



DELFIN PRO PREMIUM/MBBR

OPERATION MANUAL

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**Compliance with the standard
PN-EN-12566-3-A2:2013**

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Only materials in accordance with the manufacturer's specifications should be used.

Installation should follow the instructions in the operation manual. Any exceptions must be agreed with the equipment manufacturer and confirmed by a dedicated, separate technical design.

Scope solutions that go beyond the operating and installation instructions require agreement with the equipment manufacturer

1. DELFIN PRO WASTEWATER TREATMENT PLANT.

1.1 Purpose and equipment.

DELFIN PRO wastewater treatment plant is design to treat household wastewater for 6 p.e. and 12 p.e. The minimum amount of wastewater in relation to Q_{davg} and contamination loads, when it is possible to start up the treatment process in the wastewater treatment plant, is 50%.

If a pump station is used before the wastewater treatment plant, it must be properly selected, i.e. it must have a properly small flow (small working capacity of the pump station or very little pump efficiency).

Table Standard equipment of DELFIN PRO wastewater treatment plant.

Wastewater treatment plant components	DELFIN PRO 6	DELFIN PRO 12
PE-HD tank with cast partitions	2 560 dm³ 1 pc.	4 500 dm³ 1 pc.
▪ with preliminary sedimentation tank	1 260 dm ³ 1pc.	2 190 dm ³ 1pc.
▪ with screens on the inlet deflector to the aeration chamber	2 pc.	2 pc.
▪ with aeration chamber with aeration diffuser and air supply tubes	660 dm ³ 1 pc.	1 230 dm ³ 1 pc.
▪ with screens on outlet deflector with aeration chamber	2 pc.	2 pc.
▪ with fluidal bed in aeration chamber	-	-
▪ with secondary sedimentation tank with two „mammoth” pumps and air supply tubes	640 dm ³ 1 pc.	1 080 dm ³ 1 pc.
Control cabinet	1 pc.	1 pc.
▪ control box	1 pc.	1 pc.
▪ with blower	1 pc.	1 pc.
▪ controller	1 pc.	1 pc.

The operation of the wastewater treatment plant depends highly on the performance of sewage system and its service and on what is supplied together with wastewater to the wastewater treatment plant. **IT SHOULD BE REMEMBERED THAT THE WASTEWATER TREATMENT PLANT IS NOT A WASTE BASKET!**

Therefore:

- It is forbidden to throw into the toilet bowls sanitary materials: sanitary napkins, towels, cotton wool, etc.

- It is forbidden to discharge solids (e.g. PET bottles, rags, gloves, etc.) into the sewer system.
- It is recommended to limit the entry of sand into the sewer.
- It is recommended that cleaning products containing chlorine or large amounts of detergents are not used in excess.

The afore-mentioned factors have a very negative impact on the operation of appliances in the wastewater treatment plant or treatment process – especially pumps, valves and overflows.

DELFIN PRO 6 PREMIUM MBBR WASTEWATER TREATMENT PLANT.

Figure 1.



DIVISION INTO CHAMBERS DELFIN PRO 6 WASTEWATER TREATMENT PLANT.

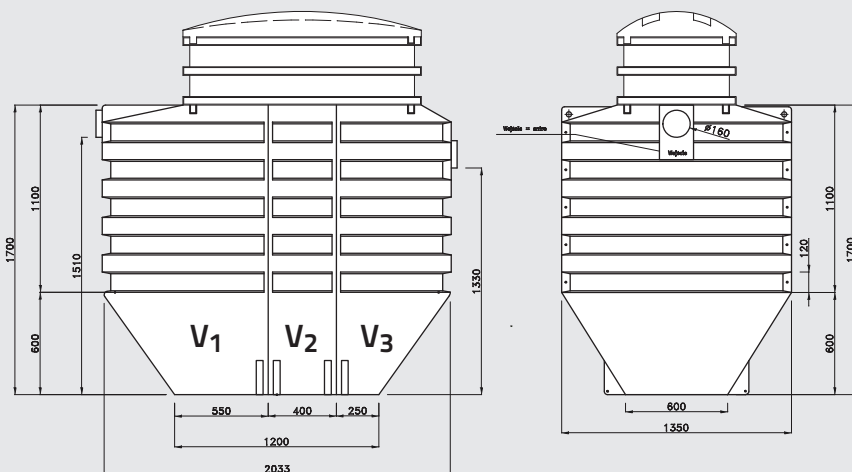


Figure 2a. Division into chambers DELFIN PRO 6 wastewater treatment plant.

EXPLANATION:

- V₁** - preliminary sedimentation tank
 $V = 1\,260\text{ dm}^3$
- V₂** - aeration chamber $V = 660\text{ dm}^3$
- V₃** - secondary sedimentation tank
 $V = 640\text{ dm}^3$

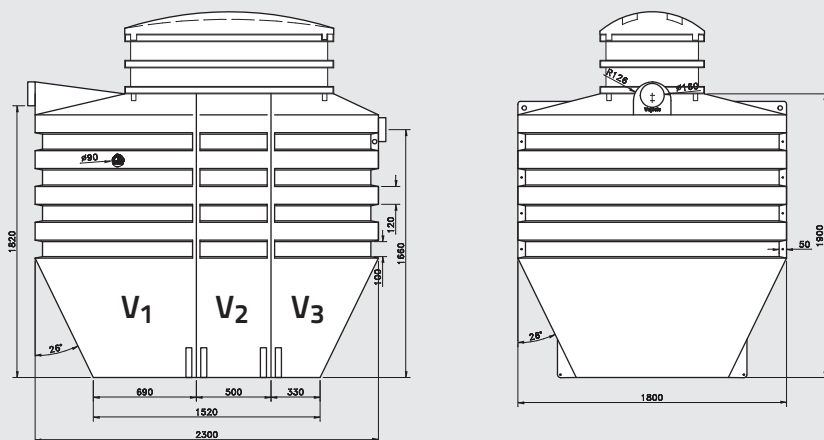


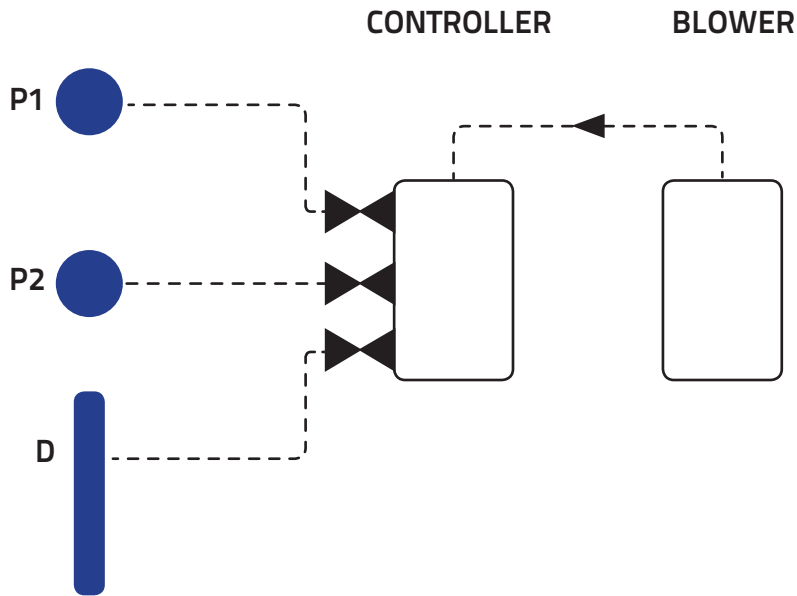
Figure 2b. Division into chambers DELFIN PRO 12 wastewater treatment plant.

EXPLANATION:

- V₁** - preliminary sedimentation tank
 $V = 2\,190\text{ dm}^3$
- V₂** - aeration chamber $V = 1\,230\text{ dm}^3$
- V₃** - secondary sedimentation tank
 $V = 1\,080\text{ dm}^3$

FLOW CHART OF TECHNOLOGICAL (BASIC) INSTALLATION OF DELFIN PRO WASTEWATER TREATMENT PLANT.

Figure 3.



EXPLANATION:

-  P1 - excessive sludge circulation pneumatic pump
-  P2 - excessive sludge discharging pneumatic pump
-  D - sewage aeration diffuser
-  air hose PEX 16 mm

1.2. Wastewater treatment technology.

FLUIDISED BED TECHNOLOGY (SUSPENDED) - DELFIN PRO PREMIUM MBBR.

MBBR MBBR - Moving Bed Biofilm Reactor is a high performance wastewater treatment technology that has been gaining increasing recognition in the world for several years.

In the MBBR technology the biofilm suspended on fittings is mixed in the aeration chamber by compressed air. The biofilm, covering the fitting surface, has optimal conditions for growth and ensured optimal supply of oxygen and organic substances to bacteria and higher microorganisms.

The conditions conducive to bacterial growth, huge biofilm concentration and high oxygen concentration in the MBBR technology cause that several times more contamination is removed per day than in traditional wastewater treatment plants with active sediment.

The microorganisms in the biofilm are much more resistant to major COD, BOD5, pH and temperature changes. The use of moving bed ensures:

- ④ stabile wastewater treatment plant operation
- ④ ability to accept larger contamination loads
- ④ speed of BOD5 and nitrogen removal
- ④ lack of clogging and self-cleaning
- ④ high resistance to pH and temperature changes
- ④ ability to use the technology to every reactor shape
- ④ high media resistance

ACTIVE SEDIMENTATION TECHNOLOGY - DELFIN PRO PREMIUM.

In the active sediment technology an actual wastewater treatment is carried out by active sediment biomass located in the aeration chamber and freely suspended in wastewater. DELFIN PRO wastewater treatment plants are flow reactors, designed on the base of one tank in which there are 3 chambers:

1. Preliminary sedimentation tank (sediment storage and concentration)
2. Activated sludge chamber (aeration)
3. Secondary sedimentation tank

The wastewater treatment technology includes the following processes:

1. Suspension sedimentation and sediment storage, concentration and partial fermentation in the preliminary sedimentation tank,
2. Oxidation of organic compound in the aeration chamber with participation of active sediment (nitrification not included in calculations),
3. Zone suspension sedimentation in the secondary sedimentation tank.

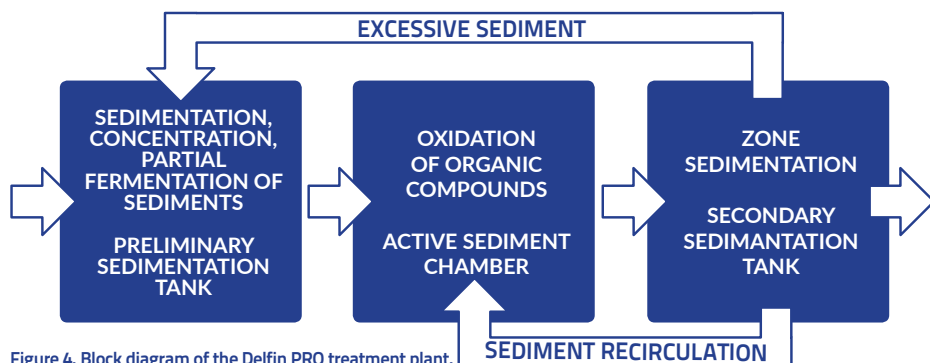


Figure 4. Block diagram of the Delfin PRO treatment plant.

1.3. CONCENTRATION OF TREATED WASTEWATER.

The DELFIN PRO wastewater treatment plant technology involves the wastewater treatment to the following indices:

④ $S_{O_{BOD5}} \leq 40 \text{ g O}_2/\text{m}^3$

④ $S_{O_{COD}} \leq 150 \text{ g O}_2/\text{m}^3$

④ $S_{O_{\text{og.cont}}} \leq 50 \text{ g/m}^3$

1.4. Number of served occupants and amount of wastewater.

Number of occupants M:

④ $M = 6$ for (DELFIN PRO 6).

④ $M = 12$ for (DELFIN PRO 12).

A theoretically assumed unit amount of water used by one occupant per day (for household purposes) is:

④ $q_{\text{avg}} = 0,15 \text{ m}^3/\text{d}$

Flow – design values	DELFIN PRO 6	DELFIN PRO 12
Average daily wastewater amount $Q_{\text{davg}} =$	0,90 m ³ /d	1,80 m ³ /d
Maximum daily wastewater amount $Q_{\text{dmax}} =$	1,35 m ³ /d	2,70 m ³ /d
Maximum hourly wastewater amount $Q_{\text{hmax}} =$	0,09 m ³ /h	0,18 m ³ /h
Minimum daily wastewater amount $Q_{\text{dmin}} =$	0,45 m ³ /d	0,90 m ³ /d

1.5. Balance of contamination loads in raw wastewater.

Bilans ładunku zanieczyszczeń *	DELFIN PRO 6	DELFIN PRO 12
Daily load BOD_5 : $L1BOD_5 =$	360 g O_2 /d	720 g O_2 /d
Daily load COD: $L1COD =$	720 g O_2 /d	1 440 g O_2 /d
Daily load of general suspension: $L1og.cont. =$	420 g/d	840 g/d

*design values

1.6. Concentration of contamination in raw wastewater.

- BOD_5 concentration: $S1_{BOD_5} = 400 \text{ g } O_2 / m^3$
- COD concentration: $S1_{COD} = 800 \text{ g } O_2 / m^3$
- Concentration of general suspension: $S1_{og.cont.} = 467 \text{ g} / m^3$

1.7. Preliminary sedimentation tank.

The capacity of the preliminary sedimentation tank is:

- $V_{p.s.t.} = 1,26 \text{ m}^3$ for DELFIN PRO 6,
- $V_{p.s.t.} = 2,19 \text{ m}^3$ for DELFIN PRO 12.

Raw wastewater and excessive sediment from the secondary sedimentation tank is supplied to the preliminary sedimentation tank. Therefore the sedimentation tank has 2 tasks:

1. to maintain easy and medium settling suspension,
2. to collect preliminary and excessive sediment till its disposal (with possible partial fermentation)

1.8. Aeration chamber.

Wastewater pre-treated in the preliminary sedimentation flows to the aeration chamber. The chamber's task is to treat wastewater by active sediment.

The capacity of the aeration chamber is:

- $V_{p.s.t.} = 0,66 \text{ m}^3$ for DELFIN PRO 6,
- $V_{p.s.t.} = 1,23 \text{ m}^3$ for DELFIN PRO 12.

1.9. Secondary sedimentation tank.

The secondary sedimentation tank is to separate active sediment from treated wastewater. Treated wastewater are disposed from the sedimentation tank to the receiver or other appliance, e.g. polishing lagoon (a lagoon with under-surface wastewater flow is recommended).

Active sediment is returned to the aeration chamber or it is discharged to the preliminary sedimentation tank in the form of excessive sediment.

The capacity of the secondary sedimentation tank is:

- Vs.s.t. = 0,64 m³ dla DELFIN PRO 6,
- Vs.s.t. = 1,08 m³ dla DELFIN PRO 12.

1.10. Control cabinet and blower.

CONTROL CABINET.

The control cabinet includes all necessary elements and appliances for a correct operation of the wastewater treatment plant, i.e.: control box with electrical protection and timers, blower,

solenoid valves and alarm signalling (light and sound).

See page 15 for description and connection of the control cabinet.

BLOWER.

An optimum air amount will be ensured by the following blower.

For DELFIN PRO 6 – 40 with the capacity of about 40 dm³/min at the working pressure of 12,8kPa. Power demand for one blower is 38W.

For DELFIN PRO 12 – 60 with the capacity of about 60 dm³/min at the working pressure of 15,0kPa. Power demand for one blower is 51W. The blower is located in the control cabinet and connected to the distributor by a tube with nominal diameter of 16mm. The connection of the blower with appliances is presented in the technological installation scheme of the wastewater treatment plant. Figure 3.

CONTROL SYSTEM.

The control system includes alarm signalling and time controllers with solenoid valves. Depending on the type it may have a probe for automatic switching for holiday mode. The box with the control system is placed in a control cabinet.

It is recommended to place a 6kg dry-powder (carbon dioxide) extinguisher near the control box (at a distance of max. 30m). The box should have a mark – warning against hazardous electric voltage.

The connection of the air ducts must be carried out according to the instruction in chapter 2.2, page 15-16

1.11. Recirculation and excessive sediment.

The recirculation is ensured by 2 mammoth pump with diameter of 50 mm.
PM 2"-type air lift pumps are selected.
The selected pumps will operate cyclically to maintain proper sediment concentration in the aeration chamber.

The operation and break time is determined in the factory; during the start-up the settings can be changed only by authorised persons (Delfin technician, installation contractor).

1.12. Ventilation.

The ventilation system is a very important element of the wastewater treatment plant. Its solutions may vary for particular wastewater treatment plants depending on the location conditions of the wastewater treatment plant and on applied additional solutions, e.g. a raw wastewater pump station that breaks the natural ventilation system of the sewage system and the objects located on it.

The basic system of the wastewater treatment plant is ventilated by the gravity sewage system. The ventilation system solution is at the discre-

tion of the designer adapting the wastewater treatment plant or at the discretion of the installer of the wastewater treatment plant who has detailed knowledge of the specific the location conditions of the wastewater treatment plant. After the wastewater treatment plant start-up and running-in period (e.g. when some sediment is collected) the ventilation system performance should be tested. If according to the tests, the accumulation of explosive gases (methane, hydrogen sulphide) is suspected, an additional mechanical ventilation system should be installed.



2. INSTALLATION INSTRUCTION FOR THE DELFIN PRO WASTEWATER TREATMENT PLANT.

2.1. Installation of wastewater treatment plant tank.

The tank (DELFIN PRO wastewater treatment plant) should be located in a place unloaded by vehicle traffic. The wastewater treatment plant should be installed at a safe distance from designed or existing structures to avoid unsymmetrical, one-sided load increase of the tank walls, transmitted by the foundations of these objects. The tank cover must protrude above the ground surface and be accessible to the septic car during

a periodical sediment disposal operation. The size do the excavation depends on the tank dimensions and shape.

Prior to the installation of the tank, detailed geological surveys should be carried out to determine a variable level of ground water in the wetland zone. The assessment of the ground and water conditions enables the execution of proper tank protection.

The DELFIN PRO tank installation method depending on the ground and water conditions is presented below.

I Variant.

- ④ height of the backfilling above the tank maximally - 80 cm
- ④ depth of the tank bottom for 6 p.e. maximally - 250 cm
- ④ depth of the tank bottom for 12 p.e. maximally - 270 cm
- ④ admissible load by the pedestrian traffic maximally 2,5 kN/m²
- ④ maximum level of the underground water surface below the tank bottom
- ④ on site permeable soils (sands)

When all the above-mentioned conditions are met, use the following installation scheme:

STEP 1: Execute an excavation for the wastewater treatment plant tank. The tank cannot adhere to the excavation walls and be exposed to protruding stones or rough surfaces. Min. 20cm space round the sedimentation tank should be planned for an absorbing layer.

STEP 2: When the foundation depth of the tank bottom is determined, execute a bed of sand with thickness of min. 20 cm on the excavation bottom. This layer of sand should be carefully compacted and levelled.

STEP 3: Set the tank on the prepared bed of sand and check the tank levelling.

STEP 4: Connect the PCV 160 mm inlet and outlet pipes. The wastewater flow direction is marked by „entry“ and „exit“ overprints located under the PCV 160 pipes.

STEP 5: Start filling the tank with water by means of a hose, putting sand around the tank at the same time. Fill each tank chamber with water up to about 1/3 of the tank capacity and then execute an equal sand pack on the whole tank perimeter up to the height of the water level in the tank. The sand pack should be executed layer by layer (of

20 cm thick each) and compacted with water (the use of mechanical compactors to harden the sand pack around the tank is forbidden).

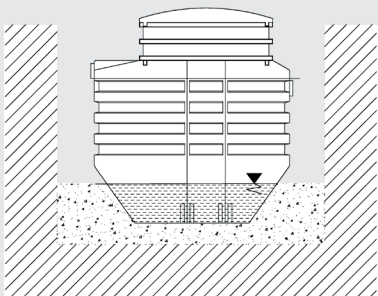
STEP 6: Fill the tank chambers with water up to 2/3 of the tank capacity and proceed as above. When the sand pack is executed up to the level of 2/3 of the tank capacity, add water once again and execute next layers of the sand pack.

STEP 7: When the chambers are filled with water, check the connection of inlet and out pipes with the tank for leak tightness.

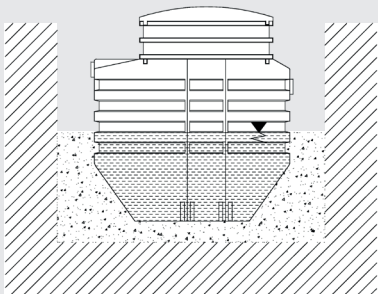
STEP 8: The control cabinet should be installed near the tank in a proper place according to the design. For the 6 p.e. wastewater treatment plant the cabinet should be located maximally 5 m from the tank. For the 12 p.e. wastewater treatment plant the maximum distance of the control cabinet is 6 m. The power supply of the wastewater treatment plant should be commissioned to an electrician and executed according to a separate design. The installation of the wastewater treatment plant and control cabinet power cord should be executed according to the terms and conditions for the connection to the low voltage network system.

STEP 9: The PEX DN 16 mm air tubes inside the tank of the wastewater treatment plant should be laid in a shallow excavation to the depth of 40 cm between the tank and the control cabinet. The ends of the PEX DN 16 mm air tubes should be connected to the proper shut-off valves located in the control cabinet according to the PRO technological installation scheme.

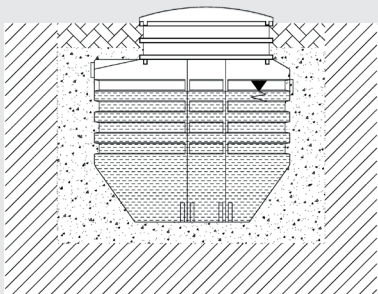
STEP 10: Start covering the tank, inlet pipe, outlet pipe and air tubes with sand and soil. The backfilling layer above the wastewater treatment plant tank should not be thicker than 80 cm.



- Wastewater level
- Backfilling - sand
- Native soil



- Wastewater level
- Backfilling - sand
- Native soil



- Wastewater level
- Backfilling - sand
- Native soil
- Embankment

II Variant.

- ② height of the backfilling above the tank from 80 to maximally 100 cm
- ② depth of the tank bottom for 6 p.e. from 250 to maximally 270 cm
- ② depth of the tank bottom for 12 p.e. from 270 to maximally 290 cm
- ② admissible load by the pedestrian traffic maximally 2,5 kN/m²
- ② maximum level of the underground water surface up to 50 cm from the tank bottom
- ② on site poorly permeable and impermeable soils (silty sands, loamy sands, clay, loams)

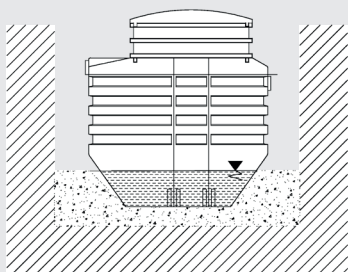
If all the above conditions are met, the following installation scheme should be used:

In the event of one or more of the above circumstances, additional protection should be provided in the form of a sand-cement backfill with a minimum ratio of 150 kg cement per 1m³ of sand. You can order a ready mix from a concrete batching plant or prepare a carefully dry mix on site. Install the treatment plant tank in the dry season, when the groundwater level is lowered, or lower the groundwater level below the level of the tank bottom foundation for the period of installation.

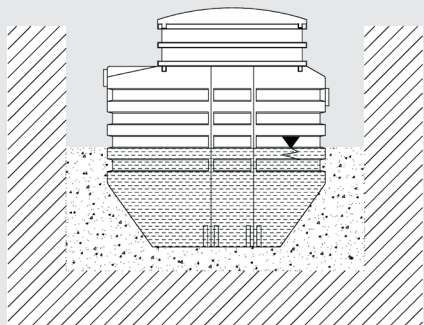
The procedure is the same as in the first installation variant. Only difference is that a sand and cement mix should be used for the bed and pack of the tank in place of sand itself.

When using the sand and cement pack its compaction with water is not necessary.

The total thickness of the backfilling layers above the tank for the second installation variant should not exceed 100 cm.



-  Wastewater level
-  Backfilling - sand with cement
-  Native soil



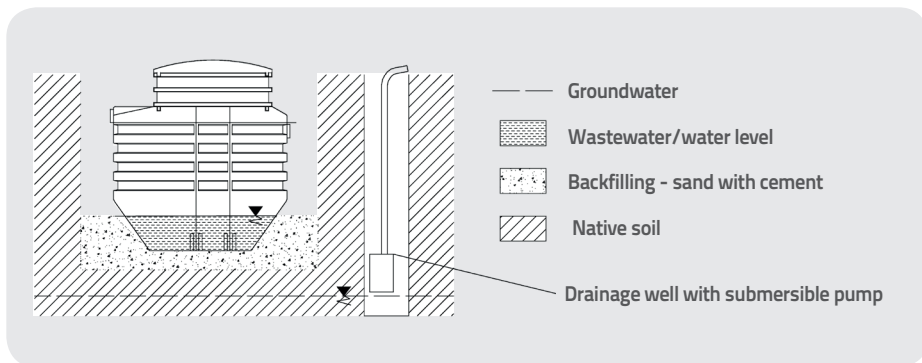
-  Wastewater level
-  Backfilling - sand with cement
-  Native soil

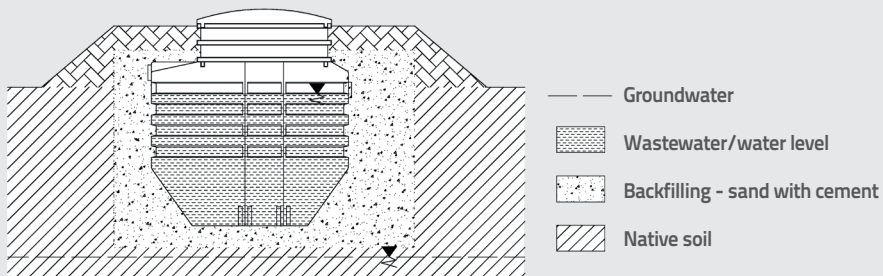
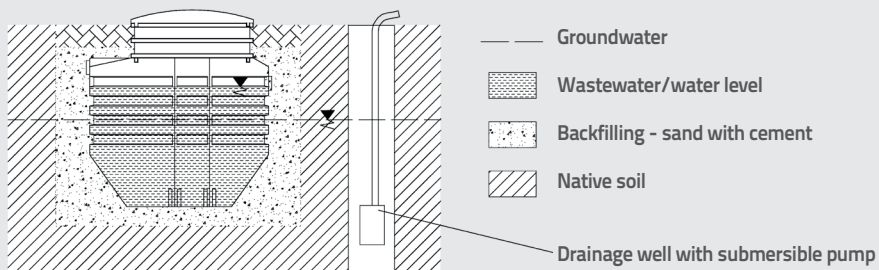
III Variant.

- ④ height of the backfilling above the tank over 100 cm
- ④ depth of the tank bottom for 6 p.e. over 270 cm
- ④ depth of the tank bottom for 12 p.e. over 290 cm
- ④ admissible load by the pedestrian traffic maximally 2,5 kN/m²
- ④ maximum level of the underground water surface over 50 cm from the tank bottom.

Every case mentioned in the third installation variant requires an individual design of the tank foundation prepared by an authorised person (calculation of additional strengthening measures in the form of ballast plates, anchoring strips, concrete slab on the excavation bottom, retaining wall and concrete slab above the appliance). In the afore-mentioned cases the DELFIN PRO wastewater treatment plant of the modified construction should be used. The connection of the extension above the wastewater treatment plant chambers must be sealed. The pack of the tank should be executed as a sand and cement pack in the proportion of minimum 150 kg of cement per 1m³ of sand. Installation of the tank should be carried out during the dry season when there is a lowered groundwater level, or the groundwater level should be lowered at the tank's foundation for the period of installation.

During the tank installation the level of ground water should be lowered below the level of the tank bottom foundation by means of a collection well with submersible pump or by means of a system of wellpoints in case of soils of medium and little permeability. When the installation is completed the collection well is used as a piezometer showing a current state of ground water. Additionally, the level of ground water can be lowered during the disposal for the sediment from the preliminary sedimentation tank chamber by means this collection well. Alternatively, in the case of high groundwater or a deep foundation of the tank, the DELFIN SP 800 pumping station with raw sewage pump should be used and the treatment tank should be placed in an embankment. The embankment should be of such height that the tank bottom is max. 50 cm below the groundwater level. The height of the embankment should be such that the bottom of the tank is max. 50 cm below groundwater level.





ATTENTION !!!

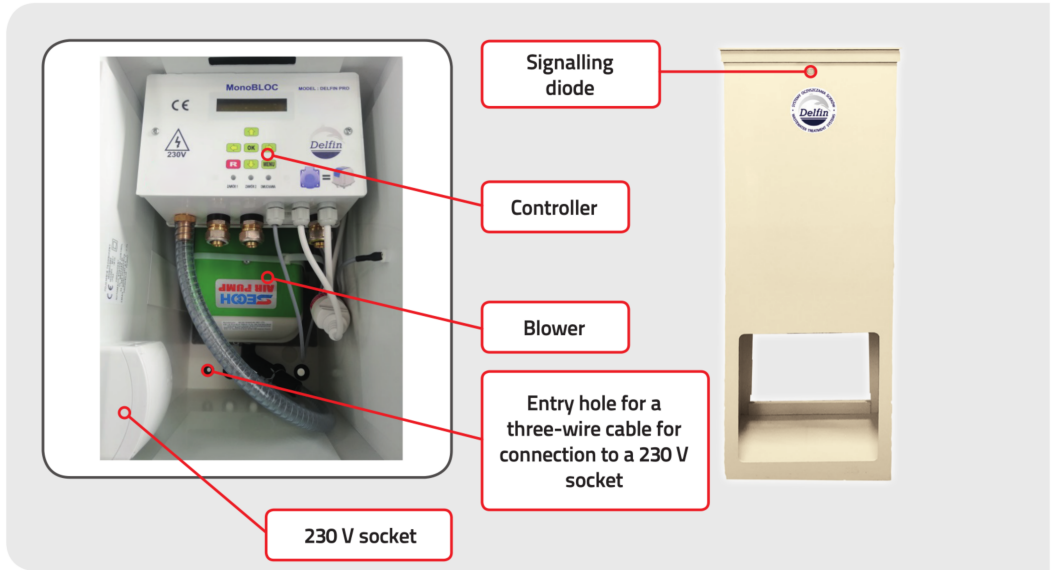
It is not permitted to install the treatment plant with a backfilling thickness of more than 80 cm above the tank without protection. Installation in waterlogged soil (groundwater table above the tank bottom) without special protection is prohibited (solutions described in Variants I-III). It is prohibited to locate the treatment plant tank in a place exposed to traffic loads. In the event of poor groundwater conditions, it is necessary to consult an authorised representative of DELFIN Sp. z o.o.

2.2. Installation of the control cabinet.

As standard, it is designed to install the power/control cabinet within 5 m of the tank.

External view of the power/control cabinet with visible LED (green -OK, red - EMERGENCY).

Internal view of the power/control cabinet with the blower, controller and 230V power socket visible.



The power/control cabinet should be buried in the ground up to the height marked on the housing.

After the control cabinet has been placed in an excavation at a suitable depth near the treatment plant, not more than 5 m away, it is necessary to:

1. Loosen the two screws with a 10 spanner on both sides of the cabinet and remove the cover.



2. Insert the three-wire power cable into the control cabinet through the opening in the bottom plate of the cabinet into the socket at the top.



Attention:

Leave slack (one coil or „s“-shaped excess) on the cable under and above the bottom panel of the cabinet before plugging it into the socket.

3. plug the cable into a 230 V socket
4. lead the air pipes from the treatment plant out of the tank through three holes in the rubber gasket located in the tank casing of the treatment plant and into the base of the control cabinet in a 40 cm deep trench
5. Insert 16 mm diameter air ducts from the treatment plant through the openings in the bottom plate of the enclosure, colour-coded as follows.



Attention:

On all air ducts under and above the bottom plate of the enclosure, leave slack on the ducts before bolting them together (s-shaped excess with attention paid to whether the duct has kinked)

6. Connect the air ducts to the colour-coded connections on the controller and screw the fittings together.

The method and sequence of connecting the air ducts supplying the treatment plant equipment is shown in the picture below:



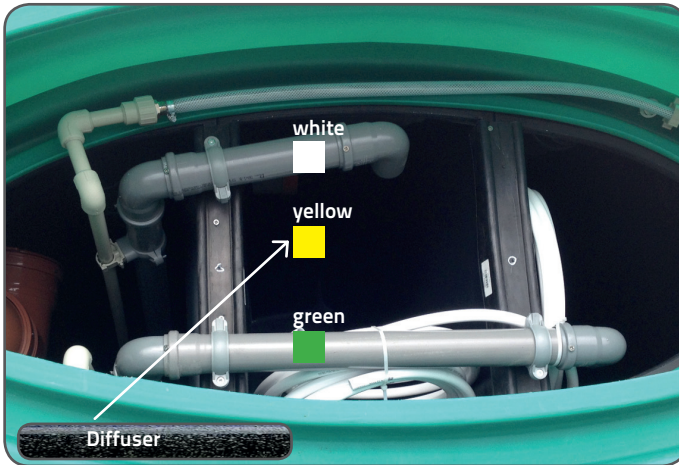
air duct
from the
blower to the
controller

white air
duct from the
controller to
mammoth
pump (sludge
recirculation)

green air
line from the
controller to the
mammoth pump
(recirculation of
surplus sludge)

yellow air
line from the
controller to the
diffuser (aeration)

Top view of the treatment plant chamber with equipment to be connected via colour-coded 16 mm PEX pipes.



Air duct colours and their functions in the wastewater treatment plant:

1. white - sludge recirculation
2. green - excess sludge recirculation
3. yellow - aeration

7. A blower must be connected to the controller by inserting the plug into the socket on the controller cable marked DMUCHAWA MAX (BLWER MAX) = 150 VA.
8. Connect the controller to the socket by inserting the plug and proceed with the start-up.
9. The assembled cabinet should be backfilled with soil to the depth marked on the enclosure and should be levelled.
10. After commissioning, close the cabinet by placing the cover over the top and tightening the two screws securing it.

ATTENTION !!!

CONNECTING THE CABLES MUST BE USED IN ACCORDANCE WITH THE COLOR MARKINGS

● PNEUMATIC CONNECTION

YELLOW	- DIFFUSER AERATION
WHITE	- RECIRCULATION OF SLUDGE
GREEN	- DRAIN OF EXCESS SLUDGE

● ELECTRICAL CONNECTION IN CABLE BOX 230 V

BROWN	- PHASE CONDUCTOR L
BLUE	- NEUTRAL CONDUCTOR N
YELLOW-GREEN	- PROTECTIVE CONDUCTOR PE

INSTALLATION WORK SHOULD BE PERFORMED BY PROFESSIONAL EMPLOYEE, WHO HAVE BEEN TRAINED IN THE INSTALLATION AND OPERATION OF DELFIN WASTEWATER TREATMENT PLANTS

Electrical supply to the wastewater treatment plant - supply/control cabinet.

The electrical supply of the treatment plant - the 230 V power/control cabinet - must be carried out by a service engineer (with the appropriate authorisation) and completed by presenting the results of the electrical measurements to the owner of the wastewater treatment plant.

The supply/control cabinet should have electrical protection in the form of a residual current circuit breaker and a B10 fuse installed in the electrical switchboard supplying the cable to the wastewater treatment plant cabinet.

3. START-UP OF THE WASTEWATER TREATMENT PLANT.

The (technological) start-up should be carried out by a qualified company.

It is recommended to use services offered by installation companies authorised by DELFIN Sp. z o.o.

During the start-up the operation correctness of the appliances is checked and the wastewater treatment plant is „run in“ to achieve proper parameters of treated wastewater.

The wastewater treatment plant can be started up if a daily wastewater flow amounts to minimum 50% of the designed average daily flow and the contamination load amounts to minimum 50% of the calculation contamination load. Less amount of wastewater may significantly hamper

or prevent the start-up of the wastewater treatment plant.

Excessive effluent volumes and pollutant loads can also cause difficulties or prevent the plant from starting up.

To make active sediment operational in the wastewater treatment plant it can be brought from the other (larger) wastewater treatment plant or it can be grown from the beginning. When active sediment is brought from the other wastewater treatment plant, treated wastewater is achieved much more quickly than in case of growing active sediment from the beginning. The start-up actions are decided by the installation company.

The commissioning of the wastewater treatment plant consists of the following steps:

1. Start the controller as follows.

The controller is started up by plugging the controller plug into a 230 V socket. After the controller is connected to the mains, the controller switches on automatically. The controller display shows „NOMINAL MODE“, the LED on the casing lights green. In the nominal mode, the controller cycles the purification devices: diffuser, pumps. In order to check the correct connection of the controller with the treatment plant equipment, perform the following steps.

After pressing the **MENU** the controller display shows the following messages:

SET DATE DD/MM/RRRR	To change the date, press OK and enter the correct date   when setting data confirming OK and proceed to the next settings 
SET CZAS GG/MM	To change the time, press OK and enter the correct time   when setting data confirming OK and proceed to the next settings 
MANUAL MODE	To enter the menu manual mode, press OK and by means of  or  to select the receiver and activate/deactivate it by pressing OK , to exit the menu, press the MENU
VALVE 1 OFF	To check the operation of sludge recirculation (the pump pumps wastewater from chamber three to chamber two) press OK and valve 1 is switched on, if the pump is pumping valve 1 is switched off by pressing OK and we proceed to the next settings 
VALVE 1 ON	To check the operation of excess sludge recirculation (the pump is pumping wastewater from chamber three to chamber one) press OK and valve 2 is switched on, if the pump is pumping valve 2 is switched off by pressing OK and we proceed to the next settings 
BLOWER SWITCHED OFF	To check aeration (the diffuser aerates the wastewater in chamber two) press OK and turn on valve 3, if the diffuser aerates valve 3 turn off by pressing OK and proceed to the next settings. 

2. Starting the inflow of wastewater to the wastewater treatment plant.
3. Verification by the installer/service engineer of the correct connection and operation of all plant equipment on the incoming wastewater in the controller's manual mode.
4. Instruction of the owner of the treatment plant by the installer/service engineer in the basic functions and operations of the wastewater treatment plant.

After the start-up period, biopreparation boosters can be used according to their manufacturer's recommendations.



NOTES:

1. Too little or too much wastewater and pollutant load may cause difficulties or make commissioning impossible.
2. Start-up of the wastewater treatment plant in winter at very low temperatures may be difficult due to ground and effluent cooling.



4. OPERATION OF WASTEWATER TREATMENT PLANT.

The wastewater treatment plant should be secured against unauthorised access.

4.1. Basic information.

During the warranty period, the wastewater treatment plant must be serviced once every 12 months and the individual units must be serviced according to the manufacturer's instructions. Failure to meet these dates will result in loss of warranty. The wastewater treatment plant is designed to treat domestic sewage according to the indicators specified in points 1.4-1.6. Proper operation of the wastewater treatment plant depends on the following factors. It is forbidden to throw or pour into sanitary facilities (e.g. sink, washbasin, toilet bowl, bathtub, shower, etc.) and directly into the wastewater treatment plant and sewage system:

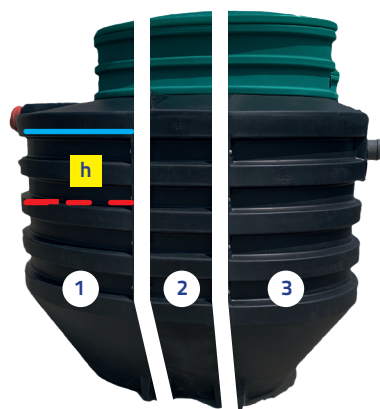
No.	Solid or liquid substances which must not be disposed of into the toilet, sink, drains and wastewater treatment plants	What these substances do	Handling of substances
1.	solvents, paints, varnishes and other chemicals	prevent the proper functioning of the WWTP	collection and transfer to a suitable disposal site
2.	construction materials e.g. cement, gypsum including water mixed with them	clog up the sewage system, settle in the wastewater treatment plant and do not decompose	collection and transfer to a suitable disposal site
3.	ash	clog up the sewage system, settle in the wastewater treatment plant and do not decompose	collection and transfer to a suitable disposal site
4.	litter/sand (including for animal faeces)	clog up the sewage system, settle in the wastewater treatment plant and do not decompose	collection and transfer to a suitable disposal site
5.	grease, petrol, oils and other oil-containing wastes	prevent the proper functioning of the WWTP	collection and transfer to a suitable disposal site
6.	Wet wipes, sanitary napkins, condoms, nappies, plasters, cotton buds, foil, cigarette butts and other solid waste	clog the sewage system, settle in the wastewater treatment plant and are not decompose	collection and transfer to a suitable disposal site
7.	ground waste, e.g. bones, refuse vegetables, fruit (in mills in sinks and macerators),	They clog up the sewerage system, settle in the wastewater treatment plant and decompose very slowly	collection and transfer to a suitable disposal site
8.	disinfectants	prevent the proper functioning of the WWTP	do not use
9.	large quantities of detergents	prevent the proper functioning of the WWTP	do not use
10.	medicines (especially antibiotics)	prevent the proper functioning of the WWTP	collection and transfer to a suitable disposal site
11.	cleaning agents with the exception of chlorine-free preparations	prevent the proper functioning of the WWTP	do not use
12.	pesticides	prevent the proper functioning of the WWTP	do not use
13.	used cooking oils	clog the sewerage system, settle in the wastewater treatment plant and cause odour nuisance	collection and transfer to a suitable disposal site
14.	food leftovers	they clog up the sewerage system, settle in the wastewater treatment plant and degrade very slowly	collection and transfer to a suitable disposal site
15.	condensate from condensing boiler	kills bacteria	separate tank
16.	water treatment plant washings	kills bacteria	separate tank
17.	phytosanitary products	prevent the proper functioning of the WWTP	collection and transfer to a suitable disposal site
18.	ordinary toilet cubes	prevent the proper functioning of the WWTP	do not use
19.	water disinfectants, photochemicals and other chemical preparation	prevent the proper functioning of the WWTP	do not use

4.2. Preliminary clarifier operation.

Operational activities in the operation of the primary settling tank consist of:

- Visually check the raw sewage inlet to the settling tank to ensure that it is not clogged. If necessary, use cleaning by washing with pressurised water or pulling out thick impurities with suitable tools.
- visually check that the wastewater is not piling up in the primary clarifier and in the inlet deflectors to the aeration chamber. If necessary, cleaning of the deflectors should be done with pressurised water or a long stick.
- visual inspection of the surface scum size (surface scum thickness). Surface scum, if any, should not be thick. When surface scum appears and odour becomes oppressive, 0,2 - 0,4 kg of lime mixed with 10 litres of water should be added to the sedimentation tank. If this does not solve the problem, sediment should be disposed from the preliminary sedimentation tank.
- periodical sediment disposal to the waste disposal facility, e.g. to the wastewater treatment plant with a technological line for the sediment treatment. The sediment disposal is carried out after the inspection of the accumulated sediment level in the preliminary sedimentation tank.

If the sludge level (counting from the raw sewage surface) is less than 40 cm, it is necessary to empty the chamber – see drawing.



EXPLANATION:

— wastewater level;

— sediment level;

h $h \geq 40\text{cm}$

1 – preliminary clarifier

2 – aeration chamber

3 – secondary clarifier



Note!

The sediment level must not be less than 40 cm under the raw wastewater surface in the preliminary sedimentation tank (first chamber from the inlet).

All activities connected with the sediment disposal should be carried out by the persons properly trained with regard to the occupational health and safety (minimum 2 persons) or by the installation contractor.

The preliminary clarifier should be emptied during the dry period, i.e. not after a period of intensive precipitation and not after snowmelt when the ground is waterlogged. The settling tank chamber should not be emptied to the bottom, leaving about 40 cm of excess effluent. Sludge from the bottom and dross from the surface of the settling tank should be removed. The settling chamber should be flooded with water or sewage immediately after emptying.

Emptying the chamber and leaving it empty during a rainfall event may cause the tank to be crushed, so after emptying it, the chamber should be immediately flooded with water to equalise the stress. Under no circumstances should anyone enter the settling tank or inhale the vapours produced in it. Checks should be carried out twice a week. Any abnormalities in the functioning of the settling tank that are noticed must be removed immediately, but under all health and safety conditions.

4.3. Operation of aeration chamber.

The maintenance activities with the operation of the aeration chamber include:

- control of the aeration performance and wastewater mixing. In case of the lack of aeration the actions should be undertaken to determine the reason. For this purpose, call the service or properly trained person,
- control of the recirculation performance,
- after several years of the operation the diffuser membrane may require to be washed. This operation should be carried out by the installation contractor,
- when needed, control of the settleability of active sediment collected from the chamber. This control includes collecting active sediment by means of a proper vessel (bucket suspended by the string) from the aeration chamber, pouring to the 1000ml cylinder and reading the amount of sediment after 0,5 h. Additionally, pay attention to above-sediment liquid. The amount of sediment should be within 250 – 450ml/1000ml. When serving, e.g. 4-5 persons, the amount of sediment may be within 150 – 300ml/1000ml. The settleability test should be commissioned to the qualified company (e.g. installation contractor) depending on the needs, i.e. mainly when the quality of treated wastewater becomes worse or the interruptions in the wastewater treatment plant operation appear.



All activities should be carried out by the persons properly trained, among other things, with regard to the occupational health and safety, or a appropriate company.

Wastewater must not be removed from the aeration chamber. It should be filled with wastewater all the time. Do not, under any circumstances, enter the aeration chamber or inhale vapours produced inside the chamber.

Checks should be carried out twice a week. Any abnormalities in the operation of the settling tank that are noticed must be rectified immediately, but under all health and safety conditions. Aeration failure must be rectified within a few hours (12-24 hours). A longer period without

aeration causes the activated sludge to start to rot. This forces a restart of the treatment plant, and the compacted sludge has to be (via the secondary settling tank and the mammoth pump for excess sludge discharge) pumped back to the primary settling tank and 0.5kg of lime mixed with water added. Table 4 indicates abnormalities in the operation of the chamber (or sludge) and how to rectify them. If necessary, contact DELFIN, an Authorised Installer or a wastewater treatment specialist.

4.4. Operation of secondary sedimentation tank.

The maintenance activities with the operation of the secondary sedimentation tank include:

- visual assessment of treated wastewater (treatment quality).
- visual inspection of the operation of mammoth pumps disposing sediment to the preliminary sedimentation tank and recirculating it to the aeration chamber. When the pumps are not switched on, control activities should be undertaken to determine the reason. The pump or time controller may be failed, the tubes or valves may be clogged. Only a properly trained person (e.g. worker of the company installing the wastewater treatment plant) can determine the failure reason.
- visual inspection of the inlet overflow to the aeration chamber and secondary sedimentation tank, and, when needed, its cleaning. The cleaning may include washing with water under pressure or by means of proper tools.
- inspection of the outlet overflow and, when needed, its cleaning. The cleaning should be executed with water under pressure.
- visually inspect the surface of the settling tank. This is because dross may appear. This dross, if it occurs at all, should not be thick. It should be broken up by stirring with e.g. pressurised water or a stick. The dross may be the result of nitrogen transformation and is not indicative of faulty operation of the treatment plant.
- basic activities that should be undertaken to improve the secondary sedimentation tank operation are presented in Table 4.



Note!

All activities should be carried out by the persons (minimum 2 persons) properly trained (among other things, with regard to the occupational health and safety) or by the service. Wastewater must not be removed from the secondary sedimentation tank. It should be filled with wastewater all the time (for constructional reasons).

Do not, under any circumstances, enter the sedimentation tank or inhale vapours produced inside the tank.

The failure of recirculating pumps in secondary sedimentation tank causes the breakdown of the whole wastewater treatment plant, i.e. the wastewater treatment process cannot be conducted without the sediment recirculation. The failure should be removed without delay.

4.5. Operation of control cabinet, control system, blower, valves.



④ Control cabinet

The maintenance activities with the operation of the control cabinet include the control of operational correctness of the appliances located inside the cabinet and the visual inspection of possible downflows, leaks, moisture accumulation. When such symptoms are noted, contact the installation contractor.

④ Control system

The maintenance activities with the operation of the control cabinet include the control of operational correctness of the appliances located inside the cabinet and the visual inspection of possible downflows, leaks, moisture accumulation. When such symptoms are noted, contact the installation contractor.

④ Blower

If a blower malfunctions and the time controls are working correctly, replace the broken blower with a new one or repair the damaged blower as soon as possible. A treatment plant without a blower will not operate. Have the cause of blower failure diagnosed by a suitably trained employee or service technician.

Service of the blower consists in periodical cleaning of the air filter. To do this, unscrew the screw on the blower cover, remove it and clean the filter.

4.6. Recirculation and excessive sediment.

The failure of the recirculation causes the breakdown of the whole wastewater treatment plant, i.e. the whole treatment process. Excessive sediment is automatically discharged by the control system. In case of doubts concerning the volume of discharged excessive sediment, contact DELFIN or a wastewater treatment expert.

4.7. Operation of individually designed object.

➤ Sewage pumping station

The operation of the pump station should be described by its manufacturer.

➤ Polishing lagoon

The operation of the polishing lagoon should be described by the contractor or lagoon designer. DELFIN leaves the designers themselves to decide on the selection of the appropriate lagoon

➤ Ventilation

A description in the further part of the manual – Section 4.8.

4.8. Operation of wastewater treatment plant ventilation system

The ventilation of the treatment plant must be checked by a competent person (company) with certification. The gravity plant will require a different inspection, a different one with a dynamic-wind fan and a different one with a mechanical fan. After commissioning (approx. 2 months), it is recommended to check the level of hydrogen sulphide, methane and ammonia in the treatment plant tank. Follow-up testing is recommended every 2 years.

Visually check every month (when inspecting the settling tanks, aeration chamber) whether, for example, the effluent inlet or effluent outlet pipe is clogged – if the effluent is piling up and reducing the possibility of ventilation.

When oppressive odours appear, first of all, call the installation contractor to determine the reason. If it is caused by the badly operating ventilation system, the reason should be removed.

The following items should be checked:

- ventilation – whether the tube is not clogged,
- preliminary sedimentation tank (pH) and add lime (0,5kg mixed with water) when needed, aeration in the aeration chamber,
- correctness of the recirculation and excessive sediment discharge (i.e. the operation of the pumps),
- surface of the secondary and preliminary sedimentation tank – whether there is large surface scum in them.



Warning! Do not go near ventilation inlets and outlets with open fire.

4.9. List of hydraulic and electric appliances.

Tab. General list of hydraulic and electric appliances*.

No.	Appliance	TYPE
1	Blower	HP40/HP60
2	Mammoth pumps	PM 2"
3	Pipe diffuser	GJ RT 32 / 1000
4	Controller	Monoblock

*DELFIN reserves the right to change equipment specified in the table.

5. PERIODIC TESTING OF WASTEWATER.

5.1. Treated waste water samples.

When operating a wastewater treatment plant, there are two basic documents to be kept in mind, which determine the frequency of sampling of treated wastewater, the quality of the wastewater and the location of the sampling:

1. The Water Law Permit (if required), which records, among other things, the specific parameters of the treated effluent, its quantity and other detailed provisions.
2. Regulation by the appropriate Ministry for the country.
3. **Delfin has an own laboratory so that it can perform wastewater analyses for BOD5, COD, Zog, Nog, Pog and much more.**

6. DIAGNOSIS OF BASIC ABNORMALITIES.

Tab 4. Diagnosis of deficiencies and how to rectify them.

Observation point	Noted irregularities	Possible reason	Recommended solution
Preliminary sedimentation tank	Large surface scum.	Low pH, intensive acid fermentation.	Increase the frequency of the sediment disposal from the sedimentation tank, increase wastewater pH adding lime mixed with water, breaking surface scum with water under pressure.
		The sedimentation tank filled with sediment.	Dispose surface scum and sediment.
	Wastewater accumulation and the clogged wastewater inlet in the overflow.	Discharge of large contamination.	Remove contamination, clean the inlet with water under pressure.
	To the aeration chamber.	The tank filled with sediment.	Dispose sediment
	Oppressive odour and surface scum.	Acid fermentation – low pH.	Call a person or company authorised to service the box to find the reason.
	Oppressive odour.	Blocked ventilation.	Call a person or company authorised to service the box to find the reason
Aeration chamber	Small amount of light gray scum.	Correct process.	Do not undertake any activities.
	Dark scum, black (dark) sediment, black chamber.	Too little oxygen in the chamber..	Increase aeration in the chamber, opening the valves ZP1 – ZP4 completely (if they were closed), or increase the working time of two blowers simultaneously, properly setting the time switches up.
	Light sediment, partially scattered, white rigid scum.	Young sediment, high load.	Reduce the discharge of excessive sediment.
	Dark, shining, rigid scum.	Low load of the chamber.	Increase the discharge of excessive sediment.
	Swollen sediment, low pH.	Growth of filamentous bacteria and fungi, rotten wastewater, discharge of wastewater other than household wastewater.	increase pH adding lime mixed with water, increase aeration or, finally, replace active sediment and start the wastewater treatment plant up again.
	Sediment dispersed, sediment settles slowly in the cylinder.	Presence of toxic substances in wastewater.	Eliminate the reason, i.e. stop discharging such substances, reduce the sediment disposal, call a wastewater treatment expert to determine further activities.
	Other.		Call a wastewater treatment expert to determine further activities.

Observation point	Noted irregularities	Possible reason	Recommended solution
Secondary sedimentation tank	Sediment does not settle correctly – too ‘much’ sediment.	The aeration chamber does not operate correctly.	See instructions in the boxes concerning the aeration chamber.
	Sediment lifting on the surface, above-sediment liquid is clear.	Denitrification in the sedimentation tank (especially, if sediment is raised up in the cylinder after about 1,5 – 2,5 h of sedimentation).	Increase the discharge of excessive sediment
			Reducing the amount of air supplied to the aeration chamber by changing the settings on the controller.
			Increase the recirculation.
		Sediment rotting.	Increase the sediment recirculation, increase the discharge of excessive sediment.
			Increase or reduce the recirculation, check its performance, clear the pressure tube when clogged.
	Treated effluent cloudy, poor sedimentation.	Recirculation defect.	Increase the discharge of excessive sediment.
		Sedimentation tank overload.	Call a wastewater treatment expert to determine next steps.
Control cabinet	Other.	Incorrect operation of the aeration chamber.	Too little or too much oxygen, improper concentration of active sediment, aeration chamber overload, improper recirculation.
			Call a wastewater treatment expert to determine further activities.
Ventilation	Oppressive odour outside the treatment plant in its direct vicinity.	Activation of fuses, failure of time switches, failure of contactors, no power supply.	Call a person or company authorised to service the box to find the reason.
		Inefficient ventilation system, clogged ventilation tube.	Remove the reason of clogging, install a new fan or repair the existing fan.
		Bad aeration.	Remove the reason of bad aeration (failure of the blower, failure of the diffuser, clogged tube) – service.
		Too much sediment or surface scum in the preliminary sedimentation tank.	Dispose sediment and surface scum.
		Surface scum in the secondary sedimentation tank.	Stir surface scum with a pole to go under.

In case of other irregularities or difficulties in solving problems specified in the table contact the installation contractor, DELFIN or the other company render services covering the wastewater treatment plants

7. OPERATION MANUAL FOR THE CONTROLLER.

7.1. Device parameters:

MONOBLOC CONTROLLER UNIT 1.10	
Voltage Supply	230 V AC 50Hz
Power consumption in standby mode	1.5 W
Maximum blower power	150 VA
IP rating	IP54 / IP65 (opcja)
Operation temperature	- 25°C do + 50°C
Alarm output	Dioda led 3 kolorowa
Clock	RTC with battery backup
Protection of the controller and output circuits	3A fuse
Surge protection	275 V AC
Valve terminal	Refer to the operating instructions of the manufacturer of the domestic treatment plant. Each controller may differ in the colour of the connectors, their number and purpose, as well as their cross-section. 1 – Valve terminal air supply maximum 150 l/min 500 mBar. 2 – sludger circulation pneumatic pump – white, 3 – excessive sludger circulation pneumatic pump – green, 4 – aeration – yellow,

7.2. Safety instructions.



WARNING!

Both the power circuit and output circuits are working under controller tension 230 V AC.

In this instruction, the name of the controller determines the main control box together with connected to him external electrical circuits.

During commissioning and operation, follow the instructions in this manual.

Prior to installation, repair or maintenance, as well as during any connection works, please disconnect the mains supply and make sure that terminals and electric wires are not live

Installation and maintenance controller can be performed only by qualified personnel with the necessary knowledge and electric powers required by law. Modification of controller parameters should be performed only by persons / companies with the appropriate certificate Automatic System Control.

Controller should be connected to the grid in accordance with current regulations and standards for electrical installations, in particular those relating to fire protection.

Controller cannot be using contrary to the destiny. The controller is not an intrinsically safe device, i.e. in the event of a fault it may be the source of a spark or high temperature, which in an environment of flammable gases or dust may cause a fire or explosion. For this reason, the controller must be isolated from flammable gases and dust, e.g. by suitable enclosure.

Use only in treatment plants constructed in accordance with current regulations.

Under no circumstances attempt to make design modifications to the controller.

Keep children away to the controller. Violation of labels or seals driver or socket is equivalent to a loss of warranty

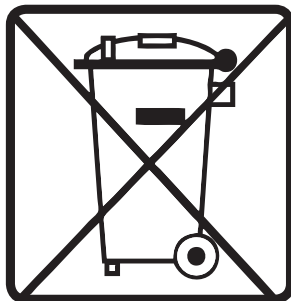
7.3 Device disposal.

According to the regulations DIRECTIVE 2002 / 96 / EC on the disposal of electronic waste and the laws in force in the Member State of the Union, the removal / disposal of this product and its electrical / electronic accessories with household waste is strictly prohibited. The owner of the equipment is responsible for the proper disposal of used equipment. They must be returned to the special points.

Dispose of packaging and product at the end of its useful life at a suitable recycling company.

Do not dispose of the product together with normal waste

Do not burn the product.



ATTENTION !!! before replacing the fuse, unplug the control unit from the mains!
OVERVOLTAGE PROTECTION OP1

User must remember that the overvoltage protection is not designed to protect the controller against overvoltage in the mains (protection of electronics and other components), but only against possible consequences of the overvoltage! once the protection has been triggered, the controller is not suitable for further operation and poses a danger to life and property!

7.4. SETTINGS IN THE MENU.

NOMINAL MODE

On the main screen is displayed:

- current time,
- mode and cycle treatment,
- breakdown and service states.

The menu move using the keyboard consisting of:



Increases values



Decreases value



Moves the menu to the previous view



Moves to the next menu view



It is used to enter into the menu, approval, or change data



Will enter the menu / exit the menu / sub-menu



Clears some failures

Each click is signalled by a short beep. If the screen remains in the menu without user intervention, it automatically exits the menu after 10 min, returning to the main window without saving the changes made. The LCD backlight runs for 2 minutes after each click. The controller performs an initialisation of the consumers at least once a day, i.e. checks the status and connection of the blower and valves and carries out an internal simulation of the correctness of the electronics. Each entry of a value or parameter in the service menu is signalled by flashing the parameter/value to be changed. Changes made in the service menu are always saved when exiting the service menu with the message „DATA RECORDED PLEASE WAIT“. The alarm signalling, when activated, only signals failures between 8:00 and 20:00. By pressing the „R“ button, the external signalling will be muted for 24 hours if there is still a problem. The controller has a summer/winter time change function. Note that if current measurement is off, the controller will not detect disconnection or damage to the blower and valves. When operating the system with current measurement switched off and the blower disconnected or damaged, there is a risk

of damage to the valve terminal. The measurement is carried out every 5 seconds.

The MONOBLOC controller has an energy-saving valve terminal, i.e. energy is consumed at the moment of opening/closing the relevant section. If the controller is equipped with a level sensor, it switches between operating modes. If there is no sensor, the start-up and holiday mode are activated from the menu item. The holiday and start-up modes switch off automatically after a suitable period of time. The manufacturer of the controller does not provide a password for the service menu, this can only be done by the manufacturer of the wastewater treatment plant. When changing the parameters in the service menu, it is important to remember and bear in mind that they affect the operation of the entire wastewater treatment process and the overall operation of the plant. Changes need to be made prudently and thoughtfully make changes.

7.5 Display layout.

GG:MMDD/MM/RRRR DELFIN Sp. z o.o.	The display during normal operation, displays the time , the cycle and the mode of operation of the plant. Also displays fault and services.
SET DATE DD/MM/RRRR	To change the time, press OK and enter the correct date using the buttons   during setting, confirming the data with OK
SET TIME GG:MM	To change the time, press OK and enter the correct time using the buttons   during setting, confirming the data with OK
MANUAL MODE	To enter the submenu for manual mode press OK and with  or  to select the receiver and activate / deactivate it by pressing OK , to exit the submenu, press the MENU
HOLIDAY MODE DEACTIVATED	To switch holiday mode on or off, press OK , then the message will start flashing. Use   to set the mode and confirm with the OK
SERVICE MENU	Tab for service technician, press OK , to enter a password using   and confirm the code OK . The controller manufacturer does not provide a password for the service menu. The password can only be made available by the manufacturer of the treatment plant.

MONOBLOCK CONTROLLER

7.6 Signal light message tables.

History of events	POSSIBLE CAUSE	SOLUTION
NO EVENTS		
FUSE FAILURE	Power surge 230V AC, short circuit in control or output circuit of blower or valves.	Fuse replacement (3A value).
BLOWER POWER	Blower disconnected or current defective.	Check blower for correct operation, reset error with „R“ button.
POWER FAILURE	No power supply for the controller 230V AC 50Hz.	Check the 230V AC supply line to the controller.
POWER RETURN		
RECEIVER CURRENT	A device other than a blower approved by the manufacturer has been connected to the blower socket.	The warranty on the controller is lost.

LED COLOR	EVENT HISTORY	POSSIBLE CAUSE	SOLUTION
Lights 	NO EVENTS		
Flashes 	BLOWER POWER	Blower disconnected or faulty current supply	Check the blower for correct operation
Does not light up 	POWER FAILURE	No power supply to control unit 230V AC 50Hz	Check the 230V AC supply line to the controller
lights 	POWER RETURN		

SYMPTOM	CAUSE
Black top line of the display	- moisture in the controller processor
The driver does not start	- blown 3A fuse, - no 230V AC power supply, - pulled internal plug connecting the circuit boards.
Blower and/or valves not working	- faulty 3A fuse, - faulty relay of the respective receiver, - burnt-out printed circuit board tracks, - faulty receivers.
Damaged Varistor OP1 below the controller, blown fuse controller off	- overvoltage in the mains 230V AC, loss of guarantee.
The display shows strange characters, bad contrast characters	- the controller is damp due to poorly plugged holes or a badly screwed housing. There is a risk of rotting from toxic fumes from the WWTP.
The controller displays a strange date for example: 35:68 55/15/2098	- moist system for real-time, - faulty or discharged battery 3V.

7.7 Connection of the device and service start-up.

Connection must be performed by a person entitled. The device must be connected according to the instructions with the principles of health and safety. Mains switchgear must have current protection to prevent shock and short-circuit protection. The end of the electrical installation is to be completed hermetic socket 230 V AC 50 Hz with rated current of not less than 6A.

The procedure during installation:

- dig a hole for the control cabinet,
- route all pressure and electrical lines through the base of the control cabinet, leaving a small margin, and feed them in using glands,
- backfill the cupboard to half its height,
- secure the 230 V AC power cable terminating in a 230 V AC socket to the controller support structure with cable ties and connect the 230 V AC plug from the controller,
- connect the pressure hoses to the appropriate pressure clamps,
- once you are sure that the connections are correct, carry out a basic electrical measurement and write it down in the protocol,
- switch on the controller and carry out the commissioning. If everything is correct and all consumers are working properly, draw up an as-built protocol,
- the manufacturer is not legally or financially responsible for the correctness and quality of the connection of the control cabinet installation and the controller.

7.8 Maintenance and inspection of the controller.

Inspection of the MONOBLOC 1.10 controller must be carried out at least once every 12 months. During inspection and maintenance, the following are to be checked:

Date of inspection / name of inspector	Correct functioning of valves [tight / leaky]	condition of electrical / pneumatic system [good/poor]	counter status „BLOWER SERVICE“ [.....h]	counter status „CONTROLLER“ [..... h]

8. INFORMATION ON H&S, FIRE SAFETY.

When operating the sewage treatment plant, the regulations arising from the Decree of the Ministry responsible for the country on health and safety at sewage treatment plants should be observed.

During the wastewater treatment process - mainly in the sludge basin - poisonous and flammable gases (fermentation products) are produced. Their concentration cannot be allowed to be high, so the treatment plant must have efficient gravitational and, in some cases, mechanical ventilation. Mechanical ventilation will be decided by a study after the plant has been commissioned and worked on.



Smoking and the use of open fire is strictly prohibited in the sewage treatment plant area. Caution should be exercised when operating any of the facilities (pumping station, settling tanks, aeration chamber, sludge tank) or manholes. Open manholes and ventilate the facilities and manholes for at least 15 minutes. It is necessary to test the electrical installation once a year. The treatment plant should be equipped with a powder or snow extinguisher.

The hazards connected with the wastewater treatment plant include:

- ⌚ presence of gases: e.g. hydrogen sulphide and methane may cause poisoning or an explosion (especially it applies to the sediment tank and preliminary sedimentation tank),
- ⌚ presence of ammonia (fermentation) may cause undesired reactions from the respiratory system,
- ⌚ reduction of oxygen amount in the tanks may cause fainting or even strangulation,
- ⌚ biologically active material – variety of microorganisms, including pathogenic or potentially pathogenic microorganisms, in wastewater, sediment and vapours – aerosols getting out from individual objects, may cause communicable diseases,
- ⌚ possibility of cutting and soiling the wounds creates a high risk of the development of all infections,
- ⌚ electric appliances improperly connected and operated may create a risk of electric shock,
- ⌚ emptying the tanks from wastewater or water may cause their crushing – the tanks should be filled with water or wastewater all the time.

Necessary precautions and safety measures:

1. The wastewater treatment plant appliances (objects) should not be accessible to unauthorised persons!
2. All covers („manholes”) should be duly protected (closed) from opening by the unauthorised persons, especially the children.
3. Maintenance, cleaning and wastewater sampling activities should be carried out by two persons.
4. Smoking and using open fire in the vicinity of the wastewater treatment plant is strictly forbidden.
5. While opening the covers of the tanks (objects) and sumps, do not inhale gases escaping from them – possibility of fainting. The tanks and sewage system should be ventilated for 15 minutes at least before starting controlling and supervising activities.

6. All works connected with the removal of defects arisen in the wastewater treatment plant should be commissioned to the qualified persons or companies.
7. Entering the wastewater treatment plant objects (sedimentation tanks, aeration chamber) is forbidden due to the risk of gas poisoning, drowning and because of the construction of the tanks (when they are empty).
8. All agents and materials used for the maintenance of the wastewater treatment plant should be applied and stored according to the manufacturers' recommendations.
9. Containers and other things used for the maintenance of the wastewater treatment plant, e.g. sampling tools and other objects coming into contact with wastewater, should be disinfected, washed and stored out of the reach of unauthorised persons.
10. Persons with damaged skin of hands and other unprotected parts of the body should not come in contact with wastewater or have a waterproof dressing.
11. Thick rubber gloves, covering forearms, and protective glasses should be used while operating the wastewater treatment plant, i.e. during the controls, inspections, wastewater sampling, biopreparation dosing etc.
12. Thoroughly wash your hands with liquid disinfecting soap, rinse and dry with disposable towel after every contact with wastewater.

9. NOTES ON FIRE PROTECTION.

In the wastewater treatment process – mainly in the sediment tank – toxic and flammable gases are produced (fermentation products). You must not allow their concentration to be high therefore the wastewater treatment plant must have the efficient gravity ventilation and, in some cases, the mechanical ventilation as well. The tests performed after the wastewater treatment plant start-up and running-in period determine whether the mechanical ventilation is necessary.

Smoking and using open fire within the wastewater treatment plant area is strictly forbidden. Caution is needed when starting maintaining any of the following objects (pump station, sedimentation tanks, aeration chamber, sediment tank) or sewage sumps. Open manholes and ventilate the objects and sumps for 15 minutes at least. The tests of the electric installation must be performed once a year. The wastewater treatment plant should be equipped with a dry-powder or carbon dioxide extinguisher.

10. INSPECTION AND SERVICE SCHEDULE.

APPLIANCE NAME	Every 3 days	Every 9 - 12 months
Preliminary sedimentation tank	(1)	(3)
Aeration chamber	(1)	
Secondary sedimentation tank	(1) +(2)	
Recirculation	(1)	
Ventilation	*depending on individual solutions of ventilation system	
Control cabinet	(1)	

EXPLANATION:

- (1) – visual inspection of appliance operation,
- (2) – visual inspection of treated wastewater,
- (3) – disposal of sediment from the preliminary sedimentation tank

11. INSPECTION AND SERVICE SHEET OF DELFIN PRO*.

Installation date Start-up date

No.	Date	Observations / Tests	Undertaken activities	Signature
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

* To be filled up by the user

12. WASTEWATER AMOUNT – WATER CONSUMPTION SHEET.

Water meter readings.

YEAR

No.	Month	Wastewater amount	Notes	Signature
1.	January			
2.	February			
3.	March			
4.	April			
5.	May			
6.	June			
7.	July			
8.	August			
9.	September			
10.	October			
11.	November			
12.	December			

13. WARRANTY TERMS.

Thank you for purchasing the wastewater treatment plant from a rich offer of DELFIN. We believe that it meets your expectations and ensures comfort in use. We guarantee an efficient operation of the appliances in accordance with the technical and maintenance conditions specified in this Manual.

DELFIN PRO wastewater treatment plants are covered by a warranty of correct functioning according to the technical and maintenance specification for the period of:

- 10 years from the date of purchase (all elements of the appliance made of polyethylene);
- other equipment included in the treatment plant unit, including the control cabinet, is subject to a warranty under the terms and conditions specified by the manufacturer of the relevant equipment;

The warranty covers physical defects of the appliances, i.e. material or installation defects.

1. The warranty service will be rendered only after the submission of correctly completed Warranty Certificate, along with an original proof of purchase.
2. The warrantor is not liable for an improper selection of the appliance for the needs and use contrary to the recommendations.
3. This warranty for the sold consumer product does not exclude, limit or suspend the Purchaser's rights resulting from the Act of 27 July 2002 (Journal of Laws, No. 141, item 1176, as amended).
4. The warranty covers only DELFIN's products, purchased in Poland from DELFIN SP. z o.o., DELFIN Authorised Partners or Vendors supplied by DELFIN.
5. The conditions for the effectiveness of the aforementioned warranty are:
 - a) installation according to the instructions and proper construction practices;
 - b) correct operation of the wastewater treatment plant:
 - according to the inspection and service schedule;
 - conducting the water consumption sheet;
 - c) documented removal of the content of the wastewater treatment plant once per 10 months or when needed;

- d) start-up of the wastewater treatment plant carried commissioning of the plant by the installer to check the correctness of the specified wastewater discharge parameters.
6. To benefit from the rights resulting from this warranty, the Purchaser must present:
 - a) correctly completed Warranty Certification, being an annex to these warranty terms;
 - b) original proof of purchase of the product;
 - c) latest invoice or document confirming the removal of sludge from the complaint wastewater treatment plant;
 - d) detailed description of the fault;
 - e) technical description of the wastewater treatment plant including ground and water conditions;
 - f) copy of the Water Consumption Card;
 - g) a copy of the record of warranty repairs at the wastewater treatment plant;
 - h) analyses of raw and treated wastewater carried out no earlier than 14 days prior to the date of the complaint;
 - i) in the event of a claim for treatment efficiency, analyses must be carried out in an accredited laboratory - 24-hour average samples.

Information necessary for settling a compliant notification properly, in particular, stating the compliance of the installation with the building documentation and the manufacturer's recommendations.

7. The warranty ensures a free replacement of spare parts according to the terms specified in this warranty as soon as possible.
8. The warranty does not cover:
 - a) products that have not been installed in accordance with the instructions described in the Operation Manual;
 - b) products whose Warranty Certificate includes traces of changes, damages or modifications;
 - c) damages resulting from:
 - use contrary to the purpose; changes and constructional modifications made by the user or third parties;
 - use of not original spare parts;
 - use of appliances without a required periodical inspection carried out by the installer;
 - use of accessories other than produced by DELFIN;
 - during the transport;
 - e) damages of appliances due to mechanical, thermal, chemical and other factors, caused by the user operation or resulting from the activities of the external forces;

- f) parts subject to natural wear because of their finished durability;
- g) products delivered without the completed Warranty Certificate within the warranty period.
- 9. The warrantor does not bear any costs connected with the product dismantling, excavating, re-installing and re-starting.
- 10. The defect should be notified to the Vendor in writing promptly after the defect is detected.
- 11. All defective products or parts that are replaced within the warranty become DELFIN's property.
- 12. The User has the right to replace the purchased appliance with defect-free one in case DELFIN states that an existing defect cannot be removed.
- 13. DELFIN and DELFIN Authorised Commercial Partners are not liable to the Purchaser for the loss, damage or destruction of the product resulting from the reasons other than the defects in the product.
- 14. The claims under the warranty terms do not cover the Purchaser's right to demand reimbursement of the profits lost or compensation for losses caused by the failure of the product.
- 15. DELFIN is not liable for an incorrect operation of the wastewater treatment plant or the failures due to the improper selection of the appliance caused by too low / high amount of wastewater discharge and because of throwing objects not biodegradable within a short period of time to the wastewater treatment plant system.
- 16. The Vendor's liability for the statutory warranty for physical defects of the product is excluded. u.

14. WARRANTY CARD.

MANUFACTURER	DELFIN Sp. z o.o. Chorzowska 22 25-852 Kielce Poland NIP 959-10-41-589 phone +48 41 27 83 555	
VENDOR	Vendor's signature and stamp	Date of sale
NAME OF PRODUCT		
MODEL		
FACTORY NUMBER		
INSTALLATION		
Installer's signature and stamp		Installation place and date
		Date of start-up
PURCHASER		
Purchaser's full name / name	Address (city, postcode, street, number)	
	e-mail	
	phone	
PURCHASER'S DECLARATION		
I declare that I have become acquainted with the WARRANTY TERMS. I have been informed about a safe use of the purchased appliance.		
City and date		Purchaser's signature

15. RECORDS OF WARRANTY REPAIRS.

Date of receipt	Description of the fault	Date of repair	Notes

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



Thank you for purchasing DELFIN PRO wastewater treatment plant.

DELFIN COMPANY

Delfin Sp. z o.o. is a leader on the market of wastewater treatment systems. Since 1993, i.e. the beginning of its operation, the company has been concentrating on the issues related to the protection of natural environment and water resources. The foundations for the operation have been laid by the cooperation with the French SEBICO group, one of the largest manufacturers of home wastewater treatment plant in Europe – from which Delfin has purchased a production technology. The company has its own laboratory used to analyse wastewater and control treatment processes. A focus on quality and innovative technology ensure that Delfin products are long life and reliable devices, meeting the expectations of single-family house occupants as well as hotel, boarding house, restaurant, petrol station and vehicle washer owners. The manufactured devices have the CE mark and meet the criteria of the following European harmonized standards: PN-EN 12566-1:2004/A1:2006 and PN-EN 12566-3:2007+A1:2009. In 2014 mechanical-biological wastewater treatment plant DELFIN PRO PREMIUM was awarded with TERAZ POLSKA title.

The company offers:

- ④ wastewater treatment plants for residential housing and public buildings;
- ④ hydrocarbon separators for gas stations, car washes, parking lots;
- ④ fat separators for hotels, restaurants, food plants;
- ④ rainwater storage tanks for saving water;
- ④ multimodule containers for industrial and agricultural solutions;
- ④ pumping stations.

More information: www.delfin-polska.pl



Delfin
Naturally...