



Established 1987

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Designers and manufacturers of waste water treatment systems  
approved to Class 'A' USA and EN 12566-PT.3 CE

## OPERATING INSTRUCTIONS BIODIGESTER 'T' RANGE SEWAGE TREATMENT PLANTS MODELS 6 - 42

The following instructions are for guidance purposes and are submitted without obligation or prejudice. **The plant owner is responsible for all matters in relation to health and safety.**

### 1. INITIAL START UP

Once the Biodigester sewage treatment plant has been installed and commissioned then operation may commence. For commissioning see separate instructions.

The small linear air compressor(s)/blower(s) run continuously and feed air to diffusers at the base of the central treatment chamber. This oxygenates the sewage and also operates a continuous recycling system that prevents any part of the Biodigester becoming septic.

Once the plant is in operation biomass will naturally build up on the surface area of the media within the treatment chamber and is also retained in suspension within the circulating liquor.

Maximum growth and full performance are normally achieved after about six weeks. If appropriate the process may be speeded up by using special additives or a small quantity of humus sludge from another operational treatment plant placed in the treatment chamber. Septic sludge must not be added.

The organisms that make up the biomass are predominantly bacteria, fungi and protozoa.

### **SAFETY FIRST - ALWAYS KEEP YOUR BIODIGESTER LOCKED**

### 2. OPERATION

Once the Biodigester treatment plant is operating it will adequately handle all ordinary domestic sewage so long as the plant is correctly sized, installed and maintained.

However whilst it will handle bleach it is better if this is used sparingly. Also take care not to use domestic cleaning products containing anti bacteria compounds or fungicides as these may inhibit growth of the biomass.

It is also important not to use Ammonia based cleaning compounds especially where the 'Consent to Discharge' has an Ammonia limit. Whenever possible use washing powders and dishwasher powders which are genuinely described as "Environmentally Friendly".

### **3. MAINTENANCE**

#### **Weekly:-**

- (a) Check that the compressor(s) / blower(s) are running.

#### **Monthly:-**

- (a) If a grease trap is in use for the kitchen drainage inspect and empty as appropriate. A grease trap is normally only used where there is a communal kitchen. After regular monitoring an emptying frequency can be established. The normal Biodigester grease trap sizing and design is for emptying every 12 months.

#### **Every 6 - 12 Months:-**

(i) **Air Compressor(s) / Blower(s)**

Refer to detailed instructions for each make of blower.

Air Filters

- (a) Disconnect the power supply. Unscrew top cover(s) and remove. Check condition of air filter(s) and clean or replace as appropriate.

Diaphragms

- (b) Unscrew the main cover(s) with either 4 or 6 screws each at the base. Check the internal black rubber diaphragms for signs of damage or wear. These oscillate continuously with the alternating current. In the event of damage or wear replace all the diaphragms. This requires one or more spares kit, a Phillips screwdriver and in some cases special spacing pieces. The diaphragms should be changed every 3 years whether or not there are any signs of damage or wear.
- (c) Check internal electrical wiring for any signs of damage. Check any trip switches and alarms that are fitted.
- (d) Check that the air blower(s) is/are located in a position away from direct sunlight and free of any risk of flooding. Adequate ventilation is essential. B E S Ltd advises against using air blowers in an underground chamber.

(ii) **Air Line(s)**

- (a) Check tightness and condition of pipe / jubilee clips at both ends of the air line(s).
- (b) Check the air lines to make sure that there is no damage and that they have not become kinked or compressed.

(iii) **Inside the Biodigester**

Air Diffusers

Check that the diffuser(s) is/are bubbling strongly. Where two or more diffusers are fitted they should appear to bubble at about the same rate. If this is not the case check all pipework, connections and taps within the Biodigester. If necessary disassemble the diffuser and check for blockages or fit a replacement diffuser.

(iv) **Diffuser Positions**

Check that all the diffuser pipes are vertical from the manifold to ensure that the diffusers are in the correct positions.

In the case of the 'T6' the single diffuser must be positioned centrally. In models T10 to T18 the two or three diffusers must be central along the main axis of the Biodigester.

(v) **Internal Pipework**

Check all internal pipework, taps and fittings for tightness. Check also for leaks and condition.

(vi) **Desludging / Emptying**

The outer settlement chamber of each Biodigester model is designed to retain a humus crust up to 400mm deep without adversely affecting effluent quality. If possible check the depth of this crust.

Each 'T' range Biodigester has been designed to have an emptying interval of three years. However some may last much longer than 3 years and a few may need to be emptied more frequently.

The effluent quality and crust depth are key indicators of whether or not the Biodigester needs to be desludged / emptied.

Significant solids or turbidity in the final effluent indicate that emptying is required or the system has a fault.

When desludging / emptying is required it is essential to first remove the majority of the humus crust from the outer settlement chamber. Secondly empty the remaining liquid from the orange labelled pipe within the central treatment chamber leaving a small amount of solid / liquid in the bottom.

The black plastic media within the central treatment chamber will be retained within the Biodigester because the emptying tube has holes smaller than the plastic media.

(vii) **Main Biodigester Tank**

From inside check for any damage or faults affecting the main body or main lid of the glassfibre (GRP) tank.

(viii) **Opening Lid**

Check condition of the lid and its securing screws. Lubricate the securing screws.

**Ensure that the Biodigester is kept locked**

(ix) **Alarm System**

Check operation of alarm system which may be a pressure sensor or electrical current sensing system. Also check all wiring and electrical trips.

(x) **Remote Monitoring System**

If applicable, check operation.

**(xi) Integral Effluent Pumping Station**

- (a) Turn off the power supply and operate any isolating valves.
- (b) Remove pump from the integral pumping station by unscrewing the grey plastic union.
- (c) Dismantle, check and clean orange float control system attached to the pump.
- (d) Carefully check tightness of bolts on pump body.
- (e) Check pump impellor to make sure it rotates freely and there are no blockages.
- (f) Check tightness of hose / jubilee clips. Check operation of non return and isolation valves. Check all pipework. Check electrical connections and condition of wiring.
- (g) Re-assemble and check operation of pump.

**High Level Alarm**

If applicable, the integral pumping station may have a high level float switch to operate a flashing beacon or audible alarm. Check condition of components and connections and test alarm by raising the float switch to the opposite / upright position.

**Sample Chamber / Outlet Pipe**

If applicable clean inlet pipe to sample chamber and the sample chamber itself.

If applicable clean outlet pipe to watercourse.

**Every 3 Years:-**

- (a) Change air blower / compressor diaphragms no less often than every 3 years.
- (b) The Biodigester design desludging interval is every 3 years. In some cases this interval can be greater. In some cases emptying /desludging may be required more often.

**4. PROLONGED ABSENCE**

In the event of prolonged absence the following procedures are advisable.

- (i) Absence of 3 months or less  
Leave plant fully operational or fit timer control at 15 minutes operation every 4-6 hours.
- (ii) Absence greater than 3 months.  
Consult B E S Ltd for advice or fit timer control as at (i)

Without any loading only a little aeration is required to keep the process alive and avoid septicity. Once loading returns the totally aerobic contents react very quickly.

**For Fault Finding - See Chart, Page 5.**

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Issue 1 3/2/09

**Fault Finding Chart – Biodigester ‘T’ Series**

<p align="center">‘A’ <u>COMPRESSOR / BLOWER INOPERATIVE</u></p>	<p align="center">‘B’ <u>COMPRESSOR / BLOWER OPERATES BUT DOES NOT DELIVER SUFFICIENT AIR TO THE TREATMENT CHAMBER.</u></p>	<p align="center">‘C’ <u>POOR EFFLUENT QUALITY</u></p>
<p>1. <u>No power supply.</u> All switches, trips and cut outs to be in the ‘On’ position.</p> <p>2. <u>Compressor Failure.</u> Check internal diaphragms for damage and operation of internal cut out switch that operates when a diaphragm fails. Check internal wiring and mechanical components.</p>	<p>1. <u>Taps / Valves</u> Check taps to individual diffusers within the Biodigester are fully open.</p> <p>2. Check <u>air filters</u> within top covers of air blowers.</p> <p>3. <u>Connections.</u> Check all air lines, pipework and hose clips for leaks.</p> <p>4. <u>Air Lines.</u> Inspect all flexible air lines to see if they are blocked or have become compressed or kinked.</p> <p>5. <u>Diffusers</u> Remove and check diffusers. If necessary disassemble and check internal screw fitting for blockage. If after these checks a diffuser will still not pass air it has blocked pores and needs to be replaced.</p>	<p>See ‘A’ and ‘B’</p> <p>1. <u>Excessive Sludge Accumulation</u> Desludge/Empty. First remove humus crust from outer settlement chamber. Then empty tank using orange pipe in central chamber. Leave a little sludge /liquid in the bottom. The plastic media will not be removed as the holes in the tube are smaller than the media.</p> <p>2. <u>Chemical or Biological Interference</u> Check for excessive use of bleach, Ammonia based cleaning products and those containing bactericides, fungicides or virucides or any other chemical or biological inhibitor.</p> <p>3. <u>Grease Contamination</u> Check Biodigester and grease trap as appropriate. (Grease traps are normally only fitted where a communal kitchen is in use.) Grease can severely interfere with the treatment process and cause odours.</p> <p>4. <u>Biodigester Overloaded</u> Contact B E S Ltd</p>