Mr & Mrs Cunliffe
Wern Farm,
Pentraeth Road, Menai Bridge, LL59 5RR

Sewage Treatment Management System Plan

ECL.9290.R05.004 B

August 2024

Prepared for

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Prepared by

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Document Review

Rev	Date	Prepared By	Reviewed By	Approved By
-	15.08.2024	V.Vale	Dan Shoesmith	Dan Shoesmith
A	05.03.2025	V.Vale	Dan Shoesmith	Dan Shoesmith
B	15.04.2025	V.Vale	Dan Shoesmith	Dan Shoesmith

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INTRODUCTION

Egniol Consulting Limited (Egniol) have produced this document to demonstrate and aid the sewage treatment management system installed on site.

This plan also assists with the management system requirements for Natural Resources Wales's (NRW) permit conditions.

The plan is to support the owner and staff of the proposed caravan park and make them aware of their responsibilities and requirements.

DESIGN PRINCIPLES

The sewage (foul) drainage will be directed through the site via a system of gravity sewers and manholes to the primary treatment through a commercial sewage treatment plant.

The foul water treatment plant is suitably sized for 55No. serviced static caravans.

Using British Water Loads and Flows table we have calculated:

No. 55 serviced static caravans = 220P.
Flow: 150 litres per day x 220P = 33,000 litres (33m³).
BOD: 60g per day x 220P = 13,200 grams (13.2kg).
Ammonia (N): 8 per day x 220P = 1,760N.

The treated sewage will then be treated through a secondary tertiary treatment module.

Once the sewage has been through the primary and secondary treatment, the treated drainage will be pumped via a surface water package pump with dual submersible pumps, using a 16.5m long rising main to connect the reed bed system, for a third treatment.

The pump is necessary to accommodate the existing site levels and the achievable inlet levels of the sewage treatment plant.

5No. Reed Beds dimensions: 30m long x 7.5m wide = 225m² per bed
5No. x 225m = 1125m² total reed bed area.

The reed beds have been designed to a minimum depth of 0.7m with a fall of 1:200 through the beds. The reed beds are 'fed' by 100mmØ perforated pipes and directed by gravity through 100mmØ surface water pipes for horizontal connections between the 5No.reed beds.

The above is in accordance with Good Building Guide GBG 42 Parts 1 and 2 (GBG 42) as stated in Building Regulations H2 paragraph 1.51, for design, construction, and maintenance of reed beds.

The total reed bed surface of 1125m² divided by 220P equals 5m² per person, this figure satisfies the recommended area per person in the GBG 42 to sufficiently and reliably work as a secondary treatment before the treated water enters the surface water system via a manhole for final discharge to the existing watercourse. All drainage assets and the existing watercourse are on land under control of the site owners, and do not impact on third party land.

Water quality inspection chambers have been installed, these are situated after the sewage is treated through the primary commercial sewage treatment plant and another after the secondary reed bed treatment; before entering the surface water system.

Refer to Appendix A, ECL.9290.D05.003A Site Sewage Infrastructure Plan and Appendix B, ECL.9290.D05.002 Reed Beed System Detail, for information and instructions to the design principles above.

Sewage Treatment Plant Specification

The commercial treatment plant specified is a Klargester Commercial BioDisc® NM.
Maximum daily flow: 45m³.
Maximum daily BOD: 13.5kg.

For further technical information for your BioDisc® NM, refer to Appendix C, Kingspan (Klargester) document no. 017775.

A similar approved sewage plant from the list of certified sewage treatment plants can be found on British Water's website can be used but must adhere to this plan.

Tertiary Treatment Module Specification

The specified tertiary module is the Klargester BioTreat® 12 Horizontal Granular Tertiary Treatment Module.

Refer to Appendix D for further technical information, Klargester document no. 102855-05.

Appendix D, section 9 gives the granular material (media) specification.

Effluent Quality Design

BOD	5mg/l
Suspended Solids	10mg/l
Ammoniacal Nitrogen	5mg/l
Phosphate - TotP	2mg/l
Nitrate - TotN	19mg/l

The quantities above show the effluent quality design after the sewage treatment plant and the tertiary treatment module, before entering the reed bed system.

GENERAL USE

Sewage Treatment Plant and Tertiary Treatment Module Operation

The biological treatment process of the BioDisc is self-regulating and it requires no specialised operational knowledge, but it is important to be aware of the following points.

- Biomass (live colonies of natural micro-organisms) are used to break down the sewage pollutants. Many domestic chemicals, especially in excessive amounts can inhibit or kill the biomass.
- The site is for 55No. fully serviced static caravans and does not have any chemical toilet waste disposal facility; it is essential that NO such waste be emptied into the sewage drainage system.
- Bear in mind that the sinks, showers etc. and not only the toilet is connected to the treatment plant.

For further information on installation and operation guidelines for your BioDisc® NM, refer to Appendix C, Kingspan (Klargester) document no. 017775.

Refer to Appendix D, Klargester document no. 1012855-05 for installation and operation guidelines.

Proper use of the sewage treatment products is essential, while standard household cleaning products should not generally result in any issues if used moderately.

Phosphate-free cleaning products are preferable.

As with any system unexpected items should not be flushed down into the drainage system causing blockages, such as baby wipes, nappies, and sanitary products.

Never use drains to dispose of chemicals, oil solvents, grease or paint brush cleaning fluids, oils, or chemicals. The micro-organisms can be damaged by certain substances. Check the manufacturer's instructions on the use of cleaning material such as bleach.

For further information on Do's and Don'ts guidelines for the BioDisc® NM, refer to Appendix C, Kingspan (Klargester) document no. 017775.

Reed Beds Operation

The treated wastewater will pass through the root zone of the reeds, treatment is via physical, chemical and biological interaction between the wastewater, plants, micro-organisms, gravel and atmosphere.

The wetland plants leak small amounts of oxygen through the roots, creating an ideal environment for the growth of micro-organisms.

The micro-organism growth needs to be protected, Do's and Don'ts above for the sewage treatment plant are also applicable to the reed beds.

The reed beds will also assist in a year-round flow for the watercourse.

MONITORING AND MAINTENANCE

All servicing, inspections and repairs to be carried out by an accredited engineer.

Monthly Checks for sewage treatment plant

- Check to see if the treatment plant appears to be operating effectively, for example no unusual noises, odours and so on. If it is not operating correctly, you must contact your appropriately qualified contractor to investigate and remediate the cause.
- Ensure that the sample points are always accessible, reinstate if necessary.
- Clear debris from inlet and outlet pipes.
- Checked covers are locked.

For further Health and Safety guidelines for your BioDisc® NM, refer to Appendix C, Kingspan (Klargester) document no. 017775 and Appendix D for the BioTreat® 12 Klargester document no. 1012855-05.

Routine Maintenance and Desludging

The BioDisc® BM requires routine maintenance and desludging quarterly (every 3 months).

All servicing to be carried out by a properly trained professional with appropriate experience with mechanical and electrical components.

Desludging to be carried out by a licensed and trained professional, on a contract basis ensuring that you are compliant with sewage legislation and have the necessary documentation to confirm waste disposal was carried out correctly.

Refer to Appendix E, for information of the planned maintenance scope of works from Kingspan Environmental Services.

Keep maintenance records, an example is shown in Appendix F. Your service contract will issue reports for any site visits/maintenance performed.

The BioTreat® Tiertary Module requires periodic flushing of the media to remove any solids that may have built up. Maintenance frequently should be carried out in tandem with the BioDisc® NM as described above.

Refer to Appendix D for health and safety procedures to be taken.

Customer Monthly Checks for Reed Beds

Check the reed beds are not dry, and water if necessary.

Check and clean inlet and outlet pipes, remove any debris blocking.

Remove weeds and thin out reeds if needed.

Reed beds are relatively low maintenance; however, we recommend a service contract with a qualified professional to guarantee longevity and sufficient system operation as well as full reporting and water sample testing.

The final discharge is via a watercourse, check the discharge point for any adverse effects on the receiving water, the bed of the watercourse, or any plants or animals within the watercourse. Adverse visible effect means dead or distressed fish, other animals or plants in the vicinity of the discharge point, noticeable deposit of solid material; growth of sewage fungus (a grey growth covering rocks or other objects in the receiving water body); or noticeable discolouration of the water flow by the discharge.

The reed beds will also assist in a year-round flow.

COMPLAINT RECORDING

You need a procedure that records:

- Any complaints you receive in relation to activities covered by your permit (for example complaints from neighbours about noise or odour).
- Investigate these complaints
- Help can be obtained from NRW:
  www.naturalresourceswales.gov.uk
  enquiries@naturalresourceswales.gov.uk
  Telephone: 03000653000
- And/or Environmental Health Department, Isle of Anglesey Council.

This can be used as evidence you have taken appropriate action to rectify any issues if NRW receive any complaints about your site.

ACCIDENT MANAGEMENT PLAN

ACCIDENT SCENARIO	PROBABILTY OF ACCIDENT OCCURING	MAGNITUDE OF POTENTIAL IMPACT	RISK MANAGEMENT
Spills & Leaks	Low	Spillage could occur when emptying the sewage treatment plant	Ensure pipe integrity has been tested prior to use and operator observes desludging process. Spill kit will be strategically located on site. All staff to be aware of location.
Flooding	Low – the development advice maps provided by NRW identifies the site as being in Zone A.	Severe	The sewage treatment plant is fully contained with a robust and structurally strong GRP casing. In cases of extreme rainfall, the sites surface water drainage has been designed for these events (100 yr + 40% climate change storm event). No surface water will enter the system.

ACCIDENT SCENARIO	PROBABILTY OF ACCIDENT OCCURING	MAGNITUDE OF POTENTIAL IMPACT	RISK MANAGEMENT
Vandalism	Low	Moderate	On-site security measures. The site will be well lit and secure. Gates will be locked. With fencing and gates to be well maintained. All visitors to the site are required to register at reception and sign out again on exit, thereby minimising the risk of unauthorised visitors on site.
Treatment system stops working due to failure of electricity supply	Medium	Low	Provision of a treatment works alarm to warn operators of power failure. Provision of a back-up generator to ensure adequate treatment. Contact your accredited engineer.

The site owners are responsible for reviewing the accident management plan yearly and completing their accident logbook of any incident.

List of contacts:

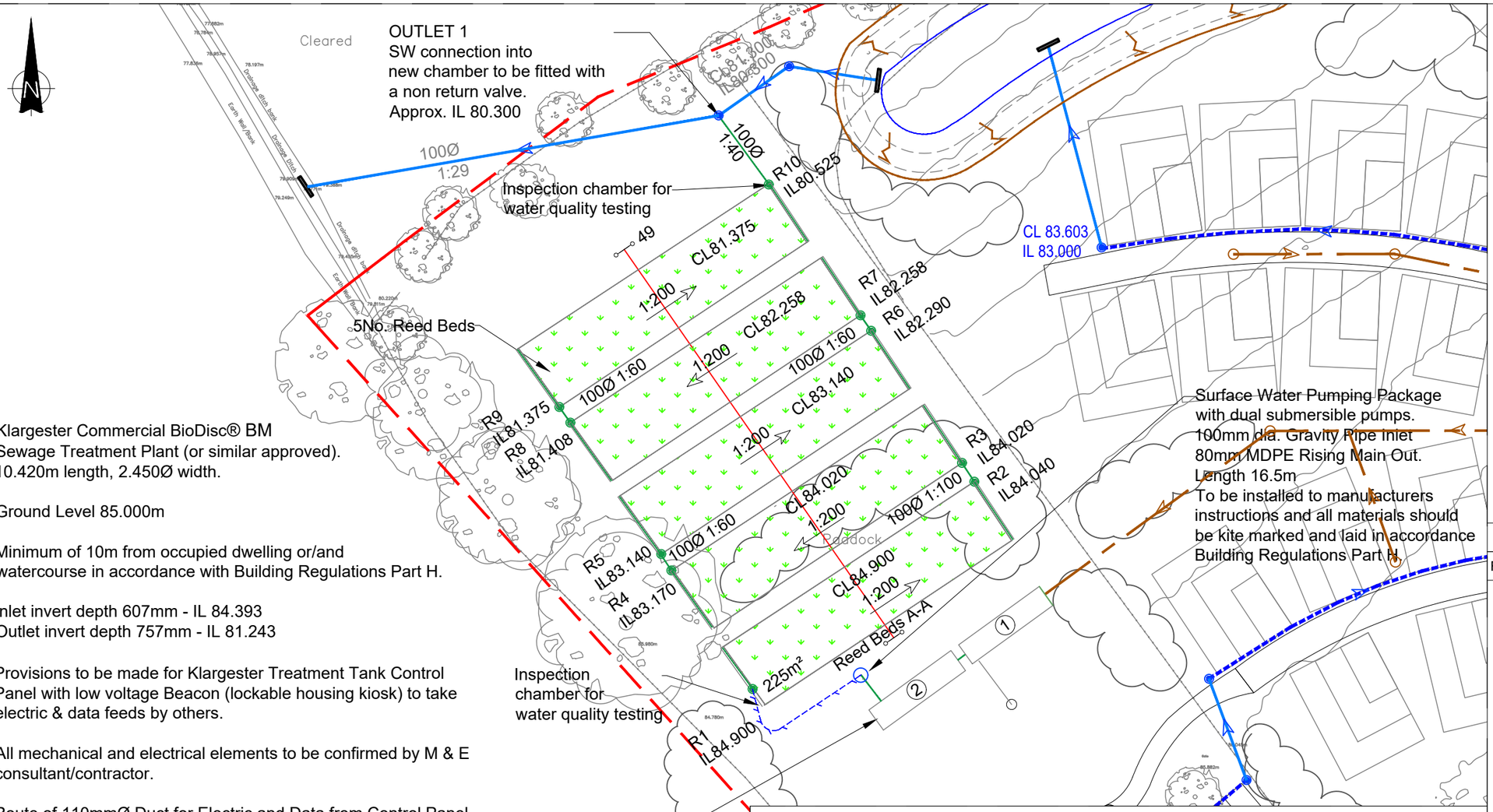
NAME	DESCRIPTION	TELEPHONE NUMBERS
Bonny Cuncliffe	**Site Owner**	**01248 712421**
TBC	**Site Manager**	
Kingspan Water & Energy Service	**Sewage Treatment Plant**	**03332406868**
TBC	**Desludge Contractor**	
TBC	**Qualified Contractor**	
Kingspan Environmental Services	**Maintenance Contract**	**0844 846 0500**

Useful links below:

- www.britishwater.co.uk/engineers
- www.naturalresources.wales/permits-and-permissions/water-discharges-and-septic-tanks/septic-tanks-and-private-sewage-systems/running-and-maintaining-a-septic-tank-or-small-sewage-plant

APPENDIX A

ECL.9290.D05.003 A
Site Sewage Infrastructure Plan Drawing



(1) Klargester Commercial BioDisc® BM
Sewage Treatment Plant (or similar approved).
10.420m length, 2.450Ø width.

Ground Level 85.000m

Minimum of 10m from occupied dwelling or/and watercourse in accordance with Building Regulations Part H.

Inlet invert depth 607mm - IL 84.393
Outlet invert depth 757mm - IL 81.243

Provisions to be made for Klargester Treatment Tank Control Panel with low voltage Beacon (lockable housing kiosk) to take electric & data feeds by others.

All mechanical and electrical elements to be confirmed by M & E consultant/contractor.

Route of 110mmØ Duct for Electric and Data from Control Panel to Treatment Tank to be determined by client and/or contractor (shown indicatively).

Klargester model chosen from British Water's sizing criteria guidelines.

55 caravan units with average of 4P per unit = 220P

60g of BOD (Biochemical Oxygen Design) per day per person.
220 x 44 = 13,200g per day (13.2kg).

All details to be confirmed by manufacturer.

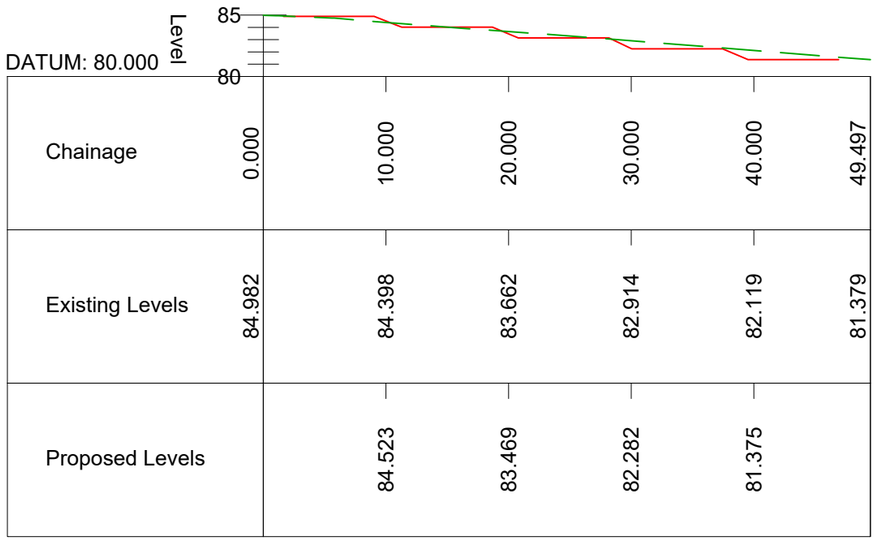
(2) Klargester Biotreat 12® Tertiary Treatment Module (or similar approved).
10.610m length, 2.605Ø width.

Ground Level 85.000m

Inlet invert depth 750mm - IL 84.238
Outlet invert depth 850mm - IL 81.138

All details to be confirmed by manufacturer

Reed Beds - A-A Section
Scale:H 1:500,V 1:500



Chainage	0.000	10.000	20.000	30.000	40.000	49.497
Existing Levels	84.982	84.398	83.662	82.914	82.119	81.379
Proposed Levels		84.523	83.469	82.282	81.375	

Notes

1. All information is given in good faith and is believed to be correct. ECL (Egniol Consulting Ltd) cannot accept responsibility for the accuracy of third party details.
2. Do not scale from this drawing. Any anomalies on this drawing should be brought to the attention of ECL.
3. To be read in conjunction with all other engineering drawings.
4. Any alterations by Architects to drawings including surface finishes and landscaping proposals must be provided to ECL.
5. Site Plan provided by Ryder Landscape Consultants, and taken from their drawing, 1000-RYD-XX-XX-DR-L-002 Landscape Masterplan.
6. Topographical survey by DTM Technologies, Drg no. 001-001-A, dated October 2021.

Rev	Modifications	By	Chk	App	Date
A	Tertiary Treatment Module added	VEV	DES	DES	15.04.2025

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Site Sewage Infrastructure Plan

Drawn by	Checked by	Approved by
VEV	DES	DES
Date	Date	Date
13.08.2024	14.08.2024	14.08.2024

Status: Approval
Scale @ A3: 1:500

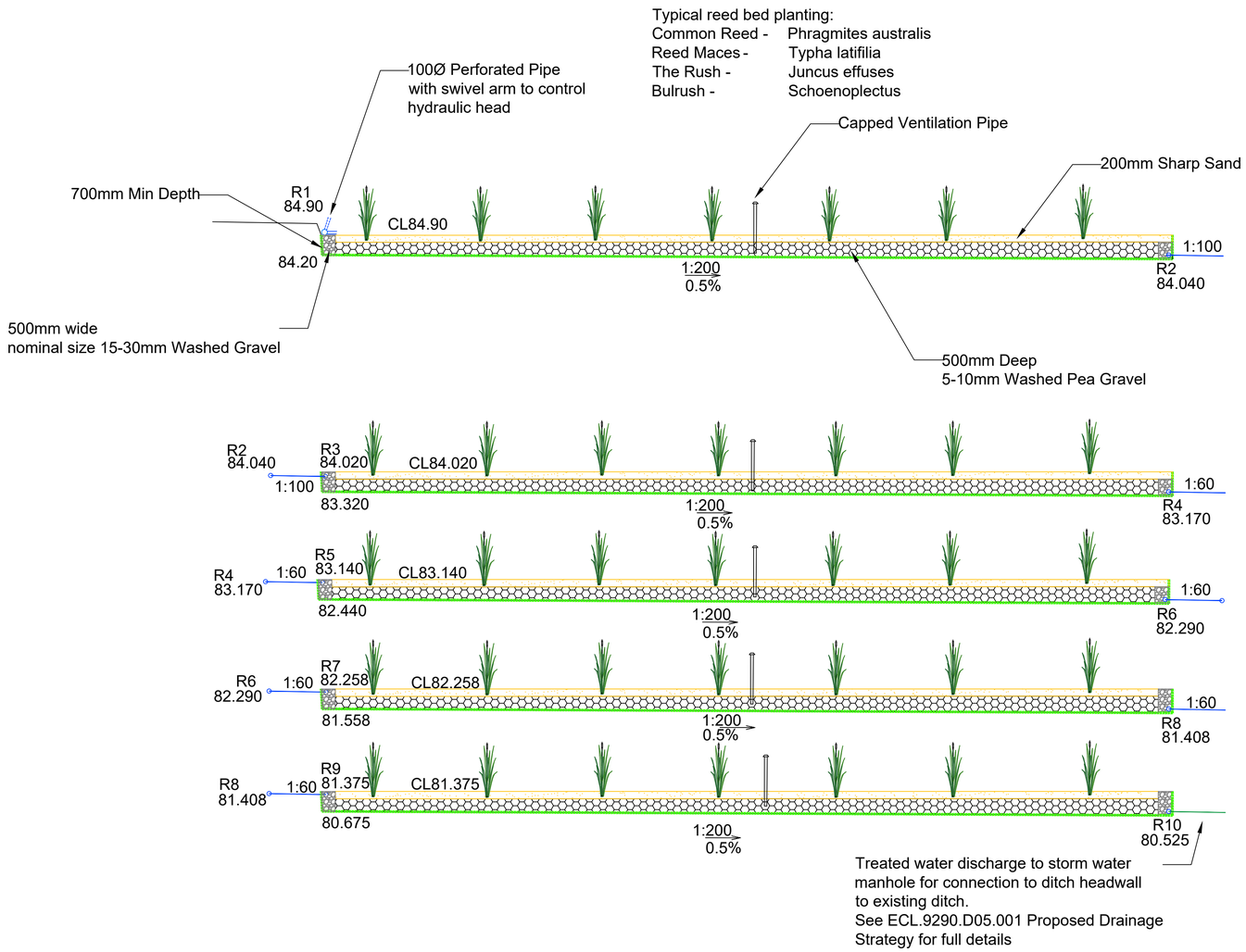
Drawing Number: ECL.9290.D05.003
Revision: A

CAD File Ref:P:\9290 Wern Farm, Menai Bridge, Carbon Management\CAD & BIM\Drawings\Current Working Drawings\ECL.9290.D05.003 Site Sewage Infrastructure Plan.dwg

APPENDIX B

ECL.9290.D05.002

Reed Bed System Detail.



Notes

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2. Do not scale from this drawing. Any anomalies on this drawing should be brought to the attention of ECL.
3. To be read in conjunction with all other engineering drawings.
4. Topographical survey by DTM Technologies, Drg no. 001-001-A, dated October 2021.
5. Proposed reed beds to be constructed in accordance with Building Regulations Part H2 and BRE Good Building Guides No 42.

Key:

- Proposed 100mmØ Storm Water Pipes with 315mmØ Inspection Chambers
- Proposed Treated Drainage pipe
- Proposed reinforced high density polyethylene (HDPE) or low density polyethylene (LDPE) membrane capable of resisting root penetration.

Rev	Modification	By	Chk	App	Date

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Proposed Reed Bed System Detail

Drawn by	Checked by	Approved by
VEV	DES	DES
Date	Date	Date
12.08.2024	13.08.2024	14.08.2024

Status	Scale @ A1
DRAFT	1:100

Drawing Number	Revision
ECL.9290.D05.002	

CAD File Ref:P:\9290 Wern Farm, Menai Bridge, Carbon Management\CAD & BIM\Drawings\Current Working Drawings\ECL.9290.D05.002 Reed Bed System Detail.dwg

APPENDIX C

Document No. 017775

Kingspan Installation and Operation Guidelines

017775
INSTALLATION & OPERATION GUIDELINES FOR SINGLE PIECE UNITS BIODISC® BM

Kingspan Water & Energy Service Contact Numbers:

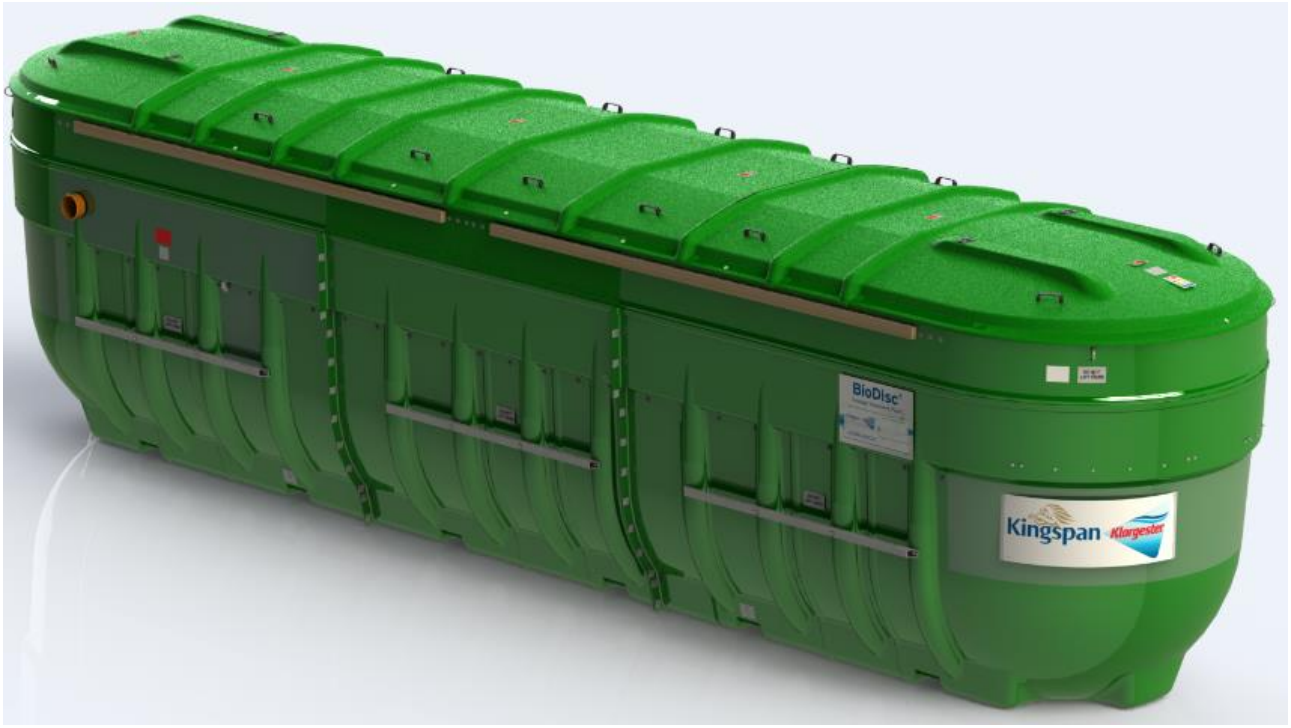
UK: 0333 240 6868

NI: 028 3836 4600

ROI: 0818 543 500

Enclosed Documents

DS1292P	BM Biodisc General Assembly – Sales Drawing



Issue	Description	Date
03	ECN 1621 / ECN 1650	January 2023
02	New issue due to Motor Placement	October 2016
01	Initial Issue	July 2016

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. Kingspan 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.

BioDisc units contain rotating machinery and associated transmission equipment.

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.

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.

Desludging should be carried out by a contractor holding the relevant permits to transport and dispose of sewage sludge. The contractor must refer to the desludge instructions in the operation section of this manual.

CONTENTS

1 Introduction

Thank you for choosing a Kingspan 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:

a) The installer.

b) The electrician.

c) The maintenance engineer.

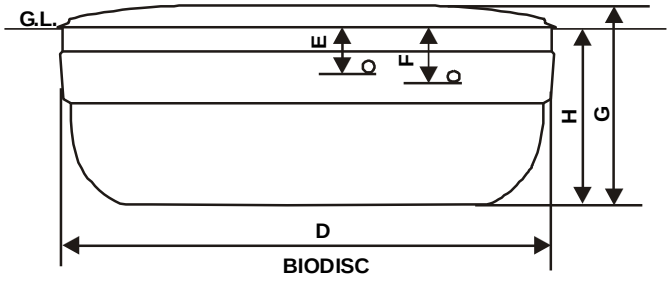
d) The desludge contractor.

e) The owner/user

These Guidelines represent Best Practice for the installation of these Kingspan BioDisc Units. Many years of specialist experience has led to the successful installation of thousands of BioDisc units. It must be noted, however, that these Guidelines are necessarily of a general nature. It is the responsibility of others to verify that they are appropriate for the specific ground conditions and in-service loads of each installation. Similarly, any information or advice given by employees or agents of Kingspan regarding the design of an installation must be verified by a qualified specialist (e.g. Civil engineering consultant).

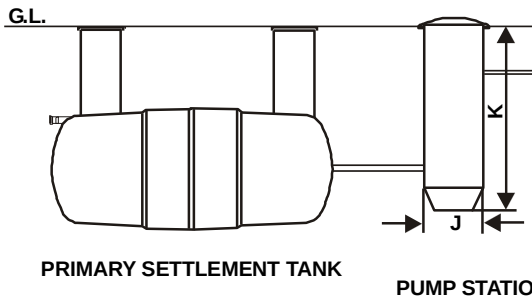
2 Technical Data

STANDARD - SINGLE PIECE SYSTEM

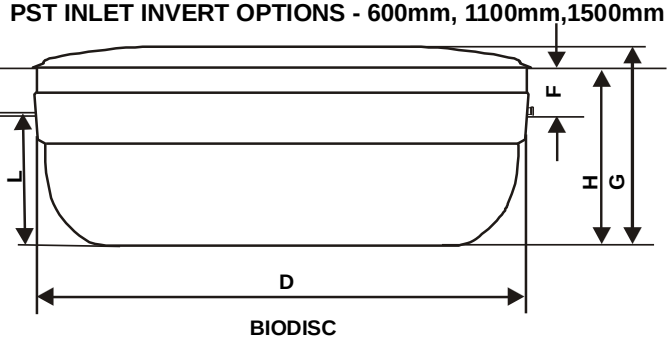


Note: Illustrations are schematic. Refer to General Arrangement Drawings for true pipework orientation.

OPTION - PUMP FED THREE PIECE SYSTEM



PST INLET INVERT OPTIONS - 600mm, 1100mm,1500mm



GL = Ground Level

2.1.1 The loadings given below are representative of typical domestic housing applications. The sizing of sewage treatment plants requires specialised knowledge and experience. Please consult Kingspan for an assessment of your application.

2.1.2

Unit	BM	
Maximum Daily BOD - **Kg BOD_5**	13.5	
Maximum Daily Flow – **m^3**	45	
Peak Flow Rate – **m^3**	4.3	
Primary Settlement Tank		
Please Refer To Klargester Sales For Applications Requiring A Primary Settlement Tank For Sizing And Dimensional Information.		
Biodisc	BM	
Inlet Invert Depth **E mm**	600	1000
Length **D mm**	10419	10650
Width **mm**	2586	
Depth Below Inlet Invert **L mm**	1790	
Outlet Invert Depth **F mm**	750	1150
Overall Height **G mm**	2830	3230
Height To rim cover **H mm**	2390	2890
Empty Weight **kg**	4550Kg	4600 Kg
Standard Power Supply	Single Phase	
Motor Rating 1 Phase **Watts**	550	
Full Load Current 3 Phase **Amps**	2.8	
Sludge Return Pump Rating **Watts**	480	
Pump Station		
Diameter **J mm**	900	
Flange Height **K mm**	2530	
Standard Power Supply	1ph	
Pump Rating **Watts**	480	

3 Handling & Storage

3.1.1 Care must be taken to ensure that the unit is not damaged during delivery and handling on site. If there is any damage it should be reported to the Warranty Team (0844 225 2785) within 48 hours of delivery.

3.1.2 The design requirements of Kingspan products will frequently mean that the centre of gravity of the unit is “offset”. Care must therefore be taken to ensure that the unit is stable when lifting. Rainwater may also collect inside units, particularly if they have been stored on site prior to installation, adding weight and increasing instability. Check units before lifting and pump out any excess water.

3.1.3 When lifting units, use webbing slings of a suitable specification. When lifting BioDisc units the slings must be passed through the indicated channels in the base of the unit.

3.1.4 A suitable spreader bar should be used to ensure that the unit is stable and that loads are evenly distributed during lifting. When lifting BioDisc units the spreader bar length should be equal to the width of the BioDisc to avoid compression damage to the covers or sides of the unit.

3.1.5 Do not use chains. Do not use the U-bolts or horizontal beams on the BioDisc case for lifting.

3.1.6 Lifting equipment should be selected by taking into account the unit weight, length and the distance of lift required on site.

3.1.7 Kingspan accepts no responsibility for the selection of lifting equipment.

3.1.8 Whenever Kingspan BioDisc are stored or moved on site, ensure that the storage location is free of rock, debris and any sharp objects, which may damage the unit. The BioDisc must be placed on ground, which is flat and level to evenly support the base of the unit.

4 Site Planning

The following points should be considered before installation of the equipment:

4.1.1 The discharge must have the consent of the relevant Environmental Regulator.

4.1.2 The installation should have Planning and Building Control approval.

4.1.3 Due to rising groundwater conditions in GB and Ireland, we strongly recommend that a concrete backfill is used to install the product.

4.1.4 Ground conditions and water table level should be assessed. If the water table will be above the base of the unit at any time of the year, adequate concrete backfill must be provided to avoid flotation. In poorly draining ground, consideration should also be given to the likelihood of flotation due to surface water collecting in the backfill. It should be borne in mind that the inlet drain trench will act as a land drain, directing surface water to the backfill around the unit.

4.1.5 If discharge is to a soakaway, a porosity test should be carried out in accordance with BS 6297 to assist in assessing sub-soil drainage and designing the sub-surface irrigation system.

4.1.6 The use of Borehole soakaways with Kingspan sewage treatment products is only acceptable when the Environment Agency discharge license allows them. Borehole soakaways are not accepted under building regs or BS6297 so it is only under special circumstances that the EA will allow such a system. Maintenance of the borehole is essential to maintain permeability.

4.1.7 The BioDisc system must be installed at a level, which will allow connection to the incoming drain and a free discharge at the system outlet. Effluent pumping station are available to lift the discharge to a higher level and/or pump to remote discharge points.

4.1.8 The unit should be installed so that the bottom lip of the cover is 65mm or more above local ground level. If the unit must be recessed, measures must be taken to ensure that it cannot be flooded by surface water run-off.

4.1.9 There must be at least 1 metre of clear, level ground all around the unit to allow for routine servicing, plus adequate space to allow complete removal of the covers.

4.1.10 Adequate access must be provided for routine de-sludging and maintenance, including crane access. Vehicles should not be permitted within a distance equal to the depth of the unit, unless suitable structural protection is provided to the installation.

4.1.11 BioDisc covers are not suitable for walking on. Where necessary the BioDisc should be fenced off or otherwise protected. Maintenance access must be maintained as above.

4.1.12 The drainage system connected to the BioDisc must be adequately vented in accordance with the Building Regulations. The head of the drainage system should be connected to a stack pipe, open at high level, so as to draw foul air from the system and sited with consideration to prevailing wind direction. Tile vents & Air admittance valves should not be used as the sole drainage ventilation facility, but if this cannot be avoided, the BioDisc should be independently ventilated. All inspection points within the drain system should be sealed so as to enable ventilation at high level.

4.1.13 An adequate electrical supply must be provided, complying with current electrical regulations. The electrical details in section 2.1.1 will enable selection of suitable cable and current overload protection, taking into account the distance from the power source to the control panel and any other relevant factors. In most cases steel wire armoured (S.W.A) cable, minimum 2.5 mm^2 will be suitable, but this is a minimum recommendation and selection is the responsibility of the installing electrician. Although not obligatory for an installation of this type, RCD protection is suggested as an extra precaution.

4.1.14 Pump stations or any other associated equipment should have a separate power supply.

4.1.15 Proximity to a mains water hosepipe connection point is recommended, for maintenance purposes. Such a supply should be connected in accordance with water bylaws and regulations. **Never leave a hose connected and immersed in sewage.**

4.1.16 Installation should only be carried out by suitably qualified and experienced contractors in accordance with the Health and Safety at Work Act. Electrical work should be carried out by a qualified electrician, working to the latest edition of IEE.

5 Installation

5.1 General

5.1.1 When units are installed in unstable ground conditions where movement of the surrounding material and/or unit may occur, the connecting pipe work should be designed to minimise the risk of damage from differential movement of the unit(s) and/or surrounding material.

5.1.2 In situations where the excavation will not maintain a vertical wall, it will be necessary to support sidewalls of the excavation (E.g. with suitable trench sheets and bracing systems) to maintain a vertical wall from the bottom to the top of the excavation. DO NOT completely remove the shoring system until after the backfilling is complete, but before the concrete fully hardens.

5.1.3 In areas where the water table is above the bottom of the excavation and/or the excavation is liable to flood, the excavation should be de-watered, using suitable pumping equipment, until the installation is complete. In such conditions it may be advisable to line the excavation with polythene sheeting, to prevent cement being washed out of the concrete surround/base.

5.1.4 During installation care must be taken to ensure that the body of the unit is uniformly supported so that point loads through the unit are avoided.

5.1.5 Refer to the drawings attached for dimensions of units.

5.1.6 The Concrete Specification is not a site-specific installation design.

GENERAL CONCRETE SPECIFICATION IN ACCORDANCE WITH BS EN 206-1 (BS 8500-1)		
TYPE OF MIX		(DC) DESIGN
PERMITTED TYPE OF CEMENT		BS 12 (OPC): BS 12 (RHPC): BS 4027 (SRPC)
PERMITTED TYPE OF AGGREGATE ((coarse & fine)		BS 882
NOMINAL MAXIMUM SIZE OF AGGREGATE		20 mm
GRADES: C25 /30 C25 /30 C16 /20		REINFORCED & ABOVE GROUND WITH HOLDING DOWN BOLTS REINFORCED (EG. FOR HIGH WATER TABLE) UNREINFORCED (NORMAL CONDITIONS)
MINIMUM CEMENT CONTENT	C30 C20	270 - 280 Kg/M^3 220 - 230 Kg/M^3
SLUMP CLASS		S1 (25mm)
RATE OF SAMPLING		READY MIX CONCRETE SHOULD BE SUPPLIED COMPLETE WITH APPROPRIATE DELIVERY TICKET IN ACCORDANCE WITH BS EN 12350-1
NOTE: STANDARD MIXES SHOULD NOT BE USED WHERE SULPHATESOR OTHER AGGRESSIVE CHEMICALS EXIST IN GROUND WATER		

5.2 BioDisc Installation

5.2.1 Excavate a hole of sufficient length and width to accommodate the unit and a minimum of 200mm concrete surround and to a depth, which allows for the burial depth of the unit plus a minimum 300mm thick concrete base.

5.2.2 Construct a suitable concrete base slab, a minimum of 300mm thick, appropriate to site conditions. In wet or unstable ground conditions it may be necessary to lay a hard-core sub-base. Ensure that the slab is flat and level. Allow the slab to set sufficiently to support the installed load.

5.2.3 Ensure that the slab is free of any stones or other material, which could damage the unit. Lower the unit onto the slab using suitable webbing slings and lifting equipment.

5.2.4 Remove the package tied to the outside of the unit. This contains a copy of the Installation Guidelines and a cover key.

5.2.5 Remove the covers by undoing the locks and folding the end covers back over the inner covers before lifting them off. Then unlock and remove the centre cover.

5.2.6 Remove the Control Panel, from the walkway inside the unit.

5.2.7 Check that the inlet and outlet orientation is correct, and that the unit is level. It is essential that the unit is installed in a level plane to avoid undue stress on the bearings. The unit must be level to within ±5mm from side to side, measured at the walkway on either side of the rotor. If necessary, lift the unit off the base and apply further concrete as needed to level up.

Note: The top flange of the BioDisc should not be used for levelling as manufacturing tolerances may result in it not being parallel with the rotor shaft.

5.2.8 It is essential that the unit levels are checked regularly throughout the installation process. Should the unit become out of level, immediate remedial action is advised, to maintain the unit within the levels stated in section 5.2.7.

5.2.9 Pour no more than 1 metre depth of water into both primary (inlet) chambers and the final (outlet) chamber ensuring that there is never more than 250mm difference in water level between any of the sections.

5.2.10 Place concrete backfill to approximately 500mm depth around the unit ensuring good compaction to avoid voids. **Do not use vibrating pokers.**

5.2.11 Continue backfilling with concrete to just below the level of the inlet spigot. Keep the concrete at an even level all round the unit, compacting in layers. As backfilling progresses keep the ballast water level inside the unit 250-500mm above the concrete backfill level, but do not attempt to fill the unit with water above the outlet level.

5.2.12 Remove blanking cap from the cable duct at the outlet end of the unit.

5.2.13 Continue to backfill, with concrete or free flowing granular material, up to ground level. **Do not use sand.** The finished surface should be 65 mm minimum lower than the lip of the cover.

Important: Refer to Front Page regarding delayed electrical installation.

5.3 Control Panel – Installation

5.3.1 The control panel is supplied fixed to the pedestrian walkway at the outlet end of the unit, cut cable ties to remove.

5.3.2 The control panel is suitable for internal or external wall mounting, with volt-free contacts for an optional beacon or telemetry. Kiosks are available as an option on request.

5.3.3 It is important that the control panel is situated in an accessible location for servicing and maintenance.

5.3.4 The panel key is in the protective bag on the front of the panel.

5.4 Control Panel - Connection

5.4.1 It is necessary to supply (by others) SWA cable to connect the control panel with the internal junction box inside the unit.

5.4.2 The gearbox, loss of rotation alarm and sludge return pump are all pre-wired into the internal junction box within the unit.

5.4.3 The SWA cable connecting the control panel and internal junction box must be ducted through the 4” port at the outlet end of the unit.

5.4.4 Refer to the wiring diagram inside the panel for connection details.

5.5 Ancillary Equipment

5.5.1 Ancillary items should be installed in accordance with the Installation Guide supplied e.g.

- Primary Settlement Tank
- Sewage Pump Station
- Effluent Pump Station
- Sample Chamber
- Grease Trap

6 Start Up

6.1.1 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 Kingspan.

6.1.2 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. **If the unit has been installed with no operational power supply, then remove the motor/gearbox unit and store it in a dry or heated environment until such time as the unit is ready for permanent operation.** Kingspan or an experienced contractor should then replace the motor gearbox unit.

6.1.3 We recommend that Kingspan should commission the system: details on request.

6.1.4 Where circumstances dictate an immediate start-up the following basic procedures should be carried out.

6.1.5 Check that the Primary Settlement Tank (where applicable) and the BioDisc are full of water to their outlet levels.

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

6.2 Automatic grease cartridges

6.2.1 The shaft roller bearings are fitted with pressurised grease cartridges. These should be activated before the unit is started.

6.2.2 Turn the control knob and it's linked dial until the figure 6 is against the arrow on the casing, as opposite (this will give a lubrication period of 12 months at the temperature in the BioDisc).

6.2.3 Depress the red button. This secures the setting and releases the control knob from dial.

6.2.4 Rotate the knob clockwise to activate the unit. **Note: Grease cartridges must be changed every 12 months.**

Setting a discharge duration of 12 months

6.3 Optional Pump Station

6.3.1 Check that the pumps have been installed and wired to the Pump Control Panel.

6.3.2 The pumps should be set to pump little and often in order to prevent excessive loading on the BioDisc.

6.3.3 Check the setting of the high level float in the pump chamber. This must be set to operate the pumps so as not to exceed the balancing volume of the unit. To ensure this the float must operate below the level of the inlet of the unit. Ensure that the float(s) can operate freely without risk of entanglement. Check that the Pump Control Panel timer is set correctly, as shown on the wiring diagram.

6.4 BioDisc

6.4.1 Check that the BioDisc is in order, with no obvious damage or misalignment of parts. If any possible problems are discovered, contact Kingspan.

6.4.2 Check that all electrical components: Drive Motor, Sludge Return Pump and LOR Alarm sensor, are connected to the Control Panel.

6.4.3 Check that the Sludge Return Timer in the BioDisc Control Panel is set correctly, as indicated on the wiring diagram.

6.5 Switch-on

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

6.5.2 Open the Pump Control Panel (where installed), check that all circuit breakers are in the “on” position and switch on the main isolator switch. Close and lock the panel. Immediately upon switching on the isolator, one of the pumps may start and run for the set time.

6.6 Process Initiation

6.6.1 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.

6.6.2 The colonisation by micro-organisms will commence naturally and a full operating biomass will establish itself on the discs in 4-8 weeks, depending on individual site circumstances.

7 Operation

7.1.1 The biological treatment process of your BioDisc is self-regulating and it requires no specialised operational knowledge, but it is important that you are aware of the following points.

7.1.2 Your BioDisc 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.

7.1.3 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.

7.1.4 If the biomass is damaged, it will usually recover over time. But in the meanwhile one of the more obvious symptoms is an unpleasant smell, so it is in the users interest to avoid this.

7.1.5 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."

7.1.6 Bear in mind too that it isn't only the toilet that is connected to the treatment plant; anything that goes down the sink, bath etc. also ends up there.

7.2 Do's and Don'ts

7.2.1 **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 Kingspan for advice if any changes are contemplated e.g. addition of extra laundry facilities.

7.2.2 **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.

7.2.3 **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.

7.2.4 **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 - its cheaper and environmentally friendly.

7.2.5 **Home beer and wine making.**

This presents a similar problem to waste disposal units. The BioDisc 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.

7.2.6 **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.

7.3 Automatic Restart

7.3.1 BioDiscs 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. In the event of any difficulties, contact Kingspan.

8 Running Checks

8.1.1 Check that the rotor is running smoothly in the correct direction of rotation (see section 8.1.2) and is not contacting any part of the fixed structure.

8.1.2 Check that the forward feed buckets are discharging correctly from the first to second stage Biozone.

8.2 Loss of Rotation Alarm

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

8.2.1.1 Open the Control Panel and switch off the drive motor circuit breaker. After a delay of 2-3 minutes the alarm should activate.

8.2.1.2 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.

8.2.1.3 Switch on the drive motor circuit breaker and close the Control Panel. The alarm should cease after approximately one minute.

8.2.1.4 Depress and release the “Beacon Off” button to reset it.

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

8.3 Customer Checks

8.3.1 The following periodic checks should be carried out monthly. Your attention is specifically drawn to the Health and Safety section of this manual.

8.3.1.1 Visually check the general condition of the plant and listen for any unusual noises. Report any aspects of concern to your maintenance engineer.

8.3.1.2 Check the appearance of the Biomass. It should be light grey to grey at 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 throughout, an overload condition is indicated.

8.3.1.3 Visually check that all fixings are secure.

8.3.1.4 Clear any debris from inlet and outlet pipes.

8.3.1.5 Check dosing buckets and transfer pipe for any build up of debris. Clean, if required, using a stiff bristled brush.

8.3.1.6 Check the Loss of Rotation Warning Device for correct operation (see section 8.2). If the alarm does not operate properly, contact your maintenance engineer.

9 Desludging and Maintenance

9.1.1 These are vital to the plant's ongoing operation and should be carried out in accordance with the guidelines in this manual.

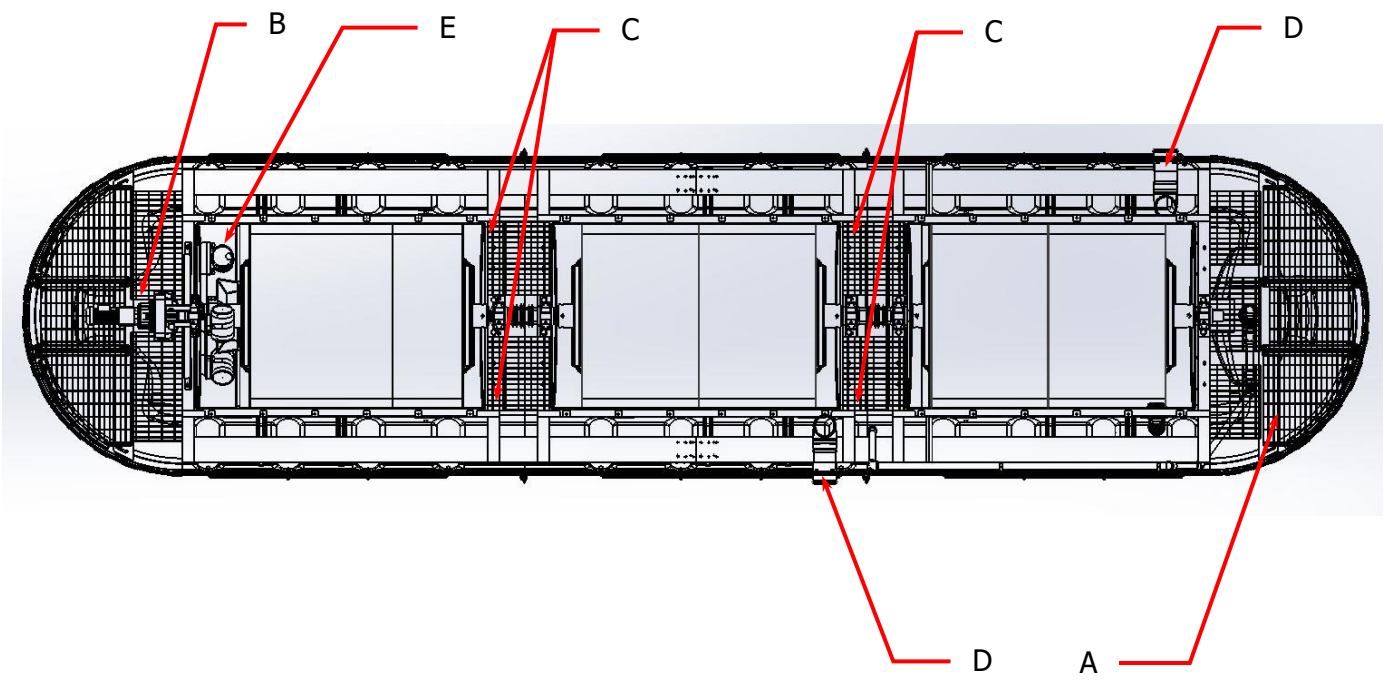
9.1.2 Mechanical and electrical maintenance must be performed by properly trained engineers, with reference to the appropriate Maintenance Manual. Kingspan offer a range of maintenance packages, details on request.

9.1.3 Kingspan BioDisc are designed and engineered for the minimum possible maintenance requirements, consistent with proper performance. Nevertheless, it is important that routine preventive electro/mechanical maintenance and de-sludging are carried out at the appropriate intervals by suitably qualified persons.

9.1.4 Kingspan offer various levels of contract maintenance of all BioDisc Systems through Kingspan Environmental Services who can be contacted on 0844 846 0500.

9.2 Sludge Removal

9.2.1 Refer to the illustration below for recommended de-sludge positions. (Note: Illustration is typical; individual units may vary).



9.2.2 Isolate power to the BioDisc (and Pump Station if applicable) at the Control Panel(s).

9.2.3 Undo the BioDisc cover latches and fold back the hinged cover sections as required to gain access. Alternatively the covers can be completely removed if wished. Hinged sections should be folded back before lifting off.

9.2.4 Remove any surface scum from the Final Settlement Tank [A]. The steel mesh may be removed for access if required. Lower the hose to the bottom of the tank and remove any settled sludge. Replace the steel mesh.

9.2.5 Remove surface scum from the BioDisc Primary Settlement Zone at point [B] and de-sludge at points [C] on either side of the rotor. De-sludge along the length of the rotor to prevent 'rat-holing'. The steel mesh over point [B] may be removed for access if required.

9.2.6 **Note:** While de-sludging the Primary Settlement Zone, ensure that there is never more than 250mm difference in water levels between points [A] and [C].

9.2.7 **DO NOT** attempt to remove any liquid from the Rotor Section.

9.2.8 **DO NOT** attempt to clean off the gelatinous growth on the rotor.

9.2.9 Ensure that the BioDisc inlet and outlet pipes [D] and the Forward Feed Buckets [E] are free of debris.

9.2.10 Ensure that all safety meshes are replaced, then close and lock the BioDisc covers.

9.2.11 Units with separate Primary Tank only - Remove the covers from Primary Settlement Tank. Remove any surface scum in the Primary Settlement Tank, then lower the hose into the bottom of the tank and completely remove settled sludge. It may be necessary to empty the tank completely to ensure full sludge removal. Ensure that the inlet and outlet pipes are clear of debris, and then replace the covers.

9.2.12 All units - Re-connect the power supply. Wait for two minutes. If the alarm on the control Panel does not activate, this indicates that the Rotor has successfully re-started. If the alarm activates, switch off the power at the Control Panel and immediately switch on again. If the alarm continues to activate, isolate the power supply and notify the plant owner so that the problem can be investigated.

9.3 Desludge Volumes

9.3.1 The minimum volumes shown here are those which can be anticipated under full loading at the de-sludge period indicated. If the system is not loaded to full capacity, the de-sludge 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 de-sludge visit.

UNIT	De-sludge Period	BioDisc Primary Settlement Zone		BioDisc Final Settlement Zone	
		Min	Max	Min	Max
BM	Approx. 3 months	17,600 (3,850)	23,800 (5,200)	2,000 (440)	8,100 (1,770)

Note: Volume is in litres (gallons below in brackets)

10 Warranty

Taken from 'Kingspan's Terms & Conditions of Sale'
The company will replace or, at its option, properly repair without charge any goods which are found to be defective and which cause failure in normal circumstances of use within a period of twelve months from the date of delivery.

This warranty is conditional upon:

(a) the Buyer notifying the Company of any claim within Seven days of the failure becoming discernible.
(b) the Company being allowed a reasonable opportunity to inspect the goods so as to confirm that they are defective.
(c) the goods not having been modified, mishandled or misused and being used strictly in accordance with any relevant instructions issued by the Company.

The Company's liability under this Clause is limited to the repair or replacement of the defective goods, and does not cover costs of transport, installation or associated site costs, if applicable.

The Company's liability to replace or repair the goods is in lieu of and excludes all other warranties and conditions, and in particular (but without limitation) the Company shall have no liability of any kind for consequential loss or damage.

For any further advice, please contact the Warranty department on 0844 225 2785.

A Warranty Form is included in this package, to register your unit for Warranty. Please complete ALL sections of the Form, and return it at your earliest convenience.

Also within this package is a Notice, describing the necessary maintenance of the plant in use. This should be fixed within the building.

Our service provider: Kingspan Water & Energy Services: 0333 240 6868

11 Notice

KINGSPAN BioDisc ®

The foul drainage from this property discharges into a package treatment works.

Maintenance is required, the frequency of which depends upon the model installed, its use and its application. Please consult your owner's pack.

* BM BioDisc requires routine maintenance and Desludging at 3 month intervals.

Maintenance and Desludging should be carried out by the owner in accordance with the Manufactures instructions.

THE OWNER OF THE PROPERTY IS LEGALLY RESPONSIBLE FOR ENSURING THAT THE SYSTEM DOES NOT CAUSE POLLUTION, A HEALTH HAZARD OR A NUISANCE.

We recommend that a separate log is kept of all maintenance and service visits, the log should detail the date and any action taken, e.g. Regular maintenance service, breakdown visit, desludge volume removed, parts replaced.

This notice should be fixed by the owner within the building alerting current and future owners to the maintenance requirement. (Building regulation H2 (1.57)

Please contact Kingspan Water & Energy Services on 0333 240 6868 to arrange a maintenance service or to request replacement operating instructions. It would be helpful if you provide your equipment serial number.

APPENDIX D

Document No. 1012855-05

Klargester Installation and Operation Guidelines

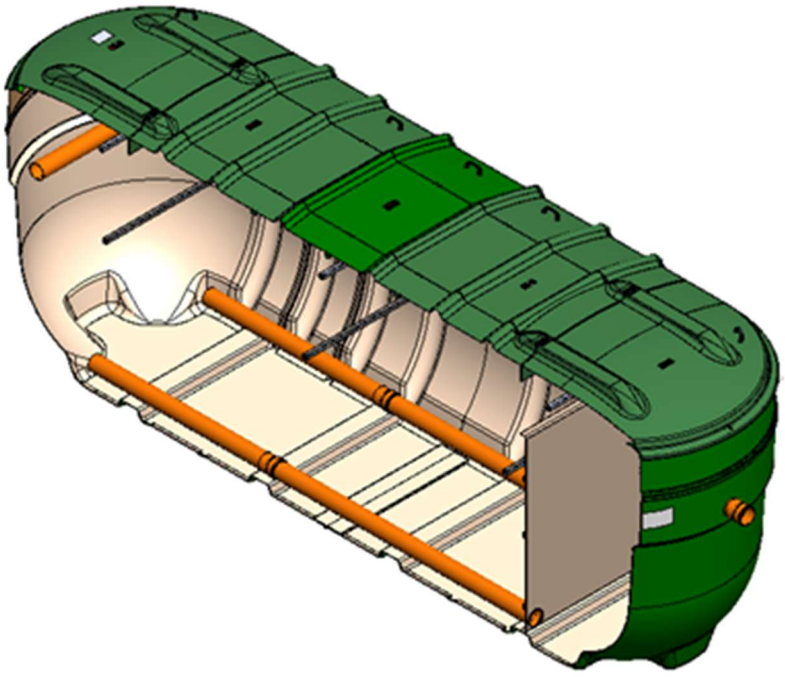
Water Management Solutions

Klargester

BioTreat 8-13 Horizontal Granular Tertiary Treatment Module

Installation Guide

Enclosed Documents	
D1412	BioTreat 8-10 Treatment Module
D1413	BioTreat 11-12 Treatment Module
D1414	BioTreat 13 Treatment Module



Part Code	1012855
Issue	05
Description	ECN 1675
Date	September 2023

Kingspan

4430

Health and Safety

Please read and follow for your own and others safety

You must read these warnings carefully before installing or using the equipment. Please ensure that you have performed a risk assessment before commencing any installation. Note that the risk assessment should be performed by a person who understands the hazards of the work, and the work environment. Note that it must be *suitable and sufficient,* i.e. adequatelyconsiders risks and ensures controls in place to mitigate risks.

You must observe all-hazard labels and take appropriate action to avoid exposure to the risks indicated. Always ensure that all relevant documents are supplied with the equipment when being transferred to a new owner.

General guidelines

- Only experienced and competent person(s) should carry out the installation.
- Take care to maintain correct posture, particularly when lifting.
- Use appropriate lifting equipment when necessary.
- The covers must be kept locked.

Personal Protective Equipment (PPE)

- We recommend the use of a dust mask and gloves when cutting GRP components.
- Person(s) carrying out maintenance on the equipment should wear suitable PPE.

Maintenance and Inspection Procedures

If you wish to inspect the equipment's operation, please observe all necessary precautions as stated in your risk assessment.

Working Area

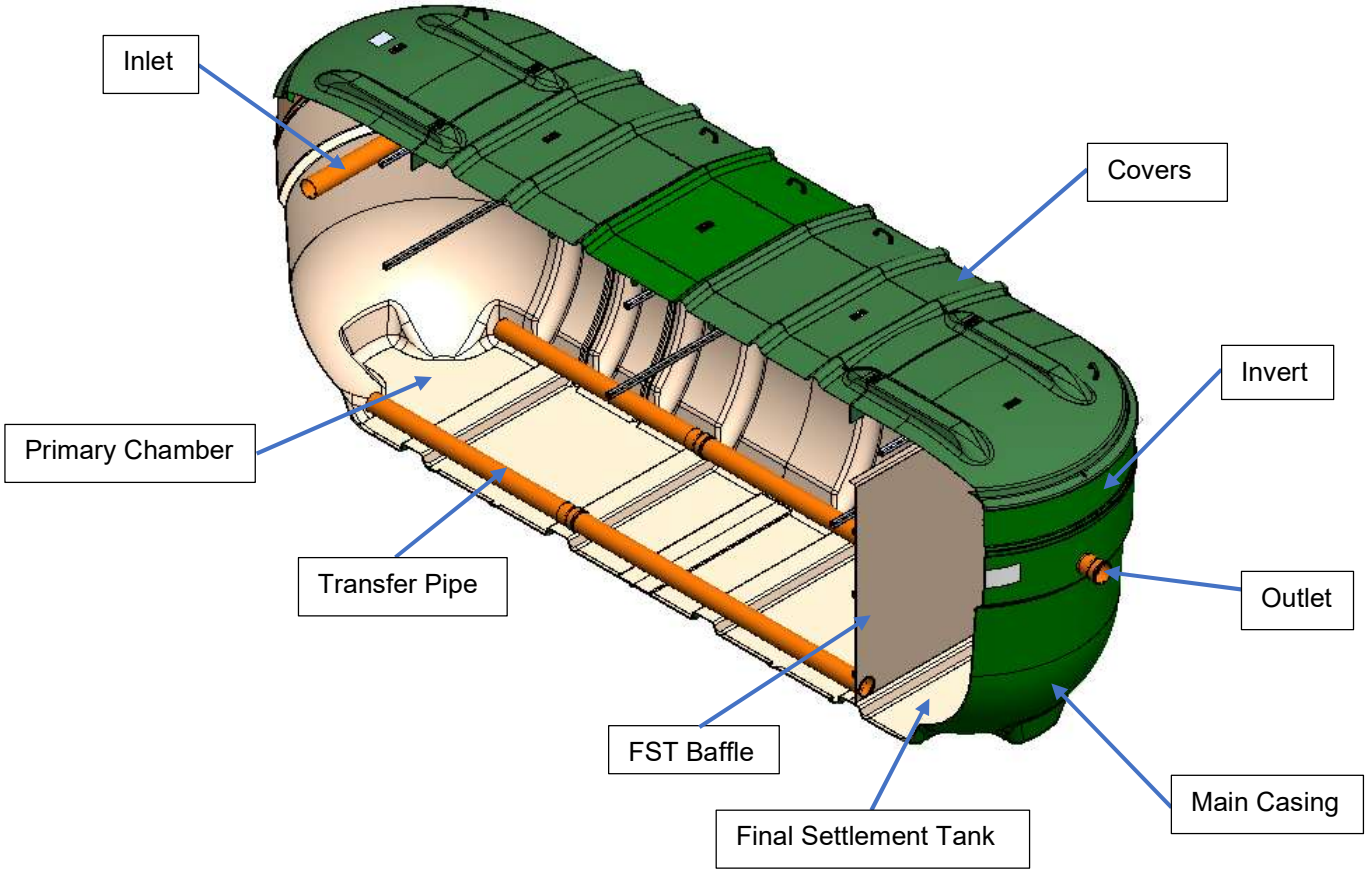
- Ensure that the working area is adequately lit.
- Ensure that you are familiar with the safe working areas and its access and egress.
- Use only the designated access walkways.
- Do not walk on the cover or deep well safety mesh(es).
- Always keep proper footing and your balance, avoid any sharp edges, or restricted points.

Contents

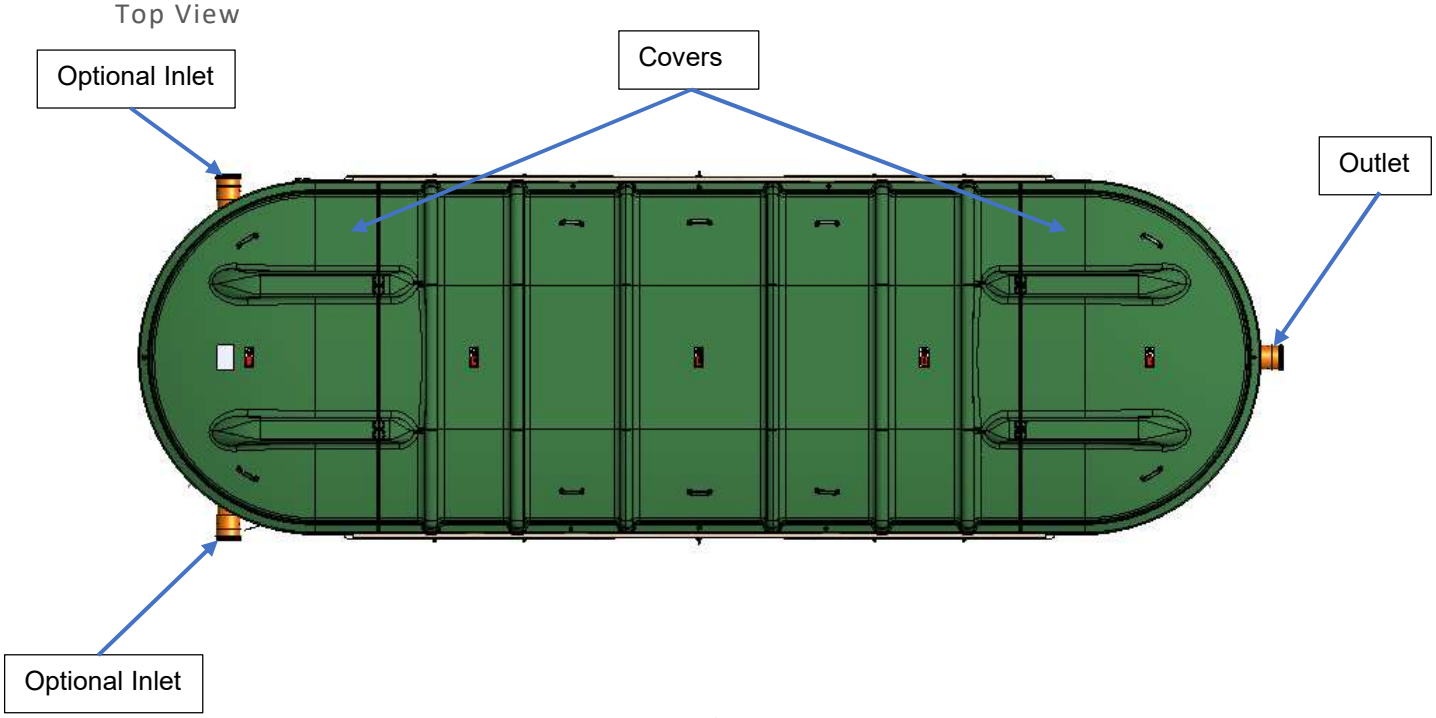
1. System Overview

Pictorial representation below indicates basic requirements for a standard system.

Cross Section



Top View



2. Introduction

2.1 Standard effluent discharge permit is normally 20/30/20 for sewage treatment plant. This means 20 mg/l Biochemical Oxygen Demand (BOD), 30 mg/l suspended solids (SS) and 20 mg/l Ammonia (NH4).

2.2 Where improved effluent qualities are required, for example BODs of <5 mg/l, further 'tertiary' treatment of the effluent is required, and this can be achieved using the Tertiary Treatment Module(s).

2.3 On Third party testing when the Tertiary Treatment Module(s) is used alongside our Klargester BioDisc treatment plant, will reduce effluent by the following:

Filter Module	Description	% Removal
BOD_5	Biochemical Oxygen Demand	99.2%
SS	Suspended Solids	99.3%
NH4-N	Ammonia	98.4%
TNb	Total Nitrogen	69.4%

2.3.a Approximate reduction values for the Tertiary Treatment Module(s) used in conjunction with another Treatment plant.

Filter Module	Description	% Removal
BOD_5	Biochemical Oxygen Demand	77.8%
SS	Suspended Solids	75.8%
TNb	Total Nitrogen	19.8%

2.4 The Tertiary Treatment Module(s) comprises of horizontal modules constructed from Glass Reinforced Plastic (GRP), filled with granular material which provides the hydraulic flow path and the environment to achieve improved effluent quality.

2.5 The inlet and outlet of each unit is fitted with a Ø160mm PVCu socket.

2.6 Each module is to be installed level with suitable backfill, then should be filled with granular media.

2.7 When installing the Tertiary Treatment Module(s) 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 Tertiary Treatment Module(s). Treatment plants which have a pumped outlet can have their discharge direct to the aggregate bed so long as there is a fall from the Tertiary Treatment Module(s) to the discharge point.

2.8 The Tertiary Treatment Module(s) are supplied with the granular material, alongside the filter module. The installer will fill the filter module on site as part of the installation.

3. Scaling

3.1 The below scaling and Tertiary Treatment Module(s) media volumes should be used when selecting the appropriate Tertiary Treatment Module.

3.2 Please ensure you have the correct number of bags suitable for the Module as detailed in the table below.

Unit	Daily Flow m^3/d	Model	Media Volume (Litres)	2000L Bags	1000L Bags	Case
BIOT08	11.25	TTM2	12,000	6	0	GRP 24m^3
BIOT09	15.00		16,000	8	0	
BIOT10	18.75		20,000	10	0	
BIOT11	22.50	TTM3	23,000	11	1	GRP 38m^3
BIOT12	33.75		33,000	16	1	
BIOT13	41.25	TTM4	44,000	22	0	GRP 49m^3

Table 1: Media volumes and Scaling

4. Site Planning

4.1 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.

4.2 We recommend, subject to local site conditions and regulations, that the gravity fed Tertiary Treatment Module is installed in close proximity to the treatment plant.

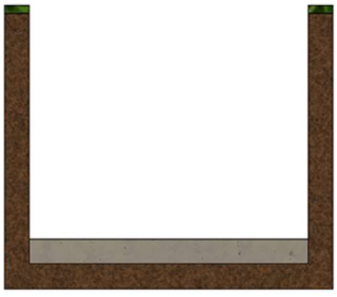
4.3 BioTreat Modules which are pump fed – the pump feed must discharge into a manhole chamber installed before the BioTreat module.

5. Tertiary Treatment Module Installation

5.1 Excavate a hole of sufficient length and width to accommodate the unit and a minimum of 200mm concrete surround and to a depth, which allows for the burial depth of the unit plus a minimum 300mm thick concrete base.

5.2 In wet or unstable ground conditions it may be necessary to lay a hard-core sub-base. Ensure that the slab is flat and level. Allow the slab to set sufficiently to support the installed load.

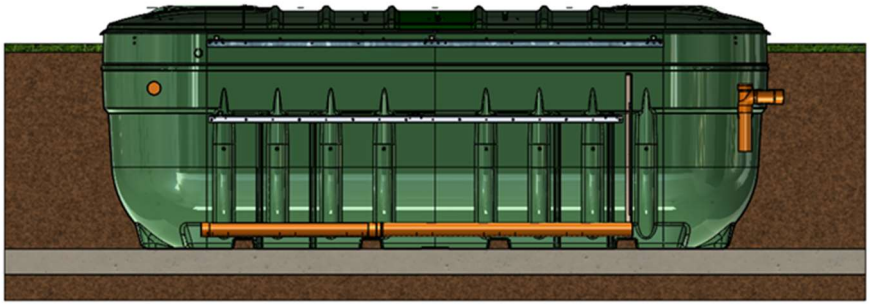
5.3 Ensure that the slab is free of any stones or other material, which could damage the unit. Lower the unit onto the slab using suitable webbing slings and lifting equipment.



5.4 The Concrete Specification given below is not a site specific installation design.

GENERAL CONCRETE SPECIFICATION IN ACCORDANCE WITH BS EN 206-1 (BS 8500-1)		
TYPE OF MIX		(DC) DESIGN
PERMITTED TYPE OF CEMENT		BS 12 (OPC): BS 12 (RHPC): BS 4027 (SRPC)
PERMITTED TYPE OF AGGREGATE (coarse & fine)		BS 882
NOMINAL MAXIMUM SIZE OF AGGREGATE		20 mm
GRADES: C25 /30 C25 /30 C16 /20		REINFORCED & ABOVE GROUND WITH HOLDING DOWN BOLTS REINFORCED (EG. FOR HIGH WATER TABLE) UNREINFORCED (NORMAL CONDITIONS)
MINIMUM CEMENT CONTENT	C30 C20	270 - 280 Kg/M^3 220 - 230 Kg/M^3
SLUMP CLASS		S1 (25mm)
RATE OF SAMPLING		READY MIX CONCRETE SHOULD BE SUPPLIED COMPLETE WITH APPROPRIATE DELIVERY TICKET IN ACCORDANCE WITH BS EN 12350-1
NOTE: STANDARD MIXES SHOULD NOT BE USED WHERE SULPHATES OR OTHER AGGRESSIVE CHEMICALS EXIST IN GROUND WATER		

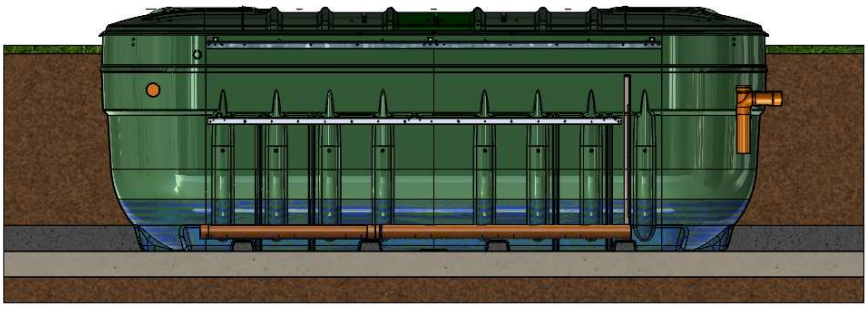
5.5 Ensure the Tertiary Treatment Module(s) are positioned in the correct orientation.



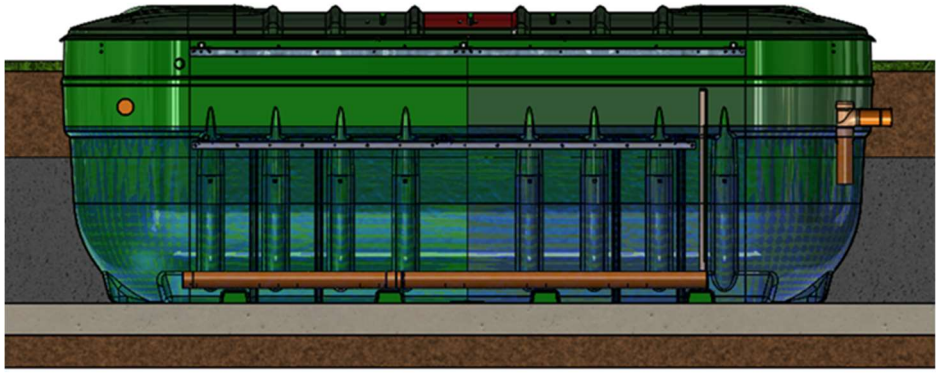
5.6 Position the Tertiary Treatment module(s) so that there is **a fall of at least 100mm** between each module.

5.7 Installation should only be carried out by suitably qualified and experienced contractors in accordance with the Health and Safety at Work Act.

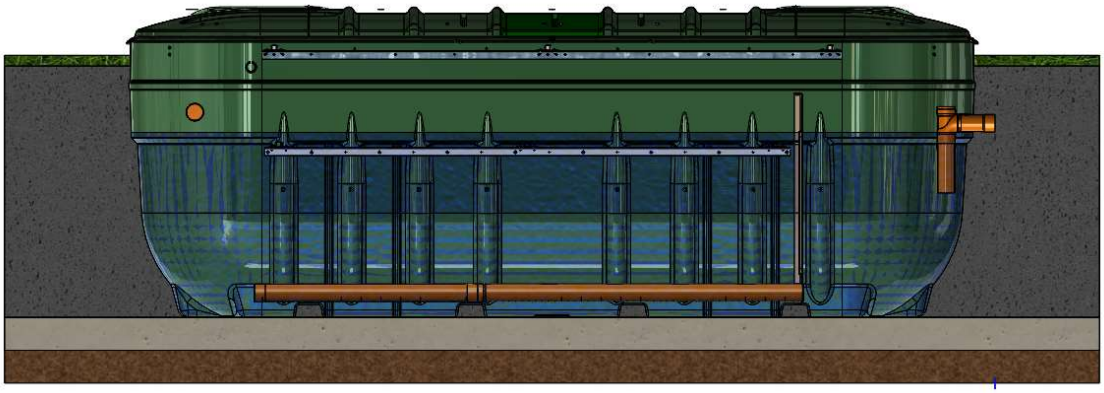
5.8 Due to rising groundwater conditions in GB and Ireland, we strongly recommend that a concrete backfill is used to install the product.



5.9 Place concrete backfill to approximately 500mm depth around the unit ensuring good compaction to avoid voids. **Do not use vibrating pokers.**



5.10 Continue backfilling with concrete to just below the level of the inlet spigot. Keep the concrete at an even level all-round the unit, compacting in layers. As backfilling progresses keep the ballast water level inside the unit 250-300mm above the concrete backfill level, but do not attempt to fill the unit with water above the outlet level. It is essential that the underside of the module is evenly supported without voids.

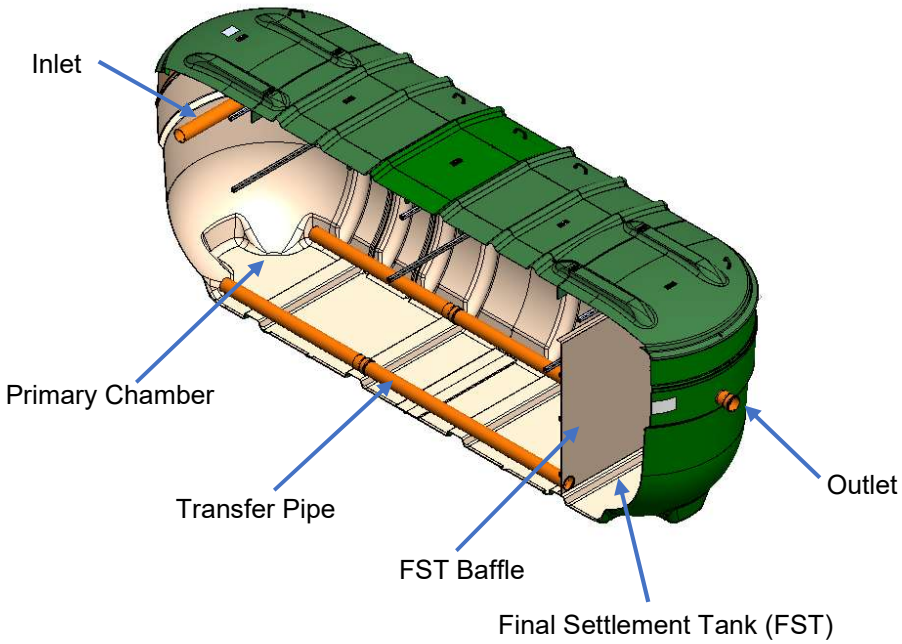


5.11 Continue backfilling, completing the installation to ground level with free-flowing soil, landscaping surrounding ground to suit.

6. Media Installation

6.1 Pour the filter media into the Primary chamber of the module slowly so that it is fed evenly into the chamber (not one place) without clogging up at the inlet. It is essential that the media is filled in after the unit is filled with water, this will allow the granular media to settle out evenly as it is poured into the filter module. Suitable lifting equipment will be required to lift media bags.

6.2 **DO NOT** put media into the FST chamber.



7. Maintenance

7.1 Visual inspection should be carried out by a qualified technician.

7.2 Regular samples should be taken in line with discharge license.

7.3 Maintenance frequency for the BioTreat is site specific and dependant on loadings. It should be carried out in tandem with the wastewater treatment plant maintenance.

7.4 Periodically the media will require flushing to remove any solids that may have built up (the frequency of this depends on site loading).

7.5 While flushing and agitating the media with clean water , the tank should be emptied via the FST at the same time using a tanker.

7.6 All health and safety procedures should be followed while working on our products.

8. GRP Durability:

The structural properties of the GRP which the tank is constructed, in common with all similar materials, will deteriorate with time. This deterioration is accelerated by contact with ground water, sewage and dissolved or suspended organic or inorganic compounds. The resulting loss of strength or stiffness has been taken into account in the manufacturers design code.

The GRP components life expectancy is at least 20 years.

9. Granular Material (Media) Specification

9.1 Granular fill material shall be that of the specification sheet attached page (8) and this will be supplied with the Tertiary Treatment Module(s).

The media volume required for each Tertiary Treatment Module tank size is specified in Table 1 on page (4)

Figure 1:Media Bags

CE

Argex NV
Kruibeeksesteenweg 162
2070 Burcht

Technical Sheet 2021
from 1/07/2021 to 31/12/2021

AR 4/10-430 - GEO

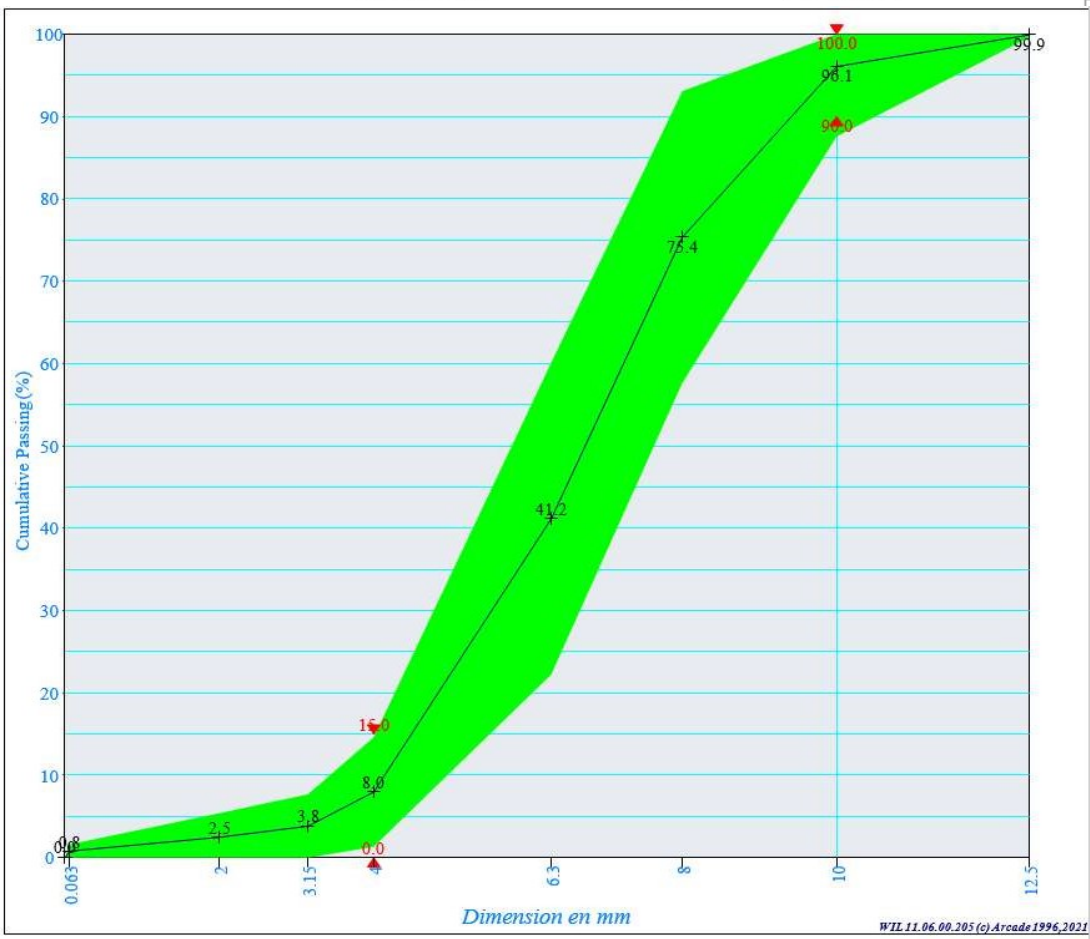
***Client :* Quality Control Argex**
0032/32.50.15.15

lab	*Quality Control Argex 0032/32.50.15.15*
Aggregate Size	*4/10 mm*
Certifications	*EN 13055 : DoP 2: EN 15732 NL BSB K73820 (1/01/2004)*

Essential char. - performance	Minimum	Average	Maximum	Declared	Standard
Particle Shape		Round			EN 13055
Crushing Resistance (T-2x30")	0.80	1.96 N/mm²	4.65		EN 13055
Loose Bulk Density (+- 15% of declared value)	366	459 kg/m³	495	430	EN 1097-3
Freezing & Thawing Resistance		2.3 %	3.3		EN 1367-7
Water Content (from silo)	0.0	4.9 %	15.0		EN 1097-5
Water Absorption 5'	11.52	14.92 %	18.37		EN 1097-6 annex C
Water Absorption 1h	16.90	21.10 %	25.67		EN 1097-6 annex C
Water Absorption 24h	26.94	32.87 %	38.56		EN 1097-6 annex C
Water Absorption 28 days (long term water content)		45.00 %			EN 1097-6 annex C
Shear strength-static loading/Triaxial/ Angle of friction(°)	38.5	42.0	44.0	38	EN 15732
Cohesion, c'peak		0 kPa		0	EN 15732
Compressibility - C%		13.0 %			EN 1097-11
Compressive Creep (150 kPa - 24 hours) - Dry		0.08 %		0.14	EN 15732
Confined compressive strength - CS(2)		620 kPa		540	EN 1097-11
Confined compressive strength - CS(10)		1120 kPa		900	EN 1097-11
Cyclic Compression (120 kPa) after 2.000.000 cycles - Dry		3.5 %		4	EN 15732
Shear Strength-cyclic loading/Triaxial Resilient modulus	160	190 MPa	220		EN 15732
Water Permeability		2.0 cm/s		2.2	EN 15732
Water Vapor Transmission (μ)		2		2	EN 15732
Release Of Dangerous Substances		BRL 9315			NL BSB K73820
Reaction To Fire		Euroclass A1			EN 13501-1

Grading (EN 933-1)

sieve (mm	mini	% passing	maxi	Declared
0.000		0.0		
0.063		0.8		
2.000		2.5		
3.150		3.8		
4.000	0.0	8.0	15.0	
6.300		41		
8.000		75		
10.000	90	96	100	
12.500		100		



10. Warranty

Taken from ‘Kingspan’s Terms & Conditions of Sale’

The company will replace or, at its option, properly repair without charge any goods which are found to be defective, and which cause failure in normal circumstances of use within a period of twelve months from the date of delivery.

This warranty is conditional upon:

(a) the Buyer notifying the Company of any claim within seven days of the failure becoming discernible.

(b) the Company being allowed a reasonable opportunity to inspect the goods so as to confirm that they are defective.

(c) the goods not having been modified, mishandled, or misused and being used strictly in accordance with any relevant instructions issued by the Company.

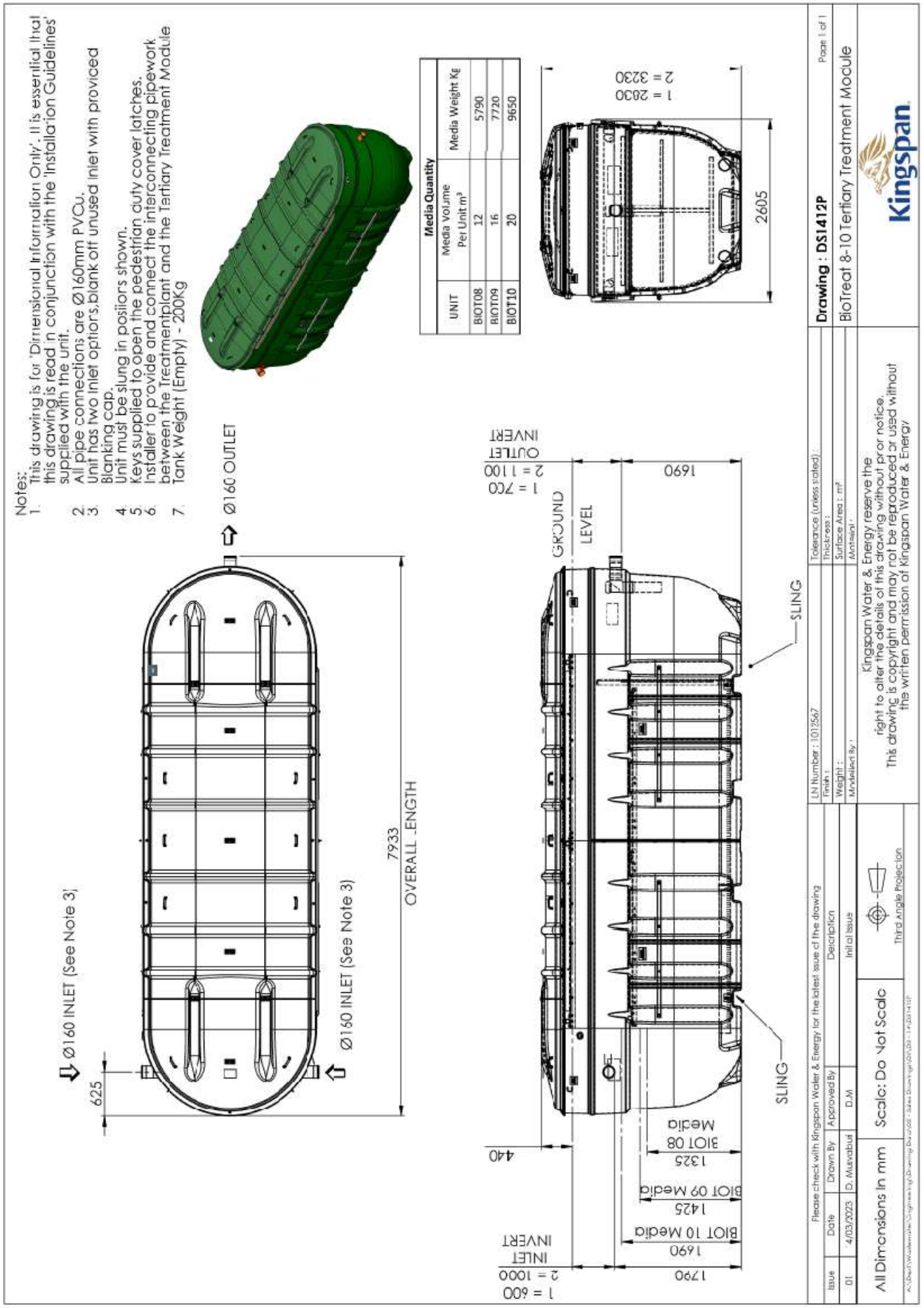
The Company’s liability under this Clause is limited to the repair or replacement of the defective goods, and does not cover costs of transport, installation, or associated site costs, if applicable.

The Company’s liability to replace or repair the goods is in lieu of and excludes all other warranties and conditions, and in particular (but without limitation) the Company shall have no liability of any kind for consequential loss or damage.

For any further advice, please contact us.

A Warranty Form is included in this package, to register your unit for Warranty. Please complete ALL sections of the Form and return it at your earliest convenience.

Also within this package is a Notice, describing the necessary maintenance of the plant in use. This should be fixed within the building.


Notes:
1. This drawing is for 'Dimensional Information Only'. It is essential that this drawing is read in conjunction with the 'Installation Guidelines' supplied with the unit.
2. All pipe connections are Ø160mm PVCu.
3. Unit has two Inlet options,blank off unused inlet with provided Blanking cap.
4. Unit must be slung in positions shown.
5. Keys supplied to open the pedestrian duty cover latches.
6. Installer to provide and connect the interconnecting pipework between the Treatmentplant and the Tertiary Treatment Module
7. Tank Weight (Empty) - 200Kg
Media Quantity
UNIT
Media Volume Per Unit m³
Media Weight Kg
BIOT08 12 5790
BIOT09 16 7720
BIOT10 20 9650
Ø160 OUTLET
Ø160 INLET (See Note 3)
Ø160 INLET (See Note 3)
625
7933
OVERALL LENGTH
1 = 2030
2 = 3230
2605
1 = 700
2 = 1100
OUTLET
INVERT
GROUND
LEVEL
1690
SLING
SLING
440
BIOT 08 Media
1325
BIOT 09 Media
1425
BIOT 10 Media
1690
1790
1 = 600
2 = 1000
INLET
INVERT
Please check with Kingspan Water & Energy for the latest issue of the drawing
Issue
Date
Drawn By
Approved By
Description
01
4/03/2023
D. Mulvahill
D.M
Initial Issue
All Dimensions In mm
Scale: Do Not Scale
Third Angle Projection
LN Number : 1012567
Finish :
Weight :
Material :
Tolerance (unless stated) :
Thickness :
Surface Area : m²
Drawing : DS1412P
Page 1 of 1
BioTreat 8-10 Tertiary Treatment Module
Kingspan
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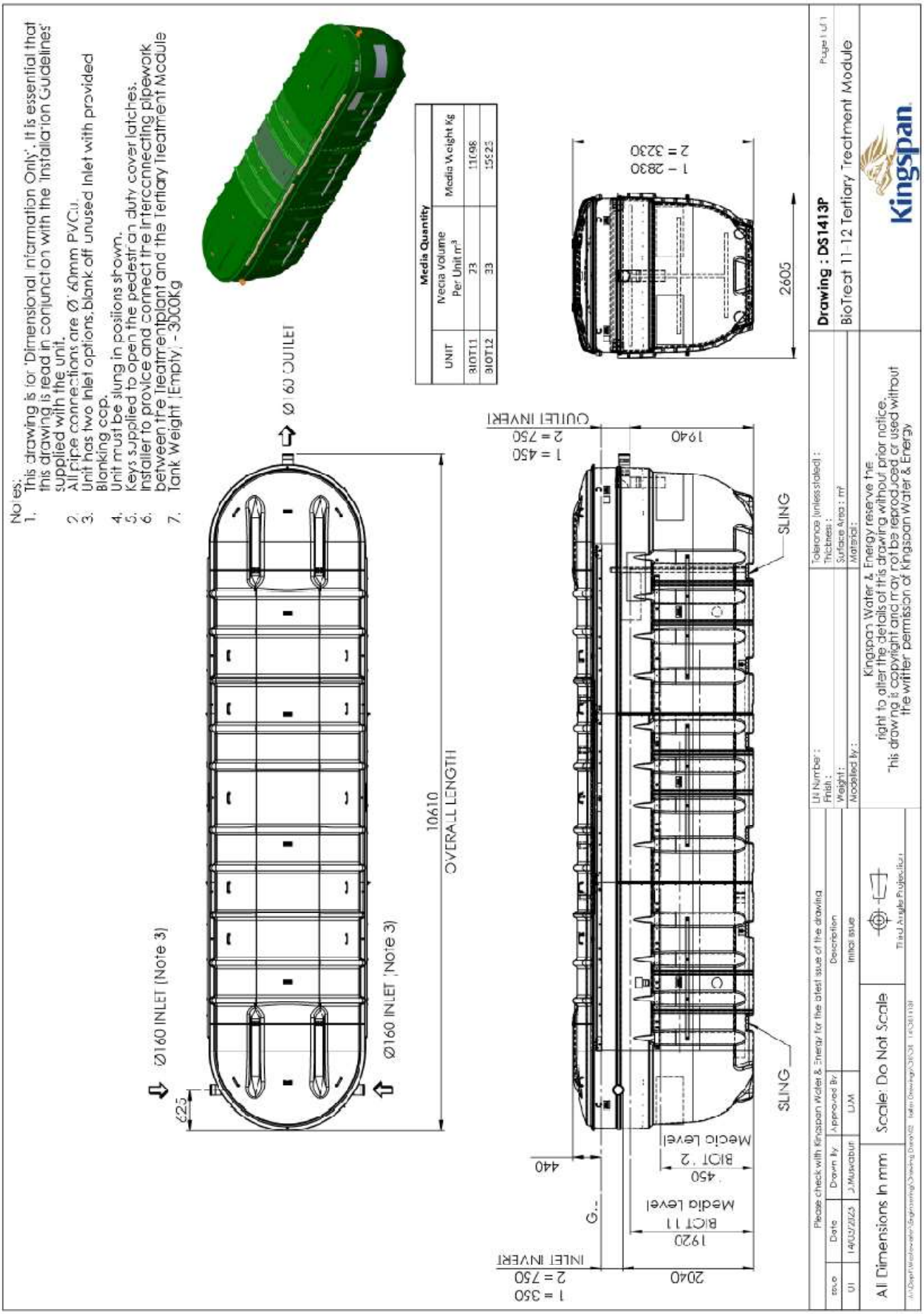
Notes:
1. This drawing is for 'Dimensional Information Only'. It is essential that this drawing is read in conjunction with the 'Installation Guidelines' supplied with the unit.
2. All pipe connections are Ø: 160mm PVCu.
3. Unit has two Inlet options, blank off unused Inlet with provided Blanking cap.
4. Unit must be slung in positions shown.
5. Keys supplied to open the pedestrian duty cover latches.
6. Installer to provice and connect the interconnecting pipework between the Treatment plant and the Tertiary Treatment Module
7. Tank Weight (Empty) - 3000kg
Media Quantity
UNIT
Media Volume Per Unit m³
Media Weight Kg
BIOT11
23
11098
BIOT12
33
15525
Ø 60 OUTLET
Ø160 INLET (Note 3)
Ø160 INLET (Note 3)
625
10610
OVERALL LENGTH
OUTLET INVERT
1 = 450
2 = 750
1940
SLING
SLING
1 - 2830
2 = 3230
2605
440
BICT 2
450
Media Level
BICT 1
1920
Media Level
INLET INVERT
1 = 350
2 = 750
2040
Please check with Kingspan Water & Energy for the latest issue of the drawing
Issue
Date
Drawn By
Approved By
Description
01
14/03/2023
J.Mulvabur
U.M
Initial issue
All Dimensions In mm
Scale: Do Not Scale
Third Angle Projection
UI Number :
Finish :
Weight :
Modelled by :
Tolerance (unless stated) :
Thickness :
Surface Area : m²
Material :
Drawing : DS1413P
Page 1 of 1
BioTreat 11-12 Tertiary Treatment Module
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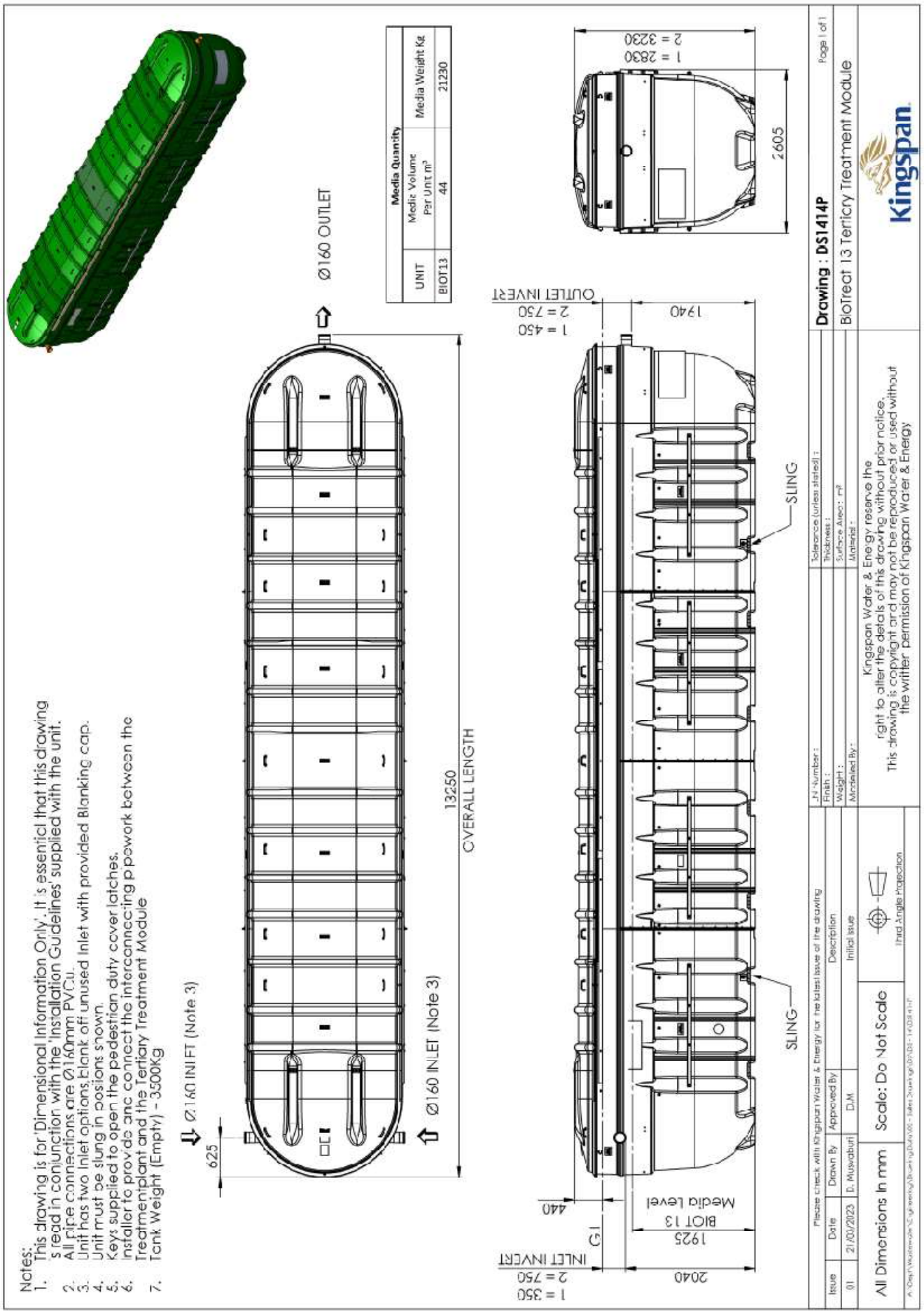
Kingspan


Notes:
1. This drawing is for 'Dimensional Information Only'. It is essential that this drawing is read in conjunction with the 'Installation Guidelines' supplied with the unit.
2. All pipe connections are Ø160mm PVCu.
3. Unit has two Inlet options, blank off unused Inlet with provided Blanking cap.
4. Unit must be slung in posions shown.
5. Keys supplied to open the pedestrian duty cover latches.
6. Installer to provide and connect the interconnecting pipework between the Treatmentplant and the Tertiary Treatment Module
7. Tank Weight (Empty) - 3500Kg
Media Quantity
UNIT
Media Volume Per Unit m³
Media Weight Kg
BIOT13
44
21230
Ø160 OUTLET
Ø160 INLET (Note 3)
625
13250
OVERALL LENGTH
OUTLET INVERT
1 = 450
2 = 750
1940
2605
1 = 2830
2 = 3230
SLING
SLING
440
Media Level
BIOT 13
1925
INLET INVERT
1 = 350
2 = 750
2040
Kingspan
Drawing : DS1414P
Page 1 of 1
BioTreat 13 Tertiary Treatment Module
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Issue
Date
Drawn By
Approved By
Description
01
21/07/2023
D. Muswaburi
DJM
Initial issue
All Dimensions In mm
Scale: Do Not Scale
Third Angle Projection

Contact Details

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Kingspan Water & Energy Ltd.
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www.kingspanservice.ie

Mktg. Comp. Code (Covers only)
4430_03/2023

APPENDIX E

Kingspan Scope of Works for Planned Maintenance

SCOPE OF WORKS FOR PLANNED MAINTENANCE

ALL BIODISC PLANTS…….

- **Ensure the plant location is suitable to avoid flooding etc.**
- Remove cover and lay face down in a suitable location (on larger units ensure the cover hinges are in good condition)
- Ensure levels in primary and final zones are normal (below cut outs in primary and up to base of tee on the final)
- Advise if the system requires a desludge
- Check for signs of previous high level (water in bottom pulley guard, tide marks above working area.)
- Isolate power from motor/gearbox via local MCB or small plant control panel.
- Check all internal wiring and contactors for signs of wear.
- On larger plants check the function of all lamps and inverters.
- Remove belt and check for signs of wear,cracks, teeth missing.
- Larger plants remove top pulley guard and visually check the condition of the chain for tension and signs of damage
- Check the greaseomatic on the chain guard and replace if required (set to 8 months) check the condition of the chain brush
- Clean bottom pulley using wire brush, use grease on the locking element screws and wearing parts.
- Clean the bottom pulley guard of all debris and water
- Check front bearing for wear and ensure there isn't too much horizontal or vertical movement
- Check the greasomatics on all bearings fitted (larger units) and replace if required (set at 12 months)
- Refit belt (smaller units) and retension
- Remove gearbox terminal cover and check for signs of corrosion or terminal wear. (black or corroded)
- Remove capacitor box cover and check terminals for signs of corrosion.
- Remove IPS pump if fitted and clean the float and pump casing, ensure the bottom end is clear of any debris.

- Check the operation of the non-return valve.
- Remove desludge pump (larger units) clean and test as per IPS pumps(if possible)
- Clean Buckets and check the correct distribution across the centre baffle weir, adjust rear disc pack if required
- Clean the centre baffle weir using a soft brush to remove all scum and biomass build up
- Hose down discs if required due to excessive biomass build up (to reduce the weight) or poor biomass growth (discs white in colour)
- Clean and grease centre drive coupling if fitted(larger units) using a wire brush and ensure all securing bolts and shim plates are in tact. On new units check the condition of the drive rubber.
- Remove and clean the high level float and test the operation (if applicable)
- Check the operation of the high level beacon (if applicable)
- Clean and test the loss of rotation sensor (if applicable) by disconnecting the terminals at the panel. (ensure dip switch 10 has been activated) check the junction box within the plant to ensure it is dry and corrosion free.
- Check the condition and working of all cover locks, clean and grease where required.
- Replace all covers and ensure they are locked correctly.
- Remove all waste from site and around the plant. Where possible dispose in customers bin.

APPENDIX F

Log Book and Maintenance Record Example

Log book and maintenance record

You need to keep a record of the checks you have completed. If you have a maintenance contract with a contractor keep a record of any work carried out by them.

Permit or Exemption Number	
Type of system	
Emergency contact details	

Date	Description of action taken	Name Include contractor and waste carrier licence number for sludge removal	Waste Transfer Note number
14/03/18	*e.g. drainage field and sludge levels checked*	*AN Example (homeowner)*	

APPENDIX G