

ALLERTON

Specialists In Sewage & Effluent Treatment Systems

MAXI RANGE

INFORMATION HANDBOOK

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

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INTRODUCTION

The Biofilter has been designed to generally conform to the British Standard Code of Practice 6297 - 1983, Design and Installation of Small Sewage Treatment Works.

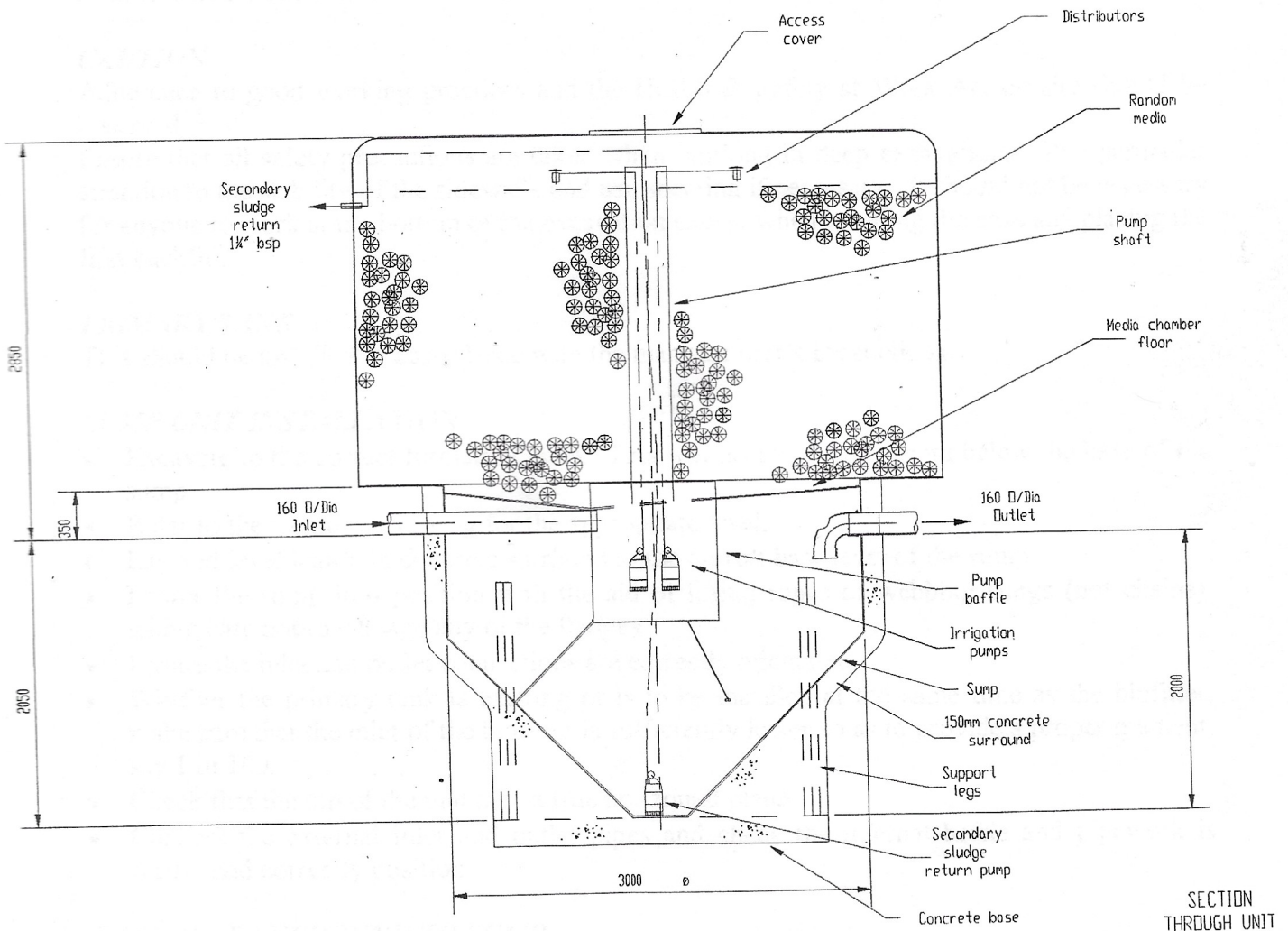
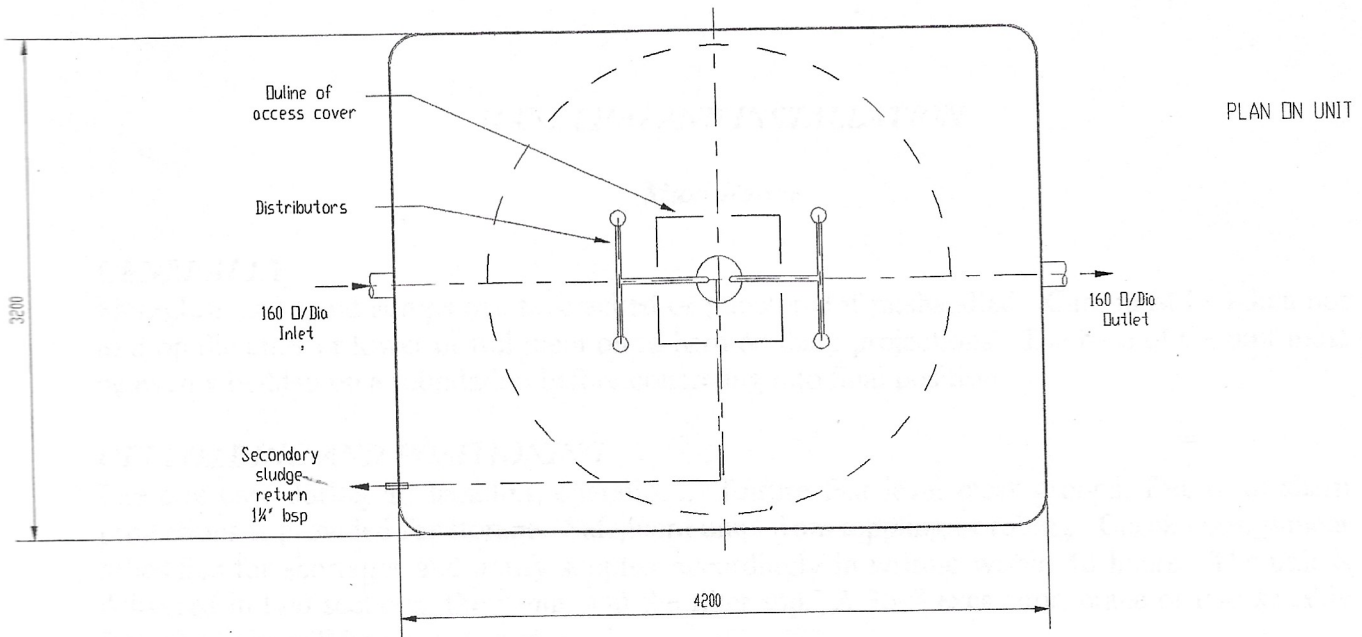
The Biofilter works in conjunction with a Primary Settlement Tank. Partially treated effluent from this tank enters the baffle area of the Biofilter. From here a submersible pump is used to distribute the liquid over the media, collecting oxygen as it passes through the distributor system whilst a small fan ensures a constant supply of fresh air.


The media is carefully designed to provide optimum surface area/volume ratio. Various bacteria, which are naturally present in the effluent, are thus encouraged to breed in almost perfect conditions with plenty of food, water and oxygen, digesting the waste in the liquor. The effluent is pumped over the media many times and then allowed to settle in the final settlement zone until the effluent is of a clear, high standard to satisfy the Environment Agency.

As the bacteria dies off at the end of its natural cycle, it sinks to the bottom of the unit where it is periodically pumped back to a manhole prior to the primary settlement tank, thus ensuring the automatic trouble free operation of the Biofilter.

ALLERTON MAXI BIOFILTER N3 SPECIFICATION

Customer	All Pumps Services
Site	Unknown
No of people:	as per attached table
Plant capacity:	180PE
Total daily flow:	28245 litres
Total daily flow rate:	3 x d.w.f.
Duration of maximum flow rate:	60 minutes
Maximum daily BOD5:	10.8 kilograms
BOD5 reduction in primary settlement tank:	30%
Final effluent in milligrammes per million:	BOD5 20
	Suspended solids 30
	Ammonia
<u>Primary settlement tank:</u>	
Primary settlement tank volume:	20.0 cubic metres
Total depth:	3515mm
Diameter:	2800mm x 5520lg
Depth to invert:	1000mm
Desludging frequency:	4 months
<u>Biofilter:</u>	
Shell construction	Green GRP
Filter shell dimension:	3200 x 4200mm.
Depth of sump:	2300mm
Depth of filter:	2500mm
Sump capacity:	8.5 cubic metres
Method of pump connection:	Quick release couplings
Internal pipework diameter:	1¼"
Diameter of SSR outlet pipe:	50mm HDPE
Access cover:	1000 x 3000mm
Diameter of inlet and outlet pipes:	160mm
Height of inlet invert above base of sump:	2050mm
Height of outlet invert above base of sump:	2000mm
Electrical Specification:	240/1/50
Description of control panel:	PVC 410W x 285H x 140D with timer, pump lights, on/off switch
Location of control panel:	In kiosk or building
Type of electric cables from control panel to unit: (customer to supply cable)	2 No 7 core 2.5mm SWA armoured (maximum length 40m - for cable runs in excess of this refer to Allerton)
Media Pump:	2 No Grundfos AP12.40.06.A1
Power:	600 watts
Timing:	5 minutes on, 5 minutes off
Secondary sludge return pump:	Grundfos KP250
Power:	250 watts
Timing:	1 minute on, 1 hour off
Fan:	18 watts, 127mm axial mounted
Timing:	Continuous



 <p>Allerton</p> <p>Allerton Drainage, Woodbridge Road, Sleaford, Lincs. NG34 7EW Tel: 01529 305757 Fax: 01529 414232</p>	Drawn by P.WILLEY Date 10/7/98 Drg Title <p style="text-align: center;">ALLERTON BIOFILTER N3.</p>			
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HANDLING AND INSTALLATION

Maxi Range

GENERALLY

Fibreglass tanks and sumps can be cracked or punctured if mishandled. Care must be taken not to drop the units or lower or roll them on to hard or sharp projections. The base of the unit must be evenly bedded on a foundation before concreting into final position.

OFFLOADING AND POSITIONING

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. The unit is delivered in two sections: the sump, and the filter top. A 360° excavator, crane or two suitable forklift trucks will be needed to off load.

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.

PRIMARY TANK

This should be installed in accordance with the manufacturer's instructions.

SUMP 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 sump 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 orientated.
- Whether the primary tank is existing or is to be installed at the same time as the biofilter, make sure that the inlet of the biofilter is sufficiently lower so as to provide a proper gradient, say 1 in 100.
- Check that the top of the unit is in a true horizontal plane.
- Connect the external inlet and outlet pipes and check the internal baffle and pipework is secure and correctly position.

CONCRETE SURROUND TO SUMP

- The concrete will normally be 150mm thick.
- In order to avoid tank distortion place the lean mix concrete in 300mm deep layers distributed evenly around the sump. Compact each layer carefully to ensure uniform contact all around sump wall.

- **DO NOT** place concrete via a chute discharging against the side of the GRP sump.
- Fill the water at same time as placing concrete backfill. The water level should be 300mm above the concrete level during the initial stage of concreting.
- Concrete up to the top of the sump.

It is essential that no gaps or voids be left in the concrete under any flanges. The concrete in these areas must be well consolidated to ensure uniform support to the flange around its entire circumference.

- **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 TOP INSTALLATION

- Lay a bed of concrete in an area around the sump level with the flange to support the filter section.
- Locate the top filter section onto the sump and ensure it is properly supported on the concrete bed.
- Fix the top to the sump using a bed of mastic around the top flange. Ensure a good seal is made
- Check the top is true and level.
- Connect up the **SECONDARY SLUDGE RETURN** outlet to the return manhole (upstream of the primary tank).
- Carefully backfill around the top to ground level with selected spoil from the excavation. Avoid using angular or sharp materials and large clay boulders.

PUMP ACCESS TUBE

- Locate the pump access tube squarely on the sump baffle so that the SSR outlet pipework on the unit lines up with the connector on the pump access tube. Place the cover over the pump access tube to prevent media entering the sump.

PUMPS AND DISTRIBUTOR

- For pump positioning consult Commissioning Instructions.

FILTER MEDIA

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

Note: All electrical work should be carried out by a qualified and competent electrician.

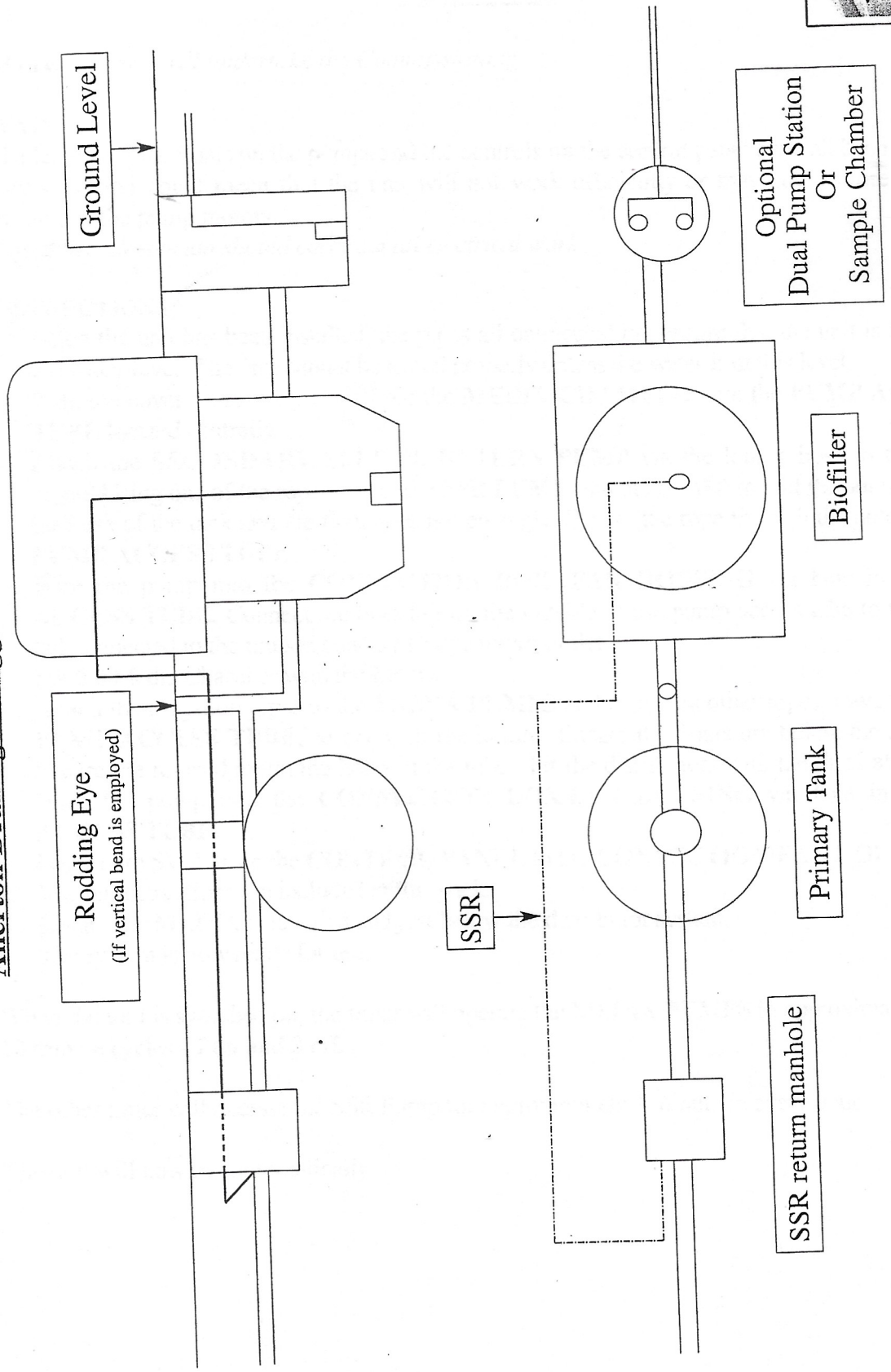
IMPORTANT

Ensure that the cable entries into the control panel are adequately sealed.

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 or misuse will invalidate the warranty.

Allerton Drainage - Suggested Maxi Biofilter site layout



Distances between units may be reduced so as to be almost negligible



Woodbridge Road Sleaford
Lincolnshire NG34 7EW
Tel 01529 305757 Fax 01529 414232
e-mail: sales@allerton-drainage.co.uk
http://www.allerton-drainage.co.uk

BIOFILTER COMMISSIONING INSTRUCTIONS

Maxi Range

NOTE Allerton will undertake the Commissioning

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 to top water level. The unit cannot be tested properly unless the water is at this level.
- With the cover removed, you will see the **MEDIA CHAMBER** with the **PUMP ACCESS TUBE** located centrally.
- Attach the **SECONDARY SLUDGE RETURN PUMP** via the longer hose to the SSR union. Using one of the ropes, lower the **SSR PUMP** into the **SUMP** 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 **PUMP ACCESS TUBE**
- Wire the pump into the **CONNECTION BOX /FAN HOUSING** via hole in **PUMP ACCESS TUBE**. Connect the hose tail on the outside of the pump access tube to the hose tail connected to the units secondary sludge return outlet
- Fill the Media Chamber with the Media.
- Attach the irrigation pipes to the **MEDIA PUMPS** and using the other ropes, lower into the **PUMP ACCESS TUBE**, secure with the union. Ensure the floats are below the surface. Secure the ropes through the holes in the tube. Fit the distributors with the discs at the top. Wire the pump into the **CONNECTION BOX/FAN HOUSING** via hole in **PUMP ACCESS TUBE**.
- Lay 7 core SWA from the **CONTROL PANEL** to the **CONNECTION/FAN HOUSING**.
- Wiring instructions are included in this pack.
- Ensure the **MEDIA** is levelled and just below the distributor system.
- The system is now ready for use.

When the unit is switched on, the timer will operate the **MEDIA PUMPS** in approximately 10 minute cycles - **7 on and 3 off**.

The other timer will operate the SSR Pump for approximately 1 minute in every hour.

The unit will now run automatically.

MAXI BIOFILTER RANGE

OPERATING INSTRUCTIONS AND FAULT FINDING

CAUTION

Extreme care should be taken to avoid contact with untreated sewage. If unavoidable, suitable protective equipment should be used.

1 GENERAL DESCRIPTION AND FUNCTION

- The Biofilter unit incorporates second and third elements of a two-stage sewage treatment plant. The first stage occurs in the *primary settlement tank* in which the solids are settled and subsequently digested. Wastewater then flows through from the primary settlement tank into the biofilter where treatment by the natural process of biochemical oxidation takes place.
- The water enters the pump zone located in the sump beneath filter module. It is then lifted by the 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 is discharged into a soakaway, or ditch etc.
- The air needed for the oxidation process is drawn into the filter module by means of a small fan. The air is vented from the module via the soil-vent pipe of the properties served, or by a separate system.
- The accumulated humus, generally dead bacteria, is pumped back to the primary settlement tank several times per day via the secondary sludge return pump (SSR).

2 TESTING

- During installation the tank will have been filled with water. Upon completion of all works check their condition to ensure the tanks have not become silt laden or the water muddied by wash through etc. If in doubt, pump out the primary settlement tank and filter sump zone and refill with fresh water. Check that the irrigation pump is immersed.
- Restore power to the biofilter by switching on the main isolator or reconnecting the power supply.
- When power is restored, the timer for the irrigation pump will operate at some point during its cycle. When the pump starts, observe the water flow through the distributor system to ensure that the spray pattern is even.
- Similarly, the SSR pump will operate at some point during its cycle. Evidence of it having operated will be seen in the return manhole.
- If the unit is required for imminent treatment 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*

- 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*

- 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 power on.
- Should the plant not need to be operational for any period in excess of two weeks, switch the power off at the mains isolator.
- 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 or more, the unit should be desludged and refilled with fresh water before starting.

5 *MAINTENANCE*

- Before doing any work on the pumps, **switch off the electrical power supply** to the unit at the mains isolator.
- **Sewage gases are toxic and explosive.** When any operations are carried out on the unit, observe all necessary precautions. Prohibit smoking and naked flames.
- *WEEKLY MAINTENANCE*
- Check operation of irrigation pump visually via access cover to ensure even distribution.
- Check and clear distributor if necessary.
- Check fan is working.
- Check for evidence of SSR pump operation in return manhole.
- *FOUR MONTHLY MAINTENANCE*
- Switch off unit at mains isolator. Remove irrigation pumps, SSR pump and delivery pipes. Wash them down.
- Desludge the primary settlement tank and ensure that all solids as well as water is removed.
- After desludging the primary settlement tank must be refilled with fresh water.
- Replace pumps and delivery pipes.
- Switch on unit and check operation.
- *THREE YEARLY*
- Remove pumps from unit and desludge via pump access tube. If necessary use pressure washer to remove old accumulated waste products.

6 FAULT FINDING

- Before conducting any repair on the unit, **switch off electrical supply** at main isolator.

6.1 FAULT – Irrigation pumps not working.

Possible Cause

- Power failure
- Pump low level protection operating.
- Pump motor failure.

Remedial Action

Check that power is on at isolator and panel switch.
Check that pump is submerged.
Check pump in accordance with manufacturers instructions.

6.2 SSR Pump not working.

- as above

as above

6.3 Persistent or recurring malfunction

- Wiring fault.

If above action fails to identify source of problem then complete system should be checked by a qualified electrician.

6.4 Large flocs in final effluent.

- High sludge level in sump.
- Excess shedding of biofilm.

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

6.5 Irrigation Pump Discharge Water Malodorous

- Inadequate air supply
- Inefficient treatment.
- Primary zone choked.

Check fan operation.
Check that ventilation holes are clear.
Check distribution system sprinkles effluent evenly over surface of media.
Adjust and level as necessary.
Check dip pipes are clear and check sludge level. Desludge as necessary.

CARING FOR YOUR BIOFILTER

The bacteria is 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;

Cooking oil and fats

Large quantities of cleaning agents

Remains of medicines

Motor engine oils etc

Nappies, sanitary pads or any fibrous materials etc

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