

012716

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



Kingspan Water & Energy Service Contact Numbers:

GB: 0844 846 0500

NI: 028 3025 4077

IRL: 048 3025 4077

Enclosed Documents

DS0654P	6 Population Horizontal Reedbed for Tertiary Treatment
DS0749P	Reedbed Planting Detail
DS0750P	12 Population Horizontal Reedbed for Tertiary Treatment



Issue	Description	Date
08	ECN 1611 – Updated Supplier Details	May 2022

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.

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

HEALTH AND SAFETY	2
1 Introduction	3
2 Site Planning	3
3 GRP Module Installation	4
4 Reed Planting	5
5 Maintenance	5
6 Gravel Filling Plates	6
7 Reed Planting Plates	7
Reed bed Plants Delivery Request Form.....	8

1 Introduction

- 1.1 The treatment plant unit discharges effluent usually to a quality of 20/30/20. 20 mg/l BOD, (Biochemical Oxygen Demand) 30 mg/l SS (suspended solids) and 20 mg/l NH⁴ (Ammonia).
- 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.
- 1.3 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.
- 1.4 The reed bed system comprises of horizontal modules constructed from Glass Reinforced Plastic (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.
- 1.5 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). Each GRP module is to be installed level with suitable backfill, following which it is filled with washed granular media (not included in our supply/ customer to supply) and planted with reeds.
- 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 modules. Where landscaping is not practical then additional dosing equipment and chamber is required (additional purchase). Treatment plants which already include a pump may be suitable in place of the extra dosing equipment.
- 1.7 The GRP modules are supplied empty of media, the washed gravel media should be sourced locally to the required specification: Clean, washed shingle or broken stone, free of fines and dust, graded 16-32mm nominal size. Reeds are supplied separately at your request to suit your installation date. **When you are ready, fill in the contact sheet at the back of this booklet and contact 'Wetland Plants' to arrange their delivery.**

2 Site Planning

- 2.1 The installer must assess the ground conditions and water table position at the intended location. Ensure that suitable equipment is available for lifting and excavating and that free permanent access to the site is available for maintenance.
- 2.2 We recommend, subject to local site conditions and regulations, that a gravity fed reed bed system is installed approximately 2 metres from the treatment plant. Please note the 100mm fall requirement between each bed.
- 2.3 Systems which are pump fed may be installed at a distance from the treatment plant.
- 2.4 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 Prepare the excavation with suitable dimensions for the units (*Refer to drawing*). The base of the excavation will need to be graded to suit the sloping base of the GRP module. Place a layer of concrete backfill onto a level base and grade to accommodate the GRP module.
- 3.2 Ensure GRP modules are positioned in the correct orientation with the adjustable outlet at the rear and lower into the excavation. **It is very important that the top flange 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.**
- 3.3 Position the modules so that there is **a fall of at least 100mm** between them. Landscaping or 'terracing' between each GRP module is required.
- 3.4 **Granular Material Specification**
- 3.4.1 Granular fill material shall be clean, washed gravel, free of fines and dust, graded 16mm nominal size.
- 3.4.2 You will require approximately 1.2 m³ per GRP module (2.4 m³ 6 population, 4.8m³ 12 population)
- 3.4.3 It is essential that the gravel is washed clean of dust before use. Prewashed 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.
- 3.4.4 Check the levels of granular media, as consolidation will occur over time. Additional media may be required to achieve the desired level. When the outlet socket is set in the "Dry" position the water level should be at or just below the gravel level, when the socket is moved to the "Wet" position water level should be above the gravel level.
- 3.5 **Integral Pump Fed Units**
- 3.5.1 Fill the first reedbed with clean washed granular material to halfway up the inlet pipe. Allow about 70mm gap from the top flange to the top shingle level (*Refer to Plate 6.1*) the next and all subsequent modules 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. (*Refer to Plate 6.1*)
- 3.6 **Gravity Fed Units**
- 3.6.1 Fill each GRP module with clean washed granular material, allowing a 200mm gap between the top flange and the gravel surface. (*Refer to Plate 6.2*)
- 3.7 **After filling it is important that the top flange is checked to ensure that it is level**, as the filling process may cause movement.
- 3.8 The inlet and outlet of each unit is fitted with a 110mm PVCu socket. Provide and connect the interconnecting pipework.
- 3.9 **Backfilling**
- 3.9.1 Our domestic treatment plant are structurally tested in accordance with EN 12566-3, which specifies structural stability testing for both wet and dry sites using granular backfill 3-8mm. However in GB it would be typical for tanks to be installed in concrete due to rising water table, and it can generally be assumed that buoyancy prevention of concrete backfill is more advantageous than the granular backfill materials used in testing.
- 3.9.2 Carefully backfill around the GRP modules with concrete. It is essential that the underside of the module is evenly supported without voids. Concrete backfill must be manually compacted. We do not recommend the use of a vibrating lance.
- 3.9.3 With the tank in position commence filling with clean water and at the same time backfill around the outside of the module to just below the inlet/outlet levels. Continue backfilling, completing the installation to ground level with free-flowing soil, landscaping surrounding ground to suit.

4 Reed Planting

- 4.1 The reeds are supplied, following request, separate from the GRP modules. Reeds are supplied boxed for transit, allowing up to 12 plants for each GRP module. To facilitate posting, the plants supplied are small, however they will grow to become large plants.
- 4.2 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.
- 4.3 When ready to plant, un-wrap all the plants, taking care not to break or damage roots or stems. *(Refer to Plate 7.1)*
- 4.4 Layout the plants on the filled modules ensuring plants are spaced equidistant along the length and breadth of the module. *(Refer to drawing)*
- 4.5 Turn the outlet to the Dry position. Plant each individual plant* with the root zone in contact with the static (outlet) water level in the module.
- 4.6 After planting, you may raise the water level by lifting the outlet elbow so that more water is retained within the unit. This will raise the water level across the module encouraging initial plant growth and reducing the potential damage from rodents. *(Refer to Plate 7.2 & 7.3) but be careful not to drown the plants*
- 4.7 **You may like to choose alternative plants such as iris. Choose a plant which will develop a good root system.*

5 Maintenance

- 5.1 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.
- 5.2 In the winter the reeds often die back. If this happens, the stems may be cut to a level of approx. 50 mm above the shingle level. Cut leaves, stems and weeds should be removed. They will grow back the following year.
- 5.3 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.
- 5.4 After 2-3 years some thinning out of the reeds may be required.
- 5.5 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.
- 5.6 Should silting of the media become a problem, then some or all the granular media and plants will require replacement. (The plants may be transplanted if healthy) The media could be washed and reused.

6 Gravel Filling Plates

Plate 6.1

First tray for a pumped feed to the reedbed.



Plate 6.2

Gravity feed to the reedbed and for a pumped feed all other preceding trays.



7 Reed Planting Plates

Plate 7.1



Plate 7.2



Plate 7.3



Reed bed Plants Delivery Request Form

Reed Plants Delivery Request Form

Site Address:

Post code:

Contact Name

Contact Telephone Number

Reed Bed Population Equivalent: 6 or 12

(Please identify delete non applicable number)

You will be supplied with:

24 plants for a 6 pop unit and 48 plants for a 12 pop unit

Preferred Delivery Date:

Please Contact: 'Wetland Plants' +44 (0) 1432 769584

Or Post request form to: Wetland Plants

Ilex, Ashfield Crescent, Ross on Wye, Herefordshire.

HR9 5PH

E-mail: info@wetlandplants.co.uk