Prüfinstitut für Abwassertechnik GmbH

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

Prüfinstitut für Abwassertechnik GmbH

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

Report on the hydraulic efficiency test according to EN 12566-1 of the septic tank

Euro-Septic Range 2800L,3800L & 4500L

Marsh Industries Ltd.

Report – No PIA2016-HWG-1609-1106.01

Germany, Aachen, November 2016

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1 Introduction

The company

Marsh Industries Ltd.
Units 3-13 Addington Park Industrial Est.
Little Addington, Kettering, NN14 4AS Northants

Great Britain

assigned the

Prüfinstitut für Abwassertechnik (PIA GmbH)
Hergenrather Weg 30
52074 Aachen
Germany

to test the hydraulic efficiency of a glass reinforced plastic septic tank according to EN 12566-1 Annex B. Within the scope of the proof of conformity and its fitness for use according to the Construction Products Regulation, the smallest septic tank of a range has to undergo a test of hydraulic efficiency according to EN 12566-1.

The extent to which the septic tank retains settling and floating solids, is determined by the hydraulic efficiency of a septic tank.

This report documents the test of the hydraulic efficiency of a glass reinforced plastic septic tank of the company Marsh Industries Ltd.

PIA GmbH has a certified quality management system according to EN ISO 9001:2008 for the field “testing of wastewater equipment” and is approved by the European Commission as a testing authority “Notified Body” (NB 1739) according to the Construction Products Regulation (CPR) for small wastewater treatment systems for up to 50 PT according to EN 12566 Part 1, 3, 4, 6 and 7. Furthermore, PIA GmbH is accredited as testing laboratory based on EN ISO/IEC 17025:2005.

2 Summary

The five filtrates were dried at 60°C in a drying chamber until they exhibited constant mass and subsequently weighed.

Trial	1	2	3	4	5
P_a-filtrate in g.	2.18	2.68	4.75	6.69	2.38

On average, (2.18 g + 2.68 g + 4.75 g + 6.69 g + 2.38 g) / 5 = 3.73 g of polystyrene beads (P_a) were filtrated in the outlet of the tank.

The average value above related to the amount of polystyrene beads (P_a) filled in – 1,000 g – the following hydraulic efficiency can be determined:

1 – (3.73 g / 1,000 g) = 0.99627

The hydraulic efficiency is = 99.63 %.

The hydraulic efficiency of a glass reinforced plastic septic tank of the company Marsh Industries Ltd with a nominal capacity of 2 m³ was tested according to EN 12566-1, Annex B “Test of Hydraulic Efficiency”.

For this, a hydraulic efficiency of 99.63 % has been determined.

3 Requirements

EN 12566-1:2000 + A1:2003 “Small wastewater treatment systems for up to 50 PT, Part 1: Prefabricated septic tanks“. The test takes place according to the “hydraulic efficiency test” as described in Annex B.

3.1 Materials and Devices Used

- Polystyrene beads P_a 0.3 mm – 0.5 mm, density 1.04, to simulate suspended particles
- Polystyrene beads P_b 2 mm – 5 mm, density 1.04, to simulate sludge
- Detergent “Tween 80”
- Testing facility
- One tank with a usable volume of 2,775 l and a nominal capacity of 2 m³ (please check report PIA2016-WD/NC-1609-1106.01) made of glass reinforced plastic of Marsh Industries Ltd.

4 Characteristics of the tank

	Septic Tank 2800 L
	
Material	Glass reinforced plastic
Shape	Sphere with shaft
Number of Chambers	1
Usable volume	2,775 l
Filter in outlet	Polylok PL 68
Height of Water Level	1.70 m

Figure 1: Inlet and outlet device

Figure 2: Outlet with filter (on the left hand side)

5 Test procedure

5.1 Testing preparations

The test of the hydraulic efficiency started on November 3rd 2016 on the premises of PIA GmbH in Aachen. For the test, the empty tank was provided with the common inlet, outlet and connection pipes, placed on the testing ground in a horizontal position and filled with fresh water.

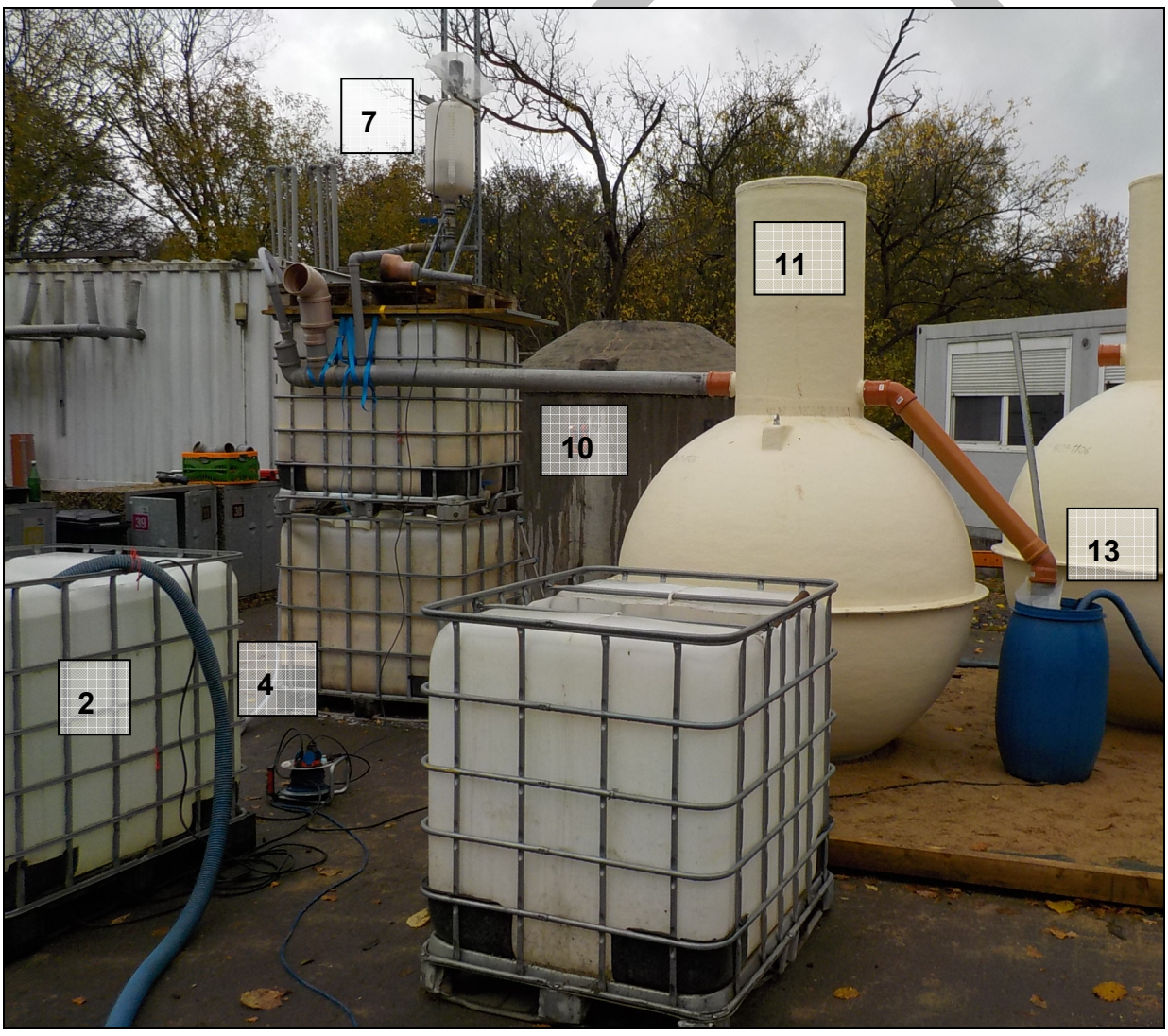

Figure 3: Testing facility with corresponding components

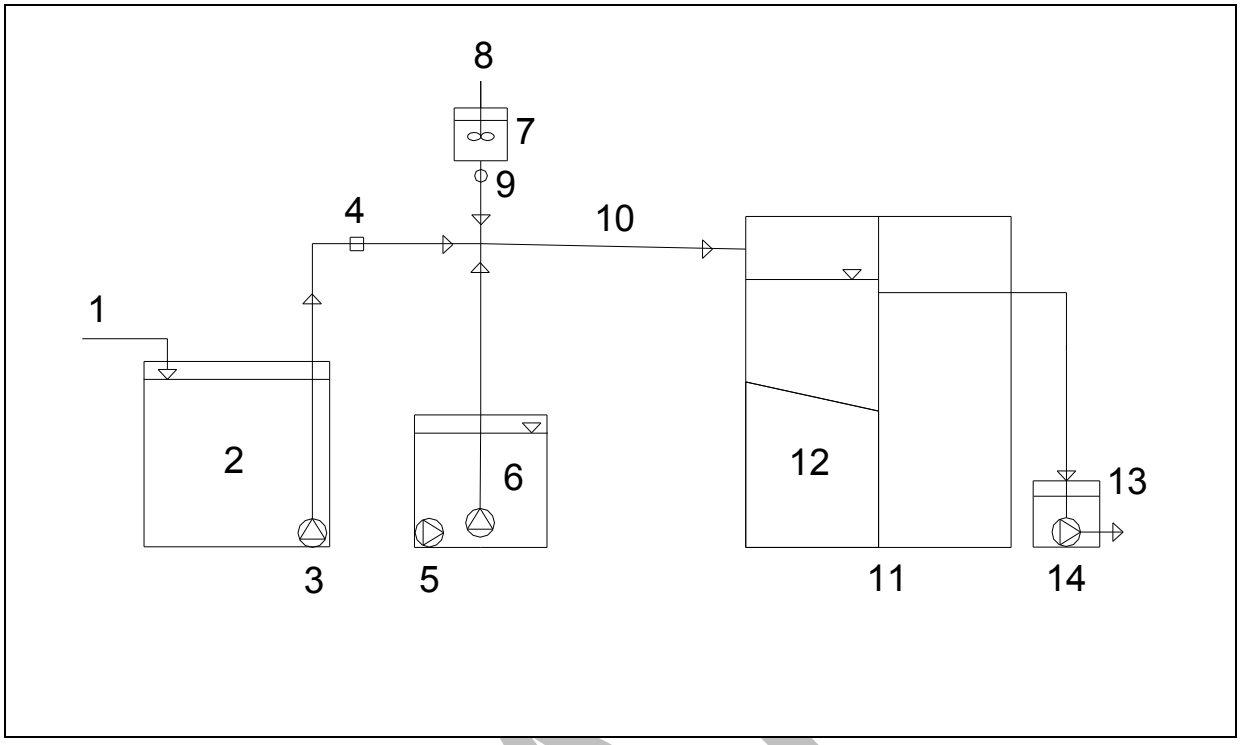

Figure 4: Schematic diagram of the testing facility to determine the hydraulic efficiency

No.	Components		No.	Components
1	Fresh water inlet		8	Agitator
2	Fresh water collection		9	Gate
3	Pump		10	Inlet section
4	Flow meter		11	Tank to be tested
5	Circulating pump		12	Ground sludge P_b
6	Mixing tank for polystyrene beads P_b and water		13	Filter
7	10-litre mixing tank for polystyrene beads P_a, water and Tween 80		14	Pump

Figure 5: Description of the schematic diagram of the testing facility

Within the scope of the testing preparations, the polystyrene beads P_b were rinsed into the tank with water on November 2nd 2016. The amount of these polystyrene beads P_b amounted to 1,000 litres. This corresponds to 50% of the septic tank's nominal capacity as required by the EN 12566-1. According to EN 12566-1 the filling speed of the ground sludge had to lie between q and 2 q and is calculated as follows:

q in l / s = (22 – nominal capacity) * nominal capacity / 80 (nominal capacity in m³)

With a nominal capacity of 2 m³, as indicated by the manufacturer, the possible filling speed of the ground sludge lies between q = 0.5 l / s and 2 q = 1.0 l / s.

The water temperature in the tank and the temperature of the ground sludge were 12.0°C. The temperature of the fresh water inflow was 12.1°C. Thus the temperatures corresponded to the requirements of the standard EN 12566-1.

5.2 Testing the hydraulic efficiency

To determine the hydraulic efficiency, the tank was charged with a concentrated suspension consisting of 1 kg of polystyrene beads P_a, 20 g Tween 80 and 10 l water. The tank was charged with fresh water for 10 minutes at constant rate of flow chosen of q = 0.5 l / s.

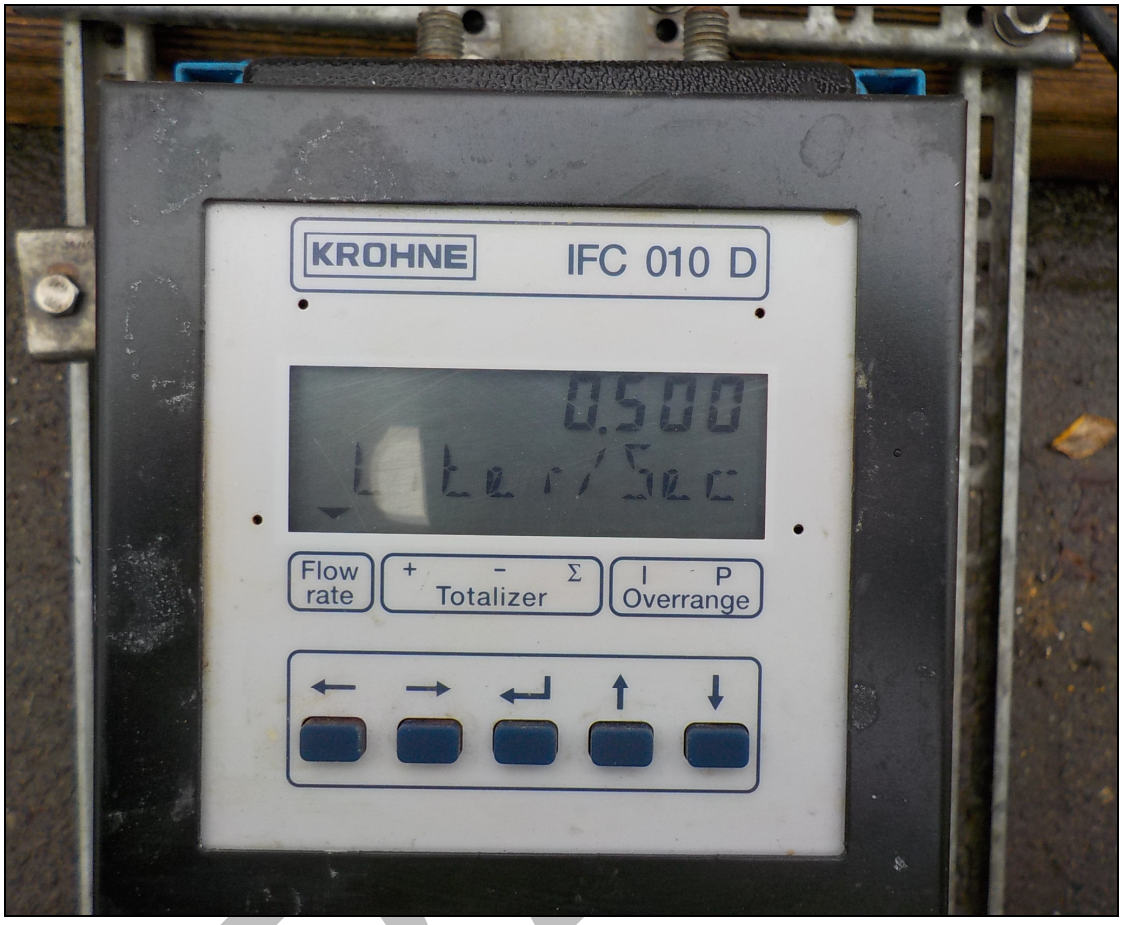

Figure 6: Magnetically inductive flow measurement (see schematic diagram, Fig. 4)

The outlet was filtrated while the tank was charged with fresh water for 10 minutes. Subsequently the outlet was filtrated for an additional time of 15 minutes without charging the tank with fresh water.

This procedure was repeated four times after a rest period of at least 45 minutes.

The average water temperature in the tank was 9.7°C. The average temperature of the testing suspension was 11.9°C. The average temperature of the fresh water inflow was 10.5°C.

6 Annex (manufacturer's information)