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ENVIRONMENTAL

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GL026K
Horizontal Reedbed Tertiary Treatment System
Installation, Planting & Maintenance Guidelines

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Enclosed Documents

SDRB0654K	**6 Population Horizontal Reedbed for Tertiary Treatment**
SDRB0749K	**Reedbed Planting Detail**
SDRB0750K	**12 Population Horizontal Reedbed for Tertiary Treatment**

Issue	Description	Date
01	Initial Issue (CC268) & (CC292)	Oct 2005

HEALTH AND SAFETY

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

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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.

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.

As with any standing water, appropriate care must be taken to prevent access.

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

Ensure that the working area is adequately lit.

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.

CONTENTS

1 Introduction

1.1.1 The treatment plant unit discharges domestic effluent to a quality of 20/30/20. 20 mg/l BOD, (Biochemical Oxygen Demand) 30 mg/l SS (suspended solids) and 20 mg/l Ammonia.

1.1.2 Where improved effluent qualities are required, for example BOD's of 10 mg/l, further 'tertiary' treatment of the effluent is required and this can be achieved using the Standard Package Horizontal Reed Bed System.

1.1.3 The Reed Bed System will typically improve the BOD and SS effluent discharge quality by approx 50%. Phosphates discharged in the effluent will also be reduced but this reduction should not be expected to continue beyond 6-9 months of the reed beds operation.

1.1.4 The reed bed system comprises of alternating horizontal modules constructed from GRP, filled with granular material, which together with the reeds provides the hydraulic flow path and environment to achieve the improved effluent quality. A 6 population unit uses 2 GRP modules, a 12 population unit uses 4 modules.

1.1.5 Each module (2500 long x 800 wide x 800 mm deep), should be connected in series to maximize the flow route to achieve the performance. Each GRP module is supplied complete with a minimum of 10 plants (separate delivery). The GRP module is to be installed level with suitable backfill, following which it is filled with washed granular media (not supplied) and planted with reeds.

1.1.6 When installing the reed-bed system after a treatment plant with a gravity outlet, it may be necessary to landscape the ground downstream of the plant to meet the invert of the reed-bed. Where landscaping is not practical then an additional dosing equipment and chamber is required (additional purchase). Treatment plants with pumped outlets may not require the extra dosing equipment.

1.1.7 The GRP modules are supplied with the initial delivery, the washed gravel media should be sourced locally to the required specification. To ensure that the reeds are healthy for planting, fill in the contact sheet at the back of this booklet and fax to 'Reeds from Seeds' on 01745 584079 to arrange reed delivery once the installation date has been set.

2 Site Planning

2.1.1 The installer must assess the ground conditions and water table position. We recommend, subject to local site conditions and regulations, that a gravity fed reed bed system is installed a minimum distance of 2 metres from the treatment plant. Please note the fall requirements between each bed. Ensure that suitable equipment is available for lifting and excavating, in particular, that free permanent access to the site is available for maintenance.

2.1.2 Systems which are pump fed may be installed at a distance from the treatment plant.

2.1.3 Reed beds should not be installed in the shade of trees or buildings as this will inhibit reed growth.

3 GRP module Installation

3.1.1 Prepare the excavation with suitable dimensions for the units (see attached drawing). The base of the excavation will need to be graded to suit the sloping base of the GRP module. Alternatively place a layer of backfill material onto a level base and grade to accommodate the GRP module. On wet sites it may be necessary to lay a concrete slab prior to grading.

3.1.2 Ensure GRP modules are positioned in the correct orientation and lower into the excavation. **It is very important that the top flange is of each GRP module is level. If the unit is not level, there will be a reduced hydraulic gradient, stagnancy and performance will be affected.**

3.1.3 Position the modules so that there is a fall of at least 50mm between them. Landscaping or 'terracing' between each GRP module is required.

3.2 Integral pump fed units

3.2.1 Fill the first reedbed with shingle to half way up the inlet pipe. Allow about 70mm gap from the top flange to the top shingle level (refer to plate 3.1) the next reedbed(s) are to be filled allowing a 200mm gap between the top flange and shingle level. The design allows for a maximum pumped volume of 50 litres.

3.3 Gravity fed reedbed

3.3.1 Fill each GRP module with granular media, allowing a 200mm gap between the top flange and the gravel surface. (refer to plate 3.2)

3.3.2 **After filling it is important that the top flange is checked to ensure that it is level,** as the filling process may cause movement.

3.3.3 Each unit inlet and outlet is fitted with a 110mm PVCu socket. Provide and connect the interconnecting pipework.

3.3.4 Carefully backfill the excavation with a suitable material, (excess granular media, dry spoil) then fill each GRP module up to the outlet level with clean water, landscaping surrounding ground to suit.

3.4 Granular Material Specification

3.4.1 Granular material (pea gravel or pea shingle) washed free of fines and dust, size 6-10 mm

3.4.2 Approximately 2 m^3 per GRP module (4 m^3 6 population, 8m^3 12 population)

3.4.3 It is essential that the gravel is washed clean of dust before use. Pre washed gravel can be purchased, however if this is not available, the gravel must be washed on site before use. The dust if left, blocks the void spaces which affects hydraulic performance and effluent quality.

4 Reed Planting

4.1.1 The reeds are supplied, following request, separate from the GRP modules. Reeds are supplied boxed for transit, allowing 12 plants for each GRP module. To facilitate posting, the plants supplied are small, however they will grow to become large plants.

4.1.2 It is not necessary to plant the reeds immediately; however they must be planted within 7-10 days of receipt. Store in a shady place and keep watered before use.

4.1.3 When ready to plant un-wrap all the plants, taking care not to break or damage roots or stems. *(refer to plate 4.1)*

4.1.4 Layout the plants on the filled modules ensuring plants are spaced equi-distance along the length and breadth of the module. *(refer to drawing)*

4.1.5 Plant each individual plant* with the root zone in contact with the static (outlet) water level in the module.

4.1.6 Position the Outlet elbow in the fully up-right vertical position and add more water to the planted modules, this will raise the water level across the module encouraging initial plant growth and reducing the potential damage from rodents. *(refer to plate 4.2 & 4.3)*

4.1.7 **You may like to choose alternative plants such as iris. Choose a plant which will develop a good root system.*

5 Maintenance

5.1.1 Other than a little bit of gardening attention (weed and trash removal), the reed bed system should require little maintenance for the first 2-3 years.

5.1.2 In the winter the reeds often die back. If this happens, the stems may be cut to a level of approx 5O mm above the shingle level. Cut leaves, stems and weeds should be removed.

5.1.3 The water level within each module can be controlled using the Outlet elbow. The discharge elbow allows the static water level within each module to be raised or lowered. When raised, the higher water level can prevent rabbit damage, reduce weed growth and encourage spring growth in young plants. When lowered, the bed surface becomes dry; this is often desirable during the summer months to reduce insects.

5.1.4 After 2-3 years some thinning out of the reeds may be required.

5.1.5 After 4-5 years there may be a requirement to remove some of the gravel ‘growing media’ due to silting up. This is apparent if there is significant ponding on the surface on the modules. There may be deterioration in effluent quality as the reed bed collects solids and silts up.

5.1.6 Should silting become a problem, then some or all of the granular media and plants will require replacement. (The plants may be transplanted if healthy)

Plate 3.1

First tray for a pumped feed to the reedbed.

Plate 3.2

Gravity feed to the reedbed and all other preceding trays

Reed Planting Plates

- Plate 4.1

- Plate 4.2

- Plate 4.3

Reed Plants Delivery Request Form

Site Address:

Post code:

Population Equivalent:	6	12	(Please delete)
Plants required:	24	48	(Please delete)

Preferred Delivery Date:

Contact Name:

Contact Telephone Number:

Please Fax: 'Reeds from Seeds' +44(0)1745 584079

E-mail: info@brynpolyn.co.uk

Telephone: +44(0)1745 582265