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OPERATION & MAINTENANCE GUIDELINES

FOR

EWwS 200SHR PACKAGED PLANT UNIT WITH CHEMICAL DOSING

SITE: ……..

PROJECT NO: EWwS ……..

Environmental Wastewater Solutions

CONTENTS:

DRAWINGS & APPENDICES:

HEALTH AND SAFETY

These warnings are provided in the interest of safety. You must read them carefully before installing or using the equipment.

It is important that this document is retained with the equipment for future reference. Should the equipment be transferred to a new owner, always ensure that all relevant documents are supplied in order that the new owner can be acquainted with the functioning of the equipment and the relevant warnings.

Installation should only be carried out by a suitably experienced contractor, following the guidelines supplied with the equipment.

We recommend the use of a dust mask and gloves when cutting GRP components.

Electrical work should be carried out by a qualified electrician.

Sewage and sewage effluent can carry micro-organisms harmful to human health. Any person carrying out maintenance on the equipment should wear suitable protective clothing, including gloves. Good hygiene practice should also be observed.

Covers must be kept locked.

Observe all hazard labels and take appropriate action to avoid exposure to the risks indicated.
The correct ongoing maintenance is essential for the proper operation of the equipment. EWwS offer a range of maintenance contracts, details on request.

Should you wish to inspect the operation of the equipment, please observe all necessary precautions, including those listed below, which apply to maintenance procedures. Packaged Plant units contain rotating machinery.

Ensure that you are familiar with the safe working areas and accesses.

Ensure that the working area is adequately lit.

The power supply to the equipment must be isolated at the control panel(s) before lifting the covers. Where a specific maintenance procedure requires the equipment to be running with the covers off, all care must be taken to avoid contact with moving parts and electrical components or conductors. Drive guards must be replaced and secured if removed during maintenance. Once power has been isolated, the control panel must be kept locked shut to avoid accidental re-connection whilst work or inspection is being carried out.

Use only the designated access walkways. Do not walk on the cover or deep well safety mesh(es).

Take care to maintain correct posture, particularly when lifting. Use appropriate lifting equipment when necessary. Keep proper footing and balance at all times. Avoid any sharp edges.

INTRODUCTION

Thank you for choosing an EWwS product. This manual will help you to keep it operating efficiently over a long service life. Please read this manual thoroughly, preferably before installation.

This manual should be referred to by:

1) The Installer
2) The Electrician
3) The Maintenance Engineer
4) The Desludge Contractor
5) The Owner/User

If you encounter any difficulties with the equipment that has been supplied, please contact EWwS at the address below:

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SECTION 1 – TECHNICAL DATA

UNIT (mm)	200 SHR
Width	2150
Length	9960
Inlet Invert Depth	600
Outlet Inert Depth	700
Depth Below Ground	2400
O/A Height	2860

SECTION 2 – DESCRIPTION AND PROCESS

1 – INTRODUCTION

Packaged plant systems are designed to accept crude domestic sewage and produce an effluent of suitable quality for discharge to a watercourse or soak away system, subject to the approval of the appropriate regulatory authority. They may be self-contained single piece units, or two-piece or three-piece systems, depending on the application and site requirements.
The PST, Optional Pump Station and the main casing and covers of the Packaged Plants are constructed of Glass Reinforced Plastic (GRP). All steel parts are stainless, galvanised or surface coated to protect against corrosion. The discs are vacuum formed polyethylene.

2 – PRIMARY SETTLEMENT TANK

Crude sewage enters the Packaged Plant Primary Settlement Tank (PST). Solid matter is settled out and retained in the PST for periodic desludging. The settled or partially clarified liquor then passes into the Biozone through a submerged transfer port. The Primary Settlement Zone is designed to have sufficient capacity to accept high flows into the system over short intervals of time and the flow-balancing regime allows fluctuation in the liquid level to accommodate such surges.

3 – BIOZONE

The Biozone contains the Rotor, which consists of corrugated polyethylene discs mounted on a horizontal shaft, supported by a bearing at each end. Pressurised grease cartridges continuously lubricate the bearings. The Rotor is slowly rotated by an electric motor and a shaft mounted reduction gearbox.
The surface of the discs becomes colonised by naturally occurring micro-organisms, which form a visible coating known as the Biomass. As the discs rotate, the Biomass is alternately submerged in the settled sewage and aerated by exposure to the atmosphere. Under these conditions the Biomass can efficiently break down the pollutants in the sewage.
The Biozone is hydraulically sealed from the forward feed bucket section and maintains a constant liquid level. Liquid is transferred from the PST to the Biozone, at a steady rate, by a series of buckets attached to the rotor. As the process proceeds, an amount of excess Biomass is produced, which sloughs off the surface of the discs and becomes entrained in the liquid. This matter is referred to as humus and is carried by the flow into the Final Settlement Tank, through a submerged transfer pipe.

4 – FINAL SETTLEMENT TANK

The Final Settlement Tank (FST) is situated under the drive motor and receives a steady flow of treated effluent from the Biozone. Humus settles out and is periodically returned to the Primary Settlement Zone, for co-settlement, by a timer-controlled pump system. Final

treated effluent then discharges from the. The FST is partly covered by a walkway, which gives maintenance access to the drive assembly.
A Recycle pump station integrated into the Final settlement tank is provided to return effluent back to the PST and Biozone sections.

5 – COVER

A GRP cover is provided to guard against injury to personnel and to protect the Packaged Plant from the weather. Please do not walk on the cover. The cover is arranged in sections and fitted with lifting handles for ease of movement.

6 – CONTROL PANEL

The weatherproof control panel should be mounted adjacent to the Packaged Plant. It includes current overload protection for the Packaged Plant motor and sludge return pump, power isolation, and automatic re-start following a power failure.
The panel is fitted with stop and run lights on the door, plus an amber alarm beacon on top. The alarm beacon will light if the rotor stops turning for any reason, other than a failure in the power supply. The beacon can be switched off by depressing the combined stop light/beacon off button. An optional remote alarm may be fitted, which can be a beacon, a sounder or a combination of both. The same button also switches this off.

SECTION 3 – INITIAL START-UP PROCEDURE

1 – INTRODUCTION

Every care is taken to ensure that all mechanical components are correctly fitted, adjusted and lubricated prior to leaving the factory. However, subsequent handling during transportation and installation may result in the movement of components and a subsequent need to re-adjust prior to starting the unit. If, on inspection, you consider that any components require adjustment, please contact EWwS Limited.
Once the unit has been installed it should be left filled with water. Please switch on the motor, following the procedure below and leave the unit running, even if there is no sewage being fed into the plant.
Where circumstances dictate an immediate start-up, the following basic procedures should be carried out.

2 – WATER

Check that the Packaged Plant is full of water to its inlet levels.

3 – ELECTRICAL

Check that the power supply is connected to the control panel. Check that all electrical components and conductors are earthed.

4 – GREASE CARTRIDGES

Ensure that the pressurised grease cartridges fitted to the bearing caps are activated. In the activated mode the red button on top of the cartridge will be depressed and the control knob will turn freely, without affecting the dial. If necessary, activate the cartridges as follows:

1) Rotate the control knob and its linked dial until the figure 12 is against the arrow on the casing.
2) Depress the red button. This secures the setting and releases the control knob from the dial.
3) Rotate the knob clockwise to activate the unit.

5 – PACKAGE PLANT

Check that the Packaged Plant is in order, with no obvious damage or misalignment of parts. If any possible problems are discovered, contact EWwS Limited.
Check that all electrical components: Drive Motor, Sludge Return Pump and LOR Alarm sensor, are connected to the Control Panel.
Check that the Sludge Return Timer (K1T) in the Control Panel is set correctly, as indicated on the wiring diagram.

6 – SWITCH ON

Open the Packaged Plant control panel, check that all circuit breakers are in the “on” position and switch on the main isolator switch (Q0). Close and lock the panel. Immediately upon switching on the sludge return pump should start and run for the set time.

7 – RUNNING CHECKS

Check that the rotor is running smoothly in the correct direction of rotation and is not contacting any part of the fixed structure.
Check that the forward feed buckets are discharging correctly from the PST to the Biozone.

8 – LOSS OF ROTATION ALARM

Check operation of the Loss of Rotation (LOR) Alarm as follows:

1) Open the Control Panel and switch off the drive motor circuit breaker (1Q1). After a delay of 2-3 minutes the alarm should activate.
2) Push the “Beacon Off” button on the front of the Control Panel. The alarm beacon should stop flashing and the red indicator light on the panel front should remain illuminated.
3) Switch on the drive motor circuit breaker and close the Control Panel. The alarm should cease after approximately one minute.
4) Depress and release the “Beacon Off” button to reset it.

Malfunctioning of the LOR Alarm does not prevent operation of the Packaged Plant System, but it should be reported to your maintenance engineer for early rectification.

9 – DIRECT DRIVE

All our Packaged Plants are direct driven units. Ensure that gearbox torque arm and shrink disc are secure. Terminal box is wired correctly and all gearbox breathers are fitted.

10 – PROCESS INITIATION

During installation, the unit will have been filled with water to prevent flotation in the concrete surround. Allow sewage to enter the unit, this will gradually displace the clean water used during installation.
The colonisation by micro-organisms will commence naturally and a full operating biomass will establish itself on the discs in 3-6 weeks, depending on individual site circumstances.

SECTION 4 – OPERATION

1 – INTRODUCTION

The biological treatment process of your Packaged Plant is self-regulating and it requires no specialised operational knowledge, but it is important that you are aware of the following:
Your Packaged Plant system uses colonies of live natural micro-organisms (biomass), to break down the pollutants in the sewage. Many chemicals used in households and commercial establishments can inhibit or kill these micro-organisms; particularly if used in excessive amounts.
Bear in mind that treatment plants serving small populations do not have the benefit of dilution that occurs at a large sewage works. A bottle of bleach tipped down the toilet in Birmingham would be virtually lost amongst the millions of gallons of sewage arriving at the city's treatment works; a bottle of bleach in a plant serving a hotel could be a lethal dose. for the biomass.
If the biomass is damaged, it will usually recover in time. But in the meanwhile, one of the more obvious symptoms is an unpleasant smell, so it is in the operator's interest to avoid this.
Generally speaking all common household cleaning fluids are acceptable, provided they are used in accordance with the makers instructions and stipulated concentrations.
The following "Do's and Don'ts" includes the most common household chemicals, but it is not an exhaustive list and the golden rule is "If in doubt - leave it out."
Bear in mind too that it is not only the toilet that is connected to the treatment plant; anything that goes down the sink, bath etc. also ends up there.

2 – DO'S AND DON'TS

Washing machine and dishwasher detergents, washing up liquids:
These are generally all right to use in the normal concentrations and usage found in domestic housing applications. All commercial applications are individually assessed before installation for their laundry load. Please contact EWwS Limited for advice if any changes are contemplated, e.g. addition of extra laundry facilities.

Floor cleaners, disinfectants and bleaches:
These are safe to use in accordance with the makers recommendations and in the minimum necessary concentration. Do not pour neat disinfectant or bleach down sinks or outside gullies. If these are smelly it usually indicates a build-up of decaying material or a plumbing problem and should be dealt with accordingly.

Nappy disinfectants and bottle sterilising fluids e.g. Milton:
When disposing of the used fluid, ensure that it is well diluted with water. The easiest way of doing this is usually to flush it away down the toilet.

Waste disposal units:
These do not inhibit the biomass, but, depending on use, they can present the treatment plant with considerable extra load. This can result in the treatment process becoming unbalanced, leading to problems. Much better to compost your vegetable peelings etc – it's cheaper and environmentally friendly.

Home beer and wine making.
This presents a similar problem to waste disposal units. The Packaged Plant has to work as hard to treat one pint of beer tipped down the drain as it does to treat all the normal waste produced by one person in 24 hours. See also the notes above regarding sterilising fluids.

THE FOLLOWING MUST NOT BE DISCHARGED INTO THE DRAINS:
Motor oil, grease, anti-freeze, brake fluid etc.
Cooking oil and fat.
Weed-killers, insecticides, fungicides and other gardening chemicals.
Paint, thinners, white spirit, turpentine, creosote etc.
Medicines - Take unused medicines to a pharmacist for safe disposal.
Photographic developing fluids.

Nappies, sanitary towels, rags, soft toys, tennis balls etc.
This may seem obvious, but it is amazing what gets flushed down the loo from time to time. Although such items are not directly damaging to the biomass they can cause problems, not the least of which is simple blockage of the drains.
Even so-called disposable nappies and sanitary towels often do not degrade fully in the treatment plant and can lead to malfunction, so it is best to dispose of them by other means.

3 – DE-SLUDGING AND MAINTENANCE

Both De-sludging and regular maintenance are vital to the plant's ongoing operation and should be carried out in accordance with the guidelines in the maintenance section of this manual.
Properly trained engineers, with reference to the appropriate Maintenance Manual, must perform mechanical and electrical maintenance.

SECTION 5 – MAINTENANCE

1 – INTRODUCTION

EWwS Limited Packaged Plants are designed and engineered for the minimum possible maintenance requirements, consistent with proper performance. Nevertheless, it is important that suitably qualified persons carry out routine preventive electro/mechanical maintenance and de-sludging at the appropriate intervals.

2 – CUSTOMER MAINTENANCE CHECKS

The following periodic checks should be carried out monthly. Refer to table below for items requiring maintenance.
Your attention is specifically drawn to the Health and Safety section of this manual.

	MAINTENANCE CHECK	INTERVAL (MONTHS)			
		1	3	6	12
A	Visually check the general condition of the plant. Report any aspects of concern to the manufacturer				
B	Check appearance of packs. The Biomass should be light grey to grey in the first bank, gradually changing to brown in the second stage and dark brown at the drive end of the rotor. If the growth is excessively thick and the colour predominantly grey, an overloading condition is indicated.				
C	Check that all pack retaining fixings are secure				
D	Clear any debris from inlet and outlet pipes.				
E	Check dosing buckets and transfer channel for any build up of material. Clean if required using a stiff bristled brush.				
F	The bearings are fully greased on assembly. Where Greasomatic units are not fitted, each bearing should be lubricated with a good quality lithium based grease (WYMARK "W") using a grease gun. Refer to WYMARK instructions in the Owners Pack for complete maintenance instructions.				
G	Replace Greasomatic cartridges fitted to each bearing and activate according to manufacturer's instructions. **NOTE: The discharge rate is set to 12 months to give 12 months life, due to operating temperature. This can be varied. For details, refer to the manufacturer's instructions for ambient temperatures and discharge rates.**				
H	Refer to the enclosed gearbox manual, Appendix C, and check the level of lubricant within the unit.				
I	Check, that running current to the drive motor does not exceed Full Load Current (FLC) stamped on motor name-plate. Also, check thermal overload setting in control panel.				
J	Lift sludge return pump from the FST. Remove any accumulated debris from the area around the impellor intake. Service at intervals specified by the Pump Manufacturer in accordance with their instructions in the Owners Pack. Test run pump and check the run time duration.				
K	Check earthing of electrical components within the unit, in accordance with the latest issue of IEE regulations or to local Country standards. Check general condition of wiring.				
L	Check chemical dosing pipework for blockage				
M	Check that chemical dosing pump is pumping the required quantities				
N	Constantly check and refill chemical holding tank, ensuring that the volume of solution in the tank does not go below 20% of the tanks capacity	*			

** Frequency of checks depends on dosing rates and capacity of holding tank. Speak to EWwS Ltd for case specific information.*

3– PARTS REPLACEMENT SCHEDULE

The following table shows the parts that will need to be replaced and the recommended interval at which they should be changed.

DESCRIPTION	EWwS PART NUMBER	RECOMMENDED CHANGE PERIOD
Drive End Bearing	456353	10 Years
Non Drive End Bearing	456354	10 Years
Bearing Greasomatic	122906	8-12 Months
Gearbox/ Motor (3 Phase)	Sie1023PH	5-10 Years
Sludge Return Pump	Vx08	3-5 Years

4 – AUTOMATIC RESTART AFTER POWER FAILURE

Packaged Plants are designed to re-start automatically when power is resumed, but the re-start may not succeed in some circumstances, such as extended power cuts. This will cause the alarm to activate when power is re-established. After power cuts, check that the rotor is turning correctly (see Section 3.0 paragraph (8). In the event of any difficulties, contact EWwS Limited.

5 – DE-SLUDGING VOLUMES

(NB: THE DESLUDGE PERIOD BELOW IS JOB SPECIFIC)

The minimum volumes shown here are those which can be anticipated under full loading at the desludge period indicated. If the system is not loaded to full capacity, the desludge period and volumes removed may be adjusted, but it is essential that a) sludge is not allowed to accumulate to the detriment of the process and b) all settled sludge and floating matter are removed at each desludge visit.

UNIT	DESLUDGE PERIOD	DESLUDGE VOLUME (LITRES)
EWwS20030-200	60 Days	13500

6 – SLUDGE REMOVAL FROM THE PACKAGE PLANT

1) Isolate power to unit.
2) Remove cover from the Packaged Plant unit.
3) Remove any sludge which has risen to the surface and is forming a scum blanket.

4) Ensure inlet and outlet pipes are free of debris, clean as necessary.
5) Lower the desludge hose to the base of each compartment to be emptied, **starting with the Final Settlement Tank**, then followed by the Primary Settlement Tank. Alternate between the two tanks, ensuring that water levels are maintained to within 300mm of each other.
   DO NOT remove the liquid from the biozone.
6) Move the hose around in each tank to ensure that as much sludge is withdrawn as possible.
7) Replace the cover and restart unit.

7. Chemical Dosing Unit

The Chemical dosing system consists of the following:

A) Control Panel

A surface mounting polycarbonate enclosure suitable for a supply voltage of 230Vac single phase, with 24V control circuit
containing;

- Power on lamp,
- Emergency stop button with key release,
- Off-Auto switch & indicator lamp for mixer,
- Off-On switch & indicator lamp for pump,
- Supplied ready wired & tested for installation by your engineers

The control panel operates the mixer via a Cycling Timer (inside the panel with the 2 x green buttons). This will cycle ON / OFF to the time that is programmed that can be adjusted via following the sequence on the 2 x scanned timer sheet. This continues as long as the switch on the front of the panel is set to auto for the mixer.

The second switch for the pump applies power to the pump. The pump is ON / OFF control so runs at the speed determined by the pump speed potentiometer on the front of the dosing pump. This will run until the switch on the front of the control panel is switched OFF.

B) Model DT500:

- 500 litre dosing tank with approximate dimensions of 815mm diameter x 1100mm in height, in natural MDPE with screw fitting lid, graduated scale and raised section.
- The tank is fitted with a slow speed geared mixer with 0.18Kw single phase motor, 316 stainless steel shaft & impeller positioned towards the bottom of the tank.
- A flooded suction assembly has been provided complete with necessary tank connector/filter etc which will be fitted to the tank and fed to the suction side of a foot mounting dosing pump to give your required output (around 3.5 l/h).

C) Model BT500:

500 litre dosing tank bund.

Attachments:

Wastewater panel connections
Wastewater panel 1
Wastewater panel GA
Installation manual GEA Series Dosing Pump
VODD Timer