



**Nutrient neutrality assessment and mitigation strategy  
for 2 No. holiday lodges at Watercress Lodges and  
Campsite Company, Dean Farm, Brighton Hill, Ropley  
SO24 9SQ.**

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**On behalf of:**

**Watercress Lodges and Campsite company**

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Prepared by:

Anna Becvar BSc Hons, M I Soil Sci, C Sci, MBPR FACTS

Earthcare Technical Ltd.

Manor Farm

Chalton

Waterlooville

Hants



Ref: ETL793/2023


03 August 2023

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## QUALITY CONTROL

Document Title:	<b>Nutrient neutrality assessment and mitigation strategy for 2 No. holiday lodges at Watercress Lodges and Campsite Company, Dean Farm, Bighton Hill, Ropley SO24 9SQ.</b>
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Prepared For:	Watercress Lodges and Campsite Company
Project Reference:	ETL 819/2023
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## Quality control sign off

Document Author	Anna Becvar	
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## 1. Introduction

This report has been prepared by Anna Becvar BSc Hons MI Soil Sci C Sci MBPR FACTS RFE/414 at the request of the applicant to support a planning application to East District Hampshire Council for Two self-contained holiday chalet cabins with associated access paths and secure cycle stores Watercress Lodges and Campsite, Bighton Hill, Ropley, Alresford, SO24 9SQ. A site plan is provided as Appendix 1 to this report. The accommodation will be referred to as '2 No. Lodges' hereafter within the report.

Considering a court Judgement (known as Dutch N), Natural England have advised East Hampshire District Council that, in light of the unfavourable condition of the River Itchen Special Area of Conservation (SAC), before determining a planning application/submission that may give rise to additional nitrogen and phosphorus within the catchment, competent authorities should undertake a Habitats Regulations Assessment (HRA).

The development is within the River Itchen Catchment. This report is a Nutrient neutrality assessment and mitigation strategy report to accompany the River Itchen Nutrient Budget Calculator Version 2 to provide background to the assumptions made within the calculator and to propose mitigation to inform a Habitats Risk Assessment (HRA).

## 2. Site description

The site does not benefit from a mains sewer connection nor is it within a viable proximity to one to connect. The installation of a package treatment plant to treat foul drainage from the 2 No. Lodges is required. A Premier Tech Solido Smart package treatment plant will be used to treat the effluent from all properties. The PIA Certificate for this plant is provided in Appendix 2 of this report.

The Proposed 2 No. Lodges will each have an average occupancy rate of 2.4 persons but for 70% of the year (255.5 days) which equates to an average occupancy of 1.68 persons. This is consistent with existing occupancy rates for the Holiday Lodges already in situ.

Site soils are free draining shallow lime rich soils over chalk and the land is within an NVZ.

## 3. Calculated net change in nitrogen and phosphorus load

The calculator is provided with this report, file reference: 2 No Lodges 70% Occupancy Itchen Nutrient Budget Calculator - V2 02.08.23.

The total annual phosphorus and nitrogen load from the proposed 2 No. Lodges is a total surplus of:

+ 0.7 kg TP per year

+ 1.95 kg TN per year

Mitigation is required.

#### 4. Proposed mitigation strategy

The farmhouse at Dean Farm near to the proposed Lodges has an old existing septic tank which could be replaced to significantly improve the overall nutrient load discharged to the catchment.

it is proposed that to mitigate the additional surplus nutrients from the proposed development the existing septic tank a will be replaced by a new package treatment plant. All properties are in the ownership of the applicant.

The discharges from The Farmhouse and existing lodges are within 200 metres of one another therefore the installed septic tanks cannot meet the interim guidelines on small scale thresholds<sup>1</sup> for insignificant levels of phosphorus discharges to ground. Threshold g) states:

“To ensure that there is no significant in combination effect, the discharge to ground should be at least 200m from any other discharge to ground.” The proposed replacement of the septic tank with a Premier Tech Solido Smart package treatment plant will therefore be considered as a significant improvement to discharged nitrogen and phosphorus load within the River Itchen Catchment.

The proposed new PTP will comply with the General Binding Rules and is not within 50 metres of a:

- Special areas of conservation
- Special protection area
- Ramsar wetland site
- Biological sites of special scientific interest (SSSI).

The close proximity of discharges means that the new PTP(s) will also not comply with the small-scale threshold interim guidelines.

The annual wastewater load for the existing septic tank at The Farmhouse have been calculated using the default values for septic tank effluent of 11.6 mg TP /litre and 96.3 kg TN/litre (O’Keeffe et al 2015). A precautionary water usage volume of 120 litres per person per day has been used within calculations as the properties are existing and not subject to water efficiency measures. Calculations are provided in Table 1 below.

Table 1 Existing annual wastewater TP load for The Farmhouse

	Calculated TP load	Calculated TN load
Average Occupancy No. persons	2.4	2.4
Water usage litres/person/day	120	120
Effluent mg /litre	11.6	96.3
wastewater litres per day	288	288
Annual wastewater nutrient load kg /yr.	1.22 kg TP/yr.	9.92 kg TN/yr.

<sup>1</sup> Interim guidelines on small scale thresholds and nutrient neutrality principles for the Somerset Levels and Moors Ramsar catchment. Somerset County Council, May 2021  
[www.somersetwestandtaunton.gov.uk/media/2586/interim-guidelines-on-small-scale-thresholds.pdf](http://www.somersetwestandtaunton.gov.uk/media/2586/interim-guidelines-on-small-scale-thresholds.pdf)

It is proposed that the existing septic tank is replaced with a Premier Tech Soildo Smart package treatment plant (PTP). This system is biological and so no chemical dosing is required.

The improved annual wastewater nutrient load for The Farmhouse is calculated in Table 2 below. All new PTPs will be of the same design.

Table 2 New improved wastewater TP load for the Farmhouse

	Calculated TP load	Calculated TN load
Average Occupancy No. persons	2.4	2.4
Water usage litres/person/day	120	120
Effluent mg /litre	2.3	10.0
wastewater litres per day	288	288
Annual wastewater load kg /yr	0.24	0.84
Annual wastewater nutrient load kg/yr with 20% precautionary buffer	0.29 kg TP/yr.	1.01 kg TN/yr.

Table 3 below demonstrates the calculated improvement versus the additional load generated from the proposed development.

Table 3 Calculated reduction in nutrient load from installation of a PTP at The Farmhouse

	Calculated TP load (kg/yr)	Calculated TN load (kg/yr)
Existing Farmhouse nutrient load	1.22	9.92
Future Farmhouse nutrient load	0.29	0.84
Reduction in Farmhouse annual nutrient load	-0.93	-9.08
Additional development nutrient load 2 No. Lodges	+0.70	+1.95
Overall balance of nutrient load	-0.23	-7.13

By improving the overall nutrient load released from the Farmhouse at Dean Farm nutrient neutrality is achieved with an overall reduction in nutrients released within the catchment, and a surplus of mitigation of 0.23 kg TP/yr and 7.13 kg TN/yr which could be used to mitigate another development.

## 5. Package treatment plant Monitoring and Maintenance Programme

The Package treatment plant will be installed following the manufacturer's installation and assembly instructions. The plant should be operated in accordance with the manufacturer's latest Owner's Manual and Installation Guide an example of which is included in Appendix 3.

The monitoring and maintenance checklist included within this manual is to be followed and records kept within PTP logbook. Failures, maintenance work, sludge removal, maintenance reports and other incidents should all be recorded in the operations logbook.

The system will be replaced by the owner of the property as and when required to ensure maintained treatment efficiency for perpetuity.

## Appendix 1 Site plan

Note:  
All dimensions must be checked on site  
and not scaled from this drawing.  
**EXCEPT EHDC USE**

**J O H N S O N D E S I G N S**



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www.johnsondesigns.co.uk

Client  
**WATERCRESS  
LODGES &  
CAMP SITE**

Job Title  
**BIGHTON HILL  
ROPLEY  
SO24 9SQ**

Drawing Title

**BLOCK PLAN**

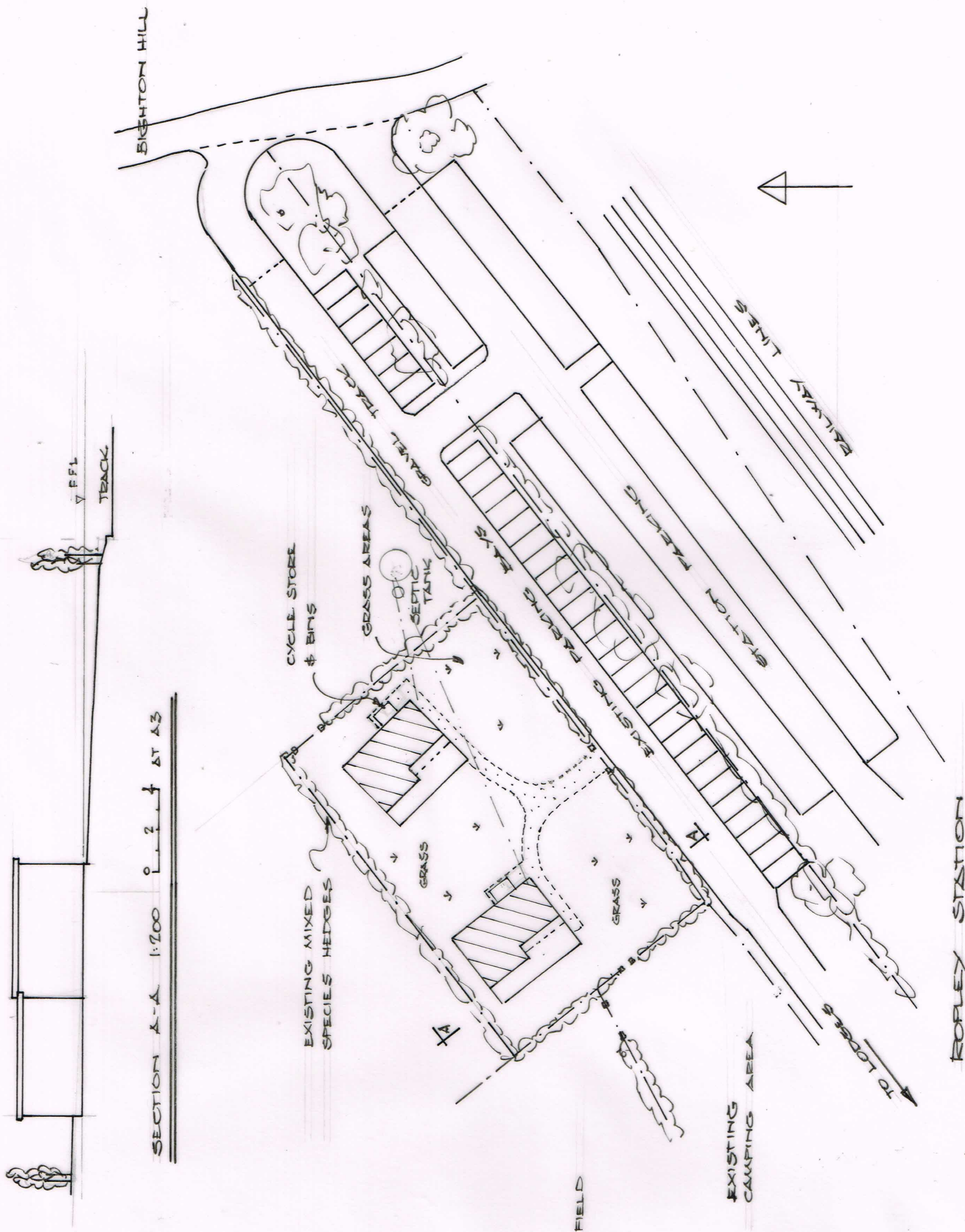
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Date **FEB 22** Drawn by **JP**

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Rev.



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## Appendix 2 PIA Certificate Premier Tech Solido Smart

# Certificate



Premier Tech Water and Environment Ltd.  
2 Whitehouse Way, South West Industrial Estate, SR8 2RA, Peterlee, County Durham, UK

EN 12566-3, Annex A, B and C

Small wastewater treatment systems for up to 50 PT

Small wastewater treatment system "Rewaterc Solido Smart"

One-chamber SBR system in one PE tank

Test report PIA2015-239B22.e

## Evaluation of the nominal sequences of the 38-week

Nominal organic daily load	0.30 kg BOB <sub>5</sub> /d		
Nominal hydraulic daily load	0.90 m <sup>3</sup> /d		
Material	Polyethylene		
Watertightness	pass		
Structural behaviour (pit test)	pass (also wet)		
Durability	pass		
Treatment efficiency	Efficiency	Effluent	
	COD	95.1 %	39 mg/l
	BOD <sub>5</sub>	98.5 %	5 mg/l
	NH <sub>4</sub> -N*	98.0 %	0.7 mg/l
	N <sub>tot</sub>	83.1 %	10 mg/l
	P <sub>tot</sub>	68.5 %	2.3 mg/l
	SS	97.1 %	13 mg/l

## Evaluation of the complete 38-week testing

Electrical consumption 0.81 kWh/d

\*determined for temperatures  $\geq 12^\circ$  C in the bioreactor

Tested by:

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

This document replaces neither the declaration of performance nor the CE marking.



Notified Body  
No.: 1739



M. Wermter/ D.Schmitz

November 2021

## Appendix 3 PTP Owner's Manual and Installation Guide



## Single-Chamber Biological Nutrient Removal Wastewater Treatment Plant

2021



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Serial Number:

Commissioning  
Date:

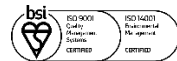
**Commissioning Company**



**Service Company**



If you require assistance finding a service company, please contact Premier Tech. Your warranty is invalidated if you do not keep to a regular servicing schedule.





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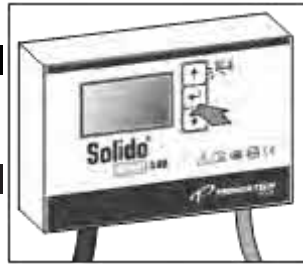
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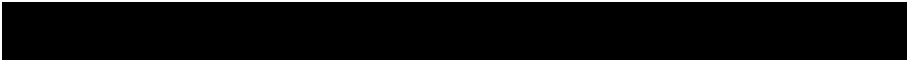
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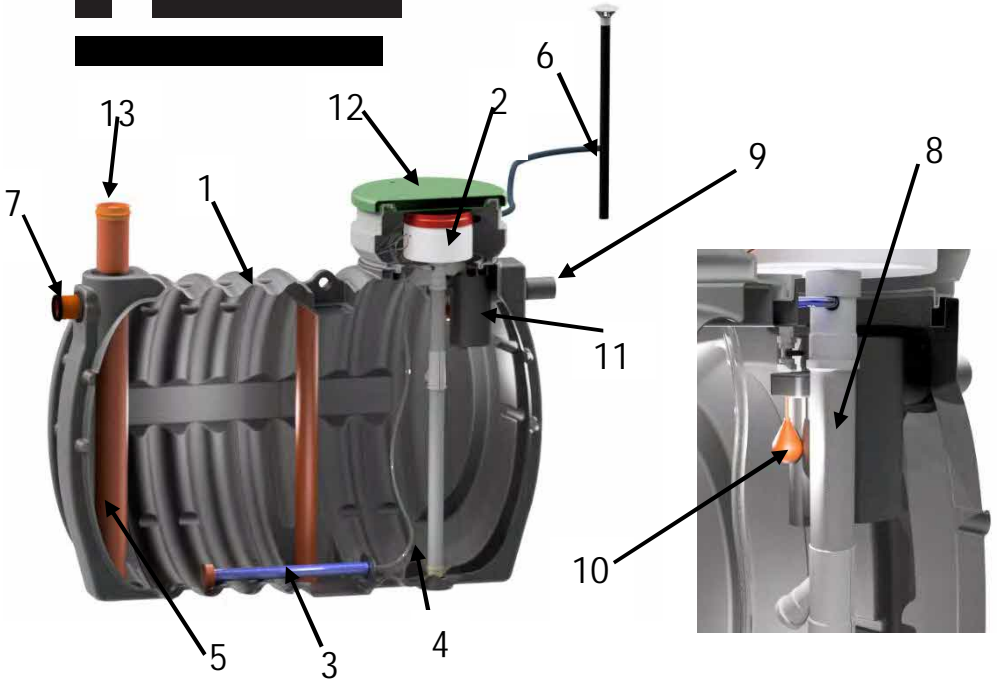
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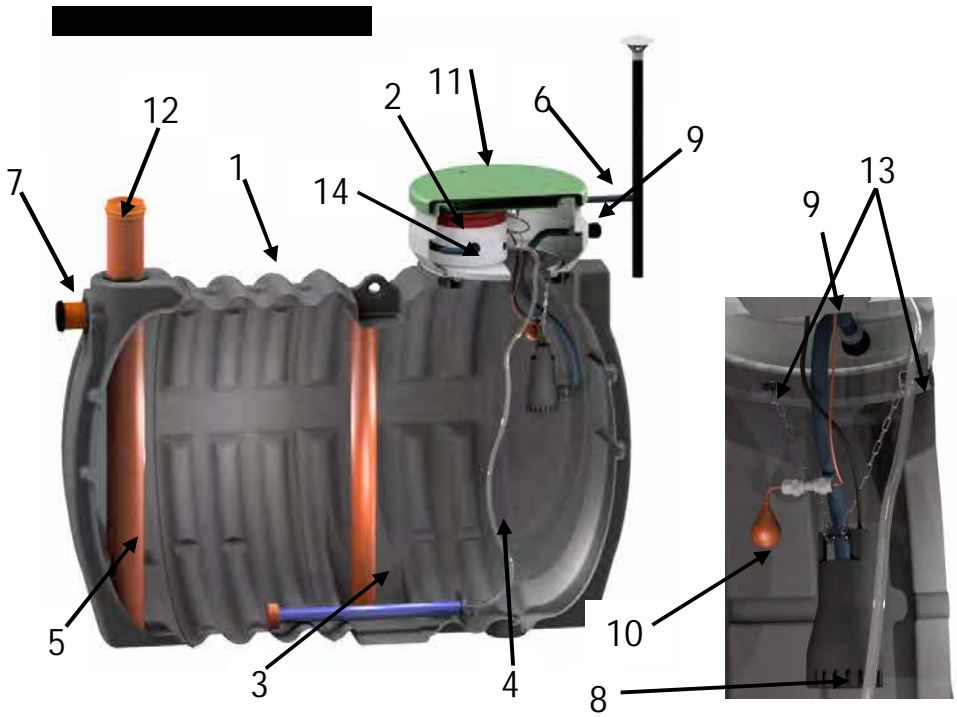
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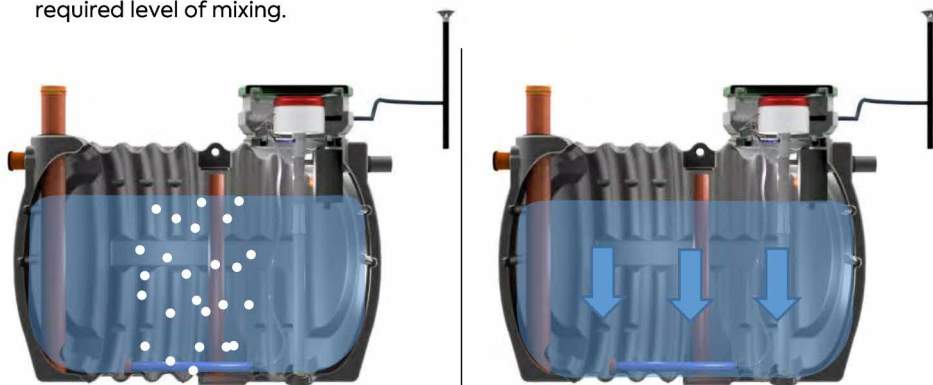
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## Intermittent aeration

Aeration/mixing is performed with diffusers. During a cycle, aeration is performed intermittently to supply micro-organisms with oxygen and ensure the required level of mixing.



Intermittent aeration/sedimentation and discharge of clearwater

## Sedimentation and discharge of clearwater

At the end of a cycle, phase separation between the activated sludge and clearwater is performed in a sedimentation phase lasting 90 minutes at minimum, followed by the discharge of clearwater.

The clearwater is extracted using a compressed air lift or a submersible pump.

### Automatic backflush system (Airlift version only)

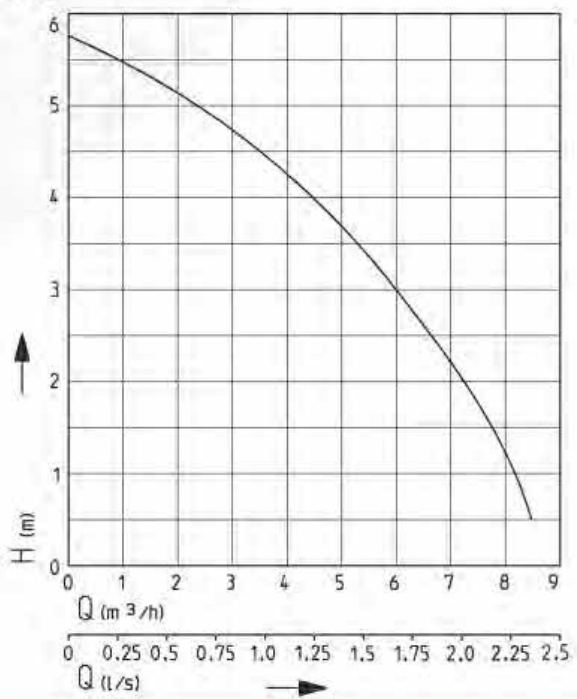
The patented design of the compressed air lifter allows backflushes to be performed automatically before each operation. The discharge of activated sludge in the effluent from the SBR reactor is significantly reduced and the lifetime of the soakaway is increased as a result. The automatic backflush system also effectively prevents potential lifter blockages.

### Pumps, capacity and rates (pumping version only)

The pumping set is installed to precisely empty the tank and ensure a consistent operation. The pumps are set to the desired level and flow to guaranty that a specific amount of effluent liquid will be driven out of the system per the fundamental design criteria.

The employed submerged pump(s) is manufactured by Jung Pumpen (OXYLIFT 2 (S)), ideal for applications related to wastewater engineering. The pumping rate is showed at the following plot (see picture next page).

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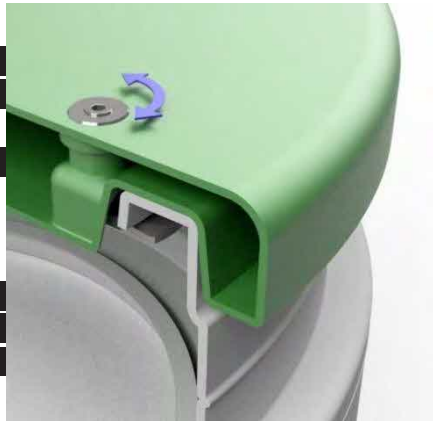
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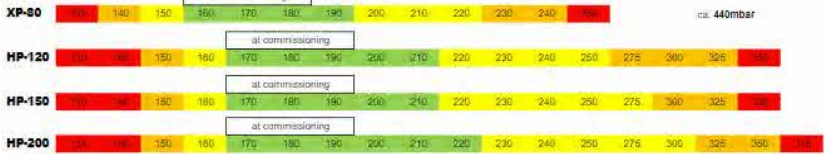


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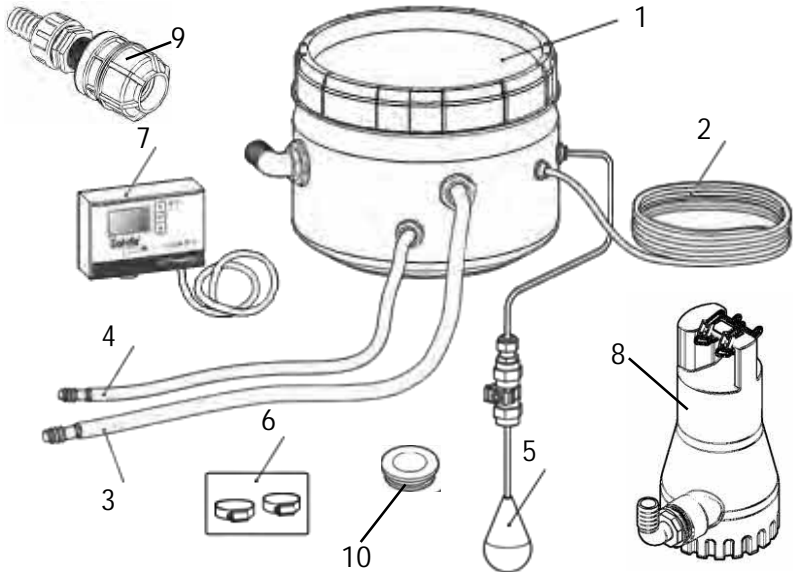
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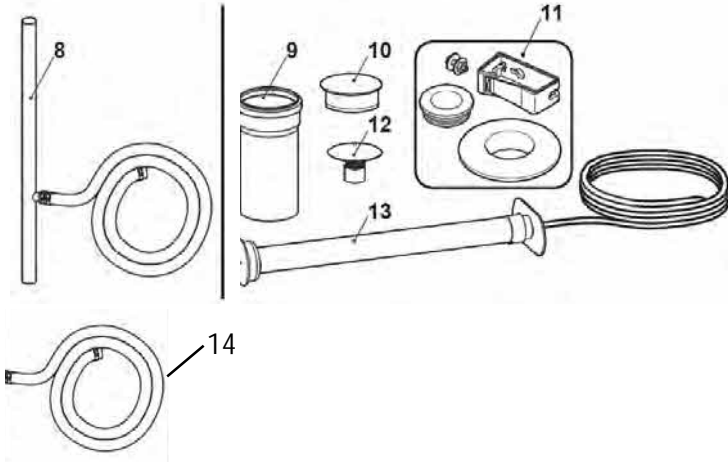
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	[REDACTED]	<input type="checkbox"/>
5.	[REDACTED]	
	[REDACTED]	
	[REDACTED]	<input type="checkbox"/>
	[REDACTED]	
6.	[REDACTED]	
	[REDACTED]	
	[REDACTED]	<input type="checkbox"/>
	[REDACTED]	
7.	[REDACTED]	
	[REDACTED]	
	[REDACTED]	<input type="checkbox"/>
8.	[REDACTED]	
	[REDACTED]	
	[REDACTED]	<input type="checkbox"/>
9.	[REDACTED]	
	[REDACTED]	
	[REDACTED]	<input type="checkbox"/>
10.	[REDACTED]	
	[REDACTED]	<input type="checkbox"/>

11.

[Redacted text]

12.

[Redacted text]

13.

[Redacted text]

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

[Redacted text]

[Redacted text]

[Redacted text]



 [Redacted text]

[Redacted text]

[Redacted text]

[Redacted text]

 [Redacted text]

[Redacted text]

[REDACTED]



13



[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



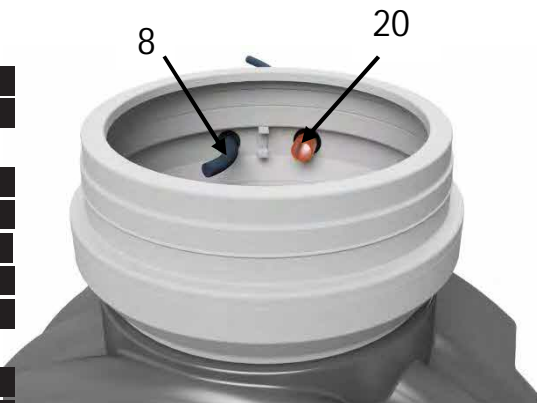
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[Redacted]

[Redacted]

[Redacted]

[Redacted]



[Redacted]

[Redacted]

[Redacted]

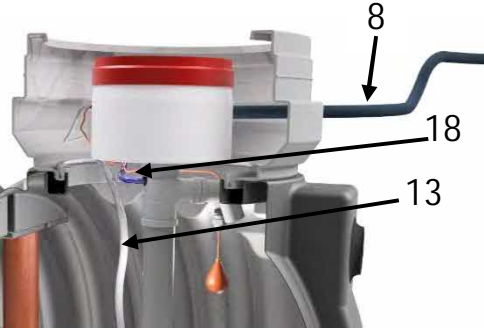
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[Redacted]

[Redacted]

[REDACTED]



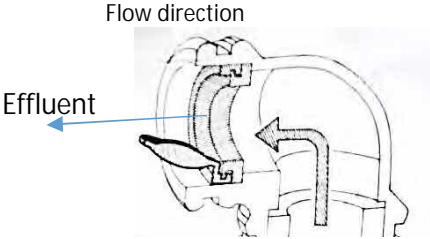
[REDACTED]

[REDACTED]



[REDACTED]

[REDACTED]







[Redacted text]



[Redacted text]



[Redacted text]



[Redacted text]



[Redacted text]



[Redacted text]



[Redacted text]

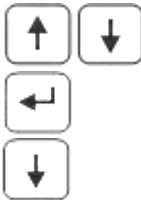
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[Redacted]

[Redacted]

[Redacted]

[Redacted]



[Redacted]

[Redacted]

[Redacted]



[Redacted]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**RELATED**

select type of plant  
Solido SMART C  
Solido SMART C

U1.02

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**RELATED**

select type of plant  
Solido SMART C  
Solido SMART N/D

U1.02

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

```
Th 28.07.16 14:30:56
1. aeration
rem. phase: 03:29:04
rem. cycle: 11:29:04
no error
```

[REDACTED]



[REDACTED]

[REDACTED]

[REDACTED]



[REDACTED]

[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

```
Th 28.07.16 14:30:56  
1. aeration  
rem. phase: 03:29:04  
rem. cycle: 11:29:04  
no error
```

[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]

```
Th 28.07.16 14:30:56  
1. aeration  
rem. phase: 03:29:04  
rem. cycle: 11:29:04  
no error
```

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

```
operat. hours  
compressor: 00000h07min  
RWH: 00000h01min  
  
total: 00000h09min  
#=weeks
```

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

```
system  
set time  
LCD-contrast: 32  
alarm pauses: 20h-08h  
display errors  
Language English  
#=enter menu #048
```

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

```
service
test mode
manual mode
clear counter
select type of plant
Solido SMART N/D 4PE 30
#=enter menu #064
```

[REDACTED]  
[REDACTED]

```
settings (smart)
BEL /20min 10.8min
Sedimentation 090min
DENI 030min
KWH / cycle 17.1min
#=enter menu #080
```

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

```
start time
1. start time: 02:00
2. start time: 14:00
Start125% 240 d
#=enter menu #096
```

[REDACTED]  
[REDACTED]

```
holiday
remaining: 00d 00h
activate holiday mode
stop holiday mode
#=enter menu #112
```

[REDACTED]  
[REDACTED]

```
current monitor
compressor off
#=enter menu #128
```

[Redacted]

## information

compressor: off  
valve KWH: off  
BEL / d: 13:06:52  
KWH / d: 00:34:12  
current: 0.0A

[Redacted]

[Redacted]



**operat. hours**  
compressor: 00006h36min  
KWP: 00001h03min  
  
total: 00028h45min  
d=weeks

or in the display **Current monitor**



**current monitor**  
compressor off  
KWP: 2.3A max.  
  
d=enter menu #128

[Redacted]

[Redacted]



[REDACTED]

[REDACTED]

```
service
test mode
manual mode
clear counter
select type of plant
Solido SMART C 4PE 60
↑↓ #069
```

[REDACTED]

```
service
t
password
*****
select type of plant
Solido SMART C 4PE 60
↑↓ #069
```

[REDACTED]

```
service
test mode
manual mode
clear counter
select type of plant
Solido SMART C 4PE 60
↑↓ #069
```

[REDACTED]

```
service
SOLIDO SMART
Yes
Yes
select type of plant
Solido SMART C 4PE 60
↑↓ #069
```

[REDACTED]

```
service
cycles per day
-2-
-2-
select type of plant
Solido SMART C 4PE 60
↑↓ #069
```

[REDACTED]

```
SERVICE
cont CW discharge
Yes
Yes
select type of plant
Solido SMART C 4PE 60
↑↓ #069
```

[REDACTED]

```
SERVICE
select aerator
80 L/min
80 L/min
select type of plant
Solido SMART N/D 4PE 80
↑↓ #069
```

```
SERVICE
select aerator
80 L/min
60 L/min
select type of plant
Solido SMART N/D 4PE 80
↑↓ #069
```

[REDACTED]

```
SERVICE
select type of plant
Solido SMART C
Solido SMART C
select type of plant
Solido SMART C 4PE 60
↑↓ #069
```

```
SERVICE
select type of plant
Solido SMART C
Solido SMART N/D
select type of plant
Solido SMART C 4PE 60
↑↓ #069
```

[REDACTED]

```
select number of PE
02 PE
03 PE
04 PE
05 PE
06 PE
```

[REDACTED]  
[REDACTED]

```
select number of PE
0 KWP instead of KWH
0 No
0 No
0 PE
06 PE
```

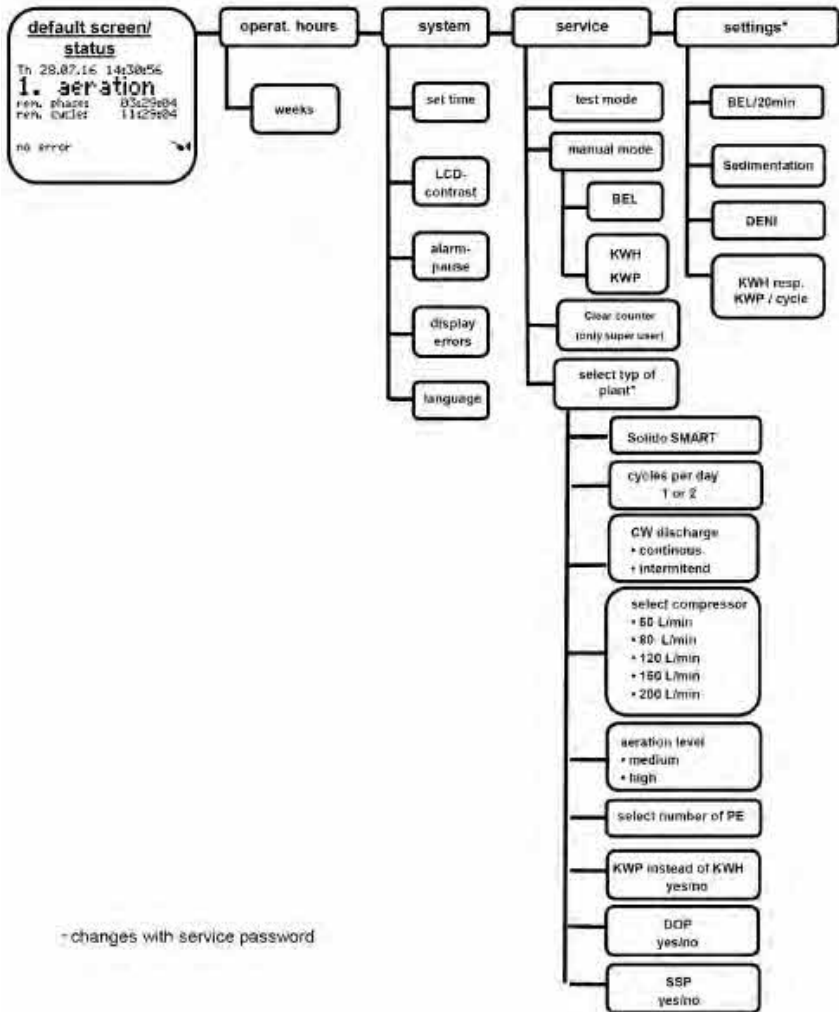
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[REDACTED]

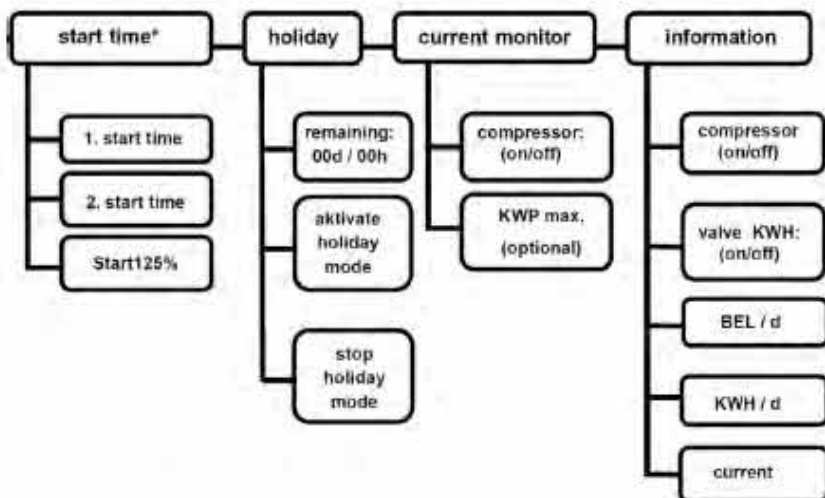
```
service
test mode
manual mode
clear counter
select type of plant
Solid SMR N/O 4PE 60
↑↓ #070
```

[REDACTED]  
[REDACTED]  
[REDACTED]



[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]





[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[Redacted]

[Redacted]



[Redacted]



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[Redacted]



[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
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[Redacted]



[Redacted]

[REDACTED]

[REDACTED]



[REDACTED]



[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]



[REDACTED]

[REDACTED]

[REDACTED]









[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
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[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

- a. [REDACTED]
- b. [REDACTED]
- c. [REDACTED]
- d. [REDACTED]
- e. [REDACTED]
- f. [REDACTED]
- g. [REDACTED]
- h. [REDACTED]

[REDACTED]

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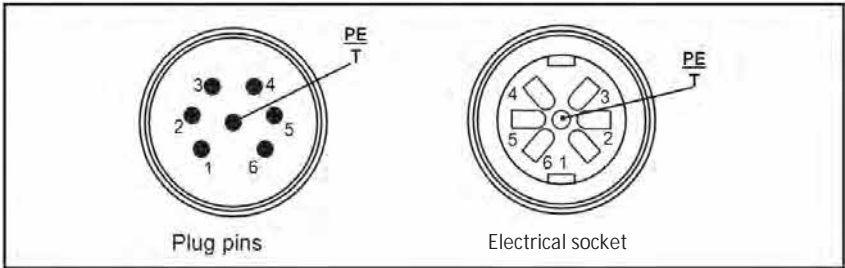
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[REDACTED]	[REDACTED]	[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED] [REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
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[REDACTED]

[REDACTED]



## 10.4 CE – declaration of performance (or declaration of conformity)



# PERFORMANCE RESULTS

**Premier Tech Aqua GmbH**

Bei der neuen Münze 11, 22145 Hamburg, Germany

**EN 12566-3, Annex B**

Small wastewater treatment systems for up to 50 PT 3

**Small wastewater treatment system Solido SMART**

One-chamber SBR system in one PE tank

Test report PIA2015-239B22.e

Nominal organic daily load	0.30 kg BOD <sub>5</sub> /d		
Nominal hydraulic daily load	0.90 m <sup>3</sup> /d		
Material	Polyethylene		
Watertightness (Annex A)	pass		
Structural behaviour (Pit Test)	pass (also wet conditions)		
Durability	pass		
Treatment efficiency (nominal sequences)	Efficiency	Effluent	
	COD	95.1 %	39 mg/l
	BOD <sub>5</sub>	98.5 %	5 mg/l
	SS	97.1 %	13 mg/l
	NH <sub>4</sub> -N	98.0 %	0.7 mg/l
	N <sub>tot</sub>	83.1 %	10 mg/l
	P <sub>tot</sub>	68.5 %	2.3 mg/l
Electrical consumption	0.81 kWh/d		

Performance tested by:

**PIA – Prüfinstitut für Abwassertechnik GmbH**

(PIA GmbH)

Hergenrather Weg 30

52074 Aachen, Germany

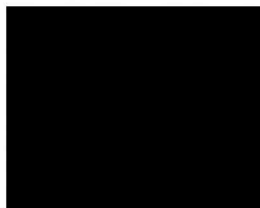
This document replaces neither the declaration of performance nor the CE marking.



Full-Test Body  
No. 1739



Certified according to  
ISO 9001:2008







[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

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