Virginia Department of Health

Office of Environmental Health Services

Technical Services – Wastewater Engineering

To: Lance Gregory, Division Director – Water and Wastewater Services
From: Marcia Degen, Ph.D., P.E. – Technical Services Manager
Date: November 12, 2021
RE: Replacement of Anua Puraflo Peat Media with Coir Media
Cc: Technical Services staff; Environmental Health Managers

Problem Definition: Puraflo treatment units contain peat fiber that treats wastewater in a single pass configuration to TL-3 quality. Recent shortages of peat have forced the manufacturer to consider other media to replace the peat when the peat is at the end of its useful life. Anua is requesting to replace the peat with Coir fiber which is a coconut by-product. This same coconut media is used in Anua's Bio-Coir units in a recirculating configuration and the Bio-Coir units are generally approved for TL-3 in that configuration.

Supporting Documentation Received:

1. "Report on the treatment efficiency test according to EN 12566-3 of the small wastewater treatment plant Tricel Seta" Data July 2015. See cover below. Tricel requested that the report be held confidential so only the cover is provided here. Received 10/5/2021
2. Data from the report in a spreadsheet format, also requested to maintain confidential. Received 10/5/2021.
3. "Puraflo Spent Peat Replacement with Coir Fiber TL-2 or TL-3 Correlation Justification" PE Seal by Michael Fugate. Received 10/14/2021.

The Tricel unit is a single pass media filter that utilizes the Coir media. The Tricel unit was tested under the EN-12566-3 standard. The test results are reported in treatment efficiencies of removal of BOD5 (97.1%) and SS (98%). European wastewater is generally stronger than wastewater in the United States and the report indicates the average influent was 434 mg/l BOD5 and 530 mg/l TSS for the runs utilizing 100% loading rates.

Verify Data:

VDH evaluated the data from the report. Where non-detects were listed, the value was entered as one-half the detection level which is in keeping with the protocol used in TL-3 testing. Values in red indicate a difference from the data in the summary. The 5 mg/l BOD5 in red was listed as 8 mg/l in the summary. VDH pulled the data from the original report and that 8 was incorrectly listed and is 5 mg/l in the original report. The EN test looked at 100% loading rates as well as 50% and 150%. When only the 100% loading rates were used, the average was 10 mg/l for BOD5 and 8.7 mg/l for TSS. When all data are used, the mean BOD5 is 9.73 mg/l and TSS is 8.17 mg/l. Given that the influent is much higher than what is expected in the US, this data supports the unit's ability to produce TL3 effluent.

Tricel Data Summary

% Design Flow	BOD5, mg/l	TSS, mg/l
100	13	7
100	14	2.5
100	9	2.5
100	10	16
100	6	5
100	9	8
100	9	10
100	9	9
100	8	9

100	9	7
100	13	7
100	14	11
100	11	9
100	4	7
100	10	17
100	6	2.5
100	5	8
100	12	2.5
100	14	19
100	15	15
50	7	8
50	4	7
150	12	2.5
150	11	9
50	9	6
50	10	6
AVG 100% Flow	10	8.7
AVG All	9.73	8.17
Median 100% Flow	9.5	8
Median All	9.5	7.5

Verify Loading Rates:
The design flow for the Tricel system tested was 160 gallons per day. The EN report did not state the media loading rate used in the study. The volume of media in the tank is not stated. The tank is a cylinder so VDH estimated the volume of the media using tank dimensions provided in the report on page 42 of 49, for the Seta 4 plant. Assumptions were made that the underdrain for the system would occupy about 12 inches of the bottom and that top of the media would be about 12 inches below the inlet to allow for the dispersal grid. The provides about 2.5 ft depth of media. The tank is listed as 8.5 ft long, but the ends are rounded so 1 foot was dropped to eliminate the rounded ends. The tank width is 4.2 ft. Therefore the approximate cubic feet of media per unit is 78.75. This is similar to what Anua calculated. 160 gallon per 78.75 cf = 2 gpd/cf.

The Puraflo unit houses 70 cf of media per module with a 125 gpd loading rate resulting in a 1.8 gpd/cf loading. Since the Coir fiber in the Puraflo units will be dosed at a lower rate (1.8 gpd/cf < 2.0 gpd/cf) than in the Tricel study, the Coir media should produce similar quality to the peat fiber.

Summary:
The basic question was could the Coir media produce TL3 quality effluent in a single pass configuration. The Tricel unit is a single pass media unit with gravity dosing using the Coir media. The loading rate is slightly higher in the Tricel study than it will be in the Puraflo unit. TheTricel study was conducted with a strong influent (BOS and TSS >300 mg/l) and the average effluent was 10 mg/l or less for both BOD5 and TSS.

Based on the provided documentation, VDH has no objection to the substitution of the Coir Media for the Puraflo media when done in conformance with the provided engineering justification. The justification provided indicates that TL3 quality effluent is likely. VDH notes that the engineering justification proposes a modification to the dosing manifold to provide helical nozzles to improve distribution. Anua has stated that the helical nozzles should be used in all replacements of peat with Coir media. All such replacements will require a submittal by a licensed professional engineer under 32.1-163.6 for permitting and will be considered non-generally approved. Sampling in accordance with 12VAC5-613-100E is required.

Prüfinstitut für Abwassertechnik GmbH

Prüfeinrichtung des Prüf- und Entwicklungsinstituts für Abwassertechnik an der RWTH Aachen

Prüfinstitut für Abwassertechnik GmbH

ZER-QMS DIN EN ISO 9001

ilac-MRA

DAkkS Deutsche Akkreditierungsstelle D-PL-17712-01-00

Report on the treatment efficiency test according to EN 12566-3 of the small wastewater treatment plant

Tricel Seta

Tricel (Killarney)

Test report – No PIA2015-227B11

Aachen, July 2015

PIA GmbH
Prüfinstitut für Abwassertechnik
Hergenrather Weg
52074 Aachen

Dipl.-Ing. Elmar Lancé

geprüft - tested - testé
NB 1739
PIA
EN 12566

2 Summary

The excerpt information listed below summarises the basic information for the declaration of performance (CE marking).

- The tested small wastewater treatment plant Tricel Seta by Tricel (Killarney) is made of GRP.
- The plant is a system with gravity filter.
- The nominal hydraulic flow amounted to 0.6 m^3/d. The average organic load measured during the nominal sequences (100 % load) was 0.21 kg BOD_5/d.
- The treatment efficiencies during the nominal sequence (100 %) were:

COD	:	**92.7 %**
BOD_5	:	**97.1 %**
SS	:	**98.0 %**
NH_4-N	:	**79.4 %**
N_{tot}	:	**41.7 %**
P_{tot}	:	**46.5 %**

- The tested small wastewater treatment plant Tricel Seta by Tricel (Killarney) is not energy dependant.

Figure 2: The Tricel Seta plant as delivered on the PIA testing field / before installation

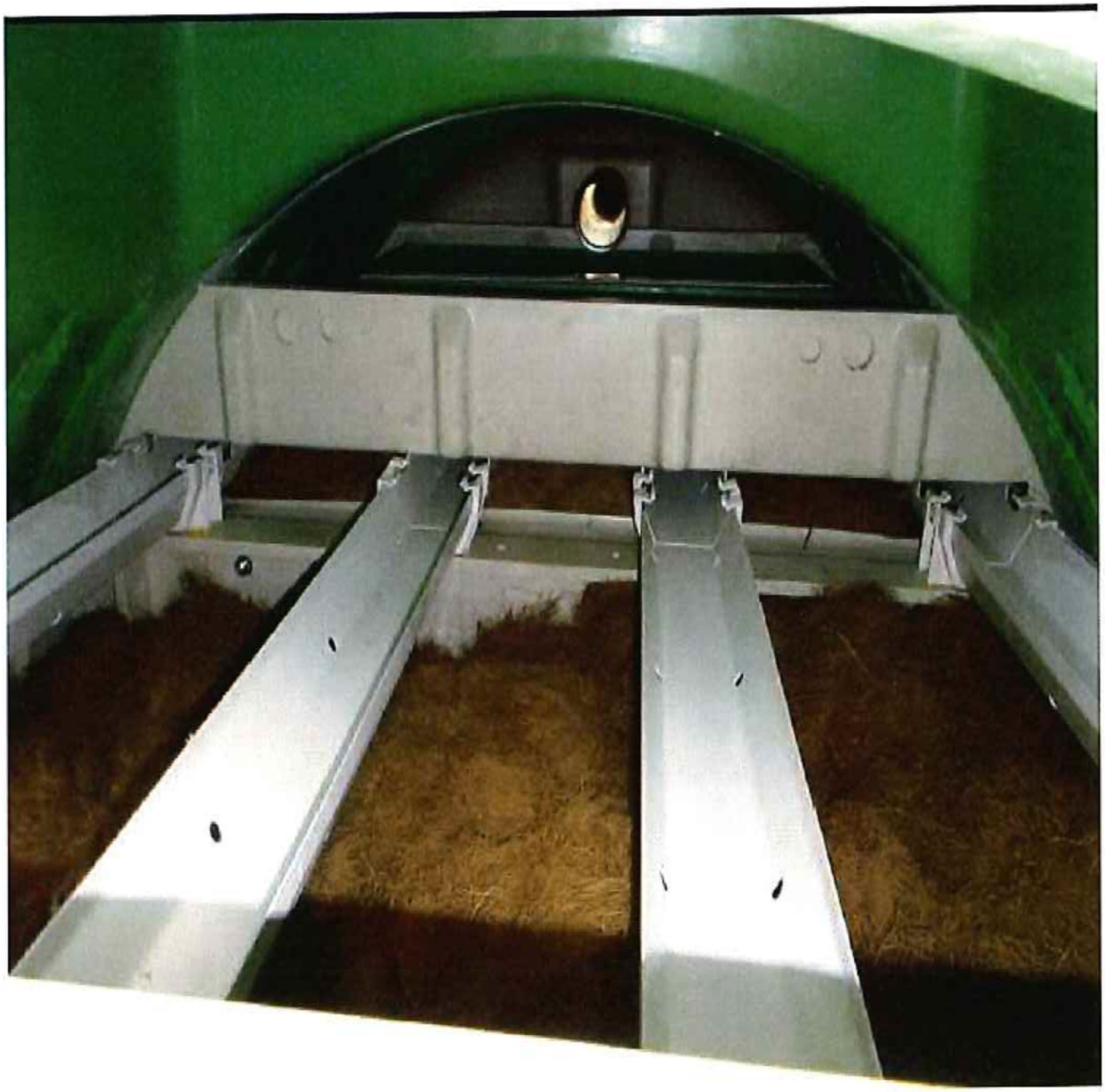


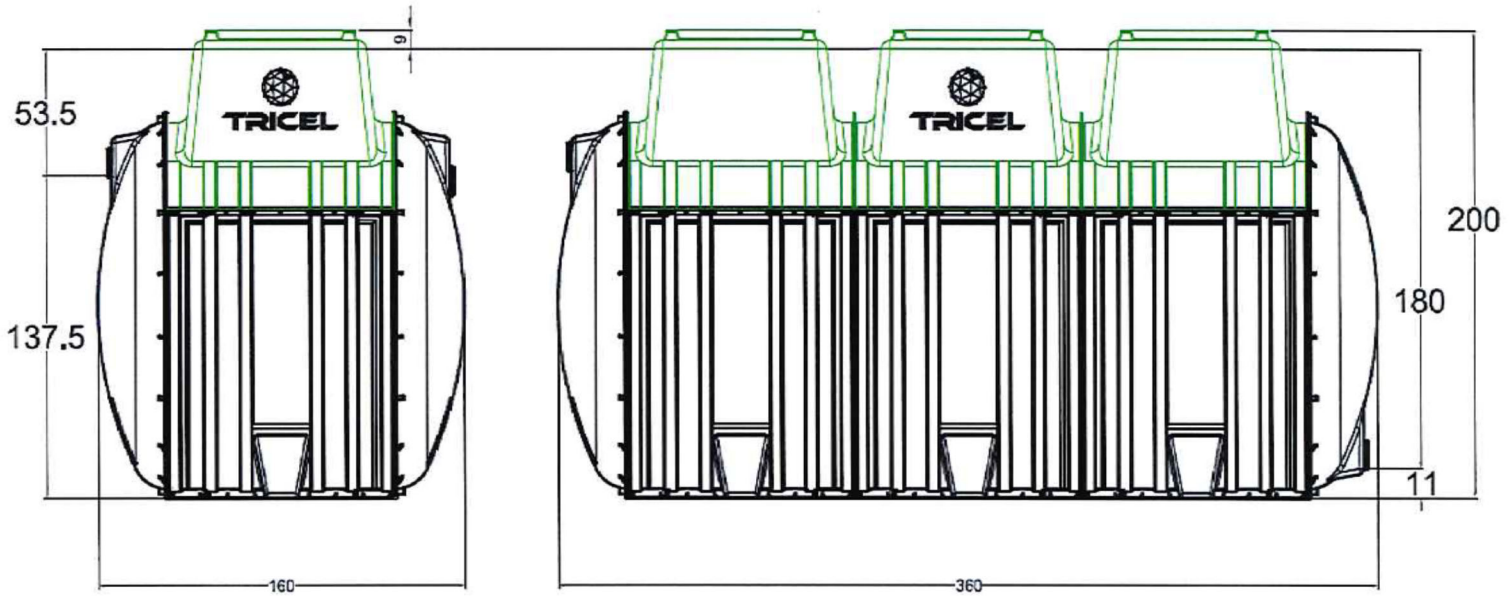
Figure 6: View into the tank with the distribution system and the filter material

Figure 9: View into the last compartment of the second tank (not in use)

Manufacturer's information

FORMULAIRE 028

SPÉCIFICATION DU PRODUIT



	PAR	DATE	TITRE:	ÉCHELLE	DWG NO.	TAILLE
DESSINÉ	DC	24/05/14	Complete Test System	N/A	TCBC - 004	N/A
VÉRIFIÉ			CLIENT :	RÉV. NO. 000		
APPROUVÉ			UNITÉS: cm	RÉVISION MICROSTATION: AA		

TRICEL réserve le droit de changer les spécifications sans notification préalable.

LES EXEMPLAIRES IMPRIMÉS DE CE DOCUMENT NE SONT PAS CONTROLLÉS SAUF INDICATION CONTRAIRE

TRICEL

5. Plant Dimensions:

Tricel Seta systems for wastewater treatment are certified to EN 12566-3:2012
For many models in the Seta system range there is a choice of septic tanks which offer a variety of choice to ensure the systems suits every site. The two possible options for septic tank are the UNA range or the VENTO range. The Seta plant then follows the septic tank.

Design population		Seta 4			Seta 5		
		Septic tanks		Seta	Septic Tank		Seta
		UNA 1800	Vento 6	IRL 4	UNA 2000	Vento 6	IRl 5
Nominal inlet/outlet pipe diameter	mm	110	110	110	110	110	110
Volume	litres	1800	3000	N/A	3000	3000	N/A
Overall length	m	1.6	2.7	2.6	2.1	2.7	3.1
Overall width	m	1.64	1.19	1.64	1.64	1.19	1.64
Overall height	m	2.00	1.44	2.00	2.00	1.44	2.00
Inlet invert to base	m	1.4	1.18	1.375	1.4	1.18	1.375
Outlet invert to base	m	1.375	1.13	0.11	1.375	1.13	0.11
Inlet invert to ground level*	m	0.51	0.23	0.535	0.51	0.23	0.535
Outlet invert to finished ground level	m	0.535	0.28	1.80	0.535	0.28	1.80
Height above finished ground level	m	0.08	0.03	0.08	0.08	0.03	0.08
Weight empty**	kg	170	120	400	250	120	500
Design flow rate (max)	l/day	600	600	600	750	750	750
No of persons		1-4	1-4	1-4	1-5	1-5	1-5
Desludge period (minimum)***	year	1-1.5	1.5-3	N/A	1.5-2.5	1.5-2.5	N/A
Thickness (minimum)	mm	5	5	5	5	5	5

*Risers are available if necessary. Note installation requirements if using risers
**This figures at a minimum should be adhered to when selecting lifting equipment.
***Desludging figures are guideline only based on previous experience but untimely are site specific and cannot be guaranteed