Turley Klärmax Ideal Domestic Waste Water Treatment Plant

EN 12566-3, Annex B

Installation, Operation & Maintenance Information

Please read this manual before installing and putting the sewage treatment plant into operation. It also contains information on maintenance of the plant.

Turley Treatment Tanks

Contents

1.0 General Information

1.1 EC Declaration of Conformity

We hereby declare that the following fully biological small sewage treatment plants with separate dimensions in accordance with calculations for industrial wastewater complies with the basic requirements of:

DIN EN 12566-3, Appendix B. Small sewage treatment plants for up to 50 P.E.

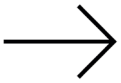
Tank Manufacturer: Turley Bros, 7 Corcreechy Road, Sheepbridge, Newry, Co Down, BT34 1LP

1.2 Signs and Symbols

The following symbols are used in the manual:

Caution
Failure to observe this point could result in material damage.

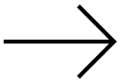
Danger
Failure to observe this point could result in personal injury.



Cross-reference
Refers to additional information in another chapter or manual.

Information
Provides useful information.

1.3 Hazard Warnings



Please read the warnings in the manual for the concrete tank and the short installation instructions in the appendix.

1.4 Preface

Dear Customer,

Congratulations on your purchase of a high-quality, innovative product.

In order to prevent any damage, you are required to read through this manual completely before putting the plant into operation or installing the plant.

We reserve the right to make changes to the technical specifications.

Please check the product on delivery for any signs of damage that may have occurred during transport. In this event, you must notify your supplier in writing immediately. Transport-damage cannot be claimed after the plant is installed or signed for.

1.5 Warranty

We refer you to the General Terms and Conditions of Turley Bros (www.turleybros.com), and to those of your supplier.

2.0 Product Description

2.1 Use

CAUTION

The small sewage treatment plant may only be used to treat household wastewater.
Different P.E. variants can be supplied.
Larger plants can be set up with multiple process lines.

2.2 Scope of Delivery

INFORMATION

The parts listed below are included as standard.
For larger plants (more than 1 tank) the connecting pipes between the chambers must be provided as part of the infrastructure (main sewer DN100) by the client. The same applies to the duct (drain pipe DN100) between the biological tank and the buffer / pre-chamber tank.

- Concrete tanks (number depends on plant version) number + size.
  See description on following pages.
- Kit (technical equipment) for biological tank.
  Preinstalled (two chamber).
- Control module, integrated into the service-shaft of the tank.
  Preinstalled

2.3 Standard Use

INFORMATION

For standard usage the technical equipment is delivered pre-installed in the concrete tanks ready for operation. Please observe the appropriate depths relating to frost protection.

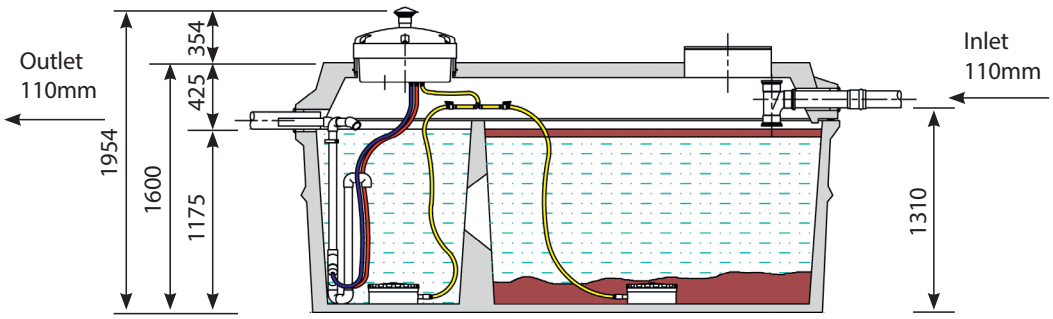
Access-shaft and service-shaft riser extensions are standard 15cm height

For other depths, please note them on order.

The risers [where required] for access-shaft (desludge) and the service-shaft (control module) need to be installed.

2.4 Tank Versions

There are 2 easily transportable versions for the small sewage treatment plant. Depending on the plant version (size) these can be combined with each other in different ways.



2.5 Plant Versions

INFORMATION

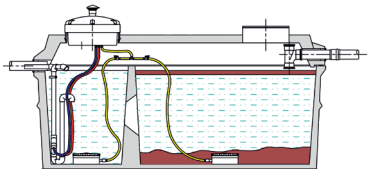
All standard plant versions are listed below. You can see which plant you have from the delivery documents and CE-plate.

CAUTION

Please make sure that the tanks are assigned correctly in order from inlet to outlet.

8 Person Plant

This small sewage treatment plant consists of 1 tank.
– 1 No. Precast Concrete Tank

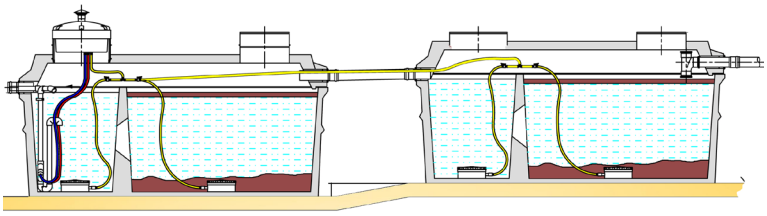


CAUTION

The hose and cable connections are inside the service-shaft of the tank.
For the option with external control module, the hose and cable connection exit from the tank.

16 Person Plant

This small sewage treatment plant consists of 2 precast concrete tanks
> hydraulically connected



CAUTION

The tanks must be hydraulically connected at specified positions.
Please follow instruction under point: 3.2 Tank connections
The hose and cable connection is inside the service-shaft of the tank.
For the option with external control module, the hose and cable connection exit from the tank.

3.0 Installation

3.1 Tank installation

Please refer to the manual for the tank and the short installation instructions in the appendix.

3.2 Tank Connections (for plants with multiple tanks)

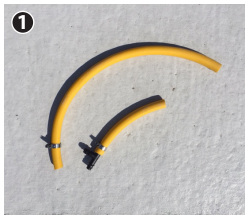
CAUTION

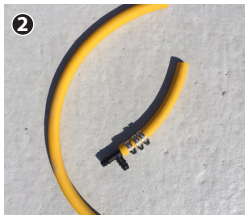
1. Bring the openings of 2 tanks together and install with DN100 pipes with min. length of 300mm through the rubber tank seals.
2. Push the tanks together. Each pipe should be equal in length inside of each tank. Make sure the seals remain watertight.
3. The air hose from the additional extra smaller tank needs to be inserted into the main tank and must be connected to its aeration system. **Please refer to detail instructions from point 3.3.**

3.3 Hose Adjustment (for plants with multiple tanks.)

INFORMATION

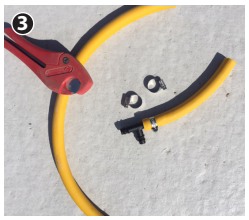
1. After putting the hose of the aeration system from the additional tank into the main tank, you need to adjust the hose connection in order for the aeration system of the additional tank to operate.
   The required material is pre-fixed on the hose.
2. Remove the three stainless steel hose clamps and the plastic distributor from the hose.
3. Cut off about 1 meter of the hose from the main tank.
4. Connect all three hoses to the plastic distributor and fix them with the stainless steel clamps.

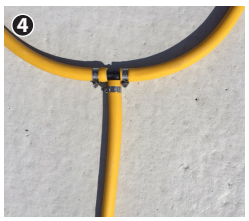




CAUTION

Important Note:
To supply enough air for all aeration discs, the blower chosen for the treatment plant has to be suitable for the equivalent P.E.-size.





3.4 Electrical Connection of the Control Module

INFORMATION

Additional access risers can be added to the top of the original cast-in risers to bring access up to grade (max recommended height 1.0m). Risers sections are available in 150mm increments and are fastened together with #10 x 38mm s/s screws. All screws must be installed in an alternate screw tightening pattern to ensure even pressure on the risers providing a watertight connection. The cable for power supply (recommended H07RNF-F3G1,5) has to be connected to the isolator inside the control module. The hoses then have to be connected according to their matching colours.

CAUTION

Make sure that there is no danger of damaging and/or breaking of the air-hoses while the control housing is removed.

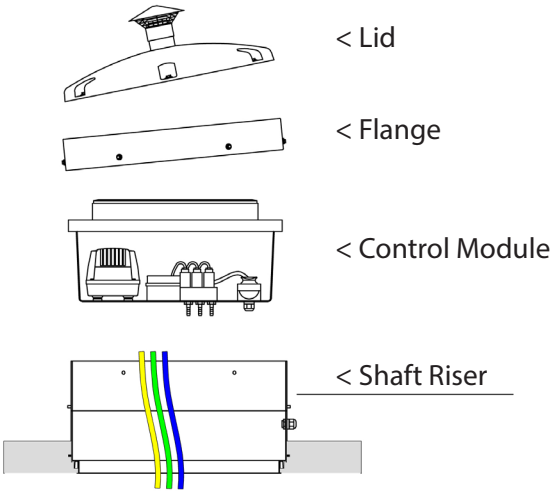
Removal of Control Module

INFORMATION

1-3. Loosen the bolts and remove lid.

4-6. Loosen the screws and remove flange.

7-9. Pull out control module housing and move sideways

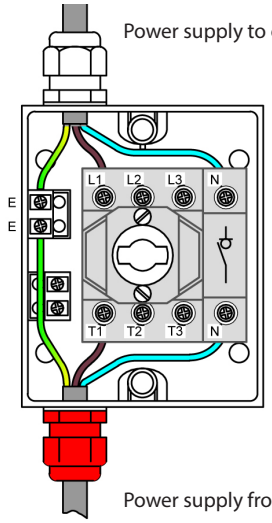


3.5 Installation of Air Hoses and Electrical Supply

CAUTION

1-4. Fit additional risers as per 3.4 on previous page and join 3 air hoses to base of control module housing according to the colour coding. Tighten pipe clamps.

Electrical Supply within the Control Module



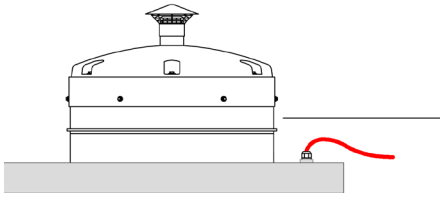
Mains electrical connection: Connect the cables as in the diagram.
Please note: always ensure that the mains supply has been suitably isolated before commencing installation.

5-6. Install power supply cable down through cable gland (red) on concrete tank lid and up out through risers. Insert cable through gland (red) in base of control module housing (allowing approx additional 1 metre of cable to allow removal of control module for future maintenance).

7-8. Remove isolator cover by loosening and removing two screws on cover. Install cable through gland (red) into isolator and connect cables as per diagram opposite. Reinstall cover on isolator, tighten all three glands (red) and reinstall control module as below.

Reassembling the Control Module

1. Insert the connected control module into shaft riser.
2. Place flange over control module and insert screws and tighten.
3. Refit lid, insert bolts and tighten down to ensure it is fully watertight.



Assembled Control Module, Flange and Lid (refer also to diagram on previous page)

4.0 Function Description

The plant works fully automatically according to the preinstalled program.

Purification phase – the wastewater is circulated in the SBR reactor using air fed in through the plate diffusers and the bacteria are supplied with oxygen. This occurs at intervals determined by the controller.

Settling phase – the wastewater separates, with the small solids and sludge material sinking (sedimentation) and the cleaned water remaining at the top (a layer of cleaned water develops).

Clearwater discharge – before the Clearwater extraction phase starts, the air powered discharge siphon is cleaned by a backflush airlift-function, to remove settled particles out of the siphon.

Clearwater extraction – following the settling phase, the clearwater siphon conveys the clearwater to the plant outlet, lowering the water level in the reactor.

The main states listed above are called the cycle. A complete purification cycle takes approximately 12 hours.

4.1 Program Sequence

After connection to the power supply, the control unit will work through to the following steps within a full cycle:

1. Continious aeration (yellow hose) – 1 hour
2. Sequenced aeration (15 min. on – 5 min. off) – 7 hours
3. Sequenced aeration (10 min. on – 10 min. off) – 2 hours, 40 min.
4. Settling (no aeration/) – 1 hour
5. Flushing of Clearwater siphon (green hose) – 1 min.
6. Pumping Clearwater(blue hose) – 19 min.

After the last step, the control unit will restart the program.
In the event of losing the power supply, the control unit will remember its phase (step) and will restart from that point when resuming power supply.

Important Note:
This program sequence only applies to the standard delivery.

5.0 Maintenance and Operation

5.1 Safety Guidelines

Flammable gases can develop in sewage treatment plants. In addition, oxygen levels can fall. For this reason, appropriate safety precautions must be taken when repair and maintenance work is being performed in the plant. A person may only climb into a sewage treatment plant if there is a second person present as a safeguard and they have all appropriate training and insurances required for the region.

All live electrical components in the plant must be switched off and isolated before working on the sewage treatment plant.

5.2 Operator Checks

The owner must operate the plant or must contract a third party to operate it (operator).

Daily check:
Perform function check. If there is any disruption in operation encountered, it must be resolved immediately by the operator or by a specially trained person instructed to do so by the operator.

Monthly check:
In accordance with the form for the monthly operator check

- Check the reactor for any blockages caused by large solids or other materials.
- Check for floating sludge in the reactor from unsuitable substances entering the plant, if present, remove it out of the system [licensed waste disposal company].
- Visual check for mechanical damage and to confirm fine bubbles present in aeration process

An operations logbook must be kept for all sewage treatment plants. For this, please make a copy of the maintenance checklist (form for the monthly operator check) found at the back of this manual. Any disruptions must be recorded in the operations logbook. Maintenance work, sludge extraction, maintenance reports and any other special incidents must also be recorded in the operations logbook. This operations logbook must be presented to the relevant authorities upon request.

5.3 Maintenance

Maintenance is performed several times a year by a maintenance company.
The relevant responsible authority prescribes how often maintenance must be performed.
The operator is free to choose the maintenance company.

The following work should be performed at least twice per year at intervals of around 6 months:

a. Function check for the mechanical, electrical and other plant equipment that is important for operations such as: blower, pump, control unit.

b. Maintenance/inspection of mechanical equipment

c. Adjustment of optimum operating values, e,g, oxygen supply (2 mg/l), sludge volume (300–500 ml/l).

d. Determination of the sludge level in the sludge storage tank and if necessary organisation of sludge removal when the sludge reaches c.20% of the water level in the sludge storage tank of separate tank.

e. Performance of general cleaning tasks, e.g.: removal of deposits and foreign bodies

f. inspection of the structural condition of the plant, e.g.: corrosion, accessibility, ventilation, screw connections, hoses.

g. The maintenance work performed must be recorded in the operations logbook.

The following tests must be performed in the course of maintenance:

Samples can only be taken from the outlet of an SBR treatment plant during the extraction pump process or from a separate sampling device.

a. Test of a random sample from the outlet for
- temperature
- pH-value
- settleable substances
- transparency
- BOD5 (at least every 2nd maintenance date)

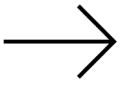
b. Tests in the activation tank:
- oxygen concentration
- proportion of sludge volume
- sludge index
- dry matter in the activated sludge

The results and the work performed must be recorded in the maintenance report.
The maintenance report must be submitted to the operator.
The operator must include the maintenance report in the operations logbook.
The maintenance report must be presented to the relevant authorities upon request.

Sludge removal has to be done in all tanks of the treatment plant.

6.0 What to do when Disruptions Occur

If you are unable to resolve the disruption on your own, please call your maintenance/ service company. You should do this immediately in order for the treatment plant to resume its function of wastewater purification.



Keep this operating manual and your sheet(s) of the monthly operation checks at hand to show them to the service company on demand.

7.1 What not to dispose of into the Plant

Solid or liquid substances that do not belong down the sink or in the toilet:	What they cause:	Where they belong:
Ash	Does not decompose	Dustbin
Sanitary towels	Choke the sewage treatment plant	Dustbin
Chemicals	Poisons wastewater	Collection points
Disinfectants	Kills bacteria	Do not use
Paints	Poisons wastewater	Collection points
Photographic chemicals	Poisons wastewater	Collection points
Frying fat	Forms deposits in pipe and results in blockages	Dustbin
Sour milk, cream	Forms deposit in the tank and disrupts the biological process	Dustbin
Plasters	Blocks pipes	Dustbin
Cat litter	Blocks pipes	Dustbin
Cigarette ends	Settle in the treatment plant	Dustbin
Condoms	Choke the sewage treatment plant	Dustbin
Corks	Settle in the treatment plant	Dustbin / Collection points
Varnishes	Poisons wastewater	Collection points
Medicines	Poisons wastewater	Collection points, Pharmacies
Engine oil	Poisons wastewater	Collection points, filling stations
Oil-based waste	Poisons wastewater	Collection points
Cotton swabs	Choke the sewage treatment plant	Dustbin
Plant protection substances	Poisons wastewater	Collection points
Brush cleaning fluid	Poisons wastewater	Collection points
Cleaning agent residues	Poisons wastewater	Collection points
Razor blades	Choke the sewage treatment plant, VerletzungsDanger	Dustbin
Drain cleaner	Poisons wastewater	Do not use
Pesticides	Poisons wastewater	Collection points
Panty liners, tampons	Choke the sewage treatment plant	Dustbin
Edible oil	Choke the sewage treatment plant	Dustbin
Food leftovers	Choke the sewage treatment plant	Dustbin
Wallpaper paste	Choke the sewage treatment plant	Collection points
Textiles (e.g. nylon stockings, cleaning rags, handkerchiefs)	Choke the sewage treatment plant	Old clothes collection, dustbin
Thinners/solvents	Poisons wastewater	Collection points
Bird sand	Choke the sewage treatment plant	Dustbin
WC rimblocks	Poisons wastewater	Do not use
Nappies	Choke the sewage treatment plant	Dustbin

7.2 Pre-printed Form for Monthly Operator Check

Date	Function check, Visual check		Remarks
	X for OK	**X** for not OK	

7.3 Installation and Commissioning Log

Order Number:	See Delivery Note
Serial Number:	See shield in the biology

Installer/Supplier: Stamp	Customer Name: Street, Number: Town, Post Code: Telephone:

Day of Installation:	
Plant Load Rating (pe):	
Number of Tanks:	

Pos		Yes	No
1	Tanks installed in accordance with the instruction manuals		
2	Instruction manuals handed over to customer		
3	Plant filled with water		
4	Water leakage test		
5	Test run performed		
6	Plant put into operation		
7	Instruction given to operator		
8	Owner's manual handed over		

Comments

The operator undertakes to remedy any defects listed above at his/her own expense. The operator was informed of his/her obligation to exercise due care in order to ensure a perfect operating condition. The proper operation of a sewage treatment plant can only be ensured with a valid maintenance agreement.

Installer, date, signature	Customer/operator, date, signature

7.4 Maintenance Report

Name of Operator:	Location of the Treatment Plant:
Manufacturer:	Size of Treatment Plant:
Number of Population Equivalents:	
Date of Maintenance:	Time:

Plant Section/Function:	Checked		Lack		Remark:
	Yes	No	Yes	No	
TANK					
Are the manhole covers in good shape?	☐	☐	☐	☐	
Are the influent and effluent pipes clean to guarantee an unimpeded floe?	☐	☐	☐	☐	
Does corrosion affect the plant?	☐	☐	☐	☐	
Does floating sludge occur?	☐	☐	☐	☐	
Is there a pump? Does it work?	☐	☐	☐	☐	
Are there any additional issues?	☐	☐	☐	☐	
SBR TREATMENT PLANT					
Influent to the reactor?	☐	☐	☐	☐	
Does the oxygenation process work?	☐	☐	☐	☐	
Volume of sewage sludge SV30?	☐	☐	☐	☐	SV30 = ml/l
Surplus sludge:	☐	☐	☐	☐	
Does the clearwater outlet work? Visible depth:	☐	☐	☐	☐	
Floating sludge:	☐	☐	☐	☐	
Are there additional issues?	☐	☐	☐	☐	

Treated wastewater Analysis

(parameters due to the prescription given by the appropriate authority)

Date of Sampling:		Date of Analysling:	
Time of Sampling:		Time of Analysling:	
Wastewater Temperature:	^{0}C	Organic Nitrogyn Norg:	mg/l
Smell:		Total Nitrogen Ntot	mg/l
Look:		Ammonium – Nitrogen NH4-N	mg/l
Colour:		Nitrite – Nitrogen NO2-N	mg/l
Settling Agents:	ml/l	Nitrate – Nitrogen NO3-N	mg/l
Chem. Oxygen Demand COD.	mg/l	Total Phosphorous Ptot	mg/l
Biol. Oxygen Demand BOD.	mg/l	pH Value:	
Acid Capacity.	mmol/l	Conductivity:	mS/cm
		Dissolved Oxygent	mg/l

Remarks:

Treatment Tanks is a trading name for Turley Bros' concrete waste water tanks.
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Turley Treatment Tanks