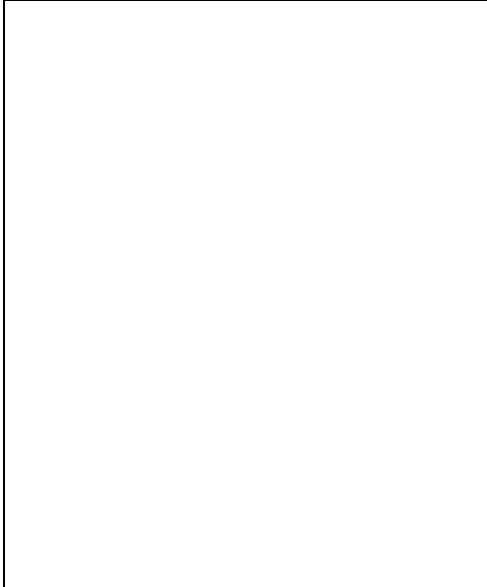


Log Book one2clean



It is essential that you observe the points described in these instructions. Failure to do so will invalidate all warranty claims. For all additional items ordered from GRAF, separate installation instructions will be provided in the transport packaging.

It is essential that you check the components for possible damage before installation.

You will receive separate instructions for assembling the system.

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1. General Notes

1. General Notes

Important tips for safe & long-lasting operation of the one2clean:

- The SBR system is designed for the treatment of all household sewage. The introduction of other wastewater, such as the wastewater from restaurants and/or business establishments, etc. is permitted if these were already known at the time of design of the system and were taken into account.
- Biocides, materials with a toxic effect or materials that are not biologically compatible must not enter the system, as these impede bacteria important for wastewater treatment and lead to biological process problems (detailed notes follow on the next pages).

It is imperative that you follow the operating and maintenance instructions for compliance with the regulatory requirements for cleaning. These instructions can be found on the following pages.

Furthermore, we ask that you carefully read and observe the following notes:

- The location of the control system for indoor installation must be a dry, well-ventilated room (basement or garage).
- If an outdoor control cabinet is used, this should be placed in as shaded place as possible to avoid overheating.
- At no time must the cabinet is be covered, in particular its air vents, and that it is freely accessible for maintenance.
- There must be a permanent power supply to the one2clean. Ensure that the control cabinet is adequately fused (16 A) and the power supply is fitted with isolator switch for repair & maintenance. Additional electrical components & consumers should not be using the same fuse as they can could power failure and interfere with one2clean operation.

2. Function of the Wastewater Treatment System

2. Function of the Wastewater Treatment System

The one2clean small wastewater treatment system is fully biological and works according to the retention process with long-term aeration (sequencing batch reactor). The system is essentially made up of an aerobic stage. This stage is split into a rest area and an activation area. The chambers are connected to one another in the bottom section. During this process, therefore, all domestic sewage is immediately exposed to aerobic wastewater treatment. The entire system is aerated by compressed air being blown in and the sludge activated as a result of this biologically cleans the wastewater.

The coarse and floating solids contained in the wastewater are initially retained in the rest area by means of a baffle. The wastewater then passes through an overflow opening in the lower part of the container from the rest area into the activation area.

As the rest area is also aerated, the solids which remain behind are also degraded aerobically over time. Wastewater treatment is performed in the one2clean without pre-treatment, so that no anaerobic digestion processes can occur.

Operation of the treatment system is carried out via a microprocessor control system which controls the air compressor and air distribution.

The SBR process is a sequence of different steps that occur at set times in a sequence and takes place at least once a day.

Step 1: Aeration



The wastewater is subjected directly to aerobic treatment for a fixed amount of time. On the one hand the microorganisms (activated sludge) are supplied with the oxygen necessary for degradation; on the other hand mixing is achieved as a result of pressure aeration. The air diffuser of the system is supplied with ambient air by a compressor. The aeration is intermittent, so as to allow targeted wastewater treatment. Thus, different environmental conditions can be achieved.

Step 2: Settling



There is no aeration in the second phase. The activated sludge and the remaining settleable solids can now settle by gravity. A clear water zone is created at the top and a layer of mud forms at the bottom. Any floating sludge which might develop is located above the clear water zone.

Step 3: Clear Water Removal



The biologically treated wastewater (clear water) is extracted from the SBR stage. This is done by pumping compressed air according to the mammoth pump principle (air lift pump). The air lift is designed in such a way that no floating sludge which might develop is drained on the clear water layer. A minimum water level in the system is maintained without additional components.

After execution of the third Step, the cleaning process begins again with step 1.

Two cycles are performed per day. The individual adaptation of switching times is possible on the part of the maintenance company.

3. Start-up of the Control System

3. Start-up of the Control System

After the system is connected to the power supply, a short system test is run, during which time the LED light is red. The LED then becomes green when the start-up phase is completed.

During the system test, the notification "SYSTEM TEST ... OK", the program version, and serial number of the control system appear for a short time. Following this, the current operating status of the system is displayed. After the system test is complete, the date and the current time should be checked and adjusted if necessary (see Section 4.2.3).

After checking the date/time, a functional check of the system components must be carried out. This check can only be carried out if the necessary air hoses are connected. The check should be carried out via the menu point "manual mode" in the control system, which is intended for this purpose. The individual parts of the system are tested for functionality.

After a successful check, the system is reset to automatic mode.




CAUTION: The clear water siphon only functions when the containers are filled.


If the date and time are not set correctly, operating faults will be stored with the incorrect time information.

4. Operation of the Control System

4. Operation of the Control System

The operation of the system is carried out via a microprocessor in the control unit. The microprocessor allows for the set-up of operating parameters, the display of operating conditions and the query of system parameters as well as the programming of working times through a specialist company.

Adjustments are made by scrolling through numerical values using the two arrow keys  . The settings are then confirmed by pressing the  button.

The individual dialogues can be terminated ahead of time by pressing  or will be terminated automatically after **2 minutes**.

The control system is broken down into the following display pages:


4. Basic level: Status of the cycle sequence with the elapsing remaining time, as well as the display of error messages.
5. Operator level: The operator can access the operator level by pressing the  button and enter operator-specific settings.
6. Service level: A password-protected service level can be accessed from the operator level using an additional code. This level is reserved for trained personnel. Here adjustments or changes can be made and diagnostic data is retrieved.



Figure 2: view of the operating unit

4.1 Control Programme

The control system switches the outputs for air compressors and stepper motors on a timer.

The timing is determined by the set sequence tables. A complete cleaning cycle is started for each start time in accordance with the selected sequence table.

By setting up holiday times in the operator level, the complete sequence of cleaning cycles can be suppressed for the set period of time. Only one holiday cycle with greatly reduced activity takes place at this time. During this time, no treated wastewater will be removed, as there should be no supply.

4. Operation of the Control System

4.1.1 Display of Operating Status

The operating status is indicated by the LEDs (green = operational / red = fault) and as text on the screen. In normal operating mode (aeration mode), the display appears as follows:




Aeration
Rest: 120:10min

In automatic mode, the liquid crystal display shows the current work phase and the remaining time left in this phase.

If a fault occurs, the red LED is turned on. A message indicating which component is faulty appears in the liquid crystal display (e.g. Fault Compressor 0.0A).

4.1.2 The following work phases are displayed





Display	Process performed
Denitrification	Y3 valve (plug X1.1) is actuated intermittently; the activated sludge is briefly mixed with the wastewater. This is followed by long pauses (response times).
Ventilation	Y3 valve (plug X1.1) is actuated; the system is aerated in intervals over a long period of time.
Sedimentation phase	No valves are actuated, the activated sludge settles in the system.
Activity phase	Y4 valve (plug X1.2) is actuated; the clear water is pumped into the drain.
Cycle pause/ holiday mode	Y3 valve (plug X1.1) is actuated; the system is aerated in intervals (considerably less than in the aeration phase).
Rest: XXX:XXmin	Display of remaining time.




Symbol	Key assignment	Function
	Enter key	Selection of operating mode, confirmation of entries
	Scroll	Display of operating modes and queries Programming of the system by entering figures
	Acknowledgement	Acknowledgement of entries without saving Acknowledgement of fault messages

4. Operation of the Control System


4.2 Operating the Control System

You can start different queries from the automatic mode.




You can access the first operating level by pressing . You can now call up the individual queries using the arrow keys   and then pressing  :



Display	Meaning
Operating mode Remaining time	Remaining time in current work phase
Operating hours	Display of the operating hours of the valve and compressor
Manual operation	Manual control of the valve
Date Time	Current time, day and date. Can be set using 
Holiday mode	Holiday mode set-up (max. 90 days)
Faults	Operational faults which occur are stored here and can be read. It is possible to switch between the error message and the corresponding date using  and 
Settings	The current settings can be viewed using the arrow keys
Service menu	For qualified personnel

4.2.1 Operating Hours Query

Press the  button. On the screen will appear:

Operating hours
meter reading

By pressing  again, the operating hours for the valves and the compressor can be displayed in sequence using the arrow keys   .



Pressing  once will take you back to the display “display operating hours”. You can access the “manual mode” menu by pressing  .

→ **Note:** If you do not press any buttons for a period of 10 minutes, normal operation will begin automatically.


4. Operation of the Control System

4.2.2 Manual Control of the Valve using “Manual Operation”


During checks, each valve should run for at least 5 seconds, as the monitoring the current consumption of the valves takes some time before any faults are detected.

In automatic mode, first press  then the arrow key  until the following is displayed on the screen:


Manual operation

By pressing on the  button again, you will receive the following message:



Aeration OFF

Pressing  allows you to turn the selected programme on and off.




The other programs can be selected using the arrow keys .


Pressing  once will take you back to the display “manual mode”.


4.2.3 Set Date/Time

Press  and then the arrow keys  until the following is displayed on the screen (example):

19-12-2007 Mon
20:15:56

By pressing , the time and date can then be set using the arrow keys  .

To confirm the correction, you must press  each time.

Pressing  once will take you to the next display in holiday mode.

A correctly set system clock and date display is absolutely mandatory in order to record the hours of operation and so that any faults can be traced. There is no automatic change from summer to winter time.

NOTE: If you do not press any buttons for a period of 10 minutes, normal operation will begin automatically.


4. Operation of the Control System

4.2.4 Setting-up Holiday Mode

NOTE: Holiday mode results in the reduced operation of the wastewater treatment system. It should only be applied when no wastewater is introduced into the wastewater treatment system during the selected time period. Wastewater that passes into the system during the holiday mode period will not be cleaned. Holiday mode is switched on and off automatically for the data you have entered.




Press , then press the arrow buttons   until the following appears on the screen:

Vacation oper.



Press  again to release the input of holiday dates:


Start: YYYY-MM-DD
End: YYYY-MM-DD


Start of holiday:

The start of holiday mode is entered in the format YYYY-MM-DD by pressing  . To switch between the different settings, the  button must be pressed in each case.

End of holiday:

As with for the start of the holiday, the end of holiday mode is entered in the year, month and day format YYYY-MM-DD by pressing  .


Press the  button to save the input data for holiday mode and to exit this function.

Pressing  returns you to the automatic mode display.

NOTE: If you do not press any buttons for a period of 2 minutes, normal operation will begin automatically without the date that you have just entered being saved.

4. Operation of the Control System

4.2.5 Old Faults




The control system stores all past fault messages and the operation of the control system via the “manual mode” function. Past fault messages with date and time can be read under the menu item “Old faults”. The individual messages can be accessed using the arrow keys. You can exit the menu item by pressing .

Faults are indicated as encoding, in order of their appearance, starting with number 0 (latest signal).

Coding	Meaning
1	Power failure (system is currentless)
2	Net is back (system regains power)
3	Compressor has over-current
4	Compressor current supply too low
5	Manual operation

The faults number 2 (net is back) and number 5 (manual operation) are no faults. They will be registered for a better temporal localization of possibly occurring faults or rather monitoring of manual activities on the control system.

4.2.6 Display Settings

This menu item allows the current control system settings to be seen. It is not possible to change these settings. This menu item is used to analyse the settings without making changes. The individual settings can be called up using the arrow keys  . You can exit the menu item by pressing .

4.2.7 Service Menu

Operating parameters can be changed in the service menu. Access is protected with a code. This second maintenance level is reserved exclusively for qualified specialist personnel only!

Any access to the control system settings by unauthorised persons will cause the warranty to expire!

5. Inspection and Maintenance

5. Inspection and Maintenance

5.1 Obligations of the Operator

The system must always be turned on. The operator is obliged to ensure the fault-free operation of the system. Almost all operational faults lead to a deterioration of the system's cleaning performance. These should therefore be detected at an early stage and eliminated immediately by you or a qualified service technician.

5.1.1 Daily checks

The system should be checked daily for correct operation. The system is operating correctly when the operating control is lit up green and no warning signal can be heard.

5.1.2 Monthly checks

- Visual inspection for any sludge output, turbidity or discoloration in the flow
- Check inflows and outflows for blockages (visual inspection)
- Read the operating hours counter on the air compressor (total operating hours), the ventilation (Y3 valve) and the clear water run-off (Y4 valve) and record in the operating log

5.2 Maintenance by a Specialist Company

Maintenance is carried out by a specialist company (experts) at least twice a year (approximately every 6 months). The time intervals and tasks specified by the local water authority in the consent permit under water laws also apply. For this purpose, the system owner must complete a maintenance contract with a qualified specialist.

The following tasks should be carried out in relation to maintenance:

- Inspection of the log book with determination of the regular operation (target-actual comparison),
- Check the air filter of the air compressor,
- Maintenance of the air compressor according to the manufacturer's instructions,
- Functional check of the air compressor and stepper motors,
- Carry out general cleaning work, e.g. removal of deposits,
- Check for adequate ventilation,
- Examination of activation tank:
 - Oxygen concentration ($O_2/l > 2 \text{ mg}$), adjust the operating time of the compressor if necessary,
 - Sludge volume ($< 900 \text{ ml/l}$),

If the sludge volume is greater than 900 ml/l, the sludge must be removed.

Maintenance tasks carried out, any damage detected or repairs made as well as other instances should be summarised by the maintenance company in a maintenance report.

5. Inspection and Maintenance

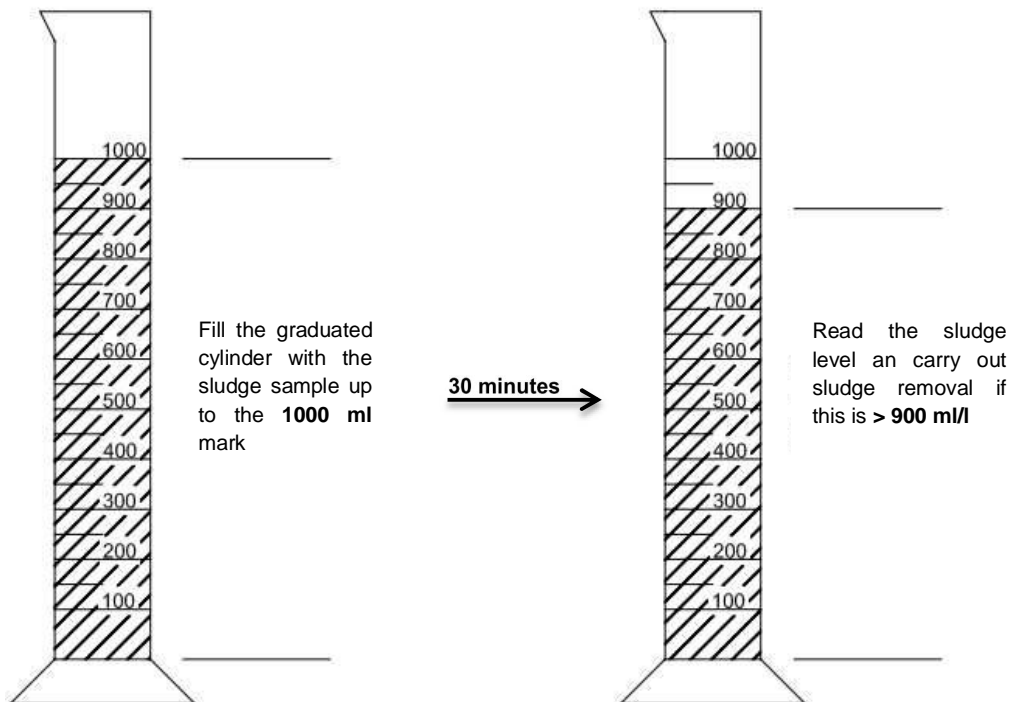
5.3 Determination of Sludge Removal

In order to determine the need for sludge removal in the wastewater treatment system, a settling test should be carried out at maintenance intervals. For this settling test, the SV30 is measured. The SV30 is the sludge volume occupied by 1000 ml of activated sludge after a settling period of 30 minutes. It is a measure of the amount of sludge present in the wastewater treatment system.

Measurement of the SV30 is carried out in a 1000 ml graduated cylinder.

The following points must be observed during this measurement:

6. Turn ventilation on - if not active - and allow to mix for a short time
7. Submerge the scoop into the tank and remove sludge sample
8. Fill the graduated cylinder with the sludge sample up to the 1000 ml mark
9. Let the cylinder containing the sample stand in a place free from vibrations for 30 minutes
10. Read the sludge level and carry out sludge removal if this is > 900 ml/l
11. After emptying the tank have to be filled up with fresh water again



5.4 Sludge Removal

Removing sludge from the wastewater treatment system should be carried out according to the following points:

7. Remove the cover
8. Remove the deposits on the water surface and on all visible surfaces (baffle, sample container, siphon)
9. Wash down the visible surfaces
10. Insert the suction hose into the wastewater treatment tank until it reaches the floor
(CAUTION: air admittance valves on the ground must not be damaged!)
11. Aspirate until about 30 cm of wastewater and sludge remain in the wastewater treatment system

6. Fault Messages and Troubleshooting

6. Fault Messages and Troubleshooting

Technical problems of system operation (failure of a unit) are visually displayed.

6.1 System Behaviour after switching off the Power Supply

If the system is disconnected from the mains (e.g. power failure), the control program and the counted operating hours are retained due to the memory of the control system. The red LED will light up. When the system is supplied with power again, it will self-start.

NOTE: If the system is disconnected from the mains for more than 24 hours, cleaning of the existing wastewater is not or is only possible to a very limited extent.

6.2 Fault Message in the Display

Faults are shown as text or as numbered codes on the liquid crystal display. The operating control lamp then lights up red.

The numbered fault codes are explained below:

6. Power failure (system is de-energised)
7. Power returned (system is supplied with power again)
8. Compressor has overcurrent
9. Compressor power supply too low
10. Manual operation

The displays no. 2 (power returned) and no. 5 (manual mode) are not faults in the proper sense. These are only registered as fault messages for better time limitations of any faults that occur and for monitoring manual activities on the control system.

Table 2: **Fault Causes and Troubleshooting**

Display	Possible cause	Remedy
Mains failure No display, no light	<ul style="list-style-type: none"> • Power failure • System turned off • There is no voltage at the control cabinet. 	<ul style="list-style-type: none"> • Check the power supply to the system and to the control system • Turn system back on • Check supply to the control cabinet • Wait for resumption of power supply
No display, light is green		<ul style="list-style-type: none"> • Turn system off and back on again after 10 seconds
Mains returned	<ul style="list-style-type: none"> • Power available again 	
Set the clock	<ul style="list-style-type: none"> • Internal clock/date not set 	<ul style="list-style-type: none"> • Set date and time via menu item
Compressor **overcurrent**	<ul style="list-style-type: none"> • Short-circuit 	<ul style="list-style-type: none"> • Check supply to the control cabinet
Compressor **current too low**	<ul style="list-style-type: none"> • Compressor does not work / is not receiving power 	<ul style="list-style-type: none"> • Check the compressor in manual mode
Manual operation	<ul style="list-style-type: none"> • System was activated manually in manual mode 	

6. Fault Messages and Troubleshooting

6.3 Unusual Water Levels - Fixing a Fault

Observation	Possible cause	Remedy
The water level in the activation tank is unusually high	<ul style="list-style-type: none"> • System is running in holiday mode • System runs continually in cycle pause • Control system settings are incorrect • The drain siphon is clogged • The air hose to the drain siphon is leaking • System has been flooded from external water source and not allowing water to drain from the system • Control system is defective 	<ul style="list-style-type: none"> • End holiday mode • Have the control system settings checked by the maintenance technician • Allow tank to be pumped out and clean siphons • Seal hose connections • Wait out flooding • Get in touch with maintenance company
The system smells, the treated water is cloudy or discoloured	<ul style="list-style-type: none"> • Too little air is entering the system • Single-sided ventilation due to defective air admittance valves 	<ul style="list-style-type: none"> • Have service company increase ventilation time • Check the ventilation, get in touch with maintenance company
Ventilation is one-sided or large air bubbles appear at points	<ul style="list-style-type: none"> • Membrane unit is defective • Seal leaky air admittance valves 	<ul style="list-style-type: none"> • Get in touch with maintenance company • Get in touch with maintenance company

7. Operating Notes

Essentially, the system should only be supplied with materials that correspond to domestic wastewater in their characteristics.

Biocides, materials with a toxic effect or materials that are not biologically compatible or degradable must not enter the system, as these lead to biological process problems. The following, in particular, should not be introduced into the system:

- Rainwater from roofs and courtyards,
- Extraneous water (e.g. drain water)
- Residues from livestock in solid or liquid form,
- Industrial or agricultural wastewater, as far as it is not comparable to domestic wastewater,
- Chemicals, pharmaceuticals, mineral oils, solvents,
- Cooling water,
- Coarse materials in the form of food scraps, plastics and hygiene products, face wipes, coffee filter papers, bottle caps and other household items,
- Milk and dairy products
- Drain water from swimming pools,
- Large amounts of blood.

In the case of large amounts of fats or vegetable oils, it is recommended that the fatty wastewater is pre-treated in one of the grease traps upstream of the wastewater treatment system (Caution: No faeces may be introduced into the grease trap!).

7. Operating Notes

The following is a list of individual substances which must not be disposed of via the wastewater treatment system:

Solid or liquid substances that do not belong in the sink or in the toilet:	What it does:	Where it should go:
Ash	Does not decompose	Dustbin
Chemicals	Contaminates wastewater	District collection point
Disinfectants	Kills bacteria	Do not use
Paints	Contaminates wastewater	District collection point
Frying fat	Accumulates in pipes and leads to blockages	Dustbin
Adhesive plasters	Clogs pipes	Dustbin
Cigarette ends	Accumulates in the system	Dustbin
Condoms	Causes blockages	Dustbin
Corks	Accumulates in the system	Dustbin
Medication	Contaminates wastewater	Pharmacy
Engine oil	Contaminates wastewater	District collection point
Oily waste	Contaminates wastewater	District collection point
Plant protection products	Contaminates wastewater	District collection point
Paintbrush cleaner	Contaminates wastewater	District collection point
Cleaning agents, except those which are chlorine-free (environmentally friendly)	Contaminates wastewater, corrodes pipes and seals	District collection point
Razorblades	Causes risk of injury for workers in sewers and wastewater treatment systems	Dustbin
Drain cleaner	Corrodes pipes and seals, contaminates wastewater	District collection point
Pesticides	Contaminates wastewater	District collection point
Panty liners/Sanitary towels	Leads to blockages, non-degradable plastic film spoil water	Dustbin
Cooking oil	Leads to deposits and pipe blockages	District collection point
Food leftovers	Lead to blockages, attracts rats	Dustbin
Wallpaper paste	Leads to blockages	District collection point
Textiles (e.g. nylon tights, cloths, handkerchiefs, etc.)	Clogs pipelines, can cripple a pumping station	Charity shop
Thinner	Contaminates wastewater	District collection point
Bird sand, cat litter	Leads to deposits and pipe blockages	Dustbin
Cotton buds/Face wipes	Clogs the system	Dustbin
Toilet blocks	Contaminates wastewater	Do not use
Nappies	Clogs pipes	Dustbin
Cement water	Creates deposits, becomes concrete	Send to a specialist company

8. EC Declaration of Conformity

8. EC Declaration of Conformity

Manufacturer: Otto Graf GmbH
Carl-Zeiss-Straße 2-6
D-79331 Teningen

hereby declares that the product **one2clean** small sewage treatment system complies with the following Directives:

2006/42/EC Directive of the European Parliament and of the Council, dated 17 May 2006, on machinery, and amending Directive 95/16/EC.

2006/95/EC "Directive of the Council relating to electrical equipment designed for use within certain voltage limits"

The following harmonised standards have been applied:

EN 60204-1 Electrical equipment of machines Part 1: General requirements

EN ISO 13849-1 Safety of machines - Safety-related parts of control systems - Part 1: General principles for design

This EC declaration of conformity becomes invalid if the product is modified without consent.

Teningen, 22.02.14



Arne Schröder
(Product Management Team Leader)

9. Declaration of Performance

9. Declaration of Performance

Declaration of performance one2clean



Nr. 008/Translation

1. Unique identification code of the product-type	EN 12566-3: Small wastewater treatment system
2. Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4)	one2clean 3-18 Inhabitants Type size and serial number on control cabinet type plate
3. Intended use or uses of the construction product, in accordance with the applicable harmonised technical specification, as foreseen by the manufacturer	Cleaning domestic wastewater in a volume of up to 150 l per inhabitant and day with a maximum pollution load of 0.06 kg/BOD ₅ per inhabitant and day
4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5)	Otto Graf GmbH Kunststoffzeugnisse Carl-Zeiss-Str. 2-6 79331 Teningen Germany
5. System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V	System 3
6. The notifying authority PIA (Prüfinstitut für Abwassertechnik GmbH) - NB 1739 - tested the cleaning performance of the wastewater treatment system. The Carat tank were tested for stability, leaks, durability and fire behaviour, see number 7. The fire behaviour of the Carat XL tank was tested by the Hoch test institute - NB 1508.	

7. Declared performance		
	Performance	Test report No.
Treatment efficiency	COD: 96,2 % 26 mg/l BOD ₅ : 98,6 % 5 mg/l NH ₄ -N: 99,0 % 0,4 mg/l N _{tot} : 79,1 % 13 mg/l SS: 98,6 % 6 mg/l	PIA2013-181B14
Watertightness	Passed	PIA2008-WD-AT0805-1027b
Crushing resistance	Passed	PIA2008-ST-AT0804-1019
Durability	Passed	PIA2008-ST-AT0710-1020+DH
Reaction to fire	Class E	PIA2013-FR-1306-1039

8. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 7. This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.

Signed for and on behalf of the manufacturer by:

I.V. Arne Schröder
Team leader, product management

Teningen, 22.01.2014

10. Technical Data of the Control System

10. Technical Data of the Control System

- Programmable logic microcontroller
- T3,15A fuse (internal)
- Wide-range 100-240 VAC/50-60 Hz power supply
- Real-time clock with 5 min/a deviation, battery back-up
- Logbook, non-volatile
- Cable break monitoring for compressors by measuring output currents
- Operating/error message display with LED (green/red)
- Operating temperature range: 0°C to +55°C
- Permissible temperature range outside of operation: -20°C to +85°C
- relative humidity: 10% to 95%, no condensation
- Degree of protection IP54, front side (with properly glued front foil)
- 4-key control panel
- Display: 2 lines of 16 characters with backlighting (blue)
- Outputs:
 - o 230 VAC 50Hz compressor (standard),
 - o 2x 24 VDC step motors/solenoid valves for compressed air flow