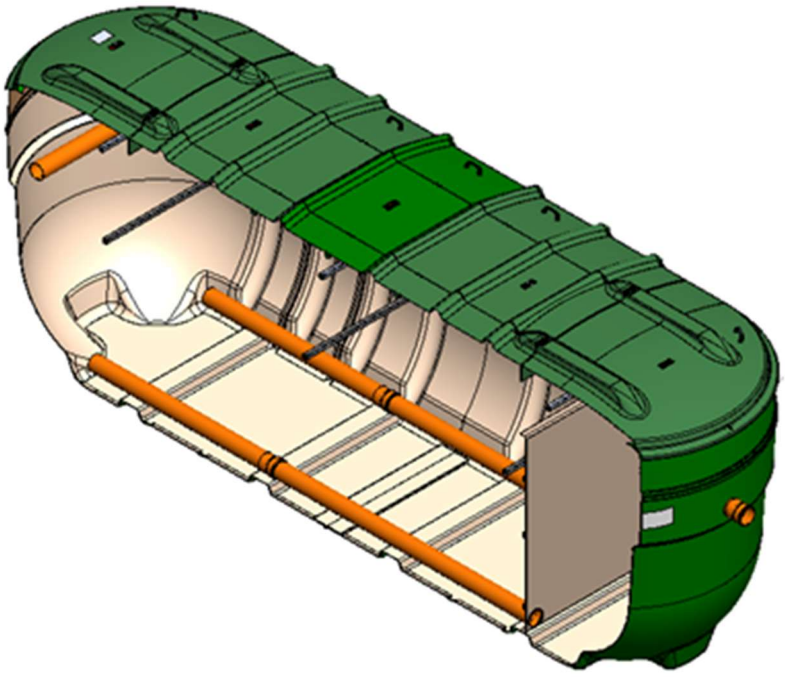
Water Management Solutions

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

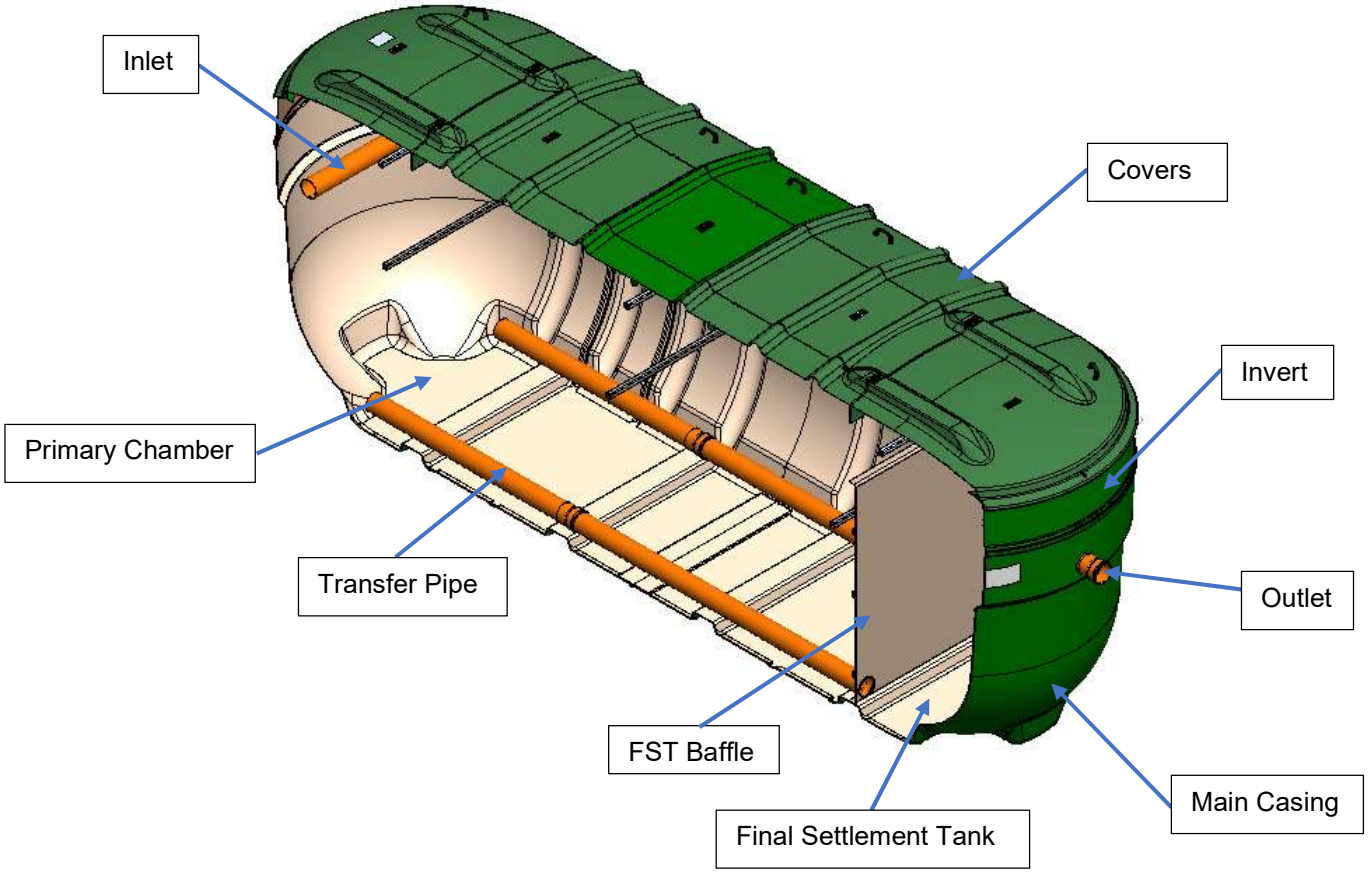
- Ensure that the working area is adequately lit.
- Ensure that you are familiar with the safe working areas and its access and egress.
- Use only the designated access walkways.
- Do not walk on the cover or deep well safety mesh(es).
- Always keep proper footing and your balance, avoid any sharp edges,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

Contents

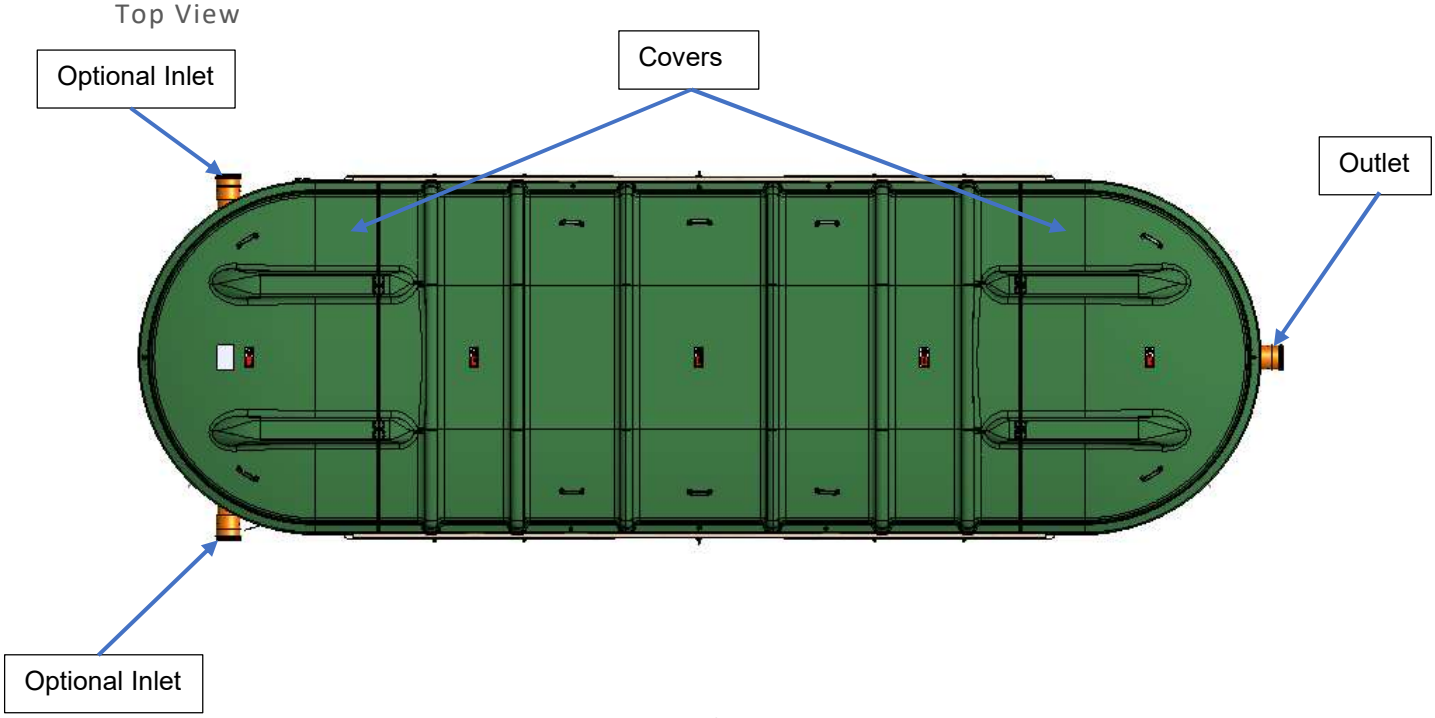
1. System Overview

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.

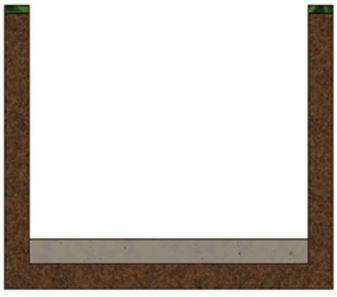
4.3 BioTreat Modules which are pump fed – the pump feed must discharge into a manhole chamber installed before the BioTreat module.

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.

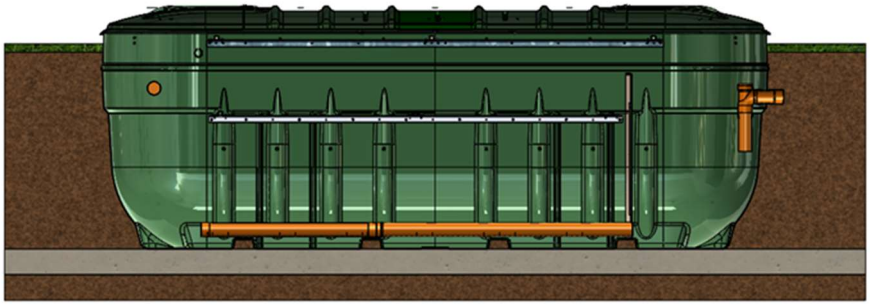
5.3 Ensure that the slab is free of any stones or other material, which could damage the unit. Lower the unit onto the slab using suitable webbing slings and lifting equipment.



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		

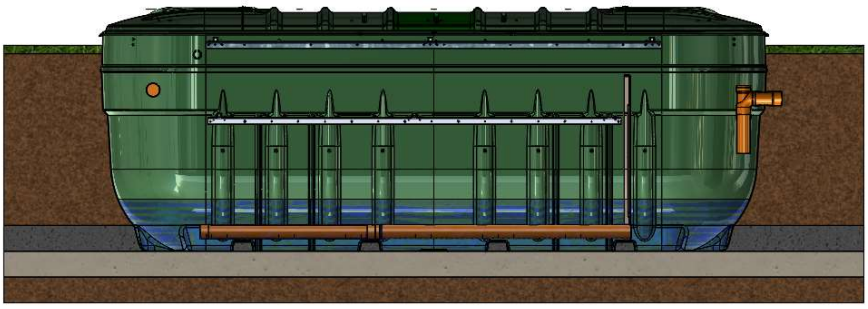
5.5 Ensure the Tertiary Treatment Module(s) are positioned in the correct orientation.



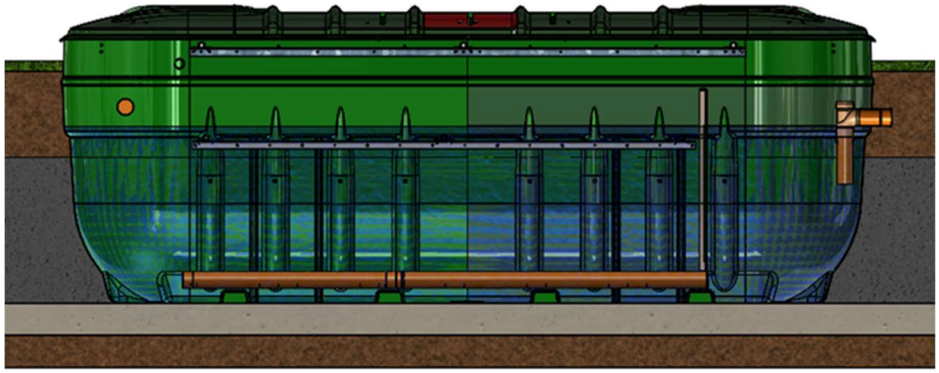
5.6 Position the Tertiary Treatment module(s) so that there is **a fall of at least 100mm** between each module.

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

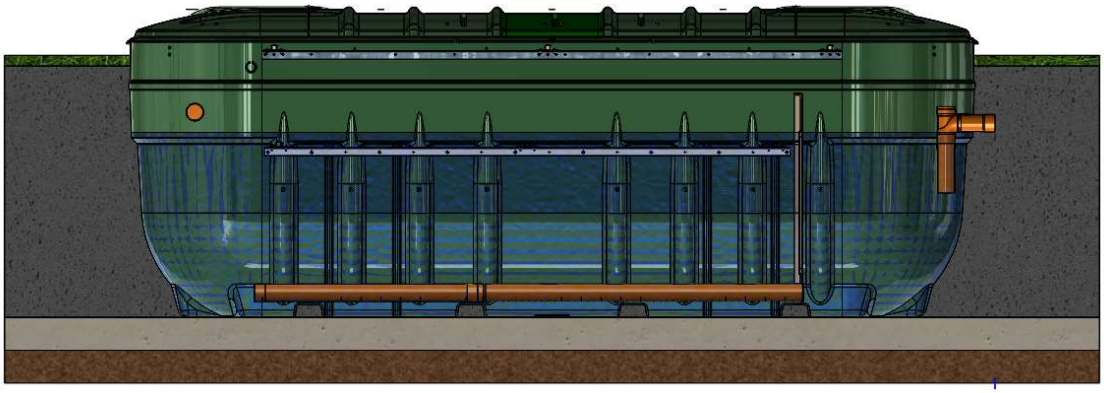
5.8 Due to rising groundwater conditions in GB and Ireland, we strongly recommend that a concrete backfill is used to install the product.



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.

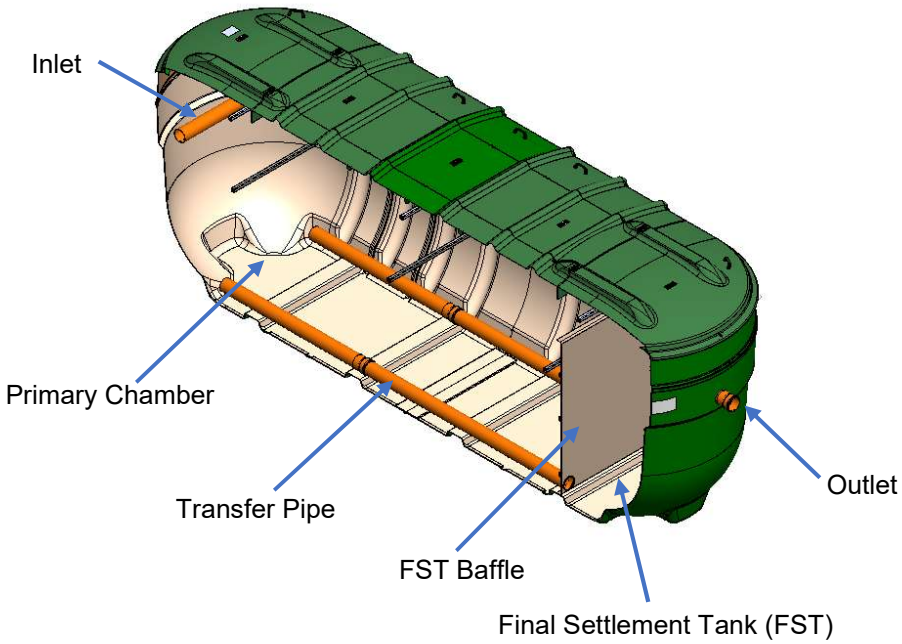


5.11 Continue backfilling, completing the installation to ground level with free-flowing soil, landscaping surrounding ground to suit.

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

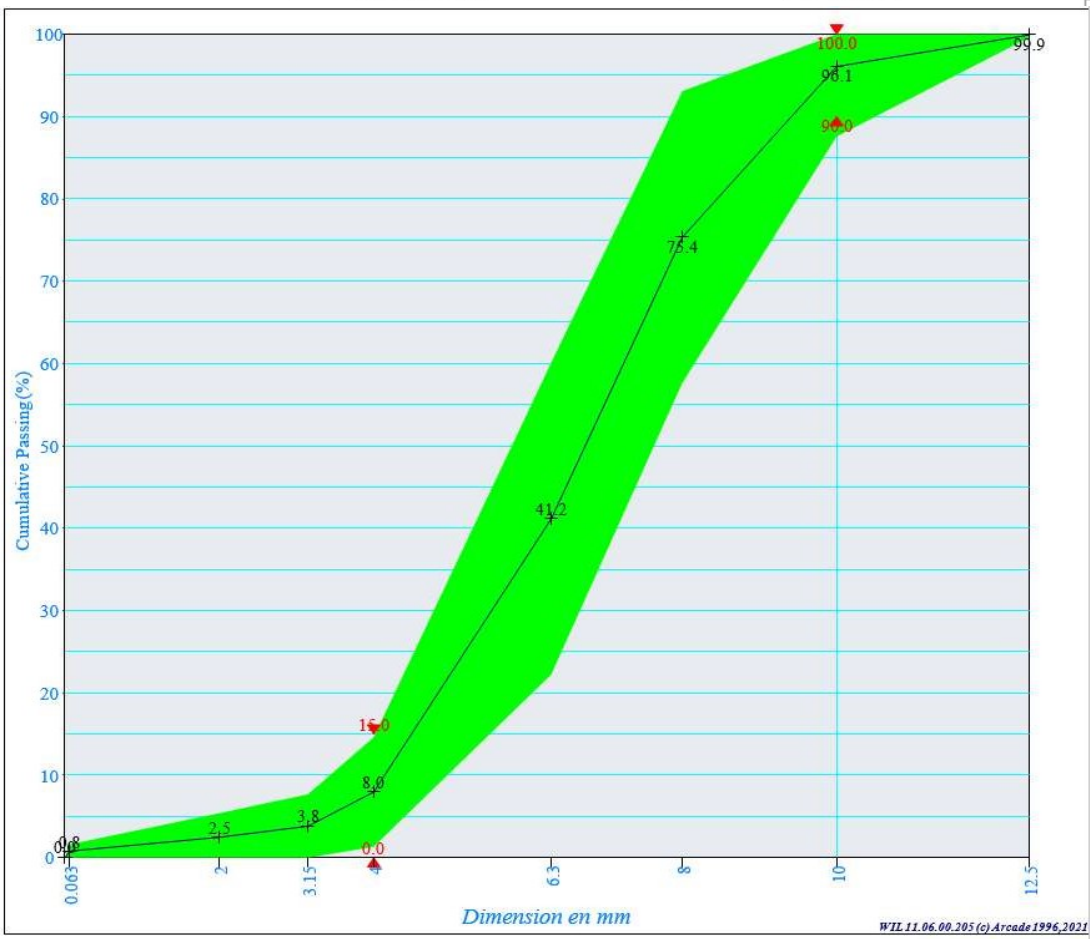
***Client :* Quality Control Argex**
0032/32.50.15.15

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.

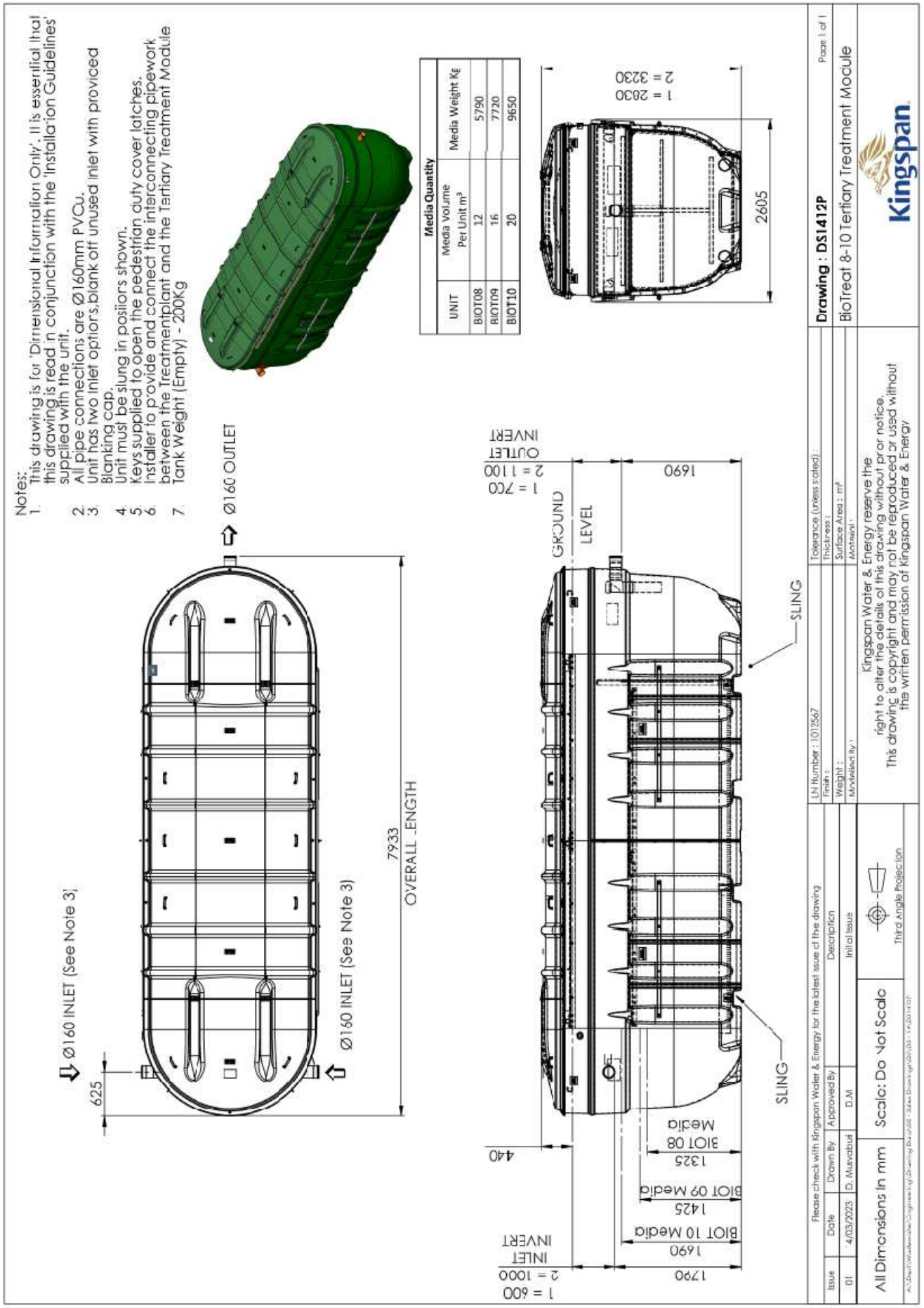
The Company’s liability under this Clause is limited to the repair or replacement of the defective goods, and does not cover costs of transport, installation, or associated site costs, if applicable.

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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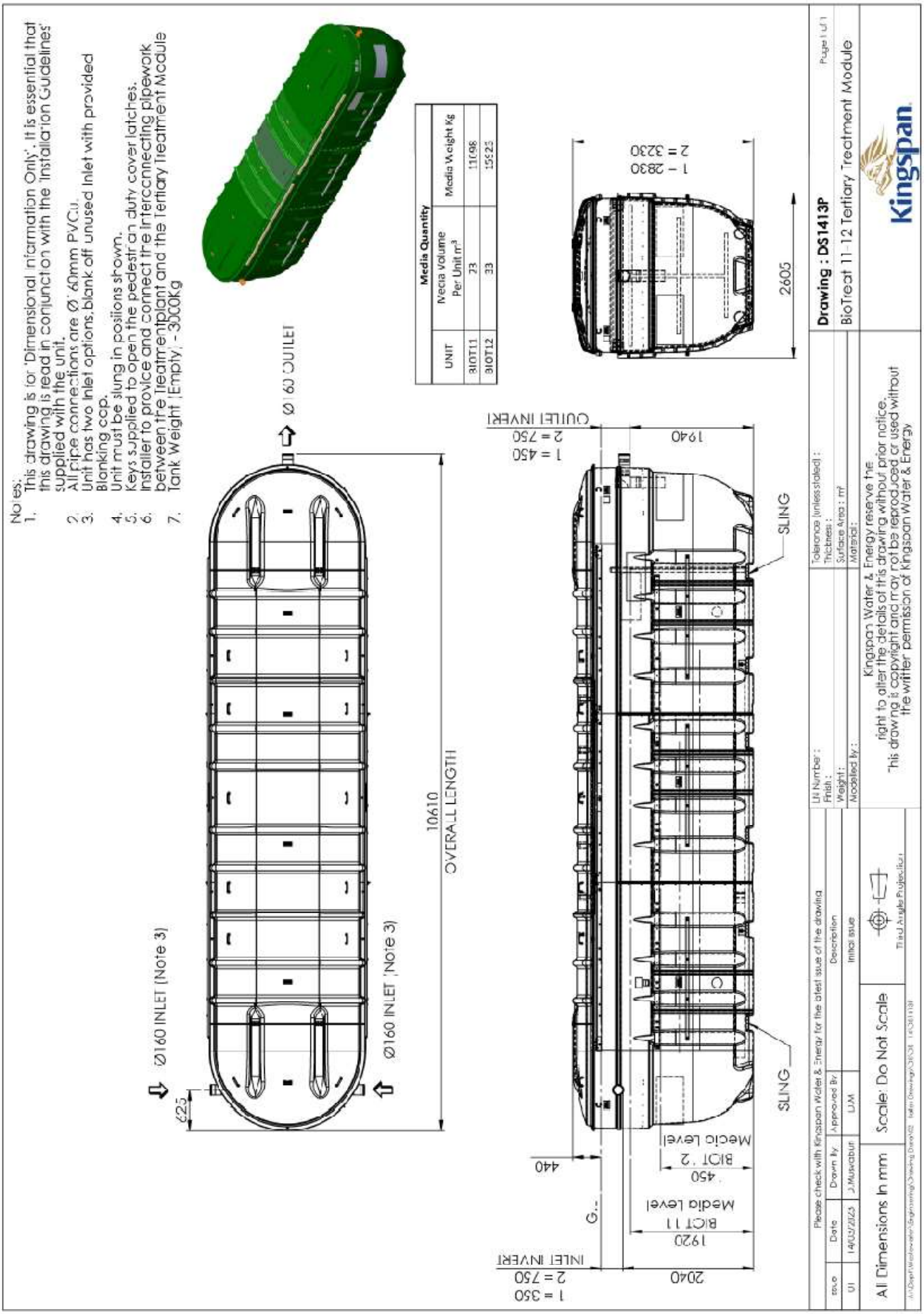
Notes:
1. This drawing is for 'Dimensional Information Only'. It is essential that this drawing is read in conjunction with the 'Installation Guidelines' supplied with the unit.
2. All pipe connections are Ø: 160mm PVCu.
3. Unit has two Inlet options, blank off unused Inlet with provided Blanking cap.
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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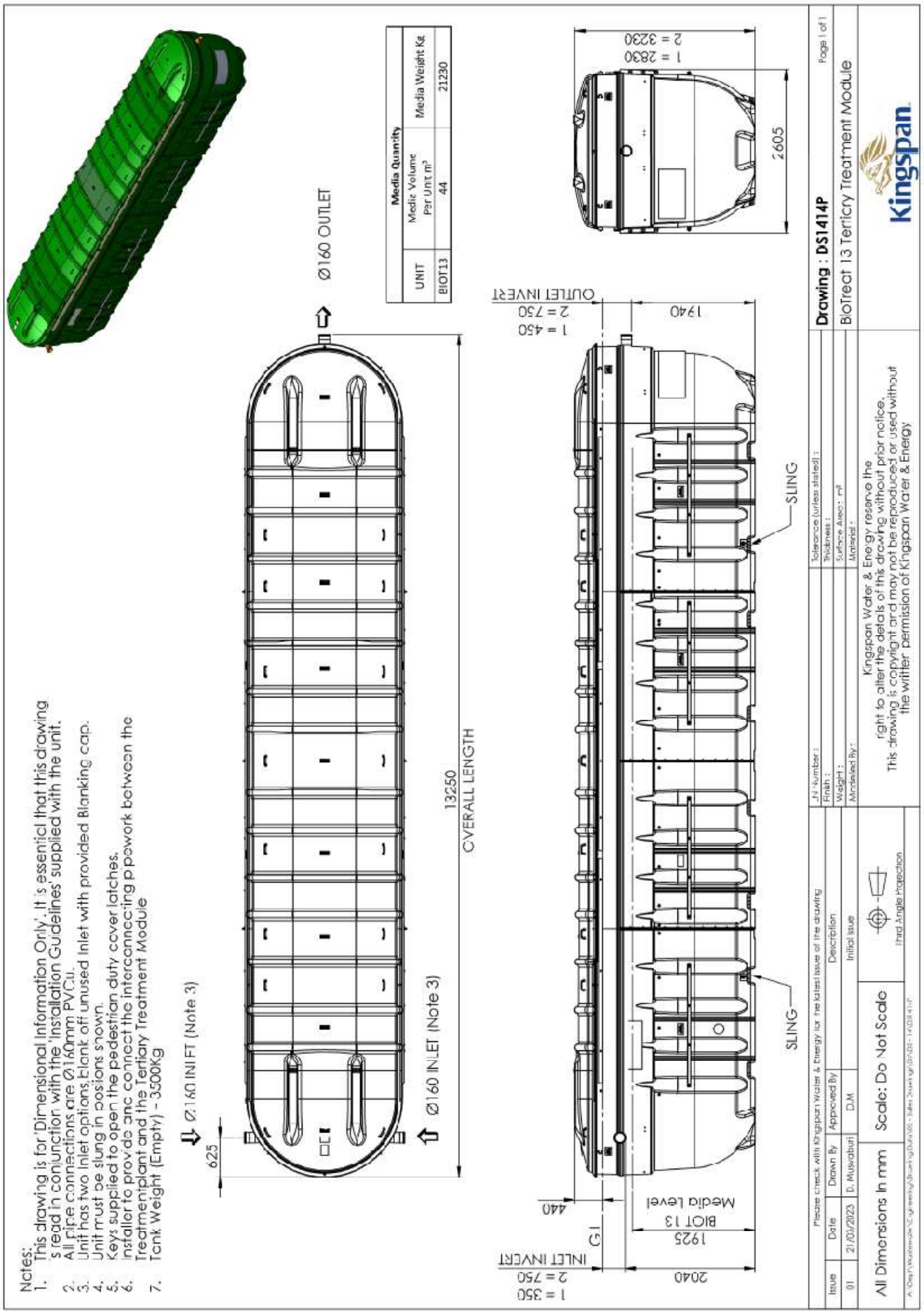
Notes:
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2. All pipe connections are Ø160mm PVCu.
3. Unit has two Inlet options, blank off unused Inlet with provided Blanking cap.
4. Unit must be slung in posions shown.
5. Keys supplied to open the pedestrian duty cover latches.
6. Installer to provide 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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www.kingspanservice.ie

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