ROTA-LOO

RL650 Owners Manual



Compost Batch Cycle Toilet System

GREEN LOO

Proudly manufactured in Australia and distributed through Green Loo Pty Ltd

CONGRATULATIONS AND THANK YOU FOR PURCHASING YOUR NEW ROTA LOO

The reasons for purchasing a Rota-Loo may be varied. It could be to conserve water, the pursuit of a more sustainable life style, or that mains sewer is not available. Your decision will help towards conserving water, reduce waste processing costs and contribute to a more sustainable future.

The first portable composting toilet came into Australia from Sweden in the late 1970's. From this idea the Rota-Loo was born, and has been developed and improved over the years to become one of the best Waterless Composting Toilet (WCT) systems in the world and have been successfully installed and operated in thousands of places throughout Australia, New Zealand and further afield.

Today, Waterless Composting Toilets are becoming more widely accepted and other products have appeared on the market. With Rota-Loos installed decades ago still operating well and owners recommending them to others, the Rota-Loo remains the simplest, most efficient and cost effective WCT available.

We hope the Rota-Loo fulfills your expectations and that it may even ignite a hidden passion to live a sustainable lifestyle and pass on the message. If you have difficulty in installing or maintaining your Rota-Loo, please get in touch with Green Loo through our website at www.greenloo.org.

PFG Group Victoria Pty Ltd is a Quality Assured company certified as compliant to ISO9001:2015

CONTENTS

Introduction.....page 3
The Composting Process..... page 3
How Rota-Loo Works ..... page 4
A Quick Guide.....Page 5
Installation Planning - Space Required ..... page 5
Installation Planning - Toilet Pedestal Location ..... page 6
Installation Planning - Structural Issues, Vent System, Excess Liquid..... page 7
Installation - Locate Rota-Loo, Prepare Floor..... page 8
Installation - Attach Pods, Final Location, Attach Inlet Piping..... page 9
Installation - Attach Fan & Outlet Piping, Turbo Vent, Fan, Electrical Connection, Insulation ..... page 10
Pedestal Installation.....page 11
Installation - Waste Chute & Pedestal, Final Checks .....page 12
Operation Overview ..... page 13
Operation - Start, Bin Filling .....page 13
Operation - What to put in, What NOT to put in, Cleaning Pedestal.....page 14
Operation - Bin Rotation, Keeping Record.....page 14
Periodic Maintenance - Salt Build up.....page 15
Fan .....page 16
Trouble Shooting.....page 17
Risk Assessment - Inspection, Storage, Access, Quality.....page 19
Risk - Transfer of Ownership, No Bulking Material, Carousel Not Turned, Too Hot.....page 20
Risk - Too Cold, Too Humid, Is Removed Early, Poor Drainage, Flooding.....page 21
Risk - Decommissioning.....page 22
Warranty .....page 22
Appendix - Checklist, Kit Parts List, Tools List .....Page 24

INTRODUCTION

The aim of this section is to give you an overview of the use of a Waterless Composting Toilet and in particular a Rota-Loo. It will cover the composting process, and how Rota-Loo works to ensure correct composting and what you will need to consider in the installation of your Rota-Loo.

THE COMPOSTING PROCESS

Composting is nature's recycling process. It is how organic material is broken down by micro-organisms to produce a rich product called Humus, an organic fertiliser, mulch and soil conditioner made from decayed organic material. Because human waste is an organic material, it can be composted to produce humus.
The quality of the humus from a Waterless Composting Toilet (WCT) will be influenced by the design and installation, the materials you are adding and climatic conditions. In a correctly installed and maintained Rota-Loo you can create humus which is soil like in texture and smell.

There are two main groups of bacteria that can be used in composting. Aerobic (requires oxygen) and anaerobic (no oxygen required). Aerobic bacteria processes material faster and with significantly less odorous gases than anaerobic bacteria. If the material in the bin gets too wet or compacted down, air (oxygen) cannot circulate through the pile and aerobic bacteria will die out and be replaced by anaerobic bacteria. Anaerobic bacteria are responsible for creating odours (nitrous oxide or rotten egg gas") which are associated with some composting and septic systems.

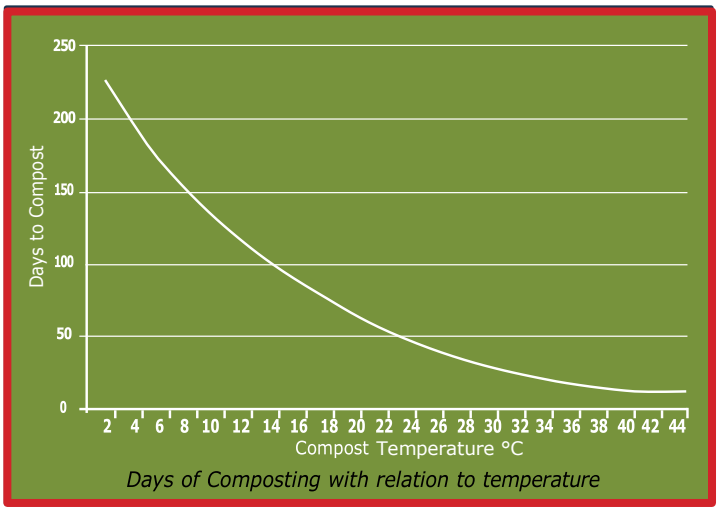


To maintain aerobic decomposition, it is important to keep the moisture containment of the material below 70%, and ideally between 50% and 60%.

The heat of the compost pile is also very important in composting. Depending on the temperature there will be different dominant bacteria groups:

- Below 41°F (5°C) very little activity takes place.
- From 42°F (6°C) to 68°F (20°C) – Psychrophilic,
- From 69°F (21°C) to 113°F (45°C) - Mesophilic,
- From 114°F (46°C) – 160°F (71°C) Thermophilic.

From the graph shown (from AS1546.2) the time for organic material to be composted is very dependent on the temperature. Heat will be generated by the bacterial activity, but holding that heat and adding to it is important for effective operation of a waterless composting toilet system.



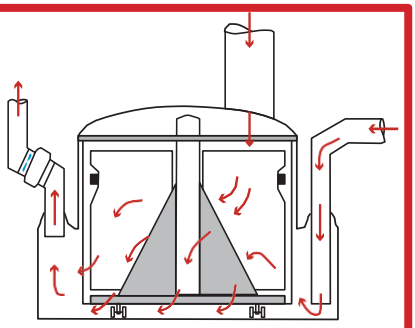
Days of Composting with relation to temperature

A realistic operation is to encourage the Mesophilic bacteria by maintaining warmth in the WCT and adding bulking materials to promote a loose textured pile that allows good air flow (oxygen supply). The Carbon-Nitrogen ratio (C/N) is a further important aspect in composting. Carbon and Nitrogen is the food required by micro organisms. The C/N Ratio can vary from 40:1 to 25:1, but in general terms you need a lot of Carbon to a small amount of Nitrogen so for optimum efficiency some high carbon bulking materials should be added.

HOW ROTA-LOO WORKS AND ENSURES EFFICIENT COMPOSTING

Inside the Rota-Loo are six bins located on a turntable. When a bin is in use it is located directly below the toilet pedestal and human waste, toilet paper and bulking material will be added to the bin. When the bin is full the turntable is rotated to the next available bin and the full bin is allowed to compost until it is needed again - typically about 12 months. By keeping the composting material inside the Rota-Loo, the best composting environment is maintained, and there is no need to move uncomposted material.

In the bottom of the bins there are a number drainage holes and a replaceable Jute liner which allows liquid to seep through to the outer tank reducing the moisture content of the composting pile.
Oxygen is provided by air flow which is created by the continuous operation of the fan. This fan, located on the air outlet pipe, also creates a negative pressure at the pedestals, making sure your toilet room is always fresh. The sides of the bins also have a number of holes to allow warm air to flow around and through the bin delivering oxygen to the bacteria.



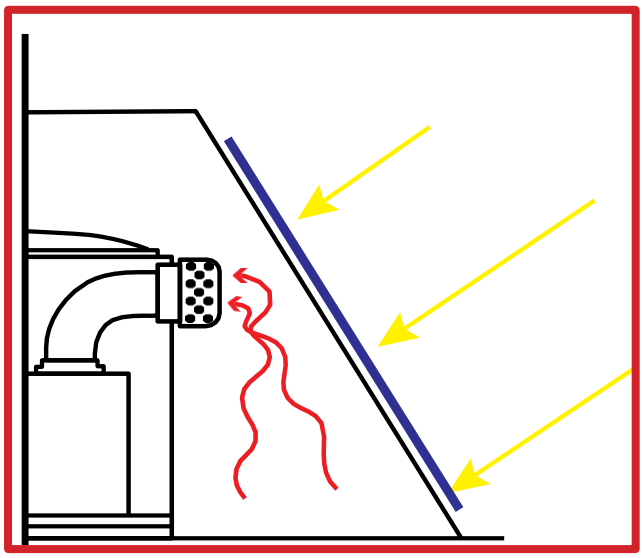
Typical air flow through the chamber

Typically, the air flow through the Rota-Loo is sufficient to evaporate the liquid that has collected in the base of the Rota-Loo chamber - note that the design of the Rota-Loo has the inlet vent low and opposite the outlet to promote cross-flow.

Where the usage of the Rota-Loo results in excess liquid that cannot be evaporated in normal operation, there is provision to drain off the excess liquid to a secondary evaporator or absorption trench.

Heat for composting is generated by the bacterial activity. Retaining the heat available is important and adding extra heat will assist the process. Using good insulation within the structure and passive solar heat are both important methods to create and retain internal warmth.

The design of the Rota-Loo provides a natural air-gap insulation around the bins. It is recommended that the Rota-Loo is installed in an insulated space to help retain heat - this is particularly important in cold climates where temperatures are regularly below 10°C. Placing the Rota-Loo in a sun-facing position and/ or in a Soltran module will improve operation.





The Soltran Principal
Clear sheeting is angled at 60 degrees with the largest surface preferably facing north. The rays of the sun heats up the cool air inside, the warm air is drawn into the Rota-Loo by the fan in the vent pipe. The front of the Soltran can also be used as the access door to the Rota-Loo room.

A significant amount of heat is lost in the airflow system, so a Rota-Loo installation requirement is that the inlet air is drawn from a warm air area, preferably through piping that acts as a solar collector (being placed in a sunny location and painted black are the simplest methods).

When a composted bin has rotated through the Rota-Loo chamber, it will be ready to empty before filling again. If all has been operating well, the result will be a soil like Humus compost which can be used as a fertiliser in the garden.

A QUICK GUIDE - INSTALLATION

It's all in the planning! Read below for a detailed guide in properly planning your installation.

For proper operation of the Rota-Loo you should consider a number of issues during the building design stages to enable the natural composting processes the best chance to give trouble-free operation. The design of the site and building needs to allow for:

- The location of the toilet pedestal in the building as well as the required structure to have the Rota-Loo placed below floor level.
- Space for the Rota-Loo and a firm, dry and sheltered base for it to sit.
- Adequate access to service and maintain the Rota-Loo.
- Warmth to assist the composting process by locating the Rota-Loo in a sunny place and maybe installing insulation, particularly in cooler climates around the structures cavity
- Good ventilation to provide oxygen and evaporate liquids
- Electrical supply (240V or 12V) to the fan location

The Rota-Loo RL650 is supplied as a kit containing most of the components required and can be installed using basic building tools and materials available at plumbing suppliers or hardware shops. See the Appendix for a list of supplied parts and required materials and tools.

Installation of the Rota-Loo involves:

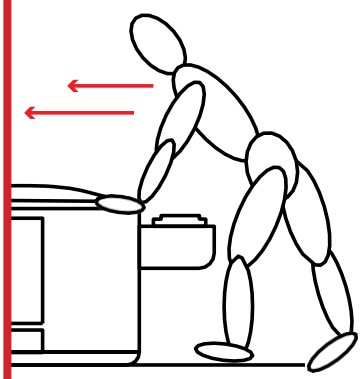
- Positioning the Pedestal and Rota-Loo to ensure a vertical drop from the pedestal to the waste bins
- Preparing a flat, level and firm base for the Rota-Loo to sit
- Installing the ventilation pipe-work, including vent pods, inlet, fan and Turbo Vent
- Connecting the Pedestal, waste chute and Rota-Loo
- Final checks before use.

INSTALLATION PLANNING

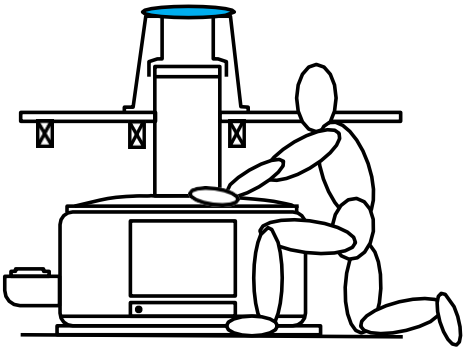
Space Required

There is no ideal set of measurements which will suit all applications but you do need to provide enough space to locate and install the Rota-Loo, enough space to fit and maintain the air vent piping and fan, and enough space to access the door to the bins. Remember that you will be accessing the bins at approximately 8 week intervals so allow space to get to the latches and manoeuvre the bins.

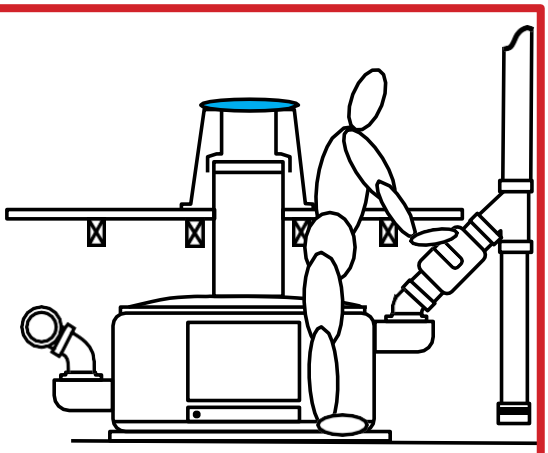
You will need:



Enough space to locate the Rota-Loo in its final place.

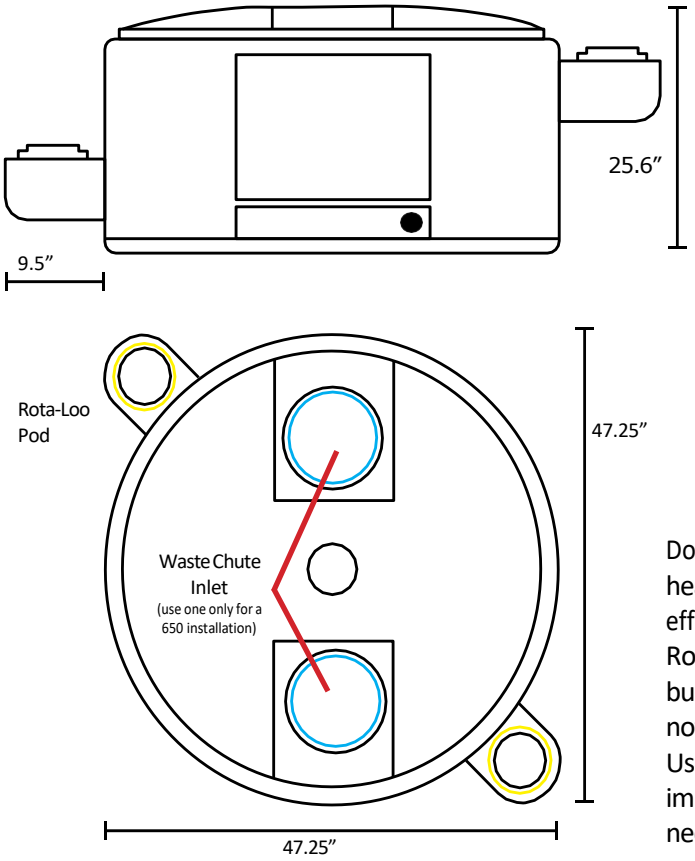


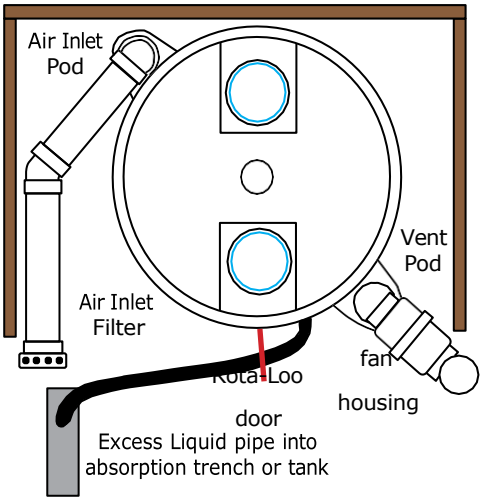
. Enough space above the Rota-Loo to connect the Waste Chute



Enough space around the Rota-Loo to connect the Air Inlet, Vent Pipe and to maintain the Rota-Loo once installed.

Allow sufficient space to permit fitting insulation throughout the build cavity. This is essential in cold climates.



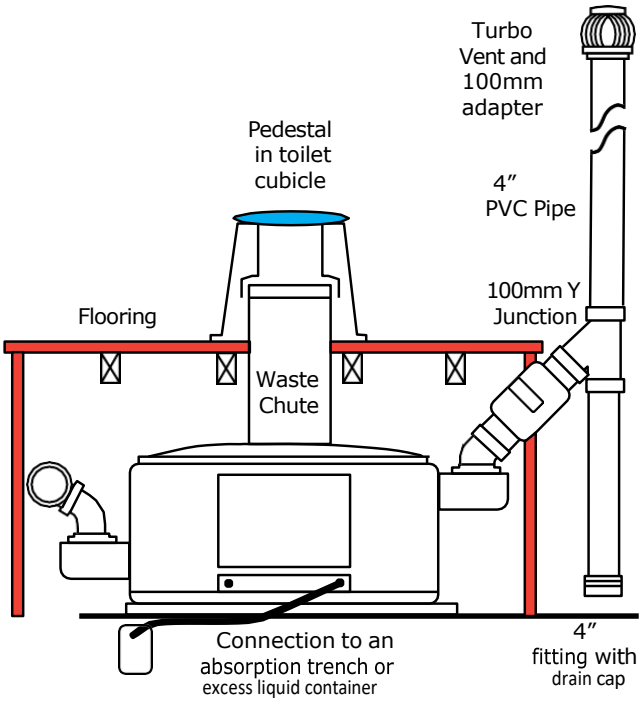


Do not underestimate the importance of acquiring and maintaining heat in the Rota-Loo. The heat is used to increase composting efficiency, help evaporate liquids and kill pathogens. Locating the Rota-Loo in a sunny location, preferably on the north side of the building (in the southern hemisphere) is worth considering and will not necessarily interrupt the energy efficiency of the building. Using a solar collector (Soltran module or similar), will greatly improve the efficiency of the operation and in cold climates may be necessary.

Locations where the monthly average temperature falls below 50 degrees Fahrenheit for 3 months or more each year will require the use of a solar collector and insulation in the cavity.
Where monthly relative humidity exceeds 80% at any time, a vent drain and insulation of the outlet vent should be installed to ensure condensate does not re-enter the Rota Loo.

Toilet Pedestal and Rota-Loo

- The Rota-Loo must be located directly below the Toilet Pedestal.
- The RL650 should have only 1 pedestal connected.
- The height of the pedestal above the Rota-Loo may vary according to the building design. The Waste Chute supplied allows for 31.5” from the base of the Pedestal to the top of the Rota-Loo but additional Waste Chutes may be added to increase this if desired.
- Don’t plan to install a light directly over the pedestal/waste chute as this will attract flying insects.



Typically the waste chute is located directly over the bin immediately at the access door as this provides the easiest operation scenario. The waste chute inlet position in the lid comes from the factory in this actual position, however the Rota-Loo lid can be rotated so the toilet drops into another bin location should the building design requires this. But please consider the impact on the operation and making sure that the active bin is always located directly under the waste chute.

Structural Issues

The Rota-Loo is installed sub-floor. It may be installed under a concrete slab or bearer and joist floor, in a full or partial cellar as desired in the building design. Consider the spacing of joists or concrete slab penetrations to allow for the waste chute. Consult a relevant Engineer to ensure support spacing and floor spans are adequate for the size and position of the Rota-Loo.

Most Rota-Loos are installed in a location largely protected from the elements and can sit freely on the base. If your installation is likely to experience extremes, you may need to consider anchoring the Rota-Loo to the ground to prevent it moving in the event of weather events. Rota-Loo is not designed to be fully immersed in water so should not be installed where severe flooding may occur without flood protection.

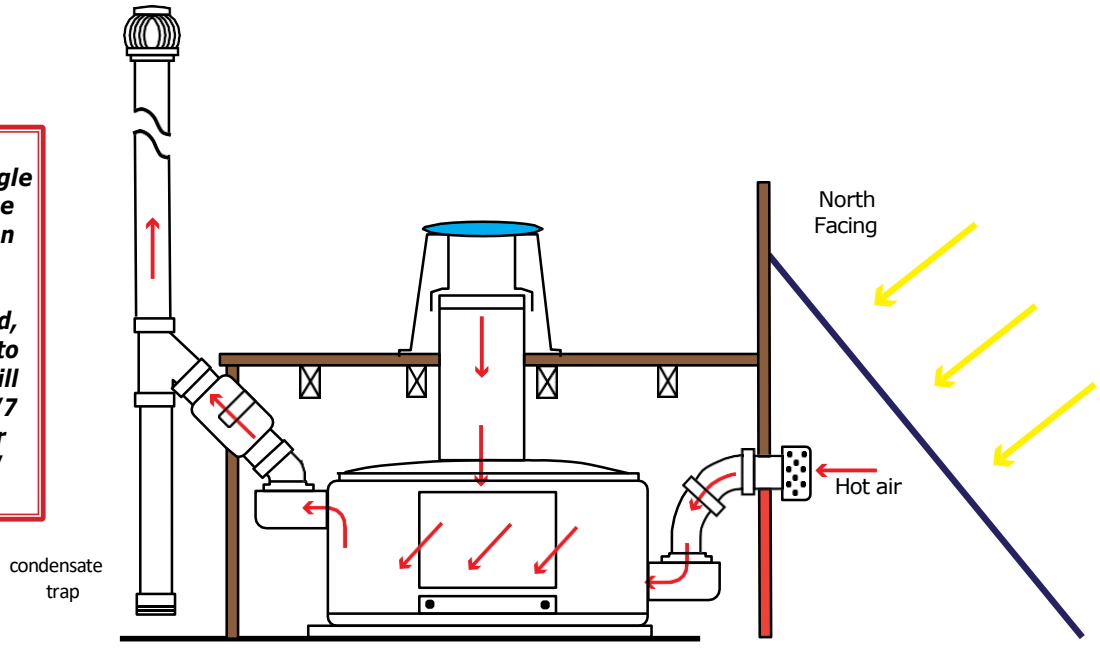
Vent System

The Rota-Loo airflow requirement is provided by 4" DWV piping (not supplied) from an inlet (Insect proof - supplied) to a Turbo Vent (supplied) and incorporates a continuous running fan (supplied).

- The Rota-Loo 650 comes with 2 Pods for the vent piping. These may be placed as suits the installation. The Inlet needs to be fitted low and opposite the Outlet, which will be higher.
- The fan is to be fitted on the outlet side. Consider how the fan will be powered (240VAC or 12VDC) and ensure the fan housing is accessible for maintenance.
- The air inlet (inlet Filter) needs to be located lower than the Pedestal, otherwise you will draw air from the toilet cubicle rather than where the air inlet is located. (To draw warm air down from ceiling cavities typically requires a second fan)
- Remember that warm air naturally rises and that sharp bends restrict airflow - designing the vent piping correctly will improve natural operation.
- Warm air holding moisture entering cold air can result in condensation. Consider insulating the outlet vent piping, and ensuring you install the supplied condensate trap, particularly in cold climates.

If a 240V fan is to be installed, a standard single PowerPoint needs to be provided close to the fan position and installed.

If solar power is planned, consult a solar installer to provide a system that will keep the fan running 24/7 - the 12V fan power consumption is 3.0W



Excess Liquid

Under normal conditions, all liquids should be dealt with by normal evaporation. If the installation experiences excessive use or does not get enough heat to evaporate the liquid internally, it may be necessary to plan to install a secondary system to handle the excess liquid. This may be a secondary evaporating tank, which should be installed in a sunny location, or an Absorption Trench System.

Speak to Green Loo for advice if you think this may be needed.

INSTALLATION

Locate Rota-Loo

The first thing to do is to decide where in the toilet room you want to place the pedestal.
Mark a centre position for the waste chute using the pedestal installation guide.

Reminder Notes:

- Be careful not to install a toilet light directly above the pedestal.
- The floor joists will need to be clear of the waste chute and provision should be made to secure the waste chute to the floor joists or another part of the building structure.

Once you have found the right spot in the toilet room, draw a 8" circle and drill a small hole through the centre point and through the floor. Go to where the Rota-Loo is to be located.

Attach a plumb bob through the centre point hole to line up the centre of the Rota-Loo waste chute hole to locate the position of the Rota-Loo.

Consider the position and ensure there is enough room around the Rota-Loo to fix the vent piping and fan and there is at least 1 yard in front of the door to access the bins.

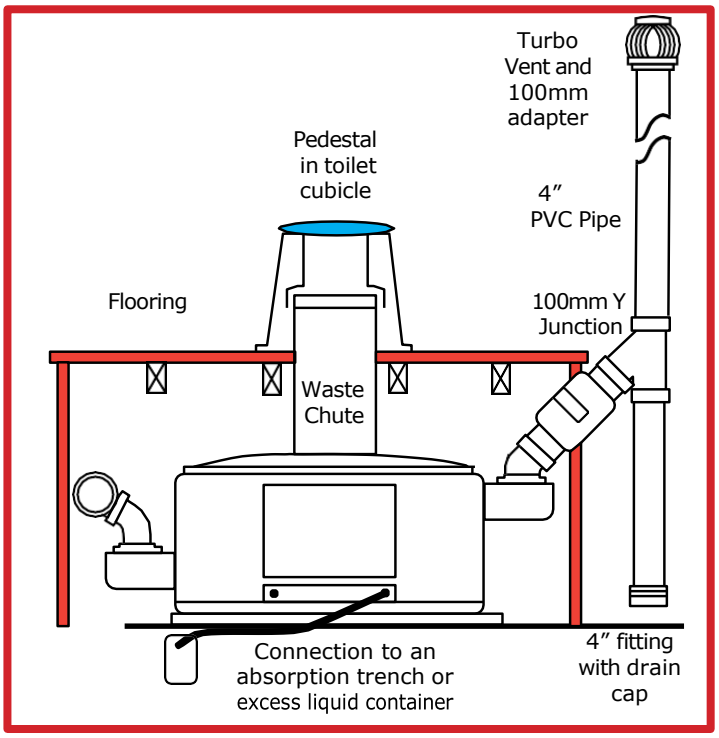
Note also:

- By maximising the length of the Waste Chute you will give yourself room to install the Waste Chute as well as minimise the visual impact when you happen to look down the Pedestal.
- Check you have clearance in the joists for the waste chute to pass through the floor.
- You also need enough space above the Rota-Loo so that you do not hit your head on the flooring joists when you service the unit.



- There are two pre-moulded depressions on the lid of the Rota Loo to receive the waste chute. If this location does not suit your application you can undo the self tappers and rotate the lid into the preferred location, ensure that you line the waste chute hole in the centre of the bin inside the Rota-Loo. Also remember that when you eventually rotate the bins you will need to line the bin up from the access door. When the desired position is found, fix the lid down using at least 8 off screws and cut out the hole to receive the waste chute.

- Determine where the Vent Pods will be fitted to the Chamber and mark the outline.
  (Remember the Fan goes on the outlet side, so make sure the Outlet Pod allows easy access for Fan maintenance).



Don't cut out the Waste Chute hole in the floor until you are sure you have everything lined up in case you need to adjust the position.

Prepare Floor

When you have confirmed the desired location in the toilet room and right location for the Rota-Loo:

- Cut the Waste Chute opening with a jigsaw. The size of the circle depends on the pedestal used.
- Prepare a firm base for the Rota-Loo to sit on. The base needs to be level, flat, firm, dry and free draining. It may be made from concrete, compressed sand or gravel or similar. Make sure there are no protruding lumps or bumps.
- Place a water resilient board on the base for the Rota-Loo to sit on. This will provide a flat surface as well as some insulation to maintain heat in the Rota-Loo.

Attach Pods

The air inlet and vent pipe pods will need to be attached to the side of the Rota-Loo, ***they must be located diagonally opposite each other.*** The air inlet pod should be as low as possible to the base of the Rota- Loo unit and the vent pipe pod should be as high as possible.



Place the inlet pod with the lower edge level with the flat section of the Rota-Loo. Draw a line around the pod onto the Rota-Loo. Measure in 1.6" from this mark, which will create a small rectangle measuring



8" long by 4" wide. Place the pod back onto the side of the Rota-Loo and look inside the pod, you should be able to see the inner marked rectangle. Cut out the 8" by 4" hole.
Drill 6 evenly spaced holes around the flange of the pod. Secure the pod using the self-tap screws supplied.

The Outlet pod is done the same way except that it is placed as high up as possible and located diagonally opposite the air inlet.

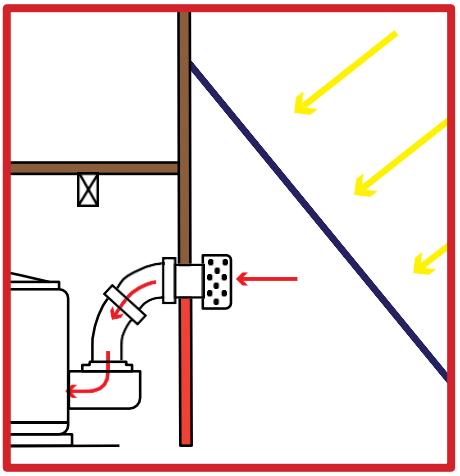
Locate the Rota-Loo in its Final Position

- Slide the Rota-Loo into place.
- Fit the Waste Chute through the hole in the floor above and ensure it is vertical - use a level or plumb bob - the eye sometimes plays tricks!
- Adjust the position of the Rota-Loo as required, making sure that it is in the best rotation for access to the bins - make sure the bin is central in the access door when the waste chute is directly over the bin. This is particularly important if the active bin is not the one at the door and you may need to mark the turntable to ensure you are always able to line up the bins correctly.
- If your installation needs the Rota-Loo to be anchored to the ground to protect it from movement due to minor floods or storms, now is the time to do this.

Install the Air Inlet Vent Piping

The Vent Kit includes a 45° F-F PVC bend to fit into the Pod and connect the pipework.

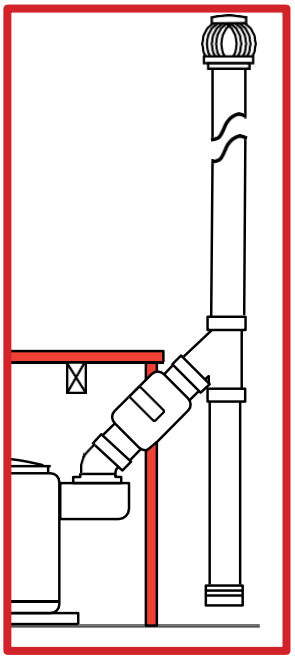
Fit the Air Inlet piping using 4" PVC pipe and fittings with the following considerations:



- The air inlet should be connected to a warm area
- Air does not like going around sharp corners.
- Hot air naturally rises.
- Wrapping the pipes in insulation will help in maintaining air temperatures.
- The greater the distance warm air travels the cooler it becomes. We have moved warm air 5 yards in an insulated 4" PVC pipe and the heat drop was approximately 5 degrees.
- Always do a dry run first before finally joining the items together with plumbers glue.
- Fit the Air Inlet Filter (provided in the kit) to the Inlet pipe - this is to prevent flying bugs entering the Rota-Loo.
- Fit the Pipework to the Pod using 3x Self Tapping Screws and seal with polyurethane sealant.

Install the Air Outlet and Fan

The Vent Kit includes a 45° F-F PVC bend to fit into the Pod and connect the pipework, a Y-Junction PVC and a Coupling & Cap as the water condensate.



The vent pipe can be installed either through the inside of the house or on the outside. Any exposed vent pipe should be insulated to ensure that the evaporating liquid does not condense and run back into the system. If pipe is situated in such
a way (or in cold climates) that condensation may occur, it is recommended that a Y-connection is fitted to allow condensation to drain away from the fan.
The vent pipe should also be as straight as possible after leaving
the Fan Housing.

The Fan Housing should be easily accessible and as close to the pod sleeve as possible. Make sure it is put in a place that enables access to the fan .

To Ensure that your installation is Noise Free it is important to make sure that the vent pipe is insulated against causing vibrations to any surface with which it may have contact. Areas that may cause vibration noise are the vent pipe being in contact with floor, walls, joins etc. If "standoff" brackets are used on the outside of the building ensure that foam strip or a similar material is used to absorb any vibration.

The fan assembly should be placed on a 45° angle using the 45° end coming from the Pod, this will ensure that any condensing vapor does not adversely affect the operation of the fan. It is not recommended that the Fan Assembly be vertical, since condensation can drip down the vent pipe and cause problems including shorting out the fan and affecting your household electrics.

The Wind Turbine Vent

Use self-tappers to attach the adapters to the Wind Turbine Vent. Ensure the Turbine spins freely and attach using three(3) self-tappers.
Do Not Use Glue.



Fan Electrical Connection



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***Mains Powered - 240V Fan.
A single PowerPoint needs to be installed by an electrician to the relevant electrical standards near the fan housing. The fan is supplied with a lead ready to be plugged into the PowerPoint.***



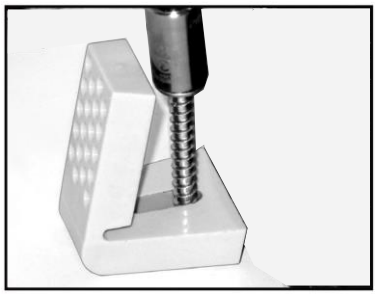
Solar Powered - 12V Fan. The 12V fan comes with a female 2.1 mm 5.5 mm DC Power Connector ready to connect to the 12V power supply (controller). This must be done in accordance with the instructions of the supplier of the solar power system. It is important to check the fan rotation to ensure it provides air flow in the correct direction.

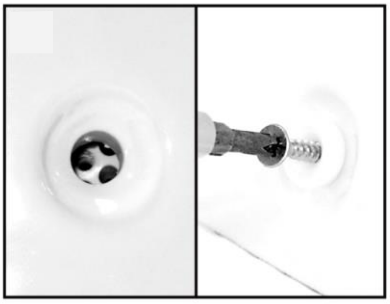
Insulation

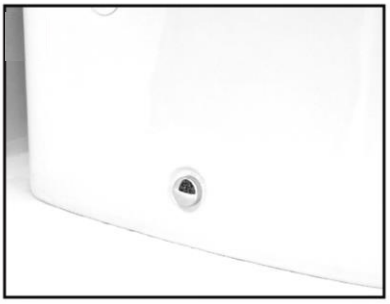
Once everything is in place, the Rota-Loo structure should be well insulated, so that the temperature inside the unit remains as warm as possible. This is particularly important in cold climate areas. **Please understand that insulation can work both ways and may keep the chamber cooler in warm climate areas which may work against good composition.**

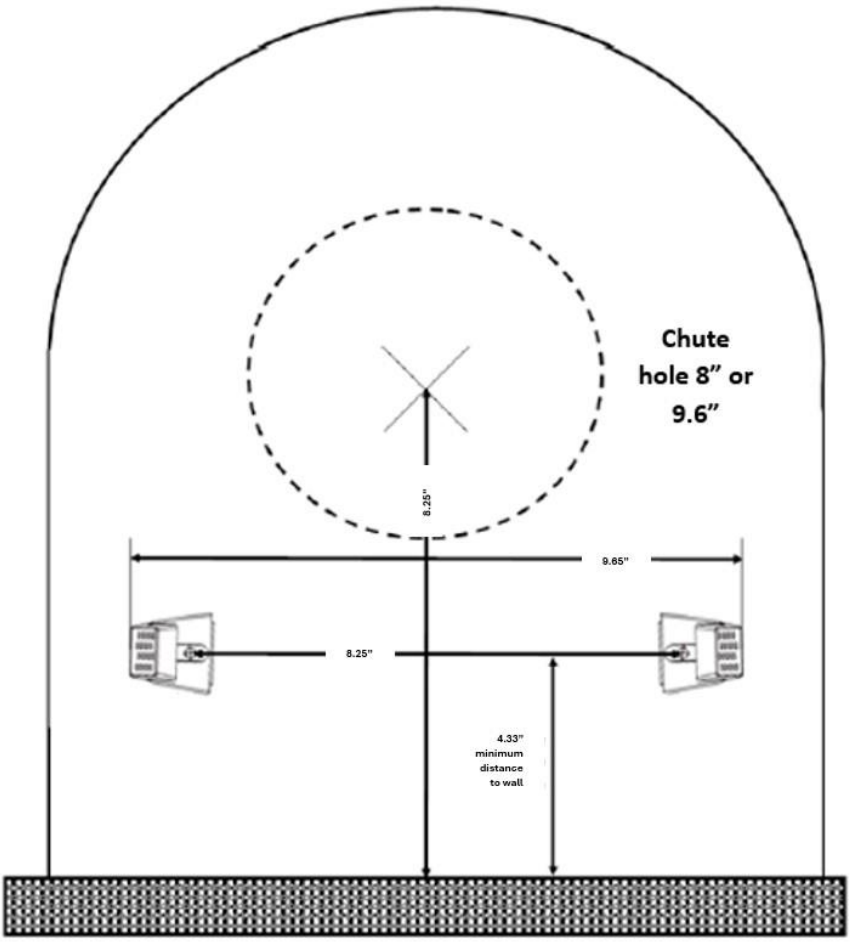
Oslo Pedestal Floor Installation

1) Ascertain whether you would like the pedestal to sit against the back wall, or some distance out from the wall
2) Ensure you have enough space either side of the pedestal to affix the fastening screws. Typically this is 12.6” to accommodate the screws and drill
3) Mark your chute hole centre 8.25” from the back position of the pedestal
4) Affix mounting brackets as per the below drawing, 4.33” from the back position of the pedestal
5) When totally satisfied that everything is in the correct place, cut chute hole (8”)
6) Place pedestal into position, glue down with Silicone or similar if desired
7) Screw pedestal into place and cap with supplied white covers

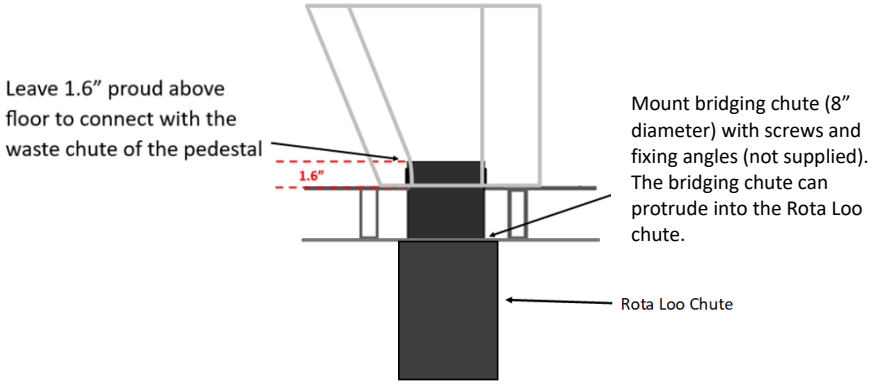








Placing the Pedestal and Connecting Chutes:
We have supplied a short length of black 8" pipe should you wish to line the distance between the pedestal (above floor cavity) and the Rota Loo chute (below floor cavity) as a bridging chute. Above floor, leave bridging chute 1.6" proud to connect with the waste chute of the pedestal.



Prepare the Rota Loo Chute

- The standard waste chute is approximately 35" long, which includes a 4" joining flange. This flange is only used to join two Standard Waste Chutes together.
- The waste chute should fit neatly onto the lip of the Rota-Loo lid; trim off any internal ledges, otherwise waste and liquid will accumulate on them.
- Place the Waste Chute into its location between the Rota-Loo lid and the underside of the floor.
- Ensure the ends of the waste chute are level; The waste chute will rest on the lip located in the Rota-Loo lid waste chute hole. Use a level and ensure that the waste chute is vertical.
- Cut the Waste Chute to the correct length ensuring the cut is square and you cut off the joining flange.
- It is important to check that no pressure is placed on the Rota-Loo lid when the chute is installed. Make any adjustments required
- When the Rota-Loo has been finally installed you will need to attach the waste chute to the joists or another part of the building structure using hoop iron, strapping or similar. The chute should not be allowed to be supported only by the top of the Rota-Loo. Do not puncture the insides of the waste chute when finally attaching the chute to the joists.

It is most important to ensure the cuts made to the waste chute are square

Attach Waste Chute to Rota-Loo

- Use plenty of polyurethane sealant around the top of the Rota-Loo to join the waste chute, also use polyurethane sealant to fill any gaps between the side of the waste chute and the floor, also check the waste chute is still vertical.
- Remove the Rota-Loo door and inside the waste chute, remove/smooth any excess polyurethane sealant from where the waste chute connects to the Rota-Loo.

Final Checks

Once all is done, the Rota-Loo is ready to use.

- Check that the turntable rotates freely
- Place a bin liner into the base of each bin. Do this by taking the bin out, pushing the liner down to the base and replacing the bin, add 2" of covering material.
- Make sure Bin No 1 is directly under the waste chute and close the door.
- Check the fan operates when turned on.

We recommend leaving the Rota-Loo for 24 hours to allow the polyurethane sealant to fully cure before use.

If you have any doubts or queries about your installation or maintenance, please contact Green Loo.

Using your Rota-Loo is great for the environment... you will use less water and less energy and you'll return nutrients to the local eco-system. But using a Rota-Loo requires some effort and care - it is not the same as pushing a button and having someone else look after your waste, but with a little care and maintenance you can expect many years of trouble free operation.

PLEASE READ THIS OPERATION MANUAL CAREFULLY. IT IS IMPORTANT THAT YOU MAINTAIN THE ROTA-LOO PROPERLY

Using the Rota-Loo

The Rota-Loo is used as any other toilet but care must be taken:

- Always keep the toilet seat down when not in use
- Do not use disinfectants to clean the toilet

Rotating the Rota-Loo

You will need to check regularly to make sure the waste bins do not overflow - this can be done by looking down the waste chute with a torch. When a bin is full a bin rotation needs to be done - expect to do this several times each year depending on use:

- Cover the waste pile with around 1" of covering material
- Rotate the bin to the left
- Empty the bin that is next to be used.

When emptying the Bin, use gloves, eye protection and a dust mask to protect yourself from any residual pathogens that may exist.

Bury the compost under 12" of top soil away from where food cultivation may occur for a 3 month period - this is a requirement of many Authorities and an additional safe guard against disease transmission

Routine Maintenance and Checks

It is recommended that each time the Bins are rotated, you:

- Check that the fan is operating and air flow is unobstructed
- Flush out the base of the Rota-Loo with a bucket of water
- Unscrew and empty the condensate cap

Trouble Shooting

Sometimes things go wrong! Most problems are due to the composting process getting too wet or out of balance. An outline of common problems and remedies are listed in the Manual.

OPERATIONS - OPERATING THE ROTA-LOO

Each installation will be slightly different because we all have different lifestyles and diets and we live in different climates. Rota-Loo is designed to operate in a wide range of conditions and in most cases composting will be effective with a minimum attention.

Start -Up

Once installed correctly and the final checks are done, the Rota-Loo is ready to use:

- Make sure Bin No. 1 is under the Waste Chute and fitted with a Jute Liner. Add 2" of supplied covering material.
- Replace the door, switch on the fan and the toilet is now ready for use.
- Fill in the Diary Sticker with the date Bin 1 started being used.

Bin Filling

Use the Rota-Loo as you would any other toilet.

Periodically check the level of the waste pile in the bin - this can be done by shining a torch down the waste chute or removing the bin through the access door. As you get to know the operation of the Rota- Loo, you'll get a feel for how long to leave the checking periods - we suggest you check weekly until you are familiar with your system.

The Bin is considered full when the pile reaches 4" below the waste chute (before the top rim of the bin). **Never let the bin overfill as the result is a mess you'd rather not deal with!**

What to put in the Rota-Loo

- use only a good quality toilet paper (either unbleached, recycled or new white paper). Try not use excessive amounts of toilet paper as the paper may break down slower than the heap. Also Bamboo based toilet paper takes longer to break down.
- The recommended amount of compost starter (supplied).
- Use a cup full of supplied covering material **after each solid deposit only**.

What NOT to put in the Rota-Loo

- any burning materials such as cigarettes or matches,
- disposable nappies, tampons, wet wipes or sanitary napkins,
- plastic, rubber, metal or glass material.
- vegetable scraps, fruit scraps or meat/fat scraps, as they are subject to putrefaction and attract flies and other vermin.

Cleaning of the Pedestal And Seat

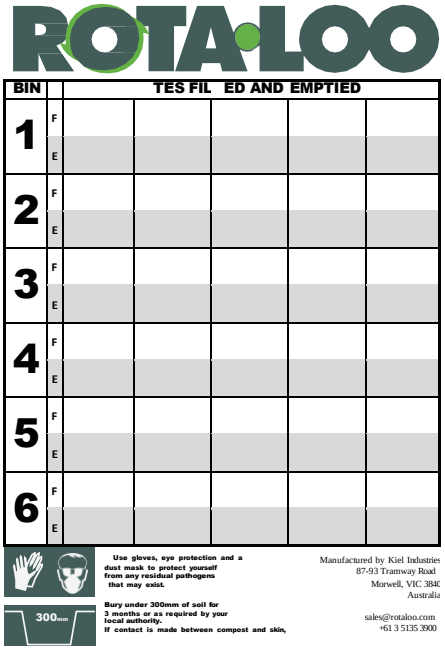
Generally once a week, or more often if required, clean the pedestal and seat with water or the supplied liquid enzyme cleaner. No problem is caused if a small amount of water is let into the system.

Bin Rotation

When the bin is full (the waste pile is no higher than 4" below the top of the bin):

- Open the access door.
- Pour the compost starter/water mix into the bin as per compost starter instructions – this can be done via the pedestal
- We recommend you cover the compost with about 1" of covering material.
- Rotate the bins one position in the clockwise direction (to the left).
- The bin now under the waste chute will be full of composted material (unless it's the first use) and needs to be emptied.
- Empty the composted material in a safe place. The Jute liner can also be composted – although this usually takes a little longer than the rest of the compost.
- Line with a new Jute liner, cover with 2" of covering material, return the bin to the Rota-Loo and close the door - it's ready to use again





Keeping Record

Use the Bin Rotation Diary supplied, either on the door of the Rota-Loo or kept in a safe and accessible place, to keep a record of when the bins are turned and emptied.

- In the 'clear' triangle fill in the date that bin was filled and rotated to the next bin
- In the 'greyed' triangle note the date that bin was emptied and rotated into the 'active' position.



If the rotation rate is such that a bin is to be emptied less that 12 months after it's 'filled' date, composting may not be complete and it is advised that the bin be removed and allowed to compost longer - spare bins and lids are available for this purpose.
Additional bins must be fitted with a lid (supplied with spare bin) and provided with a flat and secure location to ensure waste material cannot be spilled or accessed until properly disposed. The location should be in a dry warm place to assist composting.



As a guide, well composted material will be soil like in texture and appearance. It will be free of foul odours and there won't be anything that is recognisable as faecal matter.
Even if it passes all these tests, remember to bury it away from food cultivation to ensure the natural process is complete.

PERIODIC MAINTENANCE

It is wise to create a maintenance plan and carry out routine inspections of all equipment. A little effort regularly can save a lot of trouble later.

When carrying out maintenance, wear appropriate protective clothing - at a minimum, wear gloves and wash immediately if you come into contact with any compost, waste and/or surfaces directly impacted by waste.

We recommend that each time you open the door to rotate the bins, you should also carry out the following checks and maintenance.

1. Check the air inlet filter and brush off any dust that will have covered the mesh. Wash the filter if required.
2. Pour water from a bucket into the bottom of the Rota-Loo. This will help to dissolve the salt build up. Drain the liquid into the bucket through the 40mm drain fitting, making sure that there is no blockage of the outlet. Drain out only about one third of the liquid into the bucket and top with fresh water. Use this mixture on your flower garden or lawn. If your Rota-Loo is connected to a permanent drain, make sure that the outlet in the Rota-Loo tank is not blocked and that the liquid flows out.
3. Check the fan is operating.
4. Unscrew the condensate cap and clear of any liquid or materials.



40mm Drain Plug on a Rota-Loo 650

Salt Build-Up

Over a period of time, depending on use (1-3 years), there will be a build up of urea salt in the bottom of the tank. Pouring ½ - 1 gallon of fresh water may reduce this build up. Allow the mixture to stand for twenty-four hours and drain off into the emergency overflow absorption trench. Regular flushing will keep the tank free of build-up.

Fan

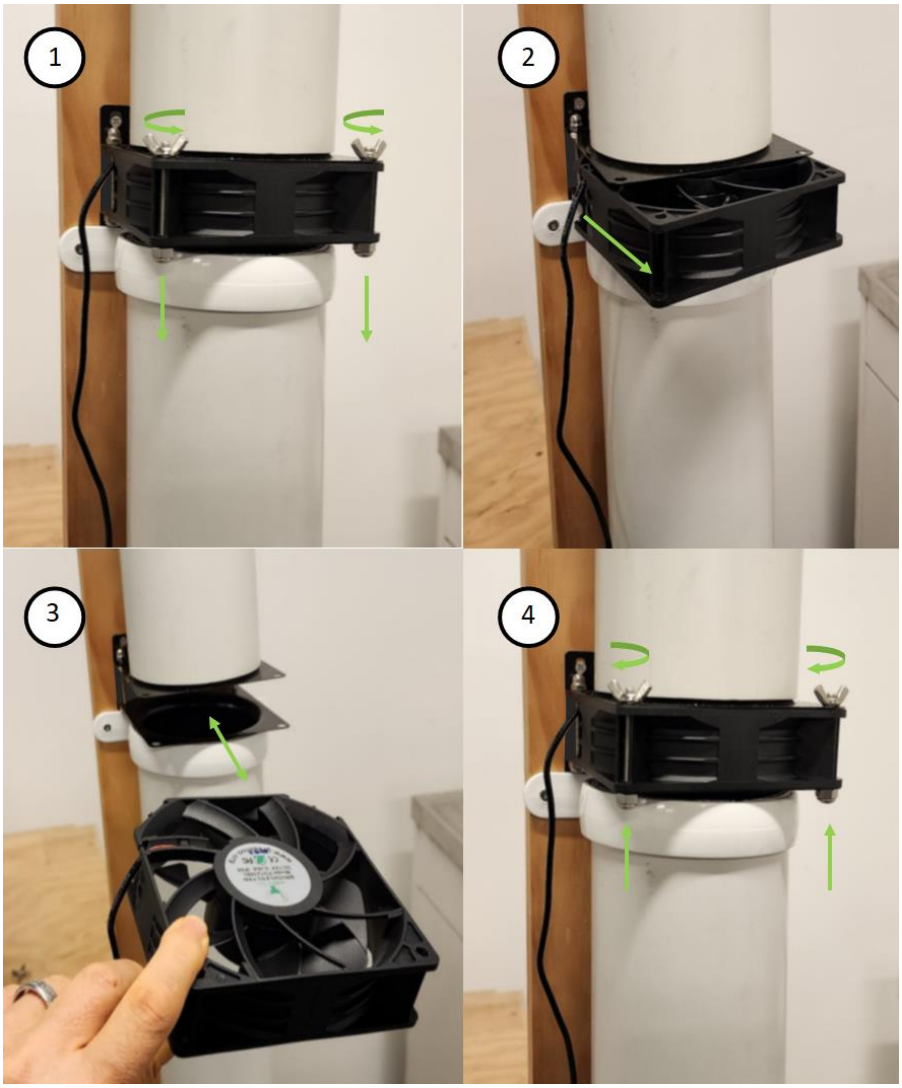
As the only moving part, the fan is likely to be the only part that will need to be replaced if found not to be working.

Removing the fan periodically (annually) to check it and clean it may pre-empt a failure which if not found could adversely impact the Rota-Loo operation.

- Remove the fan cover from the fan housing.
- Remove the fan by sliding it out of the housing as per instructions below.
- Using a soft brush eg. a paint brush, clean off the dust which can build up around the fan-blades and motor. Replace the fan.
- When the toilet is unoccupied, keep the lid closed over the seat. If the toilet seat lid is left open for long periods, there will be a decrease in evaporation and odour could occur.

To check or exchange fans:

1. Disconnect fan from power source, undo the 2 front wing nuts – remove bolts
2. Slide out fan
3. Slide in new fan (the cut off corners at the back, and the fan label pointing upwards).
4. Insert 2 front bolts and hand tighten wing nuts. Re-connect power source & check that the airflow is upwards, away from the toilet.



TROUBLE SHOOTING

The Rota-Loo is a simple system that if maintained, will operate without problems for many years. However, sometimes things go wrong! This section will help you diagnose and rectify some issues that may arise, and addresses a few common questions. If in doubt, please call your dealer or contact Rota Loo for help and advice.

If the Liquid level in the bottom of the Rota-Loo is greater than 2" deep.

The liquid needs to be drained off. Do this by placing a container under the drain outlet (near the access door) and removing the cap.

If the Rota-Loo emits an unpleasant odour.

The composting matter is probably too wet. Excess liquid may need to be drained off as above. Check the fan operation and Turbo vent. Insufficient air flow which may be caused by a failed fan or blocked air piping (a bird's nest in the Turbo vent!) will reduce evaporation. Or, if the fan stops, the airflow from the Rota-Loo may flow up the pedestal bringing what odour there is into the room. Restart the fan (failed power supply maybe) or replace the fan.

If the Liquid Level is continuously building.

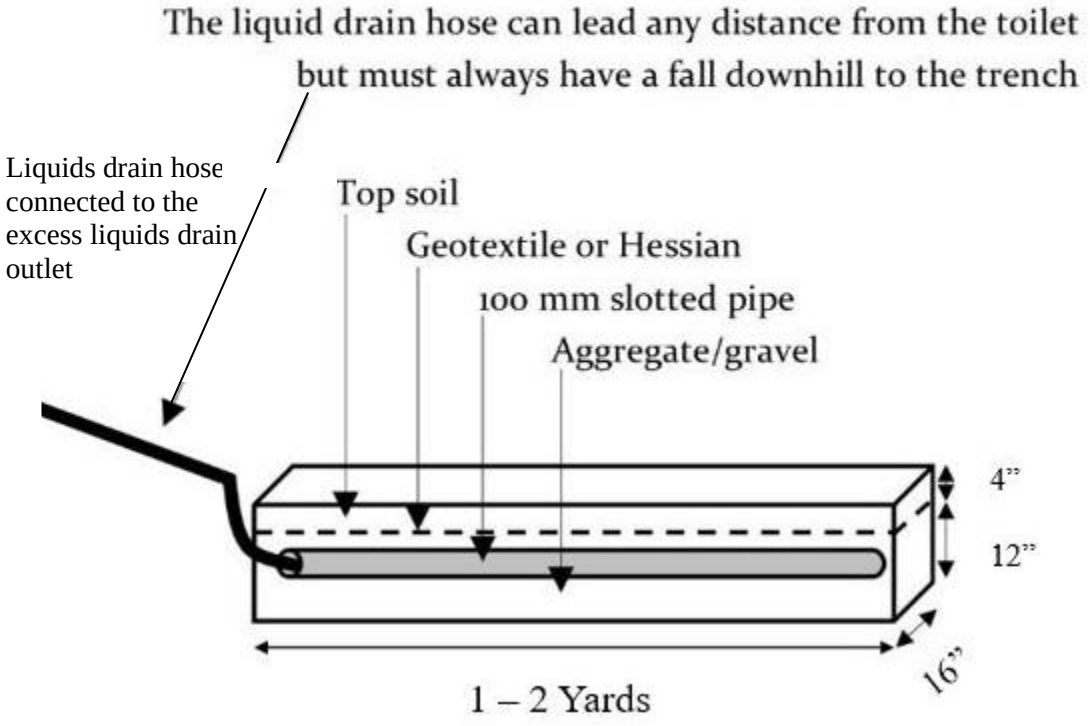
Check the fan, as above. It may be that the airflow is not enough to evaporate the liquids. Or, more heat is needed for the system to evaporate the liquid properly. A Soltran Module may need to be installed or an excess liquid dispersal system should be constructed as per below:

Materials Required:

1 – 2 yards of slotted agricultural or PVC

1 – 2 yards of Geotextile or Hessian mat

0.15 yd^3 - 0.15 yd^3 of aggregate or gravel



If the turntable won't rotate.

Check for obstructions. On the RL650 the bins are quite close to the chamber sides and it may be that a bin has got caught on a Vent Pod screw that is a little long. The Bins may not be located on the right part of the carousel as per the included photo. This would simply require the bins to be relocated to lock onto the carousel properly.



On models with turntable castors (RL950 and RL2000), check for salt build up on the base of the chamber as it may be that salt crystals block the turntable wheel path
- flush with water and drain from the excess liquid outlet.

The turntable hasn't been rotated and a Bin has become overfilled.

Should the bin overflow, the Rota-Loo will need to be cleaned out carefully. The overflowed bin will need to be removed and excess waste transferred to the next bin (after emptying). Any overflowed waste solids can be cleaned out be flushing with water and pumping out the Rota-Loo base (block-off the excess liquid outlet) to be disposed of properly (a septic pump out truck will take the waste to a proper disposal facility.

There was a power failure during the last few days.

This will not affect the composting. The heat generated from the composting process is usually sufficient to maintain the correct temperature in the composting pile. Also, the heat from the compost will set up a natural draught, which should take away the odours and keep the toilet free of smell.

What should be done if the area will be closed down for a while?

If the toilets will not be used for only a few days, we would recommend you keep the fan on, but if the toilets are not to be used for a few weeks, the fan may be turned off. When you turn the fan off, a smell may enter the room. However, this should be gone in a few hours, after the heat from the composting process starts to push the gases up the vent on its own, or the fan is restarted on return. It is also recommended that you add a dose of compost Maximiser down the pedestal before closing down. This works to keep the right balance of bacteria whilst the system is not being used.

If there are too many flies in the composting chamber.

Generally, flies are attracted by excessive amounts of carbon dioxide and methane, which is a result of anaerobic bacteria indicating that the composting pile is too moist, there is not enough heat or the wrong things have been dropped down the pedestal.

A few flies may be part of the process and may be helpful, but if they become a nuisance they can be dealt with.

- First check all the other ventilation systems (fan etc.) are working properly. and that liquid drainage and evaporation is adequate.
- Commence using a bulking regime to aerate the pile. This allows more air through the pile and will increase aerobic activity and evaporation.
- It is also recommended that a pyrethrum (natural insect repellent) spray be used for 7 consecutive days. Turn the fan off, open the access hatch and generously spray over the whole of the inside of the Rota loo. Replace the hatch and turn the fan back on after 5 minutes.
- Another option is to add Tomato Dust to the pile.
- If flies are still present and all methods have failed, it would be worthwhile emptying all bins and flushing the whole system out with water. This will allow you to start afresh.



Sphaeroceridae are a family of true flies in the order Diptera, often called small dung flies The larvae are microbial grazers found in abundance in many micro-environments with decomposing organic material. Most species appear to be associated with decaying plants or fungi and they are a part of the nutrient cycle. Many species are associated with various kinds of faeces including human faeces. Sphaerocerids may abound in decomposer communities such as compost and manure.



Vinegar Flies or Ferment Flies are a small, yellowish fly (3- 4mm) with distinct red eyes and are commonly seen around rotting fruit. The Vinegar Fly is not actually a fruit fly as it does not feed on fruit directly, just the yeasts associated with rotting fruit. They are common in homes and restaurants and wherever food is allowed to rot and ferment. With a life cycle of 1 week and the ability to lay 500 eggs, they can become very plentiful very quickly.

RISK ASSESSMENT - OVERVIEW

A Risk Management Plan has been provided to inform Rota-Loo Operators and Users how to cope with unusual or emergency situations.

Most of these issues are dealt with in the Operations Manual. This Risk Management Plan contains additional information and refers to the Operations Manual to demonstrate that a Risk Management Analysis has been carried out and to provide additional support to operators and users if required.

Design and Operation of Rota-Loo

Inherent in the design of the Rota-Loo are factors that mitigate many of the risks, however it is essential to understand that some care and maintenance is required. The design of the Rota-Loo intends to ensure effective composting occurs in most environments with little operator effort (see Page 2 - The Composting Process for greater understanding), however some occurrences may render the Rota-Loo ineffective.

PLEASE READ THIS OPERATION MANUAL CAREFULLY
IT IS IMPORTANT THAT YOU MAINTAIN THE ROTA-LOO PROPERLY

RISK ASSESSMENT

Inspections by Authorities

The Rota-Loo is a fully contained WCT system that has no need for inspection or maintenance by any outside agent or authority for safe operation. The design cycle time for waste composting is 12 months so should an authority require regular inspection, 12 monthly or greater is sufficient.

The Operations Manual contains sufficient information for the operator / user to carry out all servicing and maintenance tasks and includes a Trouble-Shooting guide to address most unusual situations. The manufacturers contact details are included on the serial number plate for contact in unknown situations.

Storage of, and access to Uncomposted Material

Being fully self contained, all uncomposted waste is retained inside the Rota-Loo in the controlled aeration and drainage system until fully composted. All material is held inside the bin / bucket into which it is deposited and moved only by rotating the turntable, which does not require operator contact with the waste. The Operations Manual includes instruction to wear gloves when rotating to ensure random contact with skin is not possible.

Service and maintenance access is by a door on the Rota-Loo. The door is securely fitted with catches and note is made in the Installation Manual that the installer should consider security of access against unauthorised persons (e.g., small children) in the placement of and access to the Rota-Loo.

Waste is only removed from the Rota-Loo when fully composted and is removed by removing the entire bin and emptying (instruction to bury as per Regulatory requirements) - with instruction to wear gloves, even the composted material does not come into contact with persons.

An option noted in the Operation Manual is for the possibility in very high use situations for additional bins to be purchased to extend the composting time outside the Rota-Loo. In these cases the first part of the composting (approx 6 months) will occur in the Rota-Loo controlled environment. Instruction in the Operations Manual includes the need to store extra bins outside the Rota-Loo for additional composting time in a flat, safe place.

End Product Quality

Rota-Loos have been operating in diverse climates from cold and alpine to tropical for many years achieving effective composting results and safe end product quality.

As part of the Product Certification process, end product tests were carried out on an installation in a temperate climate (monthly average temperature <12°C for 3 months and relative humidity ~80% for 2 months) under 'worst case' (high use, low maintenance) conditions and found end product results conform with standards.

There is a high level of confidence that Rota-Loo will deliver safe end product quality in all situations, provided some operator / user care is taken and instructions are followed.

RISK IN UNUSUAL SITUATIONS

The following are "unusual situations" listed in Appendix J that may be considered to pose a risk to the safe operation of a WCT, together with notes on how these risks are or may be mitigated. ***Appendix J, J3, d, e and g are not relevant to the Rota-Loo design***.

Transfer of Owner / occupier

If on transfer of ownership the new owner / occupier does not receive information about how to operate the Rota-Loo they may not attend to it's operation properly.

Rota-Loo provide with the kit a Wall Poster to be attached near the toilet to inform users of the basic operational needs of the system. Manufacturer contact details are also provided on the Rota-Loo access door and serial number plate and the Operations Manual is readily available to anyone who requests it.

Should the new operator / user not learn of the need to attend to the Rota-Loo before a bin overfills, they will need to address the issue as per "Carousel not turned" below and as addressed in the Troubleshooting Guide.

No Bulking Material is Fed in

The addition of bulking material is essential for effective composting.
The use of toilet paper and the design to drain the compost pile of moisture is sufficient to ensure correct composting conditions. The C/N balance may result in less efficient composting, but the design composting time to sufficient to cope with this - test site for Product Certification verified this.

The Carousel/Turntable is not turned

If the Turntable (Carousel) is not rotated the waste bin will over-fill, which is not good.

The risk to health and safety in this event is mitigated by:

- The top of the bin is very close to the waste chute, so overflow of waste to the turntable and 'tank' should be minimal before being noticed and rectified.
- The waste chute is long enough so that even if the waste chute starts to fill, the level of waste will be greater than the minimum required by the Standard.
- The bin is contained within the Rota-Loo so all waste will be contained within the Rota-Loo system.

Should the bin overflow, the Rota-Loo will need to be cleaned out carefully. The overflow bin will need to be removed and excess waste can be transferred to the next bin. Any overflowed waste solids can be cleaned out be flushing with water and pumping out the Rota-Loo base (block-off the excess liquid outlet). It is recommended that this be done by a contracted septic clean out specialist. (This eventuality is also addressed in the Troubleshooting Guide on Page 15).

The Compost gets too hot

The Rota-Loo design has continuous air ventilation so excess generated heat will be removed preventing the compost pile retaining excess heat. Should the compost pile get hot, the chimney effect of the ventilation system will increase air flow and remove more heat.

The Compost gets too cold

Should the compost pile fall below 43°F for an extended period (2-3 months) composting will slow to the point that it's retained time may not achieve full composting. This risk is mitigated by:

- The design has natural insulation which helps retain composting heat in cold climates.
- The Installation Instructions stipulates that in cold climates the Rota-Loo must be installed in a solar collecting area and with further insulation. This allows the system to gain and retain heat to continue the composting process even in cold periods.
- The Rota-Loo capacity design anticipates 12 months composting time, which in theory will ensure full composting as low as 36°F in with a safety factor of about 50%.

In the rare event that the composting process has stopped due to low temperature and lack of compostable material, it can be restarted by adding compostable material and compost starter.

The Compost gets too humid

If the compost gets too humid, (above 70% moisture) the composting process will become anaerobic which will be noticeable by the odour produced. This event can occur for a number of reasons and is addressed in the Troubleshooting Guide.

It is important to maintain aerobic composting and the Rota-Loo design uses a number of features to separate and evaporate the liquids from the solids for this purpose. Should the composting become anaerobic due to excessive liquid (high humidity of the pile) there is no immediate health risk. The odour will be unpleasant which will encourage rectification. The fan-driven ventilation system will clear any produced methane.

The Compost is removed too early

This should not occur - the design provides for a factor of safety in time for composting. In the case of very high use when compost may be removed before the designed 12 months, instructions stipulate storing in additional bins (Operations Page 13).

The Operations Manual instructs to bury the composted waste when emptying the bin and using personal protective equipment (Operations Manual page 13) so in the case that composted waste is inadvertently removed before full composting, there will not be personal contact or significant health risk.

There is poor drainage of excess liquid

The Rota-Loo 'tank' has a significant liquid capacity (to depth of about 150mm) while still being able to properly drain the composting material pile.

The Excess Liquid drainage point is significantly lower than this level. Should a blockage occur in the drain point, the high liquid level will most likely cause some anaerobic composting which will produce an odour that will be investigated - dealt with in the Troubleshooting Guide.

The Rota-Loo is Flooded

The Rota-Loo is not intended to be installed underground or submerged. In the event of a major flood event it may be possible that the water level is above the base of the Rota-Loo for a period of time. The Rota-Loo is designed to be air tight to improve ventilation and will therefore resist ingress of water so in minor events the waste material should be protected from flooding.

If significant water does enter the Rota-Loo (to above the turntable deck) the water needs to be considered contaminated. The sealed design of the Rota-Loo should prevent leakage and thus contamination of the surrounds but the Rota-Loo must be pumped

out by a septic tank specialist and washed and reset before restarting use.

If the installation is in an area that may experience flooding, consideration should be given to adequate drainage of the area around if necessary securing the Rota-Loo to prevent floating in a flood situation (noted in Installation Page 7).

Decommissioning

Decommissioning may be required if the Rota-Loo is no longer needed, is to be relocated or if major maintenance is required.

When decommissioning a Rota-Loo to minimise any health and safety risks the critical issue is to ensure un-composted wastes are properly dealt with.

- All bins can be removed - only bins that have been in the Rota-Loo for 10 months or more may be emptied according to normal bin emptying procedures. All other bins are to be emptied to proper septic waste handling facilities (septic pump out truck or similar).
- The Rota-Loo can then be removed after disconnecting the waste chute and pipe connections. Re-fit the door to contain any remnant waste inside. Or the Rota-Loo can be closed up and left till future need.
- If work is to be done internally (replace turntable) the inside of the Rota-Loo should be washed out - use hose and drain through drain point - and left to dry before removing the lid for maintenance.
- If relocating, ensure all wastes are removed and the inside of the Rota- Loo is dry before transport.

Removing the Lid from a RL2000 Maxi requires a person sitting on the turntable to hold the nuts securing the lid. If this is to be attempted, the Rota-Loo must be left open and have a fan connected to ensure adequate clean air flow for the person - knowledge of working in confined spaces is advisable. Replacing the whole unit may be cost effective and is recommended. RL650 and RL950 Lids can be removed from outside the unit

ROTA-LOO WARRANTY

◊ Green Loo will furnish new parts to a customer whose toilet fails within the allotted warranty period for the particular component, provided that our inspection shows such failure is due to defective material or workmanship. Any part supplied is warranted for the balance of the original warranty period. The warranty period for a part begins from the date the original product was dispatched (plus 10 working days for transportation)

◊ Warrranty Period:

Any electrical component including solar 1 year Any rotomolded component 15 years
Any porcelain component 4 years
Toilet seats 1 year
Any other component 1 year

◊ This warranty does not cover:

• Damage resulting from neglect, abuse, accident, or alteration; or damage caused by fire, flood, acts of God or other causality.

• Damage resulting from failure of the purchaser to follow normal installation and operating procedures outlined in the manual or in any other printed instructions supplied with the system.

Items subject to a dispute, where photographic evidence is inconclusive, must be sent prepaid to Green Loo. The cost will be reimbursed by Green Loo should the claim be found valid. In addition to the above, Green Loo will only replace a fan that fails during the warranty period under the following conditions:

• The fan has only ever been connected and powered by either a 12-volt transformer plugged into mains power or a solar system supplied by Green Loo. Connecting your fan directly to a power source other than one supplied or specified by Green Loo may result in damage to the fan and void the warranty.

• The fan and transformer must not be modified/altered in any way.

• The faulty fan is returned to Green Loo for inspection, if required. Providing the above conditions have

been met replacement fans are shipped the same or following business day free of charge by regular post.

Your Rota-Loo has been built carefully to high standards and is warranted for ten years (supplied part only) against original factory imperfections in materials and workmanship, to the original purchaser, under normal home, holiday home, trailer, boat, commercial or industrial use as described, with respect to capacities in our literature. Electrical parts are warranted for one year or as specified by the manufacturer or supplier of the part.

Rota-Loo Capacity

Model	Number of Bins	Full Time Users
RL650	6	Up to 4
RL950	6	Up to 8
RL2000	8	Up to 20

PFG Group Victoria Pty Ltd will furnish new or rebuilt parts, for any part that fails within the warranty period, provided that our inspection shows such failure is due to defective materials or workmanship. Any part supplied by us to replace another part is warranted for the balance of the original period.

THIS WARRANTY DOES NOT COVER:

1. Damage resulting from neglect, abuse, accident or alteration; or damage caused by fire, flood, acts of God, or any other casualty.
2. Parts and accessories not sold by Green Loo Pty Ltd, or damage resulting from the use of such items.
3. Work carried out by persons not authorised by Green Loo Pty Ltd.
4. Damage or failure resulting from failure of the purchaser to follow proper installation and operating procedures as outlined in the Installation Manual and Operation Manual or other printed instruction.
5. Labour, traveling and services charges incurred in the removal and replacement of any parts found under the terms of this Warranty.

This warranty is in lieu of all other warranties expressed or implied and no person is authorised to enlarge our warranty responsibility, which is limited to the terms of this certificate. The Company reserves the right to change, improve, or modify its products and to install these improvements on equipment previously manufactured.

APPENDIX

Checklist

A copy of our Batch Release/Packing List will be attached to the Rota-Loo. Please check that all the products you ordered have arrived. If any items are missing or any items damaged please contact Green Loo Pty Ltd.

Kit Parts List

Rota-Loo 650 Chamber

- Incorporating steel reinforced turntable and wheel system as well as the self-tapped lid.
- Access Door complete with Diary and direction stickers along with 4 Rubber replaceable latches to ensure unit seals tight to keep heat in and expediate composting process.
- 6 x Buckets drilled for air and liquid flow and individually numbered 1 to 6

Waste Chute & 2 Side Pods

- 900mm long waste chute with flange should extra length be required.
- In and out pods to be applied to the side of the chamber on opposite sides.

Vent Fittings

- Inlet vent complete with screen to keep insects out
- 45 degree 100mm connectors x 2 for inlet and outlet piping
- Wind turbine Sewer Vent
- Y-Junction and Screw Cap
- 12 volt fan and housing with 240 transformer plug.

Accessories

- RL650/950 liner pack of 6 Jute liners
- 1 packet of compost starter and spray bottle of liquid enzyme cleaner.
- Covering material.
- Any optional items ordered will be shown on the batch release/picking list.

Items and Materials not Supplied

Other items needed not supplied with the Rota-Loo kit:

- Sand/crushed rock for level base and water proof board or similar to place the Rota-Loo on.
- PVC piping needed to build the air vent system – 4" PVC pipe and 45˚ elbows to suit
- Pipe brackets as required to secure vent piping and PVC Pipe Glue and Priming Fluid
- Polyurethane Sealant for sealing the waste chute (silicone tends to go brittle after a time)
- Material to attach the waste chute to flooring joists (hoop iron or similar)
- Power source for the fan

If additional screws are required, use Stainless Steel only - (8g x 20 or 8g x 25 SS304 screws)

Optional Materials

- Insulation for the Rota-Loo and / or vent piping
- Paint for DWV pipe-work (black to absorb heat or coloured for desired finish

General Tools Guide

- Phillips Head Screwdrivers or Phillip's head drill bit
- Saws to cut the waste chute and PVC piping.
- Drills including a hole saw (4.4" ideal) to cut the Vent Pods to fit the Pod Connectors.
- Measuring Equipment - Level, Plumb bob, Tape measure, ruler, roofing square
- Markers, a white marker is useful when dealing with the waste chute
- Hammer
- Caulking gun

ROTA-LOO

BIN		DATES FILLED AND EMPTIED				
1	F					
	E					
2	F					
	E					
3	F					
	E					
4	F					
	E					
5	F					
	E					
6	F					
	E					

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