**INSTALLATION, OPERATION AND MAINTENANCE MANUAL**

## INTRODUCTION

Congratulations on the purchase of your **FALCON** Treatment System

We ask that you take time to fully read this manual to ensure that all the installation requirements are met and the operating principles are fully understood so that you can enjoy a trouble free system.

It is extremely important to read the health and safety information before working on the plant.

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## HEALTH AND SAFETY

United Kingdom Health and Safety at Work Act 1974

Section 6a of this act requires manufacturers to advise their customers on the safety and the handling precautions to be observed when installing, operating, maintaining and servicing their products.

The user's attention is drawn to the following:

1. The appropriate sections of this manual must be read before working on the equipment.

2. Installation must only be carried out by suitably trained/qualified personnel.

3. Normal safety precautions must be taken and appropriate procedures observed to avoid accidents.

## HEALTH

It is the client's responsibility to ensure that all necessary protective clothing/equipment is available.

Leptospirosis Are you at risk?

What is Leptospirosis?

Two types of Leptospirosis affect people in the UK.

Weil's disease. This is a serious infection that is transmitted to humans by contact with soil, water or sewage which has been contaminated with urine from infected rats.

Hardjo type Leptospirosis which is transmitted from cattle to humans.

What are the symptoms?

Both diseases start with a flu like illness with a persistent and severe headache, muscle pains and vomiting. Jaundice appears about the fourth day of the illness.

How might I catch it?

The bacteria can enter your body through cuts and scratches and through the lining of the mouth and throat and eyes.

How can I prevent it?

After having worked in sewage or anything contaminated with sewage, wash your hands and forearms thoroughly with soap and water. If your clothes or boots are contaminated with sewage, wash thoroughly after handling them.

Take immediate action to wash thoroughly any cut, scratch or abrasion of the skin immediately. Apply antiseptic to the wound, cover with cotton wool or gauze, and protect with a waterproof plaster.

**DO NOT** handle food, drink or smoking materials without first washing your hands.

If you contract the symptoms described after coming into contact with sewage, report to your doctor immediately and advise him/her of the circumstances.

## SAFETY

Sewage gases are potentially explosives and toxic. **DO NOT** enter any of the below ground compartments of the Sewage treatment plant.

Before carrying out any maintenance work, the equipment **MUST** be electrically isolated at the fuse box from which the blower power supply is derived.

Do not leave covers open for any longer than necessary. Temporary barriers and warning signs should be erected around any open covers or manways as appropriate.

# OPERATION AND MAINTENANCE MANUAL Section 2

## PLANT DESCRIPTION & PROCESS

The **FALCON** range of treatment systems for residential population equivalents up to 300 persons are a "unitank" design comprising a primary settlement stage, a biological filtration zone and a final settlement zone, within a single structure.

## THIS MANUAL REFERS SPECIFICALLY TO TREATMENT PLANT MODELS

The plant will provide long and trouble free operation provided the simple maintenance procedures are adhered to.

Your attention is drawn to the Health and safety section in this manual. It is imperative that you read these instructions carefully before attempting to carry out any work on the system.

The plant has been designed to treat the volume and strength of sewage specified in the original quotation and as detailed in the technical data section of this manual. To ensure that the plant continues to operate efficiently, your attention is drawn to the following points:

**DO NOT** exceed the maximum design loading of the plant.

**DO NOT** allow surface water to enter the system.

**DO NOT** allow high volume discharges such as from swimming pools or Jacuzzis to enter the system.

**DO NOT** allow large quantities of chemicals such as water softener regenerate, disinfectants, strong

acids or alkalis, oil and grease, pesticides or photographic chemicals to enter the system.

**DO NOT** use chemical or biological emulsifiers in grease traps.

## SCOPE OF SUPPLY

The **FALCON** system comprises the Tank unit and an enclosure containing an air blower unit and comes complete with 10m of airline.

### Tank Unit

This comprises a single tank containing all the components required for the sewage treatment process.

The tank is manufactured in Polypropylene and is supplied in a standard black/blue colour. It is completely impervious to water and sewage and has been designed to ensure a robust construction and a long service life. The tank is provided with a locking manhole cover providing access to all parts of the unit.

The submerged filter beds comprise of plastic pieces of filter media, randomly packed into the tank. The media is made from UV stable uPVC and provides a large surface area on which the bacteria, required for the purification process, can grow. The media is supported on an open mesh panel fixed above the base of the tank.

An air diffuser is installed into the submerged filter bed(s) and is located underneath the filter bed(s) this is connected to the external air supply (blower) by uPVC pipework.
The recirculation pipework is a uPVC pipe running from the bottom of the humus and media tank to the top of the primary settlement tank. The pipework has a tapping at its top where tubing is inserted down the uPVC pipe which is connected to the blower. On all models a control jet in the air line ensures a correctly balanced air flow between the air lift recirculation pipe and the diffuser in the submerged filter zone. The control jet is an integral part of the air lift hose connector which is fitted to the bulkhead between the humus tank and the submerged filter bed. The air lift system is used to recirculate effluent from the humus and media tanks to the primary settlement tank.

### Blower

The blower is mounted along with its associated electrical controls inside a weatherproof enclosure. The electrical controls comprise an isolator and a loss of air alarm connected to an external beacon which will provide a visual warning that the blower is not operational.

**NOTE :**
We reserve the right to change specifications without prior notification.

## OPERATION AND MAINTENANCE MANUAL Section 3

## INSTALLATION INSTRUCTIONS

Please read the Health & Safety, section 1 of this manual before attempting to work on the system.

**Note:** The tank should be stored with access covers in place to prevent accumulation of rainwater within the unit.

**IMPORTANT**
**The siting of a treatment plant must be agreed with the Building Control prior to installation.**

**The discharge from a treatment plant will be subject to a Environment Agency Permit or an Exemption Certificate for all discharges exceeding:**

- **5.0m$^3$ per day to surface waters**
- **2.0m$^3$ per day to ground**

**Consideration must also be given to the need for access for the servicing and desludging of the unit.**

## MECHANICAL INSTALLATION

The following instructions are offered for guidance only. The manufacturer or supplier accept no responsibility for incorrect offloading or installation.

**The contractor is responsible for offloading all items of equipment with due regard to the following:**

**DO NOT** use chains or wire ropes.

**DO NOT** lift the tank if it contains any water.

**DO NOT** subject the tank to sharp impacts.

**DO** check that all items delivered correspond with the packing note.

The unit is provided with lifting eyes on the outside of the tank. These are not intended for transportation of the units. The lifting hook should be connected to the tank lifting eyes by separate slings of equal length**. Ensure that the slinging angle does not exceed 60° at the hook in order to eliminate excessive compressive loads on the side of the unit.**
When working in deep excavation, make sure that all necessary safety precautions are taken to ensure the stability of the excavation and provide safe working conditions for site personnel. The only time anyone needs to be working at the bottom of the excavation is when levelling the base and ensuring that the first backfill is correctly placed.

It is the responsibility of the installer to determine the thickness and strength of concrete required to suit the ground conditions, taking into account the buoyancy of the unit when being desludged, external forces exerted by the water table, backfill, traffic loading, etc.

The installation should be carried out in accordance with the requirements of the Construction and Building Regulations. An inspection chamber should be installed upstream of the Falcon unit.
During the course of the installation, the following minimum equipment will be required:

Normal construction equipment and plant.

Concrete to C20P and semi dry to 30mm slump.

An adequate supply of water to fill the unit at the same rate as backfilling.

Dewatering equipment as necessary.

Set of lifting straps of correct length and adequate SWL.

**Please Note: The foul drain to the treatment plant MUST have a traditional soil/vent pipe at the**

**head of the drain run. Air admittance valves, tile or ridge vents are NOT acceptable.**

Excavate to the tank dimensions allowing a minimum clearance of 150mm between the unit and the excavation sides. Excavate to the appropriate depth for the installation ie. depth of the unit plus 150mm minimum concrete thickness (actual thickness to suit ground conditions). NOTE : The standard inlet invert depth for the 6-18PE models is 550mm, all other models have a 600mm standard inlet invert.
Lay and level the concrete base for the tank to a minimum of 150mm thickness.
Lift the tank into position using slings, taking care not to damage any external flanges or pipework. Ensure correct orientation of the inlet and outlet pipework. Check that the tank is level in all directions. Commence backfilling with concrete in 500mm lifts, and at the same time, **fill each tank compartment with water starting with the media bay section**, ensuring that the progressive concrete and water levels are approximately equal ( never exceed a difference of 200mm max ). The concrete must be evenly distributed around the unit, ensuring spigot connections are not covered at this stage. **Never partly or wholly fill the tank with water before surrounding it in concrete.**

**Note: Do not use vibrating pokers to compact the concrete.**

Make all interconnecting pipework connections, ensuring a minimum pipe gradient of 1:70.

Continue placing the concrete in 500mm lifts, terminating at the shoulder of the unit. Allow an initial set of the concrete between lifts and wait at least 24 hours for the concrete to harden.

Ensure a cable duct is laid from the 110mm connection on the neck of the treatment plant to the desired position of the Blower unit. This is for the airline only and is to ensure complete protection of the airline. There are NO electrical components within the treatment plant unless you have requested the option of a pumped discharge.

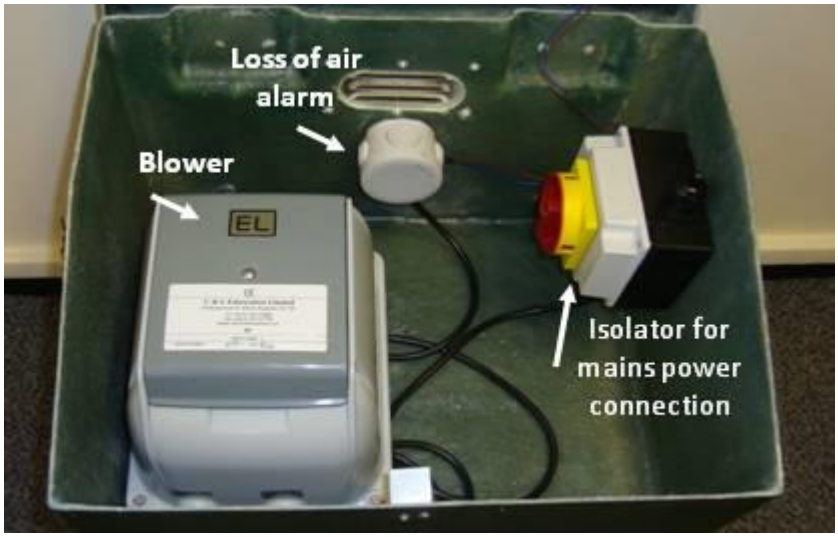
**If the treatment plant is to be installed in a trafficked area specific guidance should be sought from the manufacturer.**

**ELECTRICAL INSTALLATION (Blower Unit)**
In order that you achieve a safe and cost effective installation, it is not possible to state a specific installation configuration that would suit all sites. The selection of current protection devices must remain the responsibility of the installer. It is imperative that electrical installation of this equipment is entrusted to a fully qualified electrician.
The blower unit can be positioned wherever is most convenient bearing in mind the need to get a power supply to it and the airline from it to the treatment plant.
If a pumped discharge has been requested on the treatment plant, the cable from the pump can be fed back up the airline duct to the blower unit within which is the electrical connection for the pump. Most pumps come complete with 10 meters of cable. The blower unit is supplied with 10 meters of airline as standard.
**The airline duct MUST be sealed with expanding foam when installation is complete.**
When installing the electrical supply to the blower unit, the following points should be considered:

The supply to the unit should be by means of a dedicated circuit with isolation and protection devices consistent with the requirements for fixed equipment and in accordance with the latest regulations of the Institute of Electrical Engineers.

2. The supply to the unit should be independent of all protection devices other than the supply authority's fuse and that provided specifically for the power supply. In particular, earth leakage devices provided for normal domestic protection must **not** form part of the supply circuit to the Unit.


**Falcon 6-25 Blower & Housing**






## OPERATING SEQUENCE

The **FALCON** Sewage treatment plant is specifically designed to treat domestic sewage and other biodegradable waste in a simple and compact system comprising three basic stages, namely:

Primary settlement

Biological Filtration

Final settlement

The **FALCON** system utilizes microorganisms growing on the surface of the filter media to breakdown the sewage. It is very important that toxic chemicals such as those listed in the Introduction (section

2) do not enter the system and poison the microorganisms.

Raw sewage flowing to the unit is received in the primary settlement zone. Here, gross solids (primary sludge) settle to the bottom of the tank, where they remain until the tank is desludged as described in the Maintenance Schedule, section 6 of this manual. The settled sewage displaced from the primary zone then flows into the submerged filter zone, passing under a scum baffle.

Flow circulation in the submerged filter zone is generated by the hydraulic effect of the outlet air diffuser. This causes settled sewage entering the filter zone at high level to be drawn down through the media, aerating the sewage in the process. The flow circulation ensures that the influent sewage receives several passes through the filter bed at low flow.

In the filter zone, as the sewage passes over the filter media it is purified by micro-organisms growing on the surface of the media. Growth of these micro-organisms results in an excess which is shed as solid particles known as humus solids. Humus solids settling at the bottom of the filter zones are recirculated with the flow of incoming sewage and are deposited on the top of the primary settlement zone.

Sewage displaced from the submerged filter zone flows via a DIP pipe into the humus settlement zone. Liquid displaced from the humus zone has now been fully treated and is known as final effluent. It is suitable for discharge to a watercourse or soakaway as defined in the consent to discharge issued by the Environment Agency.

Humus solids from the final settlement tank are recirculated to the primary tank via the recirculation pipework. This helps reduce the sludge build up in the humus tank and prevents stagnation during very low inflow.

## OPERATION AND MAINTENANCE MANUAL Section 5

## PLANT START UP / SHUTDOWN PROCEDURE

### PLANT START-UP

1. Fill the plant with clean water until there is a discharge from the outlet.

2. Connect the airline from the blower unit to the receiving hosetail inside the neck of the treatment plant and ensure the connections are airtight

3. Check the blower ventilation is unobstructed.

4. Turn on the main power supply to the blower unit.

5. Turn the isolator switch inside the blower housing to the on position. This will start the blower running.

6. It will take a minute or so for the pressure to build up in the system depending on the distance of the blower from the treatment plant.

7. Check that bubbles are breaking the surface in the filter media section of the treatment plant.

8. Adjust the flow regulator thumbscrew on the airlft recycle to achieve an almost constant flow from the recycle pipework. NOTE: It will take about a minute between adjustments for

a change in flow rate. The desired setting is where the flow only just becomes constant. If this flow rate is set too high it will detrimentally affect the process performance of the treatment plant.

9. If a discharge pump is fitted check for operation.

10. Fit the manhole cover and lock if necessary.

The Unit is now in an operational state. However, the treatment process relies on the growth of microorganisms on the filter media. The time taken for these naturally occurring organisms to develop is dependent on temperature and may take up to six weeks in winter. Until the biomass is fully developed, the treatment process will be incomplete. During this time do not allow any strong cleaning agents or bleaches to enter the system.

## PLANT SHUTDOWN

Temporary absence of flow to the plant will not be detrimental as the air lift will continue to recycle sewage within the system. However, if the flow of sewage to the plant will be interrupted for more than four months, the following procedure should be completed:

1. Desludge the primary and humus tank compartments in accordance with the instructions in the Maintenance, section 6 of this manual.

2. Refill the plant with clean water.

3. Fit the manhole cover and lock if necessary.

4. Stop the blower by turning the isolator switch to off.

5. Switch off the power supply to the blower enclosure.

# OPERATION AND MAINTENANCE MANUAL Section 6

## MAINTENANCE

## OWNER RESPONSIBILITY

The owner of the sewage treatment plant is entirely responsible for the operation of the plant and for ensuring that the quality of the effluent does not breach the Permit Standards issued by the Environment Agency

You are reminded that the existence of a service agreement does not transfer responsibility for general maintenance which must be conducted in accordance with the accompanying instructions.

Soakaways, drains and the emptying of primary tanks remain the responsibility of the treatment plant owner

If the plant appears not to be operating correctly, refer to the Fault Finding, section 7 of this manual or contact your service engineer.

## MAINTENANCE SCHEDULE

***WEEKLY***

1. Check the operation of the blower. If the blower has failed for any reason other than a mains power failure the warning beacon will be flashing

***MONTHLY***

Carry out the weekly check plus:

1. Check the operation of the diffusers (bubbles rising in the Biological zone).

2. Check the recycle flow into the inlet zone

3. Look at the liquor being returned, it should run clear by the end of its cycle.

4. Check the inlet and outlet stilling zones are clear of debris.( remove any obstructions )

5. Check the blower ventilation is un-obstructed

6. Check the biomass growth on the filter media. The biomass should be a light brown colour, not white or grey. The odour in the plant should be 'earthy'. There should not be a noticeable 'rotten eggs' smell.

7. Check the final effluent. If this is cloudy or contains many suspended articles, then the humus tank is likely to require desludging.

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***6 MONTHLY / ANNUALLY***

Carry out the weekly and monthly checks plus:

1. Check the primary settlement tank with a probe , the top floating crust blanket should not exceed 200mm thick, arrange desludge if required

2. Desludge the primary and final tank every 6 months, if fully loaded with 6 person population, 12 months if used by 3 persons, etc. and desludge the biozone every 12 months. This should be done by an experienced local waste disposal tankering company.

3. The tanker suction hose should be carefully lowered into the primary and final chambers ensuring all settled sludge is removed.

4. When desludging the biozone carefully lower the suction hose down the triangular section behind the biozone making sure not to damage the pipework. Ensure the hose is down to the base of the tank so that all settled biomass sludge can be removed.

5. After desludging each compartment, it is essential that the unit is filled up with water. This can be done by using a hosepipe or by running several taps in the household(s).

6. Remove air filter from the blower unit (remove top cover to access filter), clean and replace.

Repeat the Plant Start-up Procedure, section 5 of this manual.

## OPERATION AND MAINTENANCE MANUAL Section 7

## FAULT FINDING

**1.** THE BLOWER IS NOT RUNNING

| | Cause | Remedy |
|---|---|---|
| 1.1 | Power cut. | If temporary do nothing. When the power is restored the system will restart automatically |

| | | |
|---|---|---|
| 1.2 | Power supply<br>RCD has tripped. | Switch off the power and reset the RCD, Switch on and the blower should restart automatically. If it doesn't, switch off the power supply and call an electrician, on 3 phase supply check correct rotation. |
| 1.3 | Blower runs<br>Intermittently | Check air ducts are clear, as overheating in the enclosure will cause the high temperature trip to switch of the power until cool. |

**2.** AIR BUBBLES ARE NOT RISING FROM THE DIFFUSER

| | | |
|---|---|---|
| | Cause | Remedy |
| 2.1 | Blower is not running. | Refer to fault condition 1. |
| 2.2 | Blower running | Check all valves open, and all air lines are not broken or leaking. |

**3.** THERE IS NO RECIRCULATION FLOW FROM THE HUMUS TANK COMPARTMENT

| | | |
|---|---|---|
| | Cause | Remedy |
| 3.1 | Blower fault. | Refer to fault conditions 1 & 2. |
| 3.2 | Recirculation pipework is blocked | Use a wooden pole to agitate any sludge which has settled around the bottom of the recirculation pipework in the humus tank. If there is a substantial level of sludge, then desludge the humus tank as described in the Maintenance Schedule, section 6 of this manual. |
| 3.3 | The air control jet is blocked | Remove and clean the jet. In cleaning the jet ensure the orifice is not enlarged. |

## OPERATION AND MAINTENANCE MANUAL Section 8

## TECHNICAL DATA

| Model | 6 | 9 | 12 | 18 |
|---|---|---|---|---|
| Max. Daily Flow ($m^3$) | 1.2 | 1.8 | 2.4 | 3.6 |
| Max. Daily BOD (Kg) | 0.36 | 0.54 | 0.72 | 1.08 |
| PE | 6 | 9 | 12 | 18 |
| Depth (mm) | 2,100 | 2,100 | 2,100 | 2,100 |
| Diameter (mm) | 1,500 | 1.7 | 1.9 | 2.5 |
| Inlet Invert (mm) | 550 | 550 | 550 | 550 |
| Outlet Invert (mm) | 750 | 750 | 750 | 750 |
| Cover Size (m) | 1 x 1 | 1 x 1 | 1 x 1 | 1.5 x 1 |
| Blower Rating (Kw) | 0.06 (240v) | 0.06 (240v) | 0.08 (240v) | 0.12 (240v) |
| Discharge Pump Rating (Kw) Optional | 0.25 (240v) | 0.25 (240v) | 0.25 (240v) | 0.25 (240v) |
| Desludge Interval (Days) At full loading | 180 | 180 | 180 | 180 |
| Inlet (mm) | 110 | 110 | 110 | 110 |
| Gravity Outlet (mm) | 110 | 110 | 110 | 110 |
| Pumped Outlet (mm) | 50 | 50 | 50 | 50 |
| Weight (Kg) | 250 | 300 | 350 | 500 |

| Model | 25 | 30 | 40 | 50 |
|---|---|---|---|---|
| Max. Daily Flow ($m^3$) | 5 | 6 | 8 | 10 |
| Max. Daily BOD (Kg) | 1.5 | 1.8 | 2.4 | 3.0 |
| PE | 25 | 30 | 40 | 50 |
| Depth (mm) | 2,174 | 2,174 | 2,174 | 2,174 |
| Width (mm) | 1,500 | 2,124 | 2,124 | 2,124 |
| Length (mm) | 4,710 | 4,010 | 5,060 | 5,610 |
| Inlet Invert (mm) | 600 | 600 | 600 | 600 |
| Outlet Invert (mm) | 862 | 862 | 862 | 862 |
| Blower Rating (Kw) | 0.12 (240v) | 0.37 (240v) | 0.37 (240v) | 0.37 (240v) |
| Discharge Pump Rating (Kw) Optional | 0.25 (240v) | 0.25 (240v) | 0.25 (240v) | 0.25 (240v) |
| Desludge Interval (Days) At full loading | 180 | 180 | 180 | 180 |
| Inlet (mm) | 160 | 160 | 160 | 160 |
| Gravity Outlet (mm) | 160 | 160 | 160 | 160 |
| Pumped Outlet (mm) | 50 | 50 | 50 | 50 |
| Weight (Kg) | 1,200 | 1,400 | 1,700 | 1,900 |

| Model | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|
| **Max. Daily Flow ($m^3$)** | 12 | 14 | 16 | 18 | 20 |
| **Max. Daily BOD (Kg)** | 3.6 | 4.2 | 4.8 | 5.4 | 6.0 |
| **PE** | 60 | 70 | 80 | 90 | 100 |
| **Depth (mm)** | 2,174 | 2,174 | 2,174 | 2,174 | 2,174 |
| **Width (mm)** | 2,124 | 2,124 | 2,524 | 2,524 | 2,524 |
| **Length (mm)** | 6,010 | 6,810 | 6,760 | 7,360 | 7,760 |
| **Inlet Invert (mm)** | 600 | 600 | 600 | 600 | 600 |
| **Outlet Invert (mm)** | 862 | 862 | 862 | 862 | 862 |
| **Blower Rating (Kw)** | 0.75 (240v) | 0.75 (240v) | 0.75 (240v) | 0.75 (240v) | 0.75 (240v) |
| **Discharge Pump Rating (Kw)** Optional | | | | | |
| **Desludge Interval (Days)** At full loading | 110 | 110 | 90 | 90 | 90 |
| **Inlet (mm)** | 160 | 160 | 160 | 160 | 160 |
| **Gravity Outlet (mm)** | 160 | 160 | 160 | 160 | 160 |
| **Pumped Outlet (mm)** | 50 | 50 | 50 | 50 | 50 |
| **Weight (Kg)** | 2,100 | 2,200 | 2,350 | 2,650 | 2,950 |

| Model | 125 | 150 | 200 | 250 | 300 |
|---|---|---|---|---|---|
| **Max. Daily Flow ($m^3$)** | 25 | 30 | 40 | 50 | 60 |
| **Max. Daily BOD (Kg)** | 7.5 | 9.0 | 12.0 | 15.0 | 18.0 |
| **PE** | 125 | 150 | 200 | 250 | 300 |
| **Depth (mm)** | 2,174 | 2,174 | 2,174 | 2,674 | 2,712 |
| **Width (mm)** | 2,524 | 2,524 | 2,524 | 2,524 | 2,524 |
| **Length (mm)** | 9,100 | 10,600 | 12,000 | 12,000 | 12,000 |
| **Inlet Invert (mm)** | 600 | 600 | 600 | 600 | 600 |
| **Outlet Invert (mm)** | 862 | 862 | 862 | 862 | 862 |
| **Blower Rating (Kw)** | 1.1 (240v) | 1.1 (240v) | 1.1 (240v) | 1.1 (240v) | 2.0 (415v) |
| **Discharge Pump Rating (Kw)** Optional | | | | | |
| **Desludge Interval (Days)** At full loading | 90 | 90 | 90 | 90 | 90 |
| **Inlet (mm)** | 160 | 160 | 160 | 160 | 160 |
| **Gravity Outlet (mm)** | 160 | 160 | 160 | 160 | 160 |
| **Pumped Outlet (mm)** | 50 | 50 | 50 | 50 | 50 |
| **Weight (Kg)** | 2,900 | 3,250 | 3,400 | 3,600 | 3,850 |

## FALCON PACKAGE SEWAGE TREATMENT PLANT

### PROCESS DESCRIPTION

**INFLUENT DESIGN PARAMETERS**

| | | |
|---|---|---|
| DWF (Dry Weather Flow) | = | As data sheet |
| Peak Design Flow | = | 3 x DWF |
| Organic Load | = | As data sheet |
| Nature of Influent | = | CRUDE SEWAGE |
| PH Range | = | 6 – 8 |
| Standard Effluent Quality | = | 20mg / L BOD : 30mg / L SS : 20mg/L NH4 |

**ALL SURFACE WATER MUST BE EXCLUDED. – NO WASTE DISPOSAL UNITS IN USE**
**AN EFFECTIVE GREASE TRAP MUST BE INSTALLED ON ANY COMMERCIAL KITCHEN DRAINS eg.: HOTELS / RESTAURANTS**

**The "Falcon" treatment plant is of unitank design and incorporates Primary Settlement (PST) Biological Treatment (Biozone), and Final Settlement (FST) within the same structure, allowing delivery to site as a complete unit to provide for a simple and straightforward installation. No other tanks are required except for larger applications (over 300 PE ) where a modular system is provided or where additional treatment may be required to achieve more stringent effluent quality standards or where effluent re-use is proposed.**
**The "Falcon" Treatment plant has been designed to optimize the aesthetic qualities of the final installation by ensuring that there is minimum visual impact. The "Falcon" process is designed in accordance with the requirements of BS 6297 and certified to BSEN 12566 – Pt3**

#### PRIMARY SETTLEMENT TANK

The primary settlement tank is a two stage tank designed to maximize the removal of gross and suspended solids prior to transfer of the settled effluent to the biozone for treatment. The primary settlement tank also incorporates for a sludge storage volume (based on full load) depending on the desludge periods as identified for individual applications.

#### BIOZONE

The biological treatment phase utilizes BAF technology (biological aerated filter) which incorporates two proven principles of biological process in the form of a fixed film reactor for process stability and a suspended floc dispersed growth system for
high transfer rates and operational control, to ensure a stable treatment process which is largely unaffected by shock loads.

The process incorporates a submerged, high rate, plastic media on which a fixed film of biomass is grown. This film takes nutrition from the incoming settled effluent and is provided with oxygen by means of a small blower unit which aerates the media through HDPE membrane diffusers to provide fine bubble aeration.

The action of the fine bubble aeration is carefully controlled to provide optimum oxygen transfer rates and to provide a scouring action to slough off excess biomass to keep the thickness of the fixed biological film at optimum levels, thereby preventing the production of anaerobic bacteria and ensuring maximum process efficiency.
The fact that the media remains submerged allows for an element of suspended floc dispersed growth which basically means that there will be biomass which is "unfixed" to the media but achieves treatment through suspended aeration.

The biozone incorporates a two stage process as standard that allows for constant mixing of incoming settled effluent to provide optimum treatment stability and to avoid any “short-circuiting.” The use of a two stage biozone ensures a high degree of process efficiency to not only reduce B.O.D. levels to that required, but will also achieve reductions in ammoniacal nitrogen in excess of standard requirements.

## FINAL SETTLEMENT TANK

The final settlement tank is designed in accordance with the requirements of BS 6297 to ensure relevant surface areas and rise rates are achieved to provide maximum settlement of any suspended solids prior to discharge.

The **Falcon** system also incorporates continuous and automatically timed humus sludge return systems to return humus sludge from both the final settlement tank and each biozone, back to the primary settlement tank.

Additionally this system also provides for continuous recycling of treated effluent back to the P.S.T. to not only provide dilution of incoming settled effluent but to also ensure continuous flow during periods of low or no flow, thereby keeping the biomass in prime condition.

**To maximize efficiency and to minimize maintenance requirements and potential problems, there are NO mechanical or moving parts contained within the treatment plant.**