surface water must also be diverted from flowing into the installation.

Installation must be certified to AS/NZS 1547:2012, the certificate to be issued and held by the regulatory authority.

High Water Table Installations

All roto-molded tanks have been engineered and designed with support ribbing for maximum strength, in accordance with the NZC 3604. Clauses B1 and B2 for structure and durability, to withstand any hydraulic pressures, both lateral and uplift, created by high water table conditions, even when the tanks are completely empty at install stage.

As per the NaturalFlow Systems installation instructions, in these conditions, tanks must be anchored in with concrete around base, as per the installation instructions, to height as specified.

Plumbing Pipes and Fittings

All internal plumbing is done with PVC pipes with appropriate connections according to AS/NZS 1260 and AS/NZS 4130.

Backfill and Bedding

Place and bed to NZBC G13/AS2, using compacted granular metal, in layers not exceeding 100mm.

Electrical

Where a pump is required on a flat site electrical connection must be installed according to AS/NZS 3000 and the control and alarm system must be in a weatherproof housing located in a readily visible position.

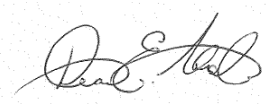
Warranty

WATERFLOW NZ LTD warrants that the NaturalFlow System will be free from defects in material and workmanship for the following periods of time from the date of installation as set out in the following conditions:

1. Roto-Molded tanks 15yrs
2. Filter media 15yrs
3. Dosing float/and or pumps 2yrs
4. WATERFLOW NZ LTD will at its discretion replace or repair such components that prove to be faulty with the same or equivalent part at no charge.
5. Warranty of operation covers the performance of the NaturalFlow systems as connected to the effluent inflow for which they are designed, and also installed to the criteria as set out in the relative installation instructions and procedures.

Warranty excludes defects due to:

A) Failure to use the system in accordance with owner's manual.
B) A force majeure event outside the reasonable control of WATERFLOW NZ LTD such as (but not limited to) earthquake, fire, flood soil subsidence ground water table variations or plumbing fault.
C) Modifications to surrounding landscape contours after installation
D) The actions of a third party
E) The system required to bear loads (either hydraulic or biological) greater than that for which it was designed
F) Any modifications or repairs undertaken without the consent of WATERFLOW NZ LTD
G) Failure, where applicable, to fence and plant land application system (disposal field)



1st June 2014
Dean Hoyle
Managing Director

NaturalFlow Series CS50 Dose Installation Instructions

The NaturalFlow system is to be installed or signed off by a registered Drain layer to the design specified by Waterflow NZ Ltd.

The following installation instructions and procedures followed correctly will ensure System performance is not compromised in any way.

1. Excavate a 2.5m diameter level platform for the Wormorator® at the appropriate depth to ensure adequate fall for inlet pipe from the source. This has to be installed on virgin ground.
2. Lay 100mm of bedding metal on platform and place Wormorator®. Do this before excavating for dose chamber as this helps keep the excavations to a minimum.
3. Analyze where the dose chamber needs to be placed (this needs to line up with the outlet at the base of the WORMORATOR®) and excavate a 1.3m diameter level platform 550mm below the Wormorator platform (this allows for 100mm of bedding material).
4. Lay 100mm of bedding metal on dose chamber platform and place tank.
5. Measure the distance between the Wormorator outlet and dose chamber inlet allowing 50mm both ends to insert into tanks. Mark pipe before inserting to ensure there is 50mm of pipe inside both tanks also fit the directional junction with flow being towards dose chamber.
6. Fit enough riser pipe to directional junction, to bring it up to grey water outlet level.
7. Trench from Dose Chamber outlet to disposal field, ensuring there is a constant fall from outlet to disposal field.
8. Where possible excavate a trench away from System and lay drain coil and drainage metal at the base of the system to drain away any surface or ground water. On a flat or high water table site System must be bedded in as per appendix A below.
9. Take a minimum of 3 photos at this point to showing connections and back fill, to ensure correct installation for sign off.
10. Back fill around dose tank with pea-metal or similar. DO NOT back fill against the plastic tanks with soil or clay of any type as this can cause point pressure on the modules, through expansion and contraction, and will cause distortion. Back filling with soil or clay is acceptable around the concrete Wormorator.

Caution: System must be protected from excessive super imposed loads both lateral and top loads. E.g. loads from vehicular traffic. There needs to be at least 2m of clearance maintained around system.

Worms: Ensure adequate moisture in the Wormorator® and add worms once installed unless systems is not going to be used within 2 months of installation.

NaturalFlow Series CS50 Pump Installation Instructions

The NaturalFlow system is to be installed or signed off by a registered Drain layer to the design specified by Waterflow NZ Ltd.

The following installation instructions and procedures followed correctly will ensure System performance is not compromised in any way.

1. Excavate a 2.5m diameter level platform for the Wormorator® at the appropriate depth to ensure adequate fall for inlet pipe from the source. This has to be installed on virgin ground.
2. Lay 100mm of bedding metal on platform and place Wormorator®. Do this before excavating for dose chamber as this helps keep the excavations to a minimum.
3. Analyze where the dose chamber needs to be placed (this needs to line up with the outlet at the base of the WORMORATOR®) and excavate a 1.3m diameter level platform 550mm below the Wormorator platform (this allows for 100mm of bedding material).
4. Lay 100mm of bedding metal on dose chamber platform and place tank.
5. Measure the distance between the Wormorator outlet and dose chamber inlet allowing 50mm both ends to insert into tanks. Mark pipe before inserting to ensure there is 50mm of pipe inside both tanks also fit the directional junction with flow being towards dose chamber.
6. Fit enough riser pipe to directional junction, to bring it up to grey water outlet level.
7. Where possible excavate a trench away from System and lay drain coil and drainage metal at the base of the system to drain away any surface or ground water. On a flat or high water table site System must be bedded in as per appendix A below.
8. Take a minimum of 3 photos at this point to showing connections and back fill, to ensure correct installation for sign off.
9. Trench from Dose Chamber outlet to disposal field, ensuring there is a constant fall from outlet to disposal field.
10. Back fill around dose tank with pea-metal or similar. DO NOT back fill with soil or clay of any type as this can cause point pressure on the modules, through expansion and contraction, and will cause distortion. Back filling with soil or clay is acceptable around the concrete Wormorator.

Caution: System must be protected from excessive super imposed loads both lateral and top loads. E.g. loads from vehicular traffic. There needs to be at least 2m of clearance maintained around system.

Worms: Ensure adequate moisture in the Wormorator® and add worms once installed unless systems is not going to be used within 2 months of installation.

Appendix A

High Water Table: For installation in high water table areas, make sure you have a pump to pump away ground water whilst installing. Excavate a pump cavity to one side of the platform and pump ground water away during entire installation process .Half fill dose tank with water, this will flow back into Wormorator as well and will help with resisting the hydraulic uplift (ensure that Wormorator is not completely flooded). Either lay 2-3m^3 of concrete around the base of the tanks or mix 3 bags of cement/cube of GAP20 (or similar) metal to form a mass to stop any hydraulic uplift. Leave water in tanks for at least 12 hours after installation is completed and then pump out to allow Wormorator to dry out.

Appendix B

Instructions for fitting UNISEAL®

1. Cut hole to the Hole saw size indicated for the UNISEAL® you are using. Either 127mm hole for a 4”/100mm pipe or 67.2mm hole for a 2”/50mm pipe.

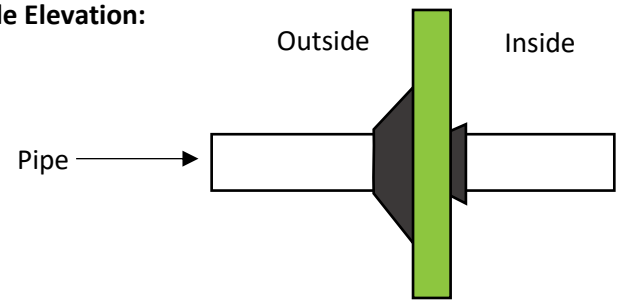
2. Ensure that the hole is clean cut with sharp edges. Irregularities could cause poor seating and ultimate leakage.

3. Insert the UNISEAL® into the hole with the wide side facing the pipe to be inserted.

4. Make certain that the pipe end to be inserted is clean cut. File the edges so that there are no sharp points to cut UNISEAL®.

5. Using Detergent, lubricate the outside of the pipe end to be inserted, then push the pipe through the UNISEAL® from the large flange side. The detergent will be squeezed off as the pipe passes through the UNISEAL®. The co-efficient of friction of the rubber holds the pipe tightly in place.

Side Elevation:



NaturalFlow Series CS50 Flow Charts

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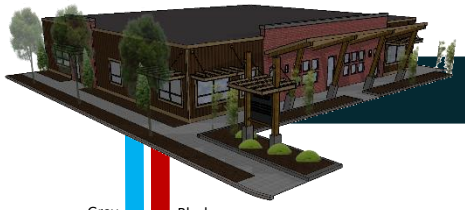
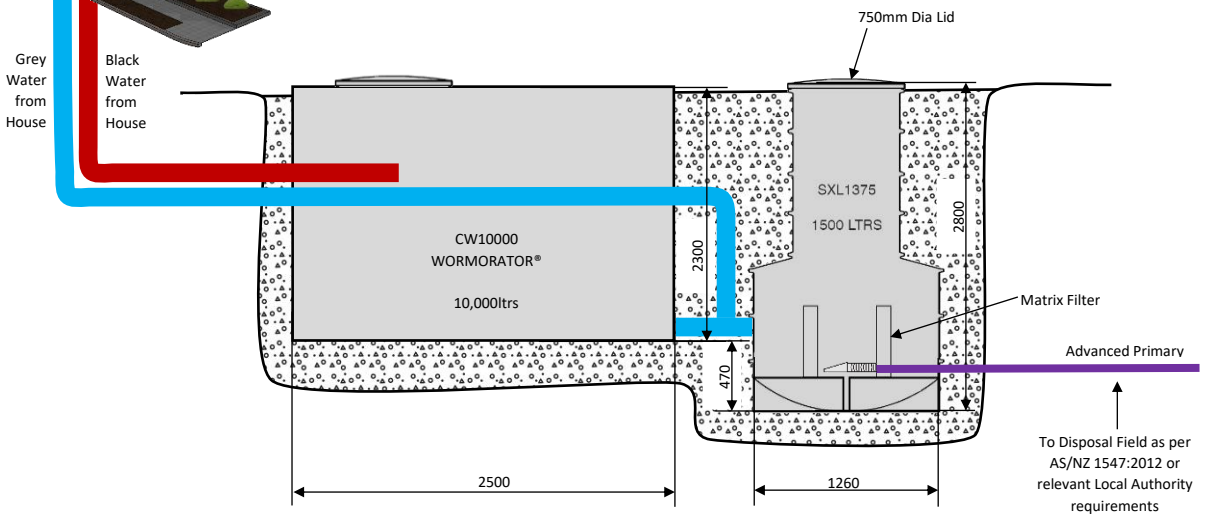
NaturalFlow Series CS50 Treatment System Dose





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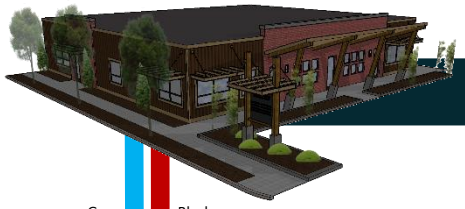
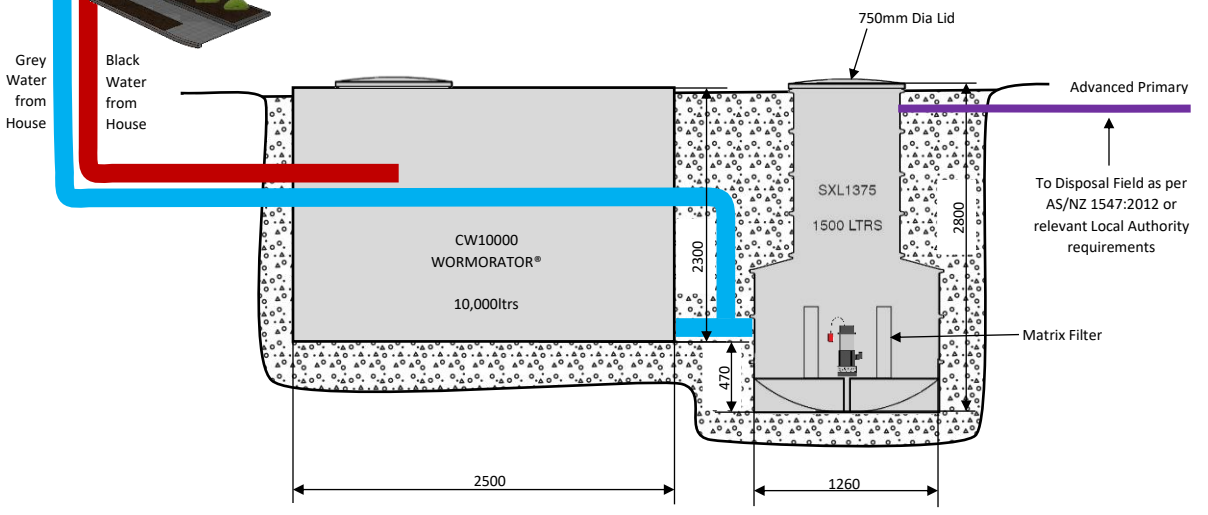
NaturalFlow Series CS50 Treatment System Pump





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