clivusmultrum ecoLet
WATERLESS COMPOSTING TOILETS

Owners Manual

ECOLET NE (SEPARERA)

The EcoLet is a biological composting toilet that uses the process of evaporation and aerobic decomposition to transform human faecal waste, urine and toilet paper to a hygienically safe product (humus) that may be safely utilised if disposed of in a manner described in this manual or by local health authorities.

Thank you for your purchase of an EcoLet Composting Toilet. With proper installation and maintenance, we are certain it will offer you a convenience and reliability you would expect from the manufacturer of the best selling septic free toilet in the world. Please read these instructions carefully as they will give you vital information about installing and maintaining your EcoLet.

Specifications

Capacity:	2 person full time use 4 person part time use.
Max Weight:	158kg
Material:	ABS
Dimension:	740 L x 400 W x 635 H
Operating Temperature:	Subject to ambient temperature & number of compost chambers
Key Feature:	Urine Separation

Electrical Requirements

Ventilation Fan:	2.6W 12V DC

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CONTENTS

1.0 PACKAGE CONTENTS

Please ensure that the package you received contains all items listed in the packing list document no. F-228 that comes with your EcoLet package.

If anything is missing, please contact your supplier immediately.

Item	Quantity
Pedestal	1
Compost chamber	2
Urine bowl diverter	1
12V DC fan c/w transformer	1
15 litre bags of humus starter	1
25mm drain hose	1.5m
Drain Clamp	1 (1 extra only for rear drainage con guration)
Hose Barb	1 (only for rear drainage con guration)
Screws	4
Long spacers	2
Short spacers	2
Washers	2
Ventilation and drain kit	Optional

Figure 1: Package content.

2.0 INSTALLATION

This section outlines the requirements and procedures to ensure trouble free installation. Please follow the instructions exactly and contact Clivus Multrum for any installation questions.

2.1 Tools Required

I. Drill
II. Hole Saw 25mm & 57mm.
III. Hand Saw
IV. Screwdriver
V. Tape Measure
VI. 100% Silicon Adhesive Sealant with Caulking Gun
VII. Pencil
VIII. Spirit Level
IX. Spade

2.2 Materials Required

I. 50mm DWV PVC pipe and fittings for ventilation pipe depending on installation requirements.
II. 50mm vent pipe supports and wall or roof flashing depending on installation requirements.
III. PVC pipe glue.
IV. Drain kit or excess fluid container if not purchased from Clivus Multrum.

2.3 Pedestal Installation

The EcoLet can be installed close to a wall with the vent pipe exiting directly through the rear wall or alternatively the vent pipe can be installed on the inside exiting up through the ceiling (Figure 2).

Figure 2: Ventilation pipe installed Outside.

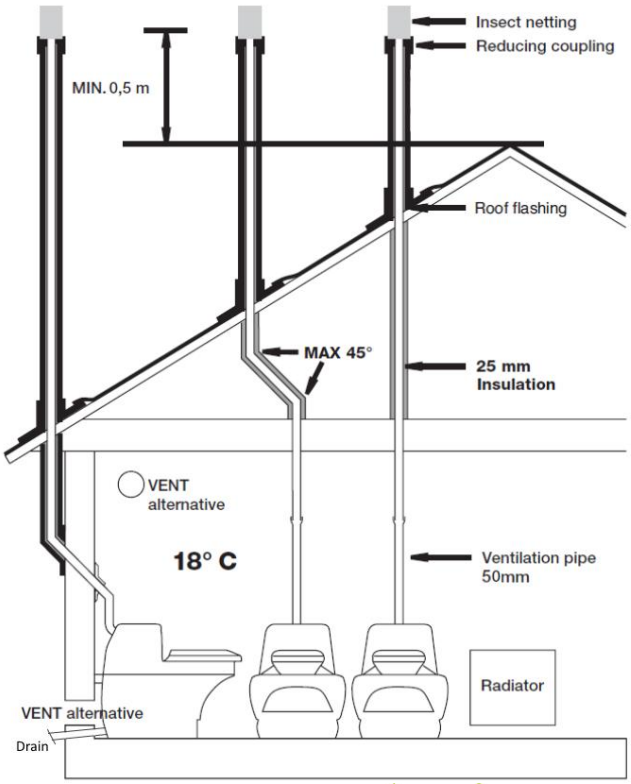
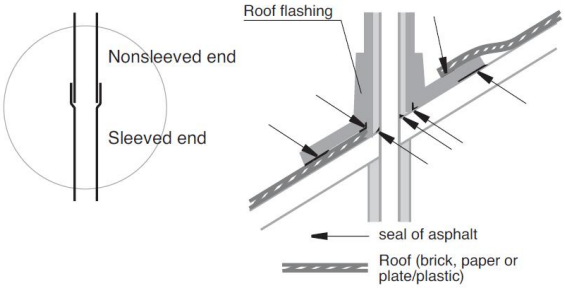


Figure 3: Roof flashing installation.



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2.0 INSTALLATION

The following instructions relate to Figure 2 and Figure 3. These are recommended installation procedures but may vary depending on the location.

1. Unpack the unit and remove all contents from the pedestal.
2. Position the unit 60mm out from wall due to vent pipe exit from rear.
3. Mark vent pipes and drain outlets. Please note that your EcoLet Separera drain outlet can be at the rear or base depending on your preference made when purchasing the unit from Clivus Multrum as shown in Figure 4.
4. 57mm and 25mm hole saws are required for vent pipe and drain outlet respectively.
5. If your unit has rear drain outlet, drill hole through wall using the 25mm hole saw.
6. Connect and a x the drain hose to drain outlet using the clamp supplied.
7. If your unit is to be drained through oor, drill hole through the protruding circle located at Ecolet Separera oor as shown in Figure 5.
8. Also drill 25mm hole through oor at the drain outlet position marked earlier.
9. Connect and a x the drain hose to the urine bowl diverter outlet using the clamp supplied and run the hose down through the oor drain outlet drilled.
10. Use 57mm hole saw, drill hole through wall and install vent pipe. Ensure no more than 2x 45° or 30° elbows being used.
11. Slide roof ashing over ventilation pipe and seal. Vent pipe must be extended at least 0.5m above roof and braced against wind.
12. Adjust ashing and use roof sealant (silicone) to seal roof and ashing as shown in Figure 3.
13. Secure insect mesh on top of the vent pipe.

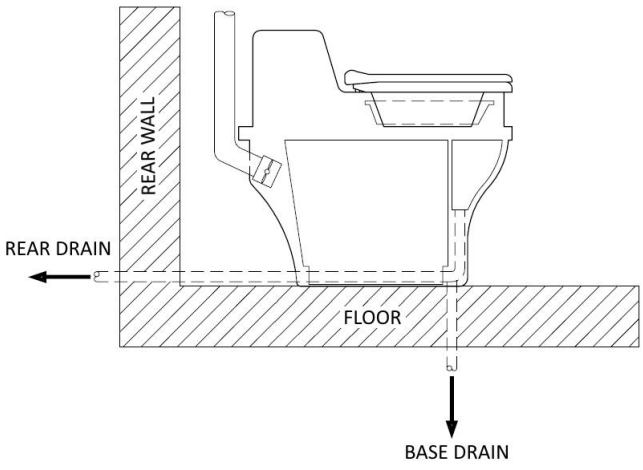


Figure 4 : Rear w all or base drain con gurations

Figure 5: Protruded circular guide for base drain.

2.0 INSTALLATION

2.4 Excess Liquid Drain Installation

The drainage system to be chosen depends entirely on the soil condition, ground water level, and local regulation.

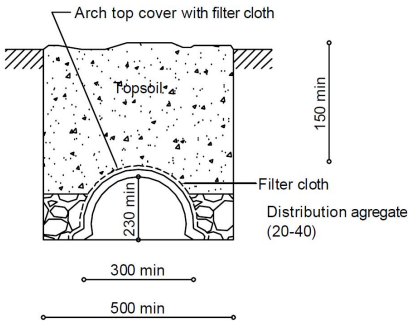
2.4.1 Absorption Trench

This is the normal method for disposal of excess liquid, but refer to council for permit for any speci c requirements. These instructions apply to installation of the drain kit items available from Clivus Multrum.

1. Dig a trench in a position located in front of the liquid end product drain.
2. The trench is to be located in soil of good permeability and in a position where ground water will not ood the unit.
3. If there is some doubt as to the permeability of soil, extra trenching length may be required especially if a hand basin or other ttings will also drain to the same trench.
4. The liquid leaving the compost unit when in use is not expected to exceed 1 litre per day per resident.
5. In some locations it may be desirable or necessary to connect the excess liquid drain to a grey water system or an alternative disposal method complying with AS/NZS 1547:2012.

Trench dimensions and construction are to be in accordance with AS/NZS 1547:2012, as shown in Figure 4.

Figure 6: Durable self supporting arch trench



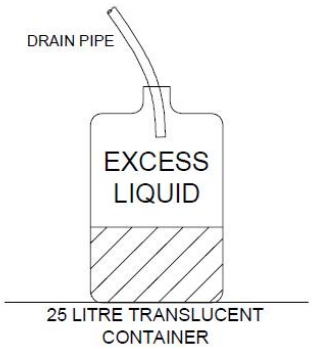
Dimensions in mm.

It is important to ensure that the trench is level along its length. Ensure the liquid drain pipe slopes away from the toilet. Trench should be protected from surface water and ooding, and vehicle tra c.

2.4.2 Option II–25 Litre Translucent Container

This option is for installation with high ground water level, poor permeability or rocks.

Figure 7: Translucent Container 25 Litre Capacity



Excess liquid can be drained into the container. When lled, remove and dilute 1 to 4 with water and use as fertiliser.

3.0 USING THE ECOLET

3.1 Initial Setup

1. Remove top of pedestal. Ensure compost chamber is placed inside the pedestal.
2. Connect the power outlet for the ventilation fan to power socket.
3. Lift and fold back the chamber lid. (Only close the lid when leaving the chamber outside for further composting)
4. Add 5 litres of wood shavings into the compost chamber.
5. Replace the top of pedestal and EcoLet is ready to be used!

4.0 MAINTENANCE

4.1 General Care

The EcoLet should be examined regularly to ensure correct operation. The key areas to be checked are listed below:

- Wash the urine diverter bowl from time to time using hot water to prevent salt deposits.
- Check ventilation fan is running.
- Check there is no access liquid in the compost chamber and pedestal. Refer to Section 7.0 for troubleshooting.

4.2 Removing The Chamber

The active compost chamber should be replaced with an empty one when it is approximately 75% full or when the pile is approximately 200 mm from top of the toilet seat.

1. Remove the top of pedestal and close chamber lid.
2. Swing the handle upright and lift the chamber out from the pedestal. When lifting the chamber, please be aware that there may be liquid dripping o from the chamber oor holes.
3. Place the chamber outside for secondary composting. The chamber should be placed in a warm sunny position preferably in a warm area such as directly under the sunlight and where direct access is restricted.
4. Put the empty second chamber in the pedestal. Remove the chamber lid and keep it in a safe place.
5. Add 5 litres of wood shavings.
6. Put back the pedestal lid.
7. EcoLet is ready to be used again.

4.3 When Do I Empty The Secondary Chamber?

As a general rule, you should leave the material in the compost chamber as long as possible. The EcoLet has been designed for 2 people full time where the average monthly temperature is greater than 18° C in any given month. Under these conditions the full chamber should only require a maximum of 60 days before it is ready for emptying.

Compost temperature is a signi cant factor in the time required for composting process. The higher the temperature within the optimum range, the faster the compost process. As a reference, 50 days is required to reach 50% decomposition with a compost temperature ranging between 22-24°C.

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4.0 MAINTENANCE

When ready for disposal the composted end product should not contain recognizable faecal material and there should be no o ensive odours immediately after removing the chamber lid.

If there is more than 2 people using the toilet or you are in a colder area then additional compost chambers may be required. Additional compost chambers can be purchased from Clivus Multrum.

4.4 How Do I Dispose The Composted End Product?

Clivus Multrum recommends wearing protective clothing whenever handling waste products. Recommended protective clothing includes gloves, appropriate footwear, a face mask and ideally eye protection.

You should dispose of the composted waste in accordance with any and all local authority regulations. All composted product should be handled and treated with caution as there is a risk of exposure to pathogens particularly if the product is not properly composted.

For an on-site burial of composted end product, it should be undertaken in a location where direct access by human and animals are restricted. It should be buried with a minimum cover of 100mm-300mm, depending on local authorities, in soil that is not intended to be used for the cultivation of root vegetables or near a water catchment area.

4.5 Adding Bulking Material

It is important to add bulking material into your toilet, we suggest 1 cup per day directly into the compost chamber. This amount is based on two people using the system full time.

By mixing the solid waste, paper and bulking material, the compost will be kept porous and moist, the supply of oxygen will increase, which substantially speeds up the transformation of waste materials into humus.

Bulking material: Wood Shavings or Chopped Straws

4.6 Insects

If insects have entered into your compost, you should sprinkle an insect control powder or any other long lasting pyrethrum based product over the compost chamber.

4.7 Cleaning

Use mild detergents on your EcoLet NE. Never use scouring powder or other strong detergents that could scratch the surface, or kill o your good bacteria. We recommend green friendly or septic safe products.

4.8 Warning

Never put cigarettes or other burning material, tampons or sanitary napkins into your toilet!

5.0 HOW COMPOSTING WORKS

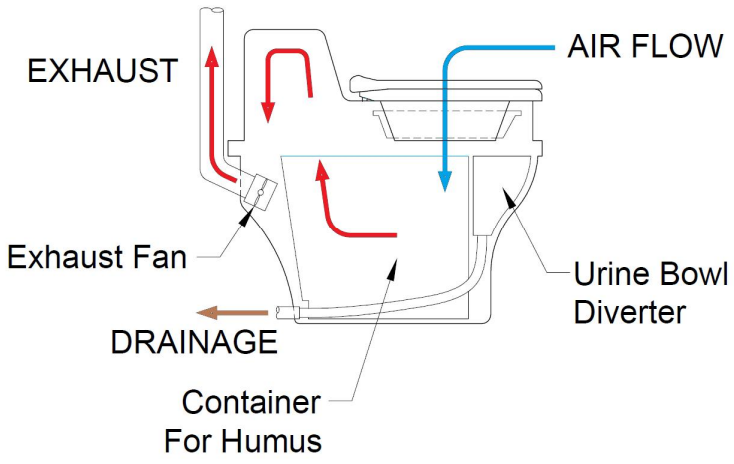

Figure 8: How EcoLet NE Separera works.

5.1 General

Composting involves the biological decomposition of organic matter using natural occurring organisms such as bacteria, fungi and other small organisms into compost which is a humus-like product.

The composting process can be aerobic or anaerobic however aerobic decomposition is desirable because it is e cient and does not produce unpleasant odours. Composting in a EcoLet is e ectively aerobic however there may be anaerobic decomposition within small pockets within the compost pile.

The composting process involves four main components: microbes (including bacteria, fungi and protozoa), organic matter, water and oxygen.

The carbon compounds present in the organic materials are used by the microorganisms as an energy source and transformed into carbon dioxide using the oxygen present. As the carbon dioxide and water vapor is released into the environment the pile becomes smaller.

Nitrogen is also a crucial element in the composting process which is required by the microbes for cell growth. For optimal decomposition the ratio of carbon to Nitrogen should be around 30:1. Urine and human feces are relatively high in Nitrogen and therefore additional carbon is required for optimal composting.

5.2 Moisture

In optimum conditions, the compost material has the consistency of potting mix about 35% to 65% moisture.

When below 35% , there is not su cient moisture for the microorganisms to function and above 70% saturated conditions begin to develop and oxygen depletion becomes a limiting factor. Under these condition the process becomes anaerobic and the process releases odorous gases such as methane and hydrogen sulphide.

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5.0 HOW COMPOSTING WORKS

5.3 Temperature

The optimum temperature range for most compost toilets is 18°C to 45°C.

Lower temperatures result in a mouldering process that takes a signi cantly longer period of time to compost. Additional chambers may be required in this instance.

5.4 Aeration

The aerobic organisms responsible for the composting process require air to survive.

Without air, they will die and be replaced by anaerobic micro organisms that will slow the composting process and generate odour.

For compost toilets to work most e ectively, the material being composted should be unsaturated with liquids, and have a loose texture to allow air to circulate freely within the pile.

5.5 Pathogens

Pathogens are eliminated through the long retention times in the compost, the compost temperature and the activity of the micro-organisms.

6.0 WARRANTY

Pedestal:

- 2 years warranty.
- Any damage caused by exceeding the maximum recommended weight listed in speci cation would void your warranty.

Ventilation Fan

- 12 months limited warranty.
- Powering the fan with unregulated power source exceeding 12V or using power supply not recommended by Clivus Multrum would void your warranty.
- Any faulty fan during the warranty period should be returned to Clivus Multrum before replacement can be provided.

All other components come with standard 12 months warranty.

7.0 TROUBLESHOOTING

A. Why is the compost chamber filling too quickly?

This can be caused by inefective composting process due to a number of issues listed below:

Insufficient air flow – Without sufficient air flow, the evaporation process will be slowed and odours start to escape into the toilet room. This can be caused by a malfunctioning fan or ventilation system has been blocked. Check if fan is properly connected or replace the fan if broken. Check if the insect netting has been block.

B. Why is the composting process slow to complete?

Composting process is dependent on temperature and humidity. Listed below are factors that could slow down the process:

Compost pile being too wet – The addition of wood shavings is an imperative part of the operation of a composting toilet. Wood shavings will assist with the absorption of liquid in your composting toilet and will aid in improving the carbon/nitrogen ratio (important for composting) and will allow air to flow more freely through the system as it loosens the compost pile.

Compost pile surrounding temperature is too low – In cool climates do not insulate the toilet; turn down the fan voltage to lessen cool air being drawn into the system. If odour occurs due to the fan voltage being turned down low simply turn it up slightly to increase air flow.

When taking the compost chamber out for secondary composting, make sure it is located in a warm spot preferably in direct sunlight.

C. How to deal with insects attracted to compost pile?

Usually insects in the compost pile indicates that the humus is too dry. Add a cup of water to the compost.

Insect Control – To break the breeding cycle of insects (most commonly vinegar flies) spray the compost pile with pyrethrum based insect spray for 7 consecutive days. Always place a layer of wood shavings over the top of the pile in the out of service chamber to eliminate the possibility of insects laying eggs.