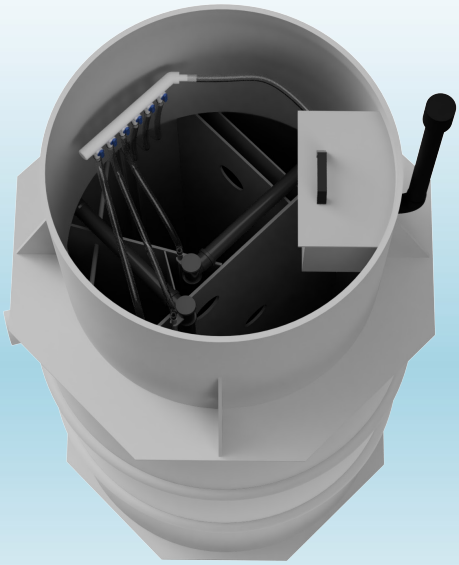
WASTEWATER TREATMENT PLANTS

PURA 4-50

TYPICAL SMALL WASTEWATER TREATMENT PLANTS
for up tp 50 PE
(capacity 0,6 – 7,5 m^3/d)



PLASTIC TECHNOLOGY

CONTENT

CE DECLARATION OF CONFORMITY

1. Product identification code:	PURA-4, PURA-6, PURA-9, PURA-12, PURA-15, PURA-20, PURA-25, PURA-30, PURA-35, PURA-40, PURA-45, PURA-50
2. European Standard:	EN 12566-3:2005+A2:2013 "Small wastewater treatment systems for up to 50 PT - Part 3: Packaged and/or site assembled domestic wastewater treatment plants"
3. Intended use of product:	Domestic wastewater treatment
4. Manufacturer:	PLASTIC TECHNOLOGY Perkūno g. 3, LT-14186 Avižieniai, Vilniaus r.
5. Authorized representative:	Not applicable
6. National system used for evaluation and verification of constancy of performance:	System 3
7. Name of accredited certification body:	UAB „Statybos produktų sertifikavimo centras" Nuotekų valymo įrenginių laboratorija

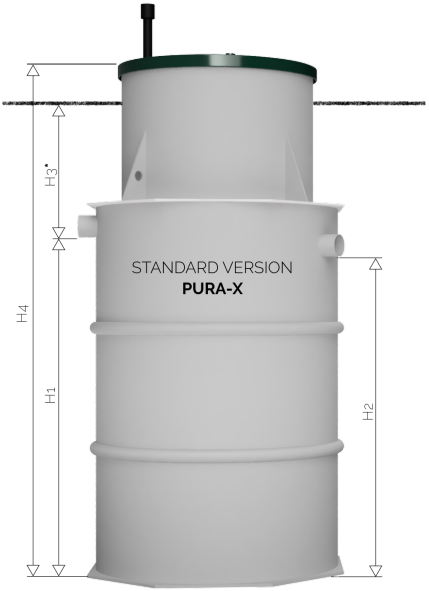
8. Information on regulated characteristics:

CHARACTERISTIC	APPLICABLE STANDARD	VALUE	PROTOCOL NO.
EFFECTIVENESS OF TREATMENT	EN 12566-3:2005+A2:2013, 6.3, 6.7 , Annex B	BOD_5 : **95,8** | **15,0** mg/l ChDS: **89,9** % | **69,3** mg/l SM: **92,7** % | **26,7** mg/l Nkj: **89,2** % | **4,79** mg/l Nb: **65,0** % | **16,9** mg/l P: **77,6** % | **1,52** mg/l NH_4-N: **92,0** % | **2,90** mg/l	SPSC protocol No. 1397-CPR-241/B
TREATMENT CAPACITY Nominal hydraulic daily flow | Nominal organic daily load BOD_5	EN 12566-3:2005+A2:2013	PURA-4: **0,60** m^3/d **0,24** kg/d PURA-6: **0,80** m^3/d **0,36** kg/d PURA-9: **1,35** m^3/d **0,54** kg/d PURA-12: **1,80** m^3/d **0,72** kg/d PURA-15: **2,25** m^3/d **0,90** kg/d PURA-20: **3,00** m^3/d **1,20** kg/d PURA-25: **3,75** m^3/d **1,50** kg/d PURA-30: **4,50** m^3/d **1,80** kg/d PURA-35: **5,25** m^3/d **2,10** kg/d PURA-40: **6,00** m^3/d **2,40** kg/d PURA-45: **6,75** m^3/d **2,70** kg/d PURA-50: **7,50** m^3/d **3,00** kg/d	
WATERTIGHTNESS Water test	EN 12566-3:2005+A2:2013, Anexx A, A.2	**Pass**	SPSC protocol No. 1397-CPR-244/A.2
CRUSHING RESISTANCE Pit test	EN 12566-3:2005+A2:2013, Annex C, C.6	**Pass** Wet conditions 3,45 m	SPSC protocol No. 1397-CPR-243/C.6
DURABILITY	6.5 p.	**Pass** Polypropylene PP-C: 0,91 kg/m3, 26 Mpa	SPSC protocol Np. 1397-CPR-243/C.6
RELEASE OF DANGEROUS SUBSTANCES	EN12566-3:2005+A2:2013	**NPD**	

CE

OVERVIEW

The PURA wastewater treatment systems (WWTP) are designed for domestic wastewater treatment. Industrial or other wastewater types can only be treated if their characteristics are similar to those of domestic wastewater. WWTP containers come with two lid options: a standard version with an integrated blower and a version with a smaller lid and a separate blower tank.



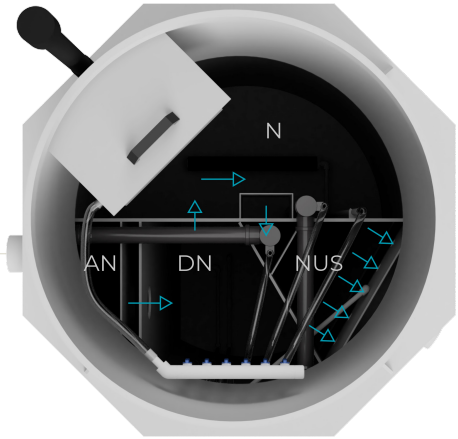
WWTP	CAPACITY	TANK DIAMETER	LID DIAMETER	H1	H2	H3*	H4	BLOWER CAPACITY	POWER	WEIGHT
	m³/d	mm	mm	mm	mm	mm	mm	l/min	W	kg
PURA-4	0,60	1200	1000	1350	1250	750	2200	60	41	120
PURA-4-MD	0,60	1200	750	1350	1250	700-900	2050	60	41	120
PURA-6	0,80	1200	1000	1650	1550	750	2500	60	41	150
PURA-6-MD	0,80	1200	750	1650	1550	700-900	2350	60	41	150
PURA-9	1,35	1400	1000	1850	1750	750	2700	82	73	210
PURA-9-MD	1,35	1400	750	1850	1750	700-900	2600	82	73	210
PURA-12	1,80	1600	1000	1800	1700	750	2700	108	99	250
PURA-15	2,25	1800	1500	1800	1700	750	2700	108	99	310
PURA-20	3,00	2000	1500	2000	1900	750	2950	125	128	400
PURA-25	3,75	2250	1500	2000	1900	750	2950	150	130	490
PURA-30	4,50	2450	1500	2000	1900	800	3000	200	200	555
PURA-35	5,25	2600	1500	2100	2000	800	3100	200	200	595
PURA-40	6,00	2750	1500	2100	2000	900	3200	216	198	640
PURA-45	6,75	2900	1500	2100	2000	900	3200	250	256	680
PURA-50	7,50	3000	1500	2200	2100	900	3200	250	256	710

*Stadart inlet pipe depth. Extensions are available (max depth of the inlet pipe is -1,5 m)
**Blower unit ventilation pipe can be extended further from WWTP (up tp 3 m)

PRINCIPLE OF OPERATION

PURA wastewater treatment plant is divided into four chambers:

1. Anaerobic chamber (AN)
2. Denitrification chamber (DN)
3. Nitrification (aeration) chamber (N)
4. Secondary sedimentation chamber (NUS)



In the first **anaerobic (AN)** chamber, during the oxidation of organic pollutants under anaerobic conditions, the activated sludge is able to convert phosphorus compounds into soluble polyphosphates, which, under aerobic conditions during aeration in the nitrification chamber are used by bacteria as an energy source. Therefore, phosphorus is absorbed into the cells of microorganisms and its concentration in treated wastewater decreases. To ensure the required concentration of acticated sludge in AN chamber Circulation sludge is returned from Secondary sedimentaion chanber by Air-lift. In order to homogenize the sludge mixture and maintain it in a suspended state, this chamber is also equipped with sludge mixing with the help of compressed air.

In the second - **denitrification (DN)** chamber nitrates dissolved in the sludge mixture are decomposed into nitrogen gas (denitrification), because nitrate oxygen is used instead of dissolved oxygen in the metabolism of denitrifying bacteria. Activated sludge is returner from N chamber by Air-lift. In order to homogenize the sludge mixture and maintain it in a suspended state, this chamber is also equipped with sludge mixing pipes by compessed air.

In the third - **nitrification (N)** chamber organic pollutants (and biogenic substances) are removed from domestic wastewater using the vital activity of microorganisms. This chamber serves to reduce BOD and COD and transfer nitrogen from ammonium (NH_4) to nitrites (NO_2) and then to nitrates (NO_3). Compressed air is supplied to the nitrification tank through a tube diffuser located at the bottom.

From the nitrification (N) chamber the mixture of sludge and sewage enters the **secondary sedimention chamber (NUS)**, in which the sludge is separated from the treated wastewater and settles in the conical part of the sedimentator. NUS chamber is equipped with a treated wastewater collection unit with a central sludge mixture feed pipe, which ensures that pollutants do not enter the effluent. An air-lift is installed in this chamber to return activated sludge to the anaerobic chamber.

The operation of all air-lifts installed in the device is regulated manually by ball-valves.

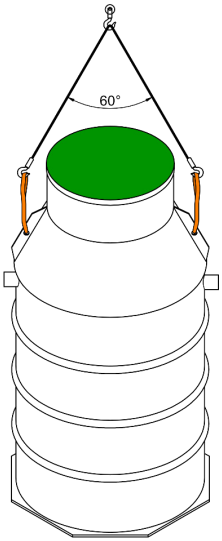
TRANSPORTATION

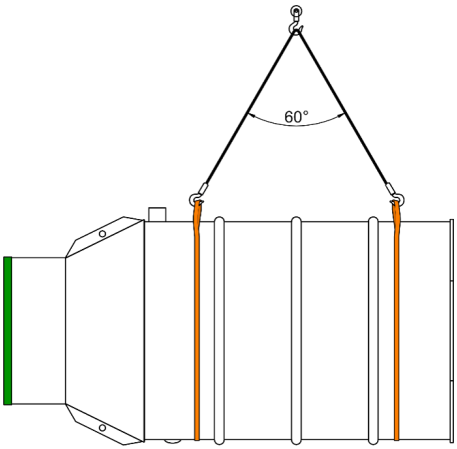
When transporting polypropylene-made equipment, it is crucial to avoid mechanical damage. Units should not be transported on sharp objects and must be secured on a flat base with straps.

LIFTING

Lifting equipment used for loading and unloading WWTP's must be bigger capacity than the weight of the specific product. Sling hooks are attached to the device's mounting loops or straps that encircle the plastic container. In order not to break or crush the device, the angle from the hook between the slings must not exceed 60° and it is necessary to ensure that the weight of the device on the straps is distributed evenly. Do not lift the container by wrapping it with cables or chains.

LIFTING STRAPS OR CHAINS CAN NOT CONTACT THE PLASTIC CONTAINER HATCH AND LID **!!!**





1. A hole is excavated for installation of the device. If the groundwater level is below the bottom of the pit, a layer of compacted gravel is prepared at the bottom. In case of high groundwater level, **a concrete anchoring plate must be installed**. The thickness and reinforcement of the concrete plate is evaluated according to the maximum possible height of the groundwater and the weight of the empty WWTP container (the total weight of the plate, the device and the soil on the protruding edge of the slab must be greater than the lifting force of the groundwater). The length and width of the plate is at least 300 mm greater than the dimensions of the device's capacity housing. The anchoring plate is installed on a smooth 300 mm thick compacted sand sub-layer (compaction at least 95% of natural density). It is also possible to use factory concrete manhole bottoms or building concrete slabs of sufficient size.

2. WWTP **container is lowered into an excavated pit** using lifting straps hooked via mounting loops. Check Inlet and Outlet pipes position.

3. If the groundwater level is above the bottom of the container, **WWTP is anchored to the concrete plate**. The bottom of the device is attached to the concrete base with stainless steel anchor bolts (holes for anchoring are prepared in the bottom).

4. WWTP is buried. The space between the edges of the pit and container is manually filled with a 0.3 - 0.5 m layer of sand-gravel mix, which is compacted with a soil compactor. After the soil has been compacted, a layer of 0.3 - 0.5 m of filler is poured again and compacted again. The final pouring is done manually. Soil compaction is necessary at this stage.

IMPORTANT Container must be gradually filled with water paralel to backfilling of the WWTP

Requirements for the filler: the filler must be clean, free-flowing, it must not contain ice, snow, clay, large and heavy objects that could damage the plastic container during backfilling. Minimum density of thr filler - 1500 kg/m^3 (sand, gravel or sand-gravel mixtures can be used).

INSTALATION UNDER THE DRIVEWAY

If WWTP has to be installend under the roadway, a concrete plate of must be made over the tank. Plate thickness must be at least 150 mm, outer dimensions - at least 300 mm larger than the dimensions of the container. The thickness of ground layer above the container must be at least 500 mm.

START-UP CALIBRATION

After installation of WWTP, it is necessary to carry out start-up and calibration. After calibration procedure WWTP should achieve it's designated treatment efficiency and meet the requirements of normative documents. The duration of start-up and adjustment works until WWTP is set and achieves the required treatment efficiency should not take longer than four months. Technological adjustment works can be extended or postponed for a period of up to two months if the daytime air temperature drops below +10°C and at night below 0°C.

WWTP's start-up and calibration and also periodic maintenance can be performed only by qualified employees. When operating a wastewater treatment plant, it is necessary to comply with general safety and health requirements. The electrical part of the devices can be regulated only by a person who has the appropriate qualifications and must comply with the requirements specified in the instructions.

START-UP AND CALIBRATION PROCEDURES

1. Hydraulic capacity test.

After installing the device, it is necessary to make sure that WWTP container is watertight. Watertightness is checked by performing a hydraulic capacity test:

- The tank is filled with clean water;
- The water level is marked with a mark;
- Water is retained for 24 hours;
- No signs of leakage shall appear throughout the hydraulic test of the unit.

2. Starting the blower.

After starting the blower, it is necessary to adjust the blower work-pause cycle with the help of the time relay. With the help of a portable oximeter, adjust the oxygen concentration during blower operation and pause within 2-4 mg O_2 /l. This means that the blower will work until the oxygen concentration in the nitrification (aeration) chamber reaches 4.0 mg O_2 /l, and during the pause it will drop to 2.0 mg O_2 /l. At the end of the start-up-adjustment period, the oxygen concentration maintained in the nitrification (aeration) (N) chamber is reduced to 1-2 mg O_2 /l. During the operation of the blower, the concentration of oxygen in the denitrification (DN) chamber must not exceed 0.5 mg O_2 /l, and there must be no oxygen at all in the anaerobic (AN) chamber.

3. Adjustment of air manifold.

The intensity of the supplied air to air-lifts and mixing pipes is adjusted with the help of manual valves.

• **Circulation sludge air-lift for pumping sludge from NUS to AN chamber**:

Hourly flow of the sludge mix returned by air-lift to AN chamber has to be equal to raw wastewater coming to WWTP hourly flow (RC = 1). Air flow supplied to Circulation sludge air-lift is adjusted by Valve **No. 4**.

• **Nitrified sludge air-lift for pumping sludge mix from N to DN chamber:**

Hourly flow of the sludge mix returned to DN chamber by air-lift has to be equal 300 - 400 % of raw wastewater coming to WWTP hourly flow (RC = 3 - 4). Air flow supplied to Nitrified sludge air-lift is adjusted by Valve **No. 5**.

• Chambers mixing with air:

Coarse aeration mixer (mixing pipes) are used in AN and DN chambers to homogenize sludge mixture. The air flow to the mixers is adjusted manually by Valves **No. 1** and **No. 2**. The homogeneity of the sludge mixture is determined by taking 3-5 sludge samples during mixing and determining the sludge volume in a 1-liter measuring cylinder after 30 min of sludge settling.

• Floating sludge removal:

Valve **No. 3** is used to adjust blowing intensity of the floating sludge removal pipe (blowing off the floating sludge).

•Aeration intensity:

Valve **No. 6** is used to adjust the amount of air supplied to the aeration system (tube diffusor). Amount of compressed air supplied to tube diffuser must be adjusted to the amount that ensures oxygen concentration in Nitrification (N) chamber equal to ~2,0 mg/l.

4. Activated sludge delivery.

It is recommended that activated sludge from efficiently functioning WWTPs should be poured to newly started WWTP. The best time to deliver acticted sludge is 3-4 days after the start of wastewater inlet to WWTP. The imported sludge has to be poured into the nitrification (N) chamber. The concentration of activated sludge in the device after bringing the sludge must be 0.2 - 0.5 g/l.

IMPORTANT The volume index of imported sludge cannot exceed 150 ml/g.

5. Filling operation register.

During the period of start-up and calibration of the WWTP it is necessary to monitor the operation of the equipment, eliminate all revealed deficiencies, adjust the main operational parameters, and determine the optimal service mode of the WWTP.

During the start-up-adjustment period, all inspections, comments and performed works must be recorded in the Operation register. It also records the temperature of the wastewater, the volume concentration of the activated sludge after 30 min. of sedimentation, the color of sediment, sludge, smell of effluent, transparency and all possible malfunctions and comments of the WWTP.

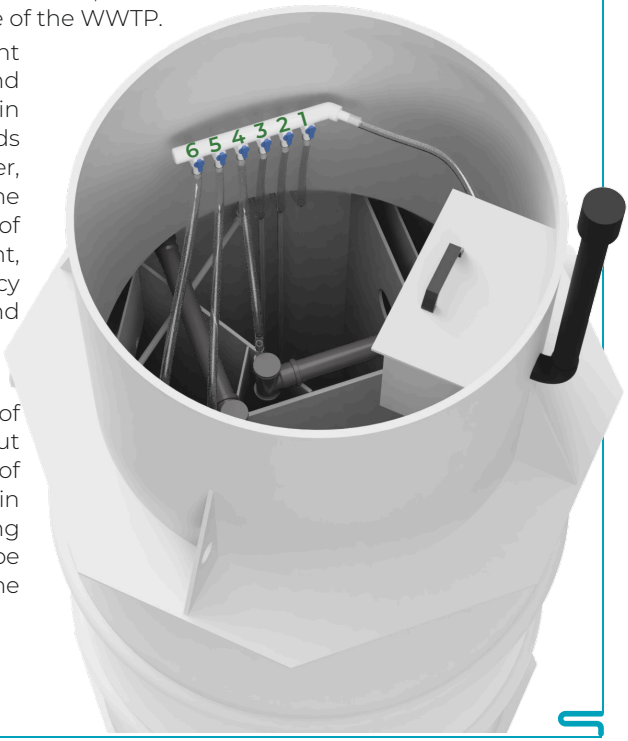
6. Laboratory analysis of samples.

Inspections and laboratory analysis of wastewater must be carried out during the start-up and calybration of the WWTP. Sampling is carried out in accordance with the sampling methodology - Samples has to be taken from the flowing current at the designated sampling points.

WWTP is set when the effluent samples results correspond to the designated treatment efficiency.

VALVES:

1 – AN chamber mixing
2 – DN chamber mixing
3 – Floating sludge removal
4 – Circulation sludge air-lift
5 - Nitrified sludge air-lift
6 - Aeration system valve



OPERATION AND MAINTENANCE

The normal operation of the WWTP begins after the complete elimination of all essential defects revealed during the set-up and calibration and after specifying the main operating parameters and determining the optimal mode of individual devices and the entire complex.

The WWTP has to be tidy and constantly supplied with materials and instruments necessary for operation.

NOT ALLOWED WHILE USING WWTP

It is stricly prohibited to pour to wastewater system substances dangerous to WWTP and the devices after it (such as gravel filters, underground infiltration fields, etc.). Pouring prohibited substances can disrupt normal operation of the WWTP and connected devices or even stop it completely, flood basements and other rooms.

It is not allowed to throw paper napkins, hygiene packages, cigarette buts, fats, oils, kithchen paper towels, etc. to the toilet or sinks. Chemicals that could contaminate soil, groundwater or open water bodies (such as paint, varnishes, battery acids, thinners, used lubricants, unusable medicines, photo thinners, pesticides and other toxic substances) also cannot be poured into wastewater systems.

Aggressive chemicals can also strongly influence the vital functions of microorganisms at the WWTP. If large amounts of chemicals enter the wastewater treatment plant, it may malfunction, as such substances are harmful to bacteria.

Wastewater that is not allowed to PURA WWTP:

- When ChDS/SO_4^{2-} concetration rate in wastewater is <10;
- When Cl- ion concentration in wastewater is higher than 800 mg/l;
- When oil/fat in wastewater is higher than 50 mg/l;
- When wastewater has high concentrations of heavy metals and cyanides;
- Only wastewater with pH between 6,5 - 8,5 is allowed.

WWTP PROBELMS AND SOLUTIONS

PARAMETER	RANGE	INFLUENCING FACTORS	SOLUTION
Total nitrogen (N_{tot}) is insufficiently removed	> 20 mg/l	Insufficient nitrification - denitrification	Maintain oxygen O2 concentration: • in Nitrification chamber – O_2 = 2 g/l, • in Denitrification chamber – O_2 < 0,5 mg/l. If nitrate concentration in treated wastewater NO_3>2 mg/l, reduce O_2 concentration in nitrification (N) chamber to 1-2 mg/l.
Total phosphorus (P_{tot}) is insufficiently removed	> 4 mg/l	Insufficient decomposition of phosphorus in anaerobic (AN) chamber.	The amount of nitrates in the circulating activated sludge must not exceed 2 mg/l. Increase the flow of Circulation sludge air-lift. Check homogeneity of the sludge mixture in the anaerobic (AN) chamber.
BOD is not sufficiently removed	BOD_5 > 20 mg/l	Insufficient decomposition of organic pollutants by microorganisms in activated sludge.	Check the age of activated sludge according to aerated and total (12/20d). The oxygen concentration in the nitrification chamber should be 2 - 4 mg/l.
Suspended solids (SS) concentration in treated wastewater is too high	SS > 20 mg/l	Insufficient sludge settling in the secondary sedimentation chamber (NUS)	Check the maximum flow rate of supplied wastewater (compare it with designated max value at wet conditions $Q_{h.max}$). Check the age of activated sludge according to aerated and total (12/20d). The oxygen concentration in the nitrification chamber should be 2 - 4 mg/l.
The overall efficiency of WWTP is insufficient	< 90%	Prohibited substances comes to WWTP with wastewater	WASTEWATER NOT ALLOWED to WWTP: • when ChDS/SO_4^{2-} rate is <10; • when Cl- ion concentration is >800 mg/l; • when oil/fat amount is >50 mg/l; • when heavy metals and cyanides concentration is hight; • when pH is not in the range of 6,5 - 8,5.
Floating sludge is above norms	Should not occur	The potential amount of filamentous bacteria in activated sludge depends on: • O_2 concentration is too low during nitrification (<1 mg/l); • low F/M ratio (BOD/SS in Nitrification (N) chamber); • high S_2- content in wastewater; • when pH<6.5; • when NO_3- concentration is 8-10 mg/l in NUS chamber	Disinfection of activated sludge with active chlorine is possible, dosing 2 - 6 kg Cl2 /1000kg SS. Check whether the concentration of nitrates in treated wastewater does not exceed 8 mg/l.

PERIODIC MAINTENANCE OPERATIONS

We recommend entrusting periodic maintenance of the WWTP only to specialists who know their job. The list of partners recommended by the manufacturer is constantly updated and is available at **www.plastictchnology.lt**

Once in 2 weeks:

- Check the blower and aeration system (whether the blower is turned on, whether it is not hot, whether there is no vibration, whether the sound has not increased);
- Ensure that all pipes are not blocked;
- Check the treated water collection device in the NUS chamber of WWTP;
- Visually check the quality of treated wastewater;
- Check the quality of the activated sludge in the reactor by measuring the sludge volume after 30 min of sedimentation (usually the sludge volume should be between 200 and 400 ml/l).

Once a month:

- Check the condition of the electrical installation;
- Check all Air-lifts and clean them if necessary;
- Check the settled sludge level (the hight of clear water between the water level in the WWTP and the maximum settled sludge level in the NUS chamber must be at least 0.5 m) and ensure the removal of excess sludge (at least once every six months, but once every two months is recommended);
- Check Secondary sedimentation (NUS) chamber if it does not contain floating sludge that could enter the treated wastewater collection device. If you notice accumulated floating sludge use a pump to remove it;
- Check the activated sludge index, because it is necessary to maintain the appropriate concentration of activated sludge in the reactor.

Activated sludge index is determined as follows:

Take a sample of activated sludge, mix it well and pour it into a 1000 ml cylinder (after 30 minutes of sedimentation write down the settled activated sludge level in %). The sludge index is calculated according to the formula:

$$I = V.\ \frac{10}{a},\ cm^3/g$$

V – volume of activated sludge after 30 min of settling;
a – concentration of dry substances of activated sludge, g/l. The design calculated load of WWTP is 5,0 g/l.

After determining the Activated sludge index, it can be compared with theoretical data:

- index of well-settled sludge is 40 - 120 ml/g;
- index of moderately settled sludge 120 - 180 ml/g;
- index of poorly settled sludge 180 - 400 ml/g.

The size of the activated sludge index depends on the load of the activated sludge, the oxygen regime in the water, the concentration of toxic substances, pH and temperature of the wastewater, as well as the activity of enzymes (they act as catalysts).

Once a year:

Perform professional WWTP maintenance works. During maintenance, the WWTP must be switched off and it must be ensured that it does not start up during the work.

Laboratory analysis of samples

It is necessary to regularly take wastewater effluent samples for laboratory testing. It ensures effective control of WWTP operation and effectiveness. Samples for testing are taken from the flowing stream at the sampling points in accordance with the sampling methodology.

MAINTENANCE WORKS

In order to ensure an effective WWTP performance according ro requirements of normative documents, WWTP must be serviced at least 1-2 times a year. The optimal service mode of the device is determined during start-up and calybration.

Operations of maintenance:

- Open the WWTP's lid and evaluate the performance of the treatment plant;
- Turn off the blower and wait 30 minutes;
- Pump out the excess activated sludge from the secondary sedimentation chamber leaving 20% of the sludge in it;
- Clean the blower filters and, if necessary, perform other operation according to blower operation rules;
- Correct all other malfuncions observed during operation;
- Record all performed work in the WWTP Operation register;
- Removed sludge must be utilized accordingly to law standars.

WORK SAFETY RULES

When performing maintenance works it is necessary to comply with work safety requirements based on the "Safety rules for water management works DT3-99". The personnel must be properly qualified and instructed and certified in accordance with the provisions of safety at work and must undergo health checks in accordance with the procedure established by the Ministry of Health Protection at least once every two years.

Individuals at least 18 years of age who have a doctor's permit to work and the necessary qualifications and a document-certificate confirming this can work on their own. Personnel must be certified for work in wells, chambers and other underground facilities and in static, closed containers.

OPERATION REGISTER

To evaluate the work of the WWTPand have history data an operation register must be filled.

It records the inspection date, wastewater temperature, volume concentration of activated sludge after 30 min of settling, sludge color, smell in the treatment plant, transparency of the effluent and other malfunctions and comments of the equipment.

Suggested form of operation register:

DATE	COMPANY DATA (that performed the works or inspection)		COMPLETED WORKS (list and describe performed operations)	NOTES AND COMMENTS (submit all notes)
	TITLE OF COMPANY	RESPONSIBLE EMPLOEE (Name, Surname and Signature)		

2 (two) years warranty is provided for the electrical part of the devices. Installation work must be carried out in compliance with the requirements of the EĮĮT and following the instructions provided by the factory. If the work is performed improperly, the warranty does not apply.

10 (ten) years warranty is provided for the capacities of the devices. Construction-installation works must be carried out in accordance with the Building regulations and Instructions provided in this document. If the construction-installation works are performed without complying with these requirements, the warranty does not apply.

The work quality of the facilities and the quality indicators of the treated wastewater will meet the requirements if:
- appropriate device type and capacity is selected and applied;
- actual flow of incoming wastewater and contamination correspond to the design indicators;
- WWTP is properly installed and operated according to approved operating rules.

The above-mentioned guarantees do not apply, if after the date of signing the act of transfer-acceptance of WWTP the following changes are made:
- the technological scheme of the WWTP and/or the type of technological equipment;
- the main characteristics of the electrical part of the device.

All these changes must be coordinated with manufacturer - Plastic Technology UAB.

If the Buyer is notified of a defect during the warranty period, the Seller coordinates with the Buyer the schedule of warranty work within 5 working days at the latest. If the Seller agrees with the Buyer's claims regarding the defect and agrees to eliminate the defect within the agreed period, the Buyer does not have the right to hire third parties to eliminate the defect.
If the Seller does not remove the defect within the agreed period, the Buyer has the right to do so at his own expense, and the Seller undertakes to compensate the repair costs according to the reasonable invoices provided by the Buyer.

PLASTIC TECHNOLOGY

WWTP identification	
Serial No.	
Weight	
Blower	
Serial No. of the blower	
Selling date	
Installation adress	

info@plastech.lt I +370 699 97741 I Perkūno g. 3, Avižieniai, Vilniaus r., LT-14186

CE