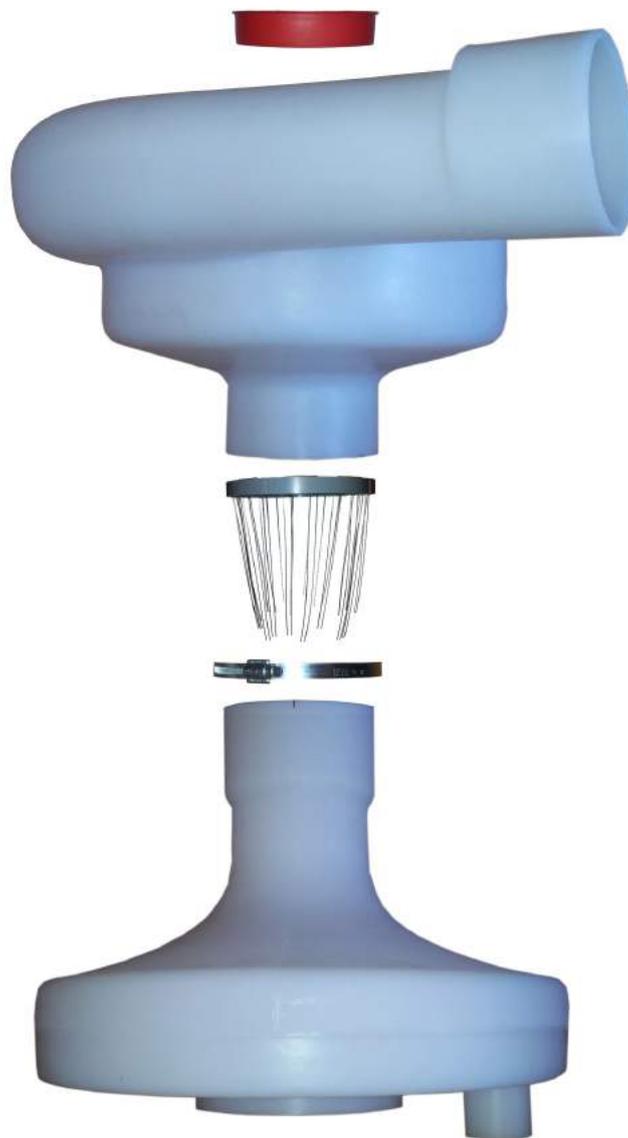


USER'S MANUAL

AQUATRON SEPARATOR

INSTALLATION AND MAINTENANCE



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Thank you very much for choosing the Aquatron biological toilet system. Your choice is good for the environment!

Our experience from many satisfied customers for over 25 years, is that properly installed and properly maintained Aquatron system works satisfactorily for many years to delight of residents and guests.



Anders Welen
Chief Executive Officer
Aquatron International AB

IMPORTANT!

For optimal functionality it is very important that this installation manual and the maintenance instructions are being followed closely. In case of problems please contact your supplier or Aquatron head office.



INTRODUCTION

Aquatron International AB was founded 1992 in order to exploit the Aquatron Separator patent (pat. granted 1986) – a Swedish invention. Aquatron International AB has acquired all rights to exploit this patent from the inventor. Initially (1987) two Aquatron models were developed, both one-family models, for vacation/leisure homes and for year-round living. Since 1994 five new Aquatron models have been developed and introduced to the market.

Today Aquatron proudly present a dynamic suite of solutions with three different separators from one-family biological toilet systems up to biological toilet systems for apartment buildings or public buildings for apartment buildings.

THE BASIC PRINCIPLES OF THE AQUATRON SEPARATOR

The biological toilet system Aquatron is a composting toilet utilising ordinary Water Closets (standard pans). (Or urine-diverting toilets if you have high restrictions in phosphorus discharges)

When the toilet is flushed, the contents of the bowl are transported to the Aquatron Separator where up to 98% of the liquid is separated by using the momentum of the flushing water (centrifugal force and gravity).
The Aquatron Separator has no mechanical parts.

The solid waste (paper and faeces) falls down into the Bio Composting Chamber where it is composted by bacteria and, if desired, by worms. If using worms, the volume of the solid waste will be reduced by approximately 75%. The need for emptying and handling the compost is therefore reduced to a minimum. Optimal temperature for the composting is (12-24 degrees Celsius), a temperature level recommended for year-round inhabited homes. The composting process is free from odours and insects because the Bio-Composting Chamber is ventilated and the small amount of liquid following the paper down into the Bio-Composting Chamber is removed by a drain at the base of the Bio-Composting Chamber.

With high treatment requirements flowing liquid waste to a UV unit where it is exposed to ultraviolet light which kills bacteria and viruses or phosphorus trap to the highest environmental discharge standards. The liquid is then equivalent to the gray water (Water from bath, dishes and Washing) and can be discharged as per gray water standards. The system can also be installed without the UV-unit/ phosphorus trap.

IMPORTANT!

You still need to follow the local environmental laws of grey water treatment in your area.

We can help you to find a complete solution if you give us your local restrictions.



TECHNICAL SPECIFICATIONS

SEPARATOR:

The Separator is manufactured in three versions, two standard Separators with 50mm outlet on the separated water and one Separator with higher capacity that has a 110mm outlet on the separated water. All Aquatron Separators has a 160mm outlet towards the bio-chamber.

Standard separator:

Capacity handles four toilets (4 liters) that flush simultaneously
Inlet 110mm (5% upwards)
Liquid outlet 50mm horizontal
Solid outlet 160mm vertical

Standard vertical separator:

Capacity handles four toilets (4 liters) that flush simultaneously
Inlet 110mm (5% upwards)
Liquid outlet 50mm vertical
Solid outlet 160mm vertical

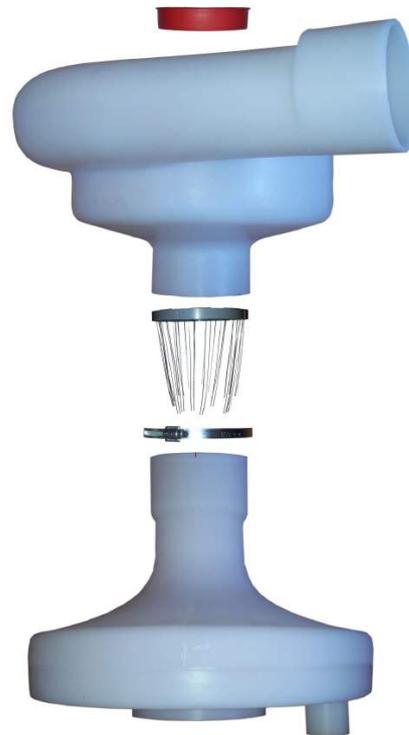
High capacity separator:

Capacity handles ten toilets (4 liters) that flush simultaneously
Inlet 110mm (5% upwards)
Liquid outlet 110mm horizontal
Solid outlet 160mm Vertical

SEPARATOR COMPONENTS

The Aquatron separator is built up from five parts.

- lid to the upper body, (inspection trap)
- upper body with inlet,
- wire ring,
- Hose clamp,
- lower body with outlets.



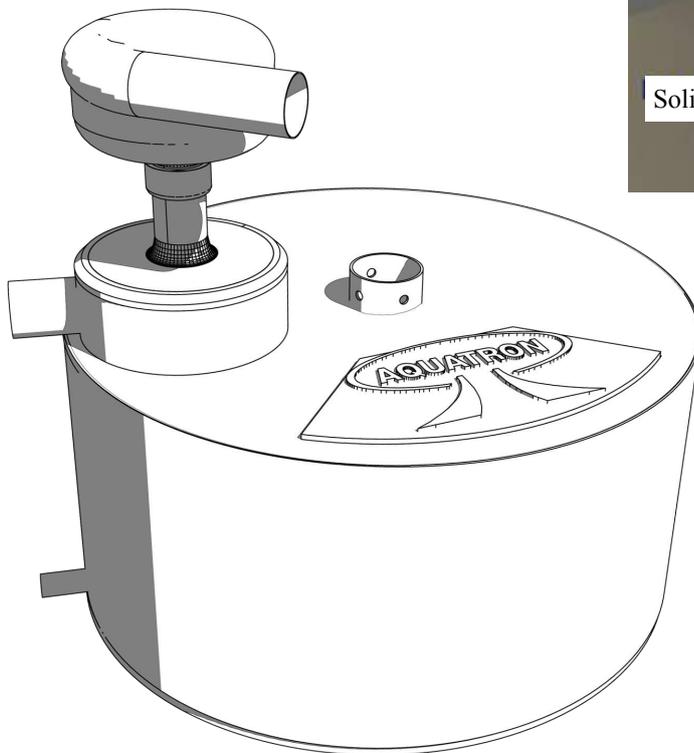
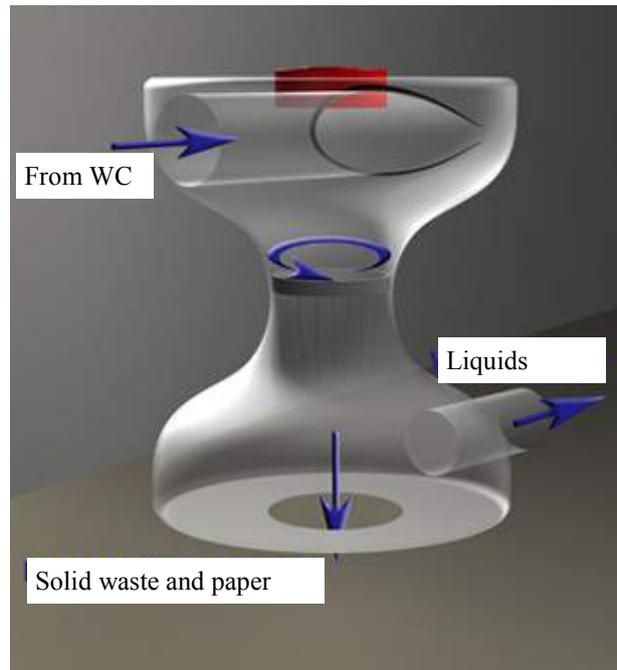
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TECHNICAL SPECIFICATIONS

FUNCTION:

The biological toilet system Aquatron is a composting toilet utilising ordinary Water Closets (standard pans). All Aquatron Systems exploit the patented Aquatron Separator (see sketch) which separates solid waste and paper from the liquid. The separated components are treated in different ways optimal for each kind of waste. Aquatron systems operate by using just the momentum of the flushing water, centrifugal force and gravity. Therefore, neither chemicals nor moving parts are needed in the separation and composting processes.



The the Aquatron Separator in combination with a drained bio-chamber for the composting of the solid waste and paper.

Aquatron has 9 types of bio-chambers to offer you the best solution.

Outcomming water from the Aquatron Separator and bio-chamber can be UV treated in the Aquatron UV unit in order to eliminate bacterias.

Aquatron has also developed a Phosphorus trap. Phosphorus traps are a means for reducing the emissions of phosphorus in the groundwater, it is not as good as urine separation where all the nitrogen and phosphorus can be put back to the plants via the urine irrigation.



UV-UNIT



PHOSPHORUS TRAP

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UNPACKING AND PREPARATION

SEPARATOR

To reduce the volume during the transport, the separator can be delivered disassembled. Verify all parts so they haven't got damaged during transport, if you have any suspicion, contact your local retailer or Aquatron International AB.



ASSEMBLE THE SEPARATOR

Verify the wires on the wire ring, they should be straight and smooth without any bending. The wire ends should be pointing the centre without touching each others.

Place the separator's lower body on a flat surface, place the wire ring inside the separator's neck, the wires shouldn't touch the surface of the neck. Don't push the ring to deep, just 10mm down at the moment.

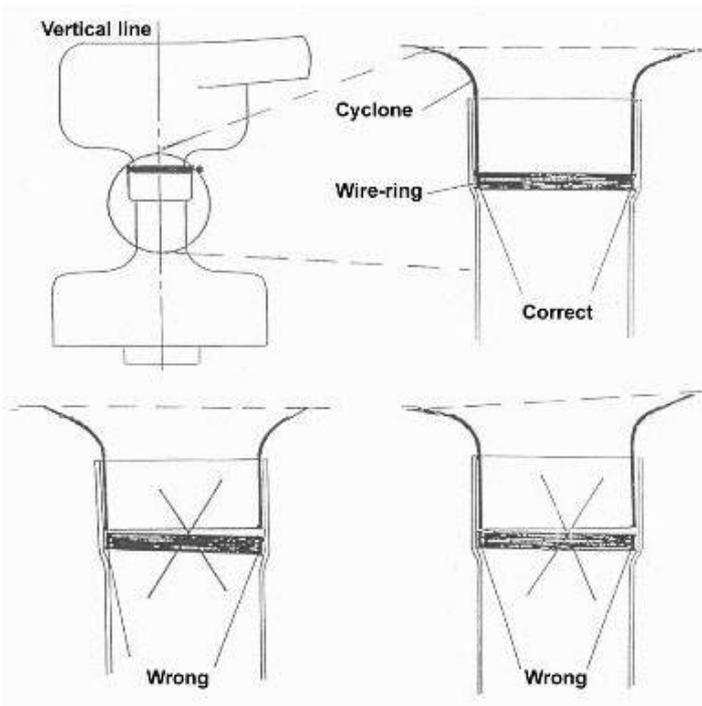
Put the hose clamp around the neck without tightening it. Put together the upper and lower parts of the Separator. Check that the Wire-ring is fully pushed down into the Separator neck and that the wires are not crossed.



The upper part of the Separator (Cyclone) should rest upon the Wire-ring.

Tighten the hose clip just as much as needed to keep the upper and lower parts of the Separator together. There must be no space between the Cyclone and the Wire-ring (see illustration below).

Verify the direction of incoming water and line up the side outlet on the separator and tighten the hose clip.



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INSTALLATION OF THE AQUATRON SYSTEM

PLACE OF INSTALLATION

Check the compartment where the system is to be installed. If low pressure occurs (e.g. if an oilburner is installed), a separate room must be built for the Bio Chamber. The room must have a ventilator to the outside air and the door should be sealed by a strip seal.

The Aquatron system should be installed in a frost free compartment where:

- optimal composting temperature is minimum 12° C (55° F),
- at year-round living or worm composting a temperature above 15° C (60° F) is recommended,
- if necessary, insulate the compartment and install a thermostat controlled electric heater.

If the system is installed in a vacation house which is closed during the winter season, special precautions must be taken.

The Aquatron system can handle temperatures below zero, but not be used under those conditions.

If you want to store up the system for the winter and not use it, just assure that there are no water left in the stench traps or put antifreeze liquid in them to prevent the smelling from coming up and the stench traps to freeze.

The Bio-Chamber can be frozen with faeces and paper without any problems, but no water can be added or sewer system to used before thawing!

The Separator must be installed in a vertical position, therefore the importance of that the area of usage is horizontal (Verified with spirit-level).

If you have a problem of levelling the ground there are a **adjustment plate** as option to put between the support and the Separator. Turn it so that the fluid outlet located in the bottom part faces towards the direction where it will be led. If needed un-tighten the hose clamp and turn the upper part of the Separator towards the pipe coming from the WC.



The outgoing outlet is connected to the composting chambers drainage (see the illustration on the Aquatron wagon system on the right).

VENTILATION:

Ventilation from Aquatron system can be placed at any position between the toilets and the separator.

Be sure to have as few bends as possible and do so grave concerns as possible to get a good draw.

It is good if the extraction point is over the roof ridge.

If necessary, you can turn on electric fan or wind turbine.

Examples of two different solutions that Aquatron propose if needed.



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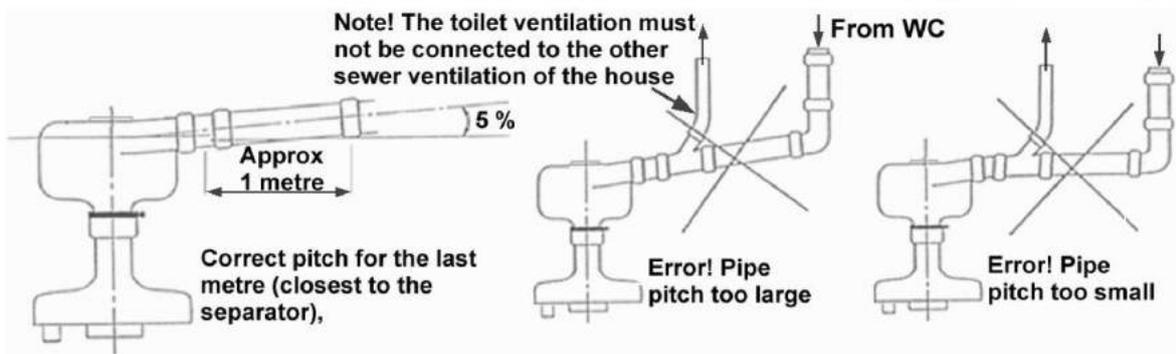
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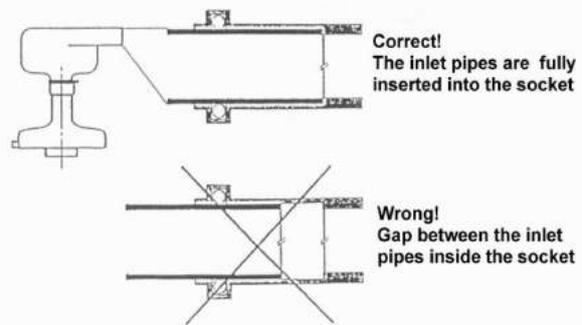
INSTALLATION OF THE AQUATRON SYSTEM

PIPE INSTALLATION



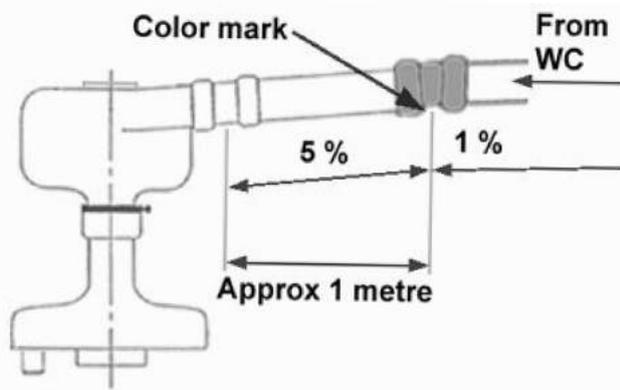
Use at least 110mm pipes between WC and Separator. For ventilation use 100mm (minimum) pipes.

The Separator should be connected to a 110mm double socket. NOTE: The Separator must be horizontal and its vertical line perpendicular to the Bio Chamber. The inlet pipe must be fully inserted into the socket.



The horizontal distance between the WC and the Separator must be **minimum 1 metre** and that last metre (closest to Separator) should be pitched at 5% (5 cm lowering on one meter). At further distances the earlier part of the pipe should have a 1-2% horizontal slope, or as national standards. If needed, use the special angled coupler double socket in order to achieve the pitch transition.

NOTE: Turn the color mark of the angled coupler double socket downwards. Furthermore, check that the inclination of the inlet pipe is smooth and that there are no depressions where fluid waste may gather.



The ventilation should be installed between the WC and the Separator. The ventilation pipe should extend above the roof. If there is a large level difference between the WC-outlet and the Separator, then first install the horizontal pipe pitched at the specified angle, and then make the necessary level adjustment with the vertical pipe.

The slope of 1-2% (1-2cm per meter) is OPTIMAL, less slope could result in that the solids and water wont run off, to much slope could result that the liquids will run faster than the solids. Both cases will result in a stopper.

We have clients that have 60 meters between the house and their separator, it works perfectly due to the respect of having the OPTIMAL slope of 1-2%.

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INSTALLATION OF THE AQUATRON SYSTEM

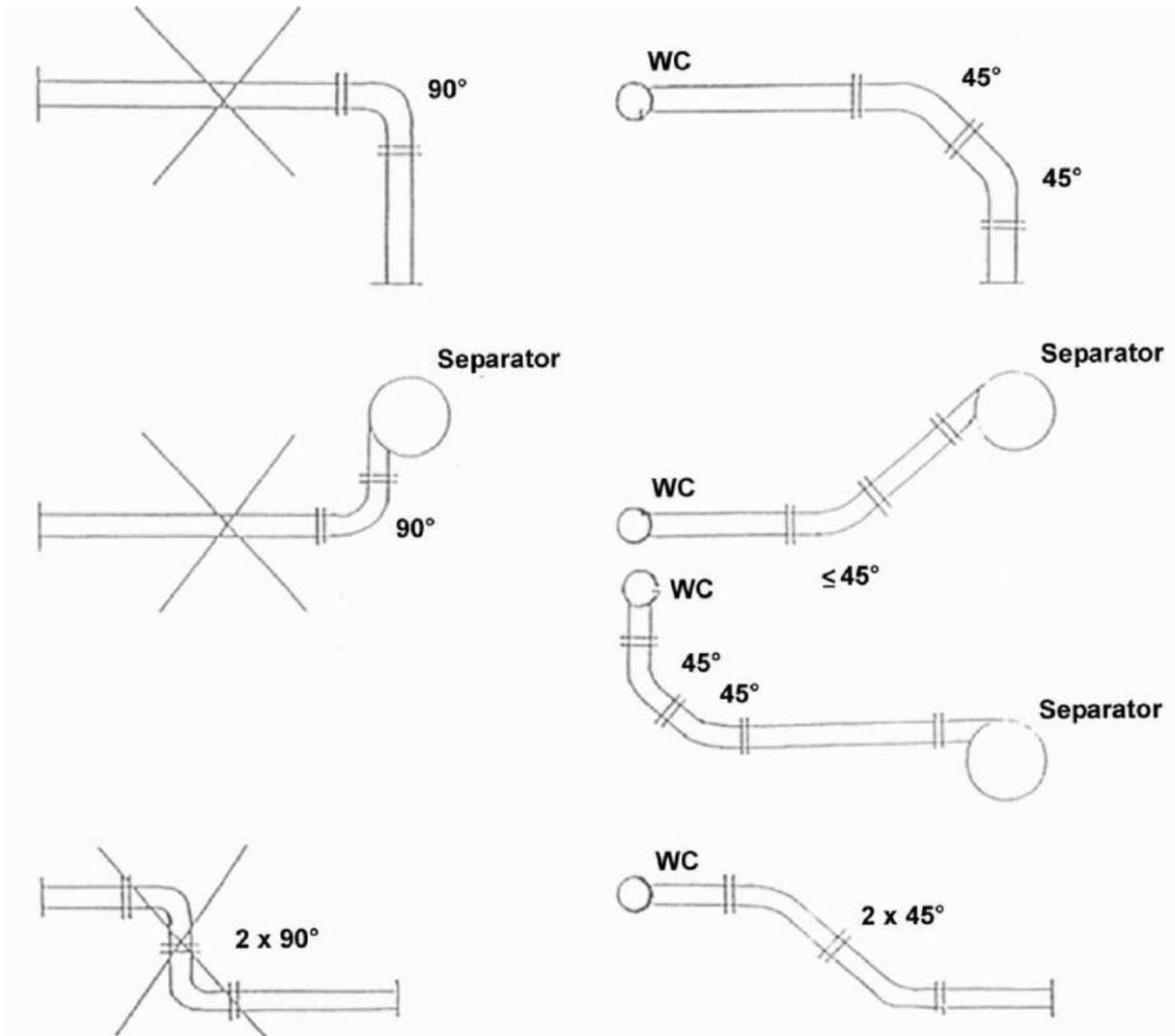
SOME EXAMPLES OF HORIZONTAL PIPE BENDS

A vertical or horizontal 90° angle can have the result of either slowing down the flush water or fragment the solids, this will make it more difficult for the separator to work properly.

If you are installing an Aquatron system in a all ready built house, just respect this with the new pipes before the separator, **no need to redo your complete pipe system.**

NOT RECOMMENDED

OUR RECOMMENDATION



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AFTER INSTALLATION AND MAINTENANCE

FLUSHING TEST

Once the Aquatron system is installed you have to check how much of the flush water that enters the Bio Chamber each time you flush. Put a recipient in the Bio Chamber and flush the toilet once. If correctly installed, when flushing with water only, a maximum of 0.5 decilitres should go that way.

If too much water enters into the Bio Chamber there are two explanations:

- If the water enters the Bio Chamber at the beginning of the flushing the velocity of the incoming fluid is too high and the pitch is too large – decrease the pitch of the inlet pipe.
- If the water enters the Bio Chamber at the end of the flushing the velocity of the incoming fluid is too low and the pitch is too small – increase the pitch of the inlet pipe.

You can always contact the support team at Aquatron for help, info@aquatron.se

COMPOSTING

Start up

Put the Geo-textile at the bottom of the Bio Chamber, be carefully so it covers the filter mat. Add some compost from the garden in order to insert microorganisms by this the composting process will get a more rapid start, 2-3cm is well enough.

If the temperature is always above 10° you can add some composting-worms (not the same as you find in the garden). Composting worms will after a few months taken care about 95% of the composting volume.



Faeces are quite nutrient-poor for composting and once and a while you can add leftovers from the kitchen, this will help you to a better composting. (There are plenty of good tips and tricks on internet about toilet composting)

MAINTENANCE

ONCE A MONTH

Separator:

Verify **by looking** through the lid of the separator that the wire-ring is clean from toilet paper and deposits.

Composting chamber:

Verify the level of solids and paper in the chamber, if the composting pile up, level it out with a stick. Verify the consistence of the compost so it's not to humid (due to a malfunction, stuck paper e..t.c.)

Once the chamber is full there are two solutions:

- Empty the content in a place for after composting, we recommend 6-12months.

(In Sweden the environmental laws says that faeces has to be after composed for 6 months)

- Replace the chamber if its mobile, let the mobile chamber do after composting during six months before empty the left over in the nature.

Aquatron recommend drainage mats in the bottom of the composting chamber.



Drainage mats in our Aquatron 90 drawer.

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A FEW OF OUR COMPLETE SYSTEMS PROPOSED BY AQUATRON



AQUATRON 50
One of Aquatron smallest systems, only a tray of 50 liters once full it's emptied for compostage.



AQUATRON 4x200 system. All the 4x system are built to composte the faeces and papers in separate chambers within the composting unit. Once composted the volume is reduced by 75-90%



A well maintaind Aquatron doesn't smell and the area of installation can be used for other activitys.



Two AQUATRON 4x300 systems installed near Barcelona in Spain.

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OPTIONS:

UV-FILTER

In order to the toilet water will become 100% clean from bacteria so runs the fluid through UV -unit there one total kills of bacteria is received also at diarrhoea conditions. The length of life on the two fluorescent lights is approximately 9 000 hours if they stand on the day and night around, a buzzer alarm when a fluorescent light breakage. The fluid runs to the UV-unit breakage het where it is elucidated with ultraviolet light as effective kills bacteria and virus. The fluid is then equivalent with Grey Water (bath, dish washing and laundry water) and can to be leaded out in one into a suitable receptacle.



PHOSPHORUS TRAP

Phosphorus Traps are a means for reducing the emissions of phosphorus in the groundwater, it is not as good as urine separation where all the nitrogen and phosphorus back to the plants via the urine irrigation.

With phosphor trap you receives highest protection level together with a validated infiltration. A normal phosphorus trap is 10 times larger and considerably, the purchase and replacement of phosphorus-binding material (must have lorry with crane for a change of the material). Then only flush water go through phosphorus trap volume can be reduced by 90%. The optimum is to have such a high concentration of urine as possible (where all the phosphorus is) and avoid as much plain water as possible when the only leach out the phosphorus binding material.



PUMP SOLUTION

Pump can be used to save the installation height or when the building sewer is located higher than Aquatron system fluid outlet.

Over the years we found that Saniflo pump is reliable and easy to use.

The pump installed between the Bio Chamber outlet and phosphorus trap or UV unit inlet.

NOTE: To avoid that the liquid to splash on fluorescent lamps and fittings, a 45 ° pipe bend mounted inside the UV unit inlet. Pipe bend towards the UV unit bottom. A reduction of between 40 mm and 50 mm purchased separately as well as 45 ° pipe bend.

VENTILATION

If you need a better extraction of the air Aquatron can propose you a **wind spin** or an **electric fan**



FOR MORE INFORMATION ABOUT OPTIONS OR SPARE PARTS VISIT OUR HOMEPAGE

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ERROR CHECKLIST

TYPE OF ERROR	CAUSE	MEASURE
1 Wet bio-bed	- Bad drainage	Check that the drainage holes are not blocked and that the drainage layer is in accordance with the manual,
	- Too much water	A: Check that the Separator was installed horizontally on the Bio-Chamber and that its vertical line is perpendicular to the Bio-Chamber. B: Check that the Wire-ring is positioned correctly and that the wires do not stick to the inside of the the Separator neck. The wires should be slightly bent towards the middle of the Separator neck, see C: Check that the cyclone is fully pushed down into the Separator neck and it rests firmly on the Wire-ring. D: Check pitch of the inlet pipe. At too large pitch, fluid enters the Bio Chamber at beginning of the flushing; at too low pitch, fluid enters the Bio Chamber at the end of the flushing.
	- Leaking WC	E: Repair the WC. Check the pitching of the inlet pipe. It must have a smooth slope and no depressions where fluid waste may gather,
2 Odour in the room	- Wet bio-bed	See above.
	- Wrong ventilation	A: The ventilation pipe is too short, it does not extend over the roof. B: The ventilation is coupled together with the other sewer ventilation of the house. C: Backflow? A vacuum-valve must not be used. D: Check the waterseal to assure that no odour is coming from the sewer system.
3 Odour when windy	- Air is pressed into the ventilation the roof.	The ventilation pipe does not extend high enough above It must be lengthened. Mount a vane on the ventilation pipe.
4 Stoppage in the separator	- A too high pyramid of paper has been built up in the Bio Chamber - The wires in the Wire-ring of the Separator are bent or crossed - The inlet of the Adjust, separator is not fully inserted into the socket	Tilt the pyramid with a suitable tool, alternatively turn the composting chamber slightly or switch to the next compartment if needed. Straighten the wires.
5 Stoppage in the fluid outlet of the Separator	- The flushing water is entering the Separator at too high speed	The pipe between WC and Separator has a too large inclination. See Items 4.5.3, 4.5.5 and 4.6.
6 Stoppage in the fluid outlet of the system	- Sediments or foreign objects in the fluid outlet	Check that the fluid is not stopped in the UV unit or in the waterseal underneath it. Clean the UV unit and the waterseal from sediments and foreign objects.
7 Flies in the Bio Chamber	- Wet bio-bed	See Items 1 and 2 above. Spray the inside of the Bio Chamber with an appropriate insecticide

PERSONAL NOTES: