

ALLERTON

Specialists In Sewage & Effluent Treatment Systems

MINI BIOFILTER 6PE Pumped Outlet

INFORMATION HANDBOOK

Allerton
Woodbridge Road
Sleaford
Lincs. NG34 7EW
Tel: 01529 305757
Fax: 01529 414232
e-mail: sales@allertonuk.com
<http://www.allertonuk.com>

CONTENTS

	<u>Page</u>
1. Health and Safety	1
2. Introduction	3
3. Technical Drawing	4
4. Specification	5
5. Handling & Installation	6
6. Commissioning	8
7. a) Field Wiring Diagram	9
b) Wiring Diagram	10
c) Irrigation Timer Settings	11
8. Operating Instructions & Fault Finding	12
9. Warranty	16

HEALTH and SAFETY

Important – Please Read Carefully

Health & Safety at work act 1974

We are required under section 6a of this Act to advise our customers on the safety and handling precautions to be observed when installing, operating, maintaining and servicing our products.

The Users attention is therefore drawn to the following:

1. The appropriate sections of this manual must be read before working on the equipment.
2. Installation and servicing must only be carried out by suitably trained or qualified personnel.
3. Normal safety precautions must be undertaken and appropriate procedures observed to avoid accidents.

Refer to Allerton for technical advice or product information.

Health

Due to the nature of our products, you will come into contact with sewage, which can be hazardous to health, and the following information should be noted prior to commencing work.

a) Standard Precautions

It is the clients responsibility to ensure that the necessary protective clothing and equipment is available to their personnel.

Always wear gloves when handling items contaminated with sewage. Wash hands thoroughly after having worked in sewage or anything contaminated with sewage, including your clothing and boots.

Any cut, scratch or abrasion of the skin needs to be washed thoroughly with clean water and covered with waterproof plasters until healed.

Do not eat, drink or smoke before washing your hands.

If you contract any of the symptoms described after coming into contact with sewage, report to your doctor immediately. Advice can be obtained from the doctor on the vaccinations associated with working with sewage.

b) Leptospyrosis

Two forms of Leptospyrosis can affect people in the UK.

- i) Weil's Disease.
A serious and sometimes fatal infection that is transmitted to humans by contact with urine from affected rats.
- ii) Hardjo form of leptospyrosis.
Transmitted from cattle to humans.

What are the systems?

Both diseases start with a flu-like illness with a persistent and severe headache. After a few days jaundice will appear.

How might I catch it?

The bacteria can get into the body through cuts and scratches and through the lining of the mouth, throat and eyes after contact with infected urine or contaminated water.

Safety

Sewage gases are potentially toxic and explosive. Do not enter the biofilter once the unit is operational. If entry becomes necessary, this should only be undertaken by Confined Space trained operatives with the correct gas monitoring equipment and breathing apparatus.

Isolate the unit electrically before undertaking any maintenance work.

Do not leave open covers unattended, use temporary barriers and signs as appropriate.

INTRODUCTION

The Allerton Sewage Treatment Unit has been designed to generally conform to the ***British Standard Code of Practice BS 6297:1983 – Design & Installation of Small Sewage Treatment Works***. The unit will treat domestic raw sewage in remote areas where connection to the mains sewer is not possible.

In order to get the best out of your unit, we recommend that you read this information prior to installation.

We also recommend that after Commissioning the unit you follow the Operating Instructions carefully, including maintenance and desludging instructions.

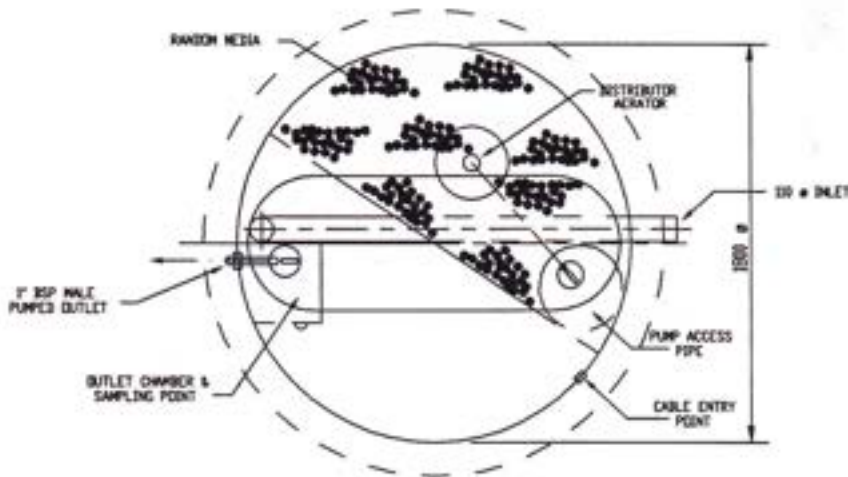
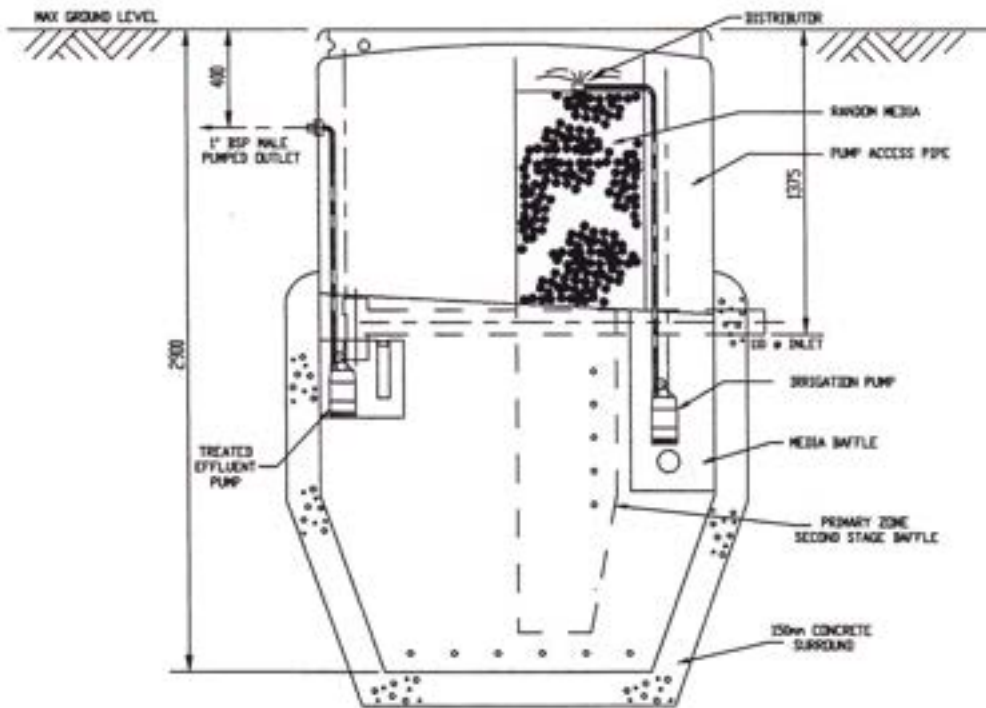
A Maintenance Contract is offered.

HOW IT WORKS

Raw sewage is gravitated into the primary settlement zone of the unit. Here the solids will settle out leaving supernatant liquor to pass through into the second stage of the primary settlement zone. Largely free from solids, the liquor is fed by displacement into the irrigation pump zone where it is pumped into the distribution system on top of the media, collecting air as it passes through the distributor. The plastic media is carefully designed to provide optimum surface area/volume ratio. The bacteria which occur naturally in the effluent, are encouraged to breed, living in almost perfect conditions, with plenty of food, water and air, digesting the organic waste in the liquor. The effluent is recycled over the media many times until the final effluent is of a clear high standard. A sample can be take from the outlet chamber when necessary.

This effluent is then pumped to the outfall ditch or soakaway. However, during the dry months of the year, it is very easy to use this free water in an underground irrigation system using inexpensive corrugated pipe.

SECTION
THROUGH UNIT



PLAN OF UNIT
(WITH COVER REMOVED)

Rev.	Description	Date	Appr
1	OUTLET MOD	18.12.01	MJV
0	ORIGINAL	28.11.00	

Allerton

Drawn: MJW Date: 28/11/00

Title
ENCLOSED BIOFILTER
WITH INTEGRAL
PRIMARY TANK.
6 PERSON PUMPED

© Allerton

Drwg. No: 6PEP_10

Mini 6PE Pumped Outlet Biofilter Specification

Population Equivalent:	6
Total daily flow:	1200 litres
Maximum daily flow:	3 x d.w.f
Duration of maximum flow rate:	60 minutes
Total daily BOD5:	360 grams
BOD5 reduction in primary settlement tank:	30%
Final effluent in milligrams per million:	BOD5 20
	Suspended Solids: 30
Primary settlement tank volume:	1.6 cubic metres
Sludge storage volume:	0.4 cubic metres
Desludging frequency:	Annual
Plant capacity:	360 grams/day
Shell construction:	GRP
Diameter of unit:	1800mm
Depth of unit:	2900mm
Weight of unit empty:	250Kg
Media pump:	Grundfos KP150 A 1
Outlet Pump:	Grundfos KP150 A 1
Internal pipework:	1" PVC
Discharge pipe fitting:	1" BSP male thread
Access cover:	Green GRP Pedestrian weight
Diameter of inlet pipe:	110mm
Depth of inlet invert:	1375mm
Location of control panel:	In building or kiosk
Type of electric cables from control panel to unit: (customer to supply cable)	7 core 1.5mm SWA armoured (maximum length 40m – for cable run in excess of this please refer to Allerton).
Description of control panel:	PVC box 215mm wide x 210mm high x 100mm deep, complete with timer, pump light, fuses and on/off switch.

HANDLING AND INSTALLATION

Pumped Outlet

GENERALLY

The unit is designed to be installed to ground level. It is constructed of GRP and care must be taken not to crack or puncture the unit. It should not be dropped even a short distance nor should it be lowered or rolled onto hard or sharp objects. The base of the unit must be evenly bedded on a foundation before concreting into final position.

OFFLOADING AND POSITIONING

The unit weighs approximately 250 Kilos. Exercise care during all handling operations. Ensure that level clear ground, free from sharp projections is provided for storage. Safeguard units from toppling or rolling. Check consignment schedules for shortages and notify supplier accordingly in writing within 48 hours.

CAUTION

Adherence to good working practices and the Health & Safety at Work Act on site should be observed.

Ensure that all safety precautions are taken when working in deep excavations. Pay particular attention to the stability of the sidewalls and use sheeting if necessary. It should not be necessary for anyone to work at the bottom of the excavation except when levelling the base and placing the first backfill.

SEWAGE UNIT INSTALLATION

- Excavate to the correct formation level. This will normally be 150mm below the base of the sump.
- Refer to the technical drawing for the appropriate level.
- Lay and level lean mix concrete surround to the correct base level of the sump.
- Lower the unit into position with the aid of lifting ropes or webbing slings (not chains), taking care not to damage any of the flanges.
- Ensure the inlet and outlet connections are correctly oriented.
- Check that the top of the unit is in a true horizontal plane.
- Connect the external inlet and outlet pipes. The inlet is a standard 110mm UG sewer pipe plain end, and the outlet is a 1" BSP male threaded fitting.
- Concrete surround to sump. The concrete will normally be 150mm thick.

- Place the lean mix concrete in 300mm deep layers evenly a round to the sump in order to avoid distortion.
- Compact each layer carefully to ensure uniform contact all round the sump wall.
- **DO NOT** place concrete via a chute discharging against the side of the GRP sump.
- **IMPORTANT** Fill with water **at the same time** as placing concrete around the unit up to the level of the inlet pipe. The water level should be 300mm **above** the concrete level during the initial stage of concreting. Concrete up to just above the top of the inlet pipe.
- **DO NOT USE VIBRATING POKERS ETC** as this will deform the walls of the unit.
- Ensure that the backfill material contains no large stones or sharp projections or lumps of clay.
- Make a final check on the level and plane of the unit.

FILTER MEDIA

Fill the media chamber with the media. Check that it is level and evenly distributed before putting the unit into service.

INTERNAL PIPEWORK AND ELECTRICAL CONNECTIONS

Please read Commissioning Instructions.

Note: A qualified electrician should carry out all electrical work.

WARRANTY

The unit is covered by a **3-year warranty** on all parts providing that Allerton have Commissioned the unit, and that the unit has been correctly installed. If the unit has been Commissioned by a recognised specialist, then the **3-year warranty** will still apply.

Any evidence of abuse of misuse will invalidate the warranty.

COMMISSIONING INSTRUCTIONS

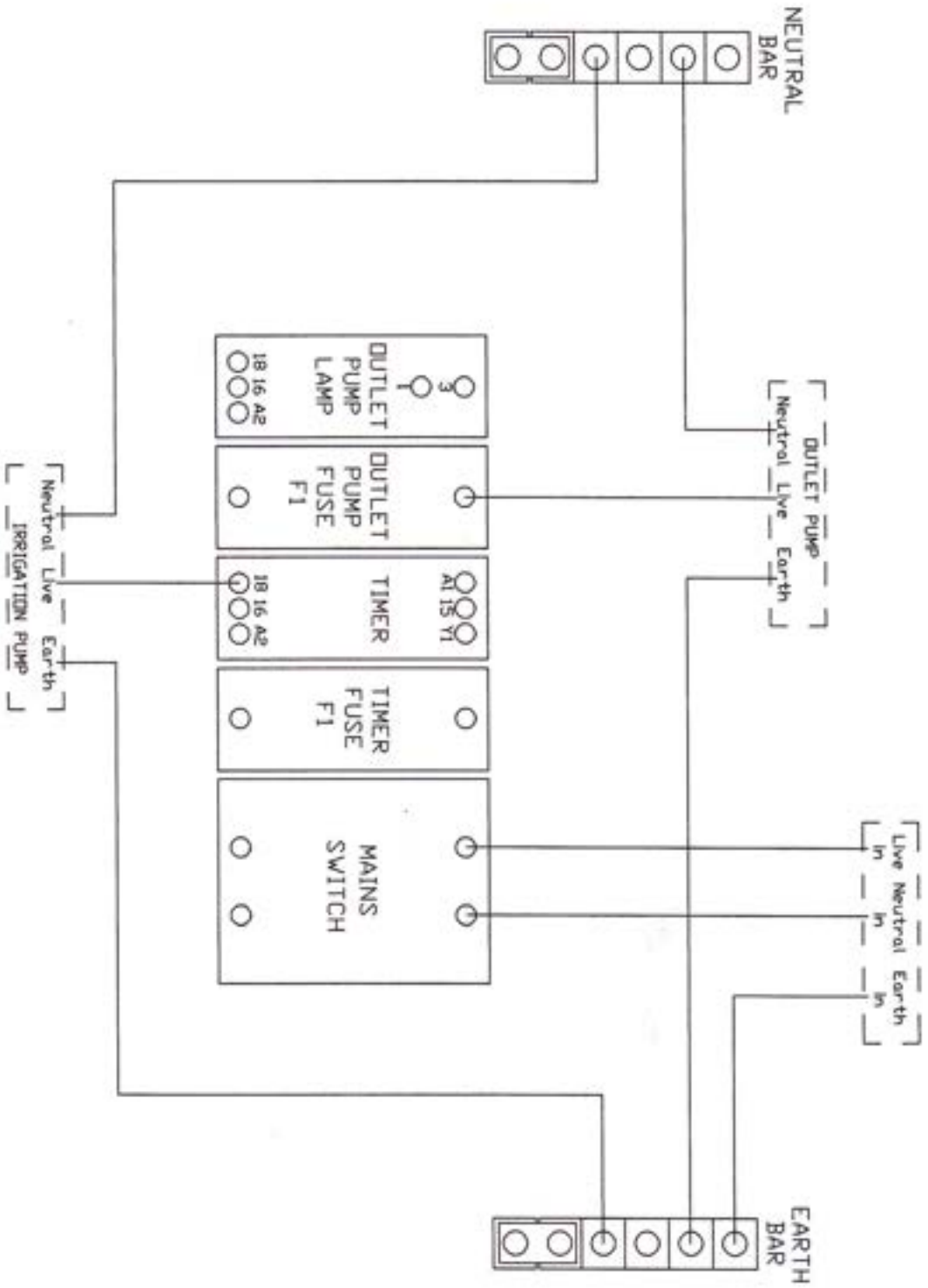
WARNING

The lengths of the floats on the pumps and the controls on the control panel have all been pre-set. Any alteration could mean that the unit will not work efficiently or may cause more serious damage to the pump motors. A qualified electrician should carry out all electrical work.

INSTRUCTIONS

- When the unit has been installed, the pipes all connected up, ensure that the unit is filled with water (see Handling and Installation) to a point about 1.3 metres below the rim. The unit cannot be tested properly unless the water is at this level.
- With the cover removed, you will see the **MEDIA CHAMBER** with at one end the **PUMP ACCESS TUBE**. Opposite the **PUMP ACCESS TUBE**, below water level, is the **OUTLET BOX** with the outlet 1.0 metre above it.
- Attach the **OUTLET PUMP** Via the shorter pipe to the outlet union. Using one of the ropes lower the **OUTLET PUMP** into the **OUTLET BOX** so that the pump sits on the base of the tank and the float does not entangle. Secure the rope through the holes in the media wall. This rope is there to ensure the pumps are not lifted or lowered by an electrical lead or the pipework. Wire the pump into the **CONNECTION BOX**.
- Ensure the media is level in the Media Chamber and attach the **DISTRIBUTOR** to the union at the **PUMP ACCESS TUBE** ensuring the disc is level and facing upwards.
- Attach the pipe to the **IRRIGATION PUMP** and using the other rope, lower into the **PUMP ACCESS TUBE** in the **MEDIA CHAMBER**. Attach the pipe to the union inside the tube. Ensure the float is below the surface. Secure the rope through the holes in the tube. Wire the pump into the **CONNECTION BOX**.
- Lay 7 core **SWA** from the **CONTROL PANEL** to the **CONNECTION BOX**.
- Wiring Instructions are included in this pack.
- Ensure the **MEDIA** is levelled and below the distributor.
- When the unit is switched on, the outlet lamp will indicate that the outlet pump is operating. The pump will switch off automatically when the outlet box is empty. The timer will operate the **IRRIGATION PUMP** in approximately 10 minute cycles – 3 minutes on and 7 minutes off.

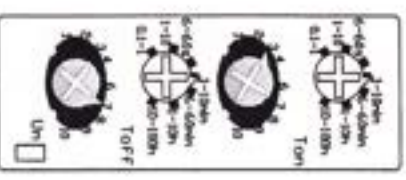
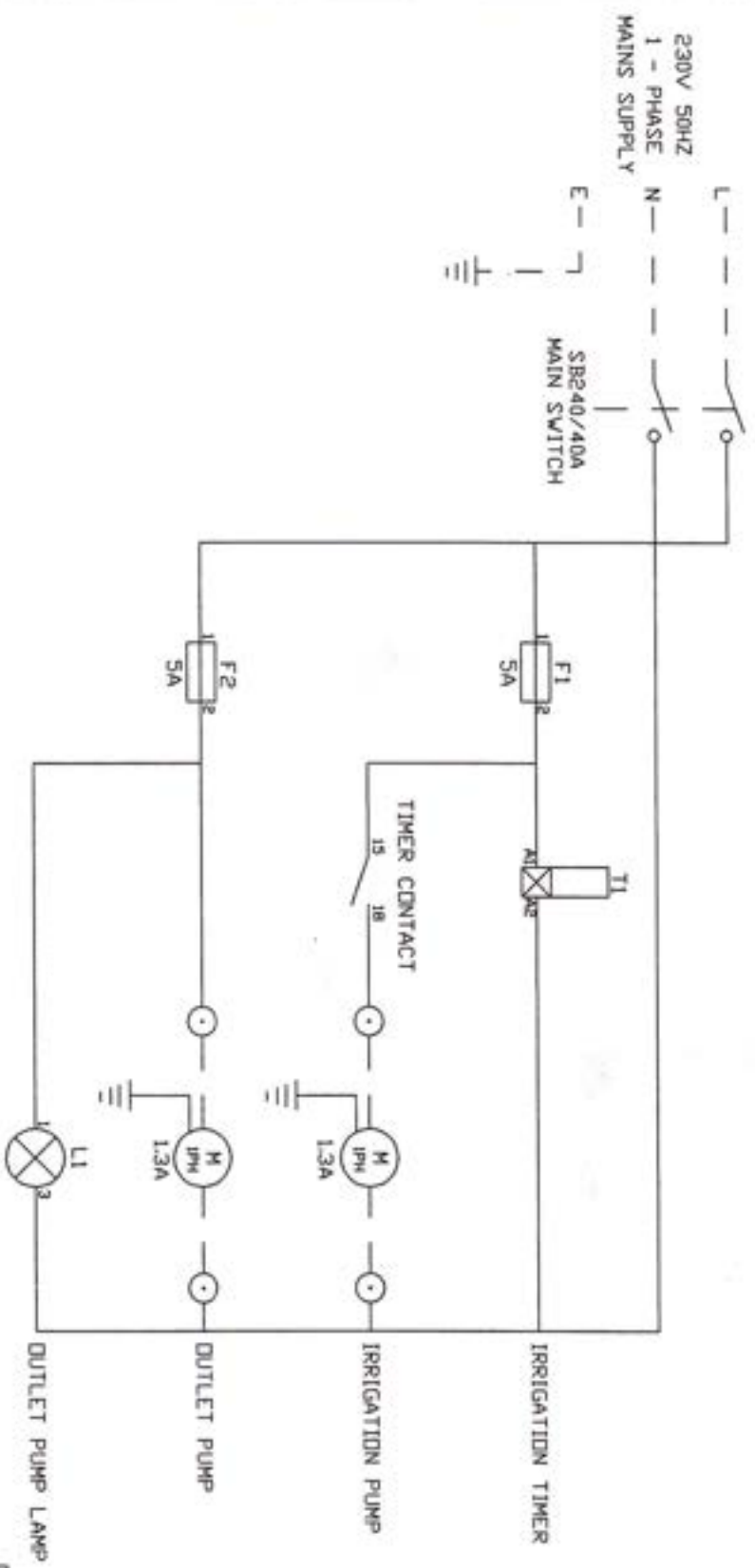
The unit will now run automatically



Rev.	Description	Date	Appr.
0	ORIGINAL	14/02/01	

Drawn: MJW Date: 14/02/01
 Title: MINI BIOFILTER PUMPED OUTLET FIELD WIRING
 Drawn: MJW
 Dra. No: 1228_01

Allertom

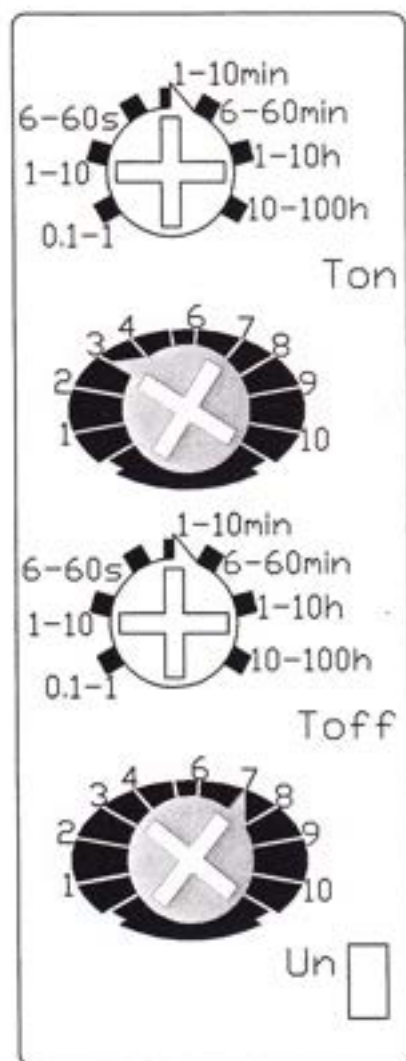


Allertom

Drawn M.J.W. Date 14/02/01

**MINI BIDFILTER
PUMPED OUTLET
WIRING DIAGRAM**

Ref No. 1203_1



Allerton

Drawn MJW Date 4/02/01

Title
MINI BIOFILTER
IRRIGATION TIMER
SETTINGS

© Allerton

Drwg No. MINIRRTR/01

OPERATING & MAINTENANCE INSTRUCTIONS

CAUTION: Extreme care should be taken to avoid contact with sewage, and if unavoidable, suitable protective equipment must be used.

1 GENERAL DESCRIPTION AND FUNCTION

- 1.1 The Allerton Mini Biofilter unit incorporates the first, second and third elements of a three-stage sewage treatment plant.
The first stage occurs in the primary settlement zone in which the solids are settled and subsequently digested. Wastewater then flows through from the primary settlement zone into the filter where treatment by the natural process of biochemical oxidation takes place.
- 1.2 The water enters the pump zone located in the sump beneath the filter module. It is then lifted by the submersible irrigation pump to the distributor from whence it is sprinkled over the surface of the filter media. The oxidation process takes place as the water trickles through the media and over the biological film that grows on the media surfaces. The treated water is returned to the sump inner zone where the humus sludges are allowed to settle. The final effluent goes over a weir into the outlet chamber from where the outlet pump ejects it to a soakaway or ditch etc. A sample can also be taken from the outlet chamber.
- 1.3 The air needed for the oxidation process is introduced into the supernatant liquor as it passes through the distributor system. The air is vented from the unit via the soil-vent pipe of the property served or by a separate system.

2 TESTING

- 2.1 During installation the tank will have been filled with water. Upon completion of all works check the condition to ensure it has not become silt laden or the water muddied by wash through etc. If in doubt, pump out the primary zone and filter sump and refill with fresh water. Check that the irrigation pump is immersed.
- 2.2 Restore power to the filter by switching on main isolator or reconnecting power supply.
- 2.3 As soon as power is restored the pump will start operating in a 3 minutes on, 7 minutes off cycle. When the pump starts, observe the water flow through the distributor system to ensure that the spray pattern is even.

- 2.4 If the unit is required for imminent use it may be left in the operating condition. If there is some delay before being needed it is recommended that the panel switch and mains isolator be left in the "off" position.

3 OPERATION

- 3.1 The unit operates automatically. It should only be necessary to comply with the rudimentary precautions and simple maintenance procedures in Section 5 of the manual to ensure optimum results.

4 PLANT SHUT DOWN

- 4.1 No action should be taken if there is a temporary cessation of flow to the plant for any period of time up to two weeks. Leave the plant in operation with the power on.
- 4.2 Should the plant not need to be operational for any period in excess of two weeks, switch power off at the main isolator.
- 4.3 On resumption of the flow to the plant, the unit should be made operational again as described in Section 2.
NOTE: Should the plant have been out of operation for four weeks, the unit should be desludged and refilled with fresh water before starting.

5 MAINTENANCE

- 5.1 Before doing any work on the pump **switch off** the electrical power supply to the unit at the main isolator.
- 5.2 **Sewage gases are toxic and explosive.** When any operations are carried out on the unit, observe all necessary precautions. Prohibit smoking and naked flames.
- 5.3 *Weekly Maintenance*
Check the control panel ensure that the green light on the timer is flashing at all times. A short flash indicates that the irrigation pump is in its 'off' cycle, a long flash indicates the irrigation pump is in its 'on' cycle.

5.4 *Three Monthly Maintenance*

Check pump operation visually via access lid. Clean air inlet perforations under lid and ensure that there are no restrictions to the flow of air.
Check and clear the distributor if needed.

5.5 *Annual Maintenance*

- Switch off unit at mains isolator. Remove irrigation and outlet pumps and delivery pipes. Wash them down. Check pump oil levels.
- **Desludging.** The units should be desludged every twelve months.
It is recommended that the desludging hose is not more than 4" diameter.
- **Firstly** empty the **primary zone** as this will also reduce the level in the **final zone**. **Secondly** empty what remains in the **final zone** and return hose to the **primary zone** if needed.
- **NB** All water and solids should be completely removed. We also advise that the unit is backwashed each time, if not every other time and that the desludging of the unit is supervised to ensure this is done correctly.
- After desludging the unit must be refilled with fresh water. A tap running in the house for 4-6 hours will suffice.
- Replace pumps and delivery pipes.
- Switch on unit and check operation.

6 **FAULT FINDING**

*Before conducting any repair on the pump, **switch off** the electrical supply at mains isolator.*

Possible Cause

Remedial Action

6.1 *Irrigation OR Outlet pump not working*

- | | |
|---|---|
| <ul style="list-style-type: none">• Power failure• Pump low level protection operating• Pump motor failure• Blown fuse | <p>Check that power is on at isolator and panel switch.</p> <p>Check that pump float is submerged.</p> <p>Check pump is accordance with manufacturer's instructions.</p> <p>Check pump, check junction box for water ingress.</p> |
|---|---|

6.2 *Persistent or recurring malfunction*

- | | |
|--|---|
| <ul style="list-style-type: none">• Wiring fault | <p>If above actions fail to identify source of problem then complete system should be checked by a qualified electrician.</p> |
|--|---|

NB *If the system has been allowed to backup, when the outlet pump is operating again it may empty the unit too fast and solids may wash through. When the water*

level has been returned to normal for 2 hours, BOTH pumps should be removed and checked for items that could cause a blockage.

6.3 *Large flocs in final effluent*

- High sludge level in sump necessary. Check sludge level and desludge as necessary.
- Excess shedding of biofilm Investigate and eliminate as necessary any source of biofilm poisoning such as high concentrations of disinfectant, household bleach, acids etc on waste.

6.4 *Irrigation pump discharge water malodorous*

- Inadequate air supply Check that ventilation holes are clear.
- Inefficient treatment Check distribution system sprinkles flow evenly over surface of media. Adjust and level as necessary.
- Primary zone choked Check dip pipes are clear and check sludge level. Desludge as necessary.

6.5 *Uneven, irregular or weak distribution pattern*

- Solids blocking distributor Check, remove obstruction, clean distributor.
- Pump blocked Remove pump, clean according to manufacturer's instructions.
- Pipework blocked Either scaled up or some solid matter. Clean and replace.

WARRANTY

The Mini Biofilter is covered by a **3 year warranty** on all parts provided that the unit was installed and commissioned by Allerton or an Allerton approved company. Any evidence of abuse or misuse will invalidate the warranty.

CARING FOR YOUR BIOFILTER

The bacteria are a living organism and like any other animal can be killed off by poisonous substances. We therefore recommend that you try and prevent the following entering the system:-

- *Excessive amounts of cooking oil and fats*
- *Excessive amounts of cleaning agents, bleach etc*
- *Remains of medicines*
- *Motor engine oils, solvents or paint brush cleaning agents etc*
- *Nappies, sanitary products, wet wipes or any fibrous materials etc*
- *Chlorine backwash from swimming pools*

We would recommend that you take out a Service Agreement to maintain the standard of effluent from your unit.

Should you experience any problems please contact:

***Allerton
Woodbridge Road
Sleaford
Lincs
NG34 7EW
Tel: 01529 305757
Fax: 01529 414232***